Boskalis
Dredging & Marine Experts

# PROJECT SHEET

**LIBYAN GAS TRANSMISSION SYSTEM**
GELA, ITALY & MELLITAH, LIBYA

## BOSKALIS OFFSHORE: SKILLS, RESOURCES, EXPERIENCE

Boskalis Offshore brings together the offshore skills, resources and experience of Royal Boskalis Westminster nv. The offshore capabilities of Boskalis include seabed rectification works for pipeline/cable and platform installation, construction of pipeline shore approaches and landfalls, offshore mineral mining, offshore supply and support services and decommissioning services.

Boskalis provides clients with tailored, project-specific solutions for above dredge related offshore services, as illustrated by the following project summary.

## LIBYAN GAS TRANSMISSION SYSTEM

project West Libya aims to enhance its position in the supply of continental Europe's energy needs. As the demand for cleaner energy is rising and gas consumption in Italy is expected to increase, Libya and Italy have found common ground for cooperation. Construction of a 700 million USD gas treatment plant in Mellitah is the centrepiece of this West Libya gas project. The Mellitah plant is supplied with gas from the desert Wafa field, 520 kilometres south-west of Tripoli, and from the offshore Bahr Essalam field, 110 kilometres north of Tripoli. The Libyan Gas Transmission System Project, also called the Green Stream project, comprises the installation of a 32-inch gas pipeline across the Mediterranean Sea, approximately 516 kilometres long, from Mellitah landfall to Gela landfall at Sicily, Italy.

The client is Green Stream, a joint venture between Agip Gas and the Libyan National Oil

## FEATURES

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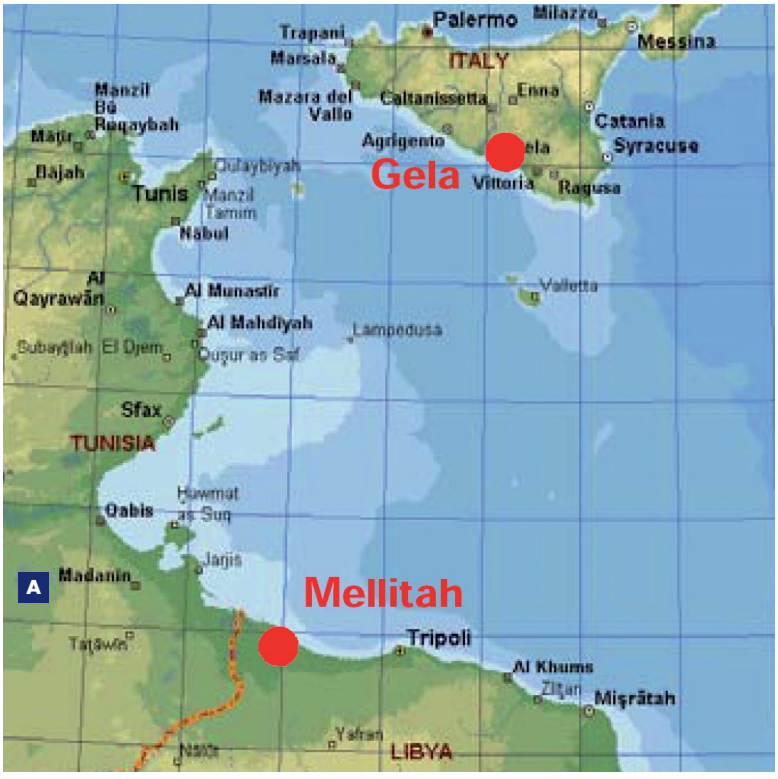
|---|---|
| Client | Green Stream (Agip Gas & Libyan National Oil Company) |
| Location | Gela, Italy & Mellitah, Libya |
| Period | 2003-2004 |
| Main contractor | Saipem S.p.A. |
| Contractor | Boskalis Offshore - Tideway J.V. |




**A** Location map
**B** Landfall at Gela, Italy
**C** Landfall at Mellitah, Libya


Company; the main contractor is Saipem S.p.A., who have also been contracted for the installation of the offshore twin pipeline from Bahr Essalam gas field to the Mellitah plant.

Boskalis Offshore bv, in joint venture with Tideway bv, has executed the shore approach and landfall works. These included trench excavation (onshore and offshore), installation of pull arrangements, assistance during pipe pull and backfill (rock and sand) of the trenches.

## LANDFALL AT MELLITAH, LIBYA

At the Libyan side of the Mediterranean Sea, a 1.9-kilometre long trench has been dredged, which accommodated three pipelines: the outgoing 32-inch trunk line to Sicily and the two incoming pipelines (36 and 10 inch) with dehydrated gas and stabilised condensate from the Bahr Essalam offshore field - formerly known as NC 41. The trench was dredged with Backhoe "Ambiorix" and Cutter Suction Dredger "Taurus". The trench bottom width was 15 metres and the minimum depth 2.1 metres. Particular works were offshore seabed levelling, in this case 'peak shaving', which took about four days with "Taurus", and the design and construction of a causeway. The causeway provided access to dry earthmoving equipment for nearshore trench dredging works and minimised trench siltation prior to pipeline installation.

Upon installation of a linear winch, the cable drums, anchor moles and the messenger wire, the pipelines were pulled from Saipem's lay barge "Crawler" in about two weeks. Thereafter the trench was backfilled, for protection purposes, with 40- to 70-millimetre gravel/rock from local quarries, to a level of at least 1.5 metres above pipe. On top of that, sand was placed up to original seabed level. The works were completed by early January 2004.

## LANDFALL AT GELA, SICILY

At the Sicily landfall a 750-metres long trench was dredged to a minimum depth of 3.5 metres. The trench bottom was 10 metres wide to accommodate a second 32-inch pipeline.

The works, in water depths up to 12 metres, took place with employment of the self-propelled Crane Barge "Fioravante" and the Trailing Suction Hopper Dredger "Vlaanderen I". The dredged sand was transported to two stockpiles in de vicinity of the trench. A 180-metres long sheet-piled cofferdam was designed and installed in the surf zone and dune area in order to give safe access for dry excavation equipment and to minimise trench siltation.

Assistance was provided to Saipem during the pipe pull, from their lay barge "Castoro 6" towards the shore. The pull itself took approximately two weeks.

Immediately after the pipe pulls, backfilling commenced. The trench was backfilled with gravel/rock (same 40- to 70- millimetres), to a minimum level of 1.5 metres above pipe. The remainder was backfilled with the stockpiled sand up to the original seabed level. The works at Gela were finished early December 2003.





**D** Landfall at Gela, Italy
**E** Landfall at Mellitah, Libya
**F** CSD "Taurus"
**G** Backhoe "Ambiorix"

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