



NEW ENERGY  
FOR ITALY

# Terminale GNL Adriatico Srl

**T**erminale GNL Adriatico Srl is the company that has designed, built and will operate the LNG receiving Terminal located offshore of Porto Levante, in the northern Adriatic Sea.

The company was established in 2005 by **Qatar Terminal Limited**, a world leader in LNG export, **ExxonMobil Italiana Gas**, an affiliate of ExxonMobil - the world's largest publicly traded energy company and **Edison**, a leading player in the Italian energy market.



The Terminal has a regasification capacity of 8 billion cubic meters per year, approximately equal to 10% of the country's entire gas consumption.

## THE TERMINAL Strategic

The Adriatic LNG Terminal is the **first offshore Gravity Based Structure (GBS) in the world** for unloading, storage and regasification of liquefied natural gas (LNG).

Full operational capacity of this new plant, strategic for Italy's energy supply, will be achieved in 2009. It is located offshore of Porto Levante, in the province of Rovigo, about 15 kilometers off the Veneto coastline.

It has a regasification capacity of 8 billion cubic meters per year, approximately equal to 10% of the country's entire gas consumption.

Eighty percent of this capacity will be utilized by Edison for a period of 25 years, to regasify LNG imported from Qatar, a new energy supplier for Italy, while the remaining 20% will be open for third party access, on the basis of the procedures defined by the

relevant authorities. The plant is included in the list of the "strategic works for the modernization and development of the country".

The Italian Electric and Gas Energy Authority and the Competition and Market Monitoring Authority have described the project as an "essential factor for the improvement of competitiveness in the Italian natural gas market"

# THE TERMINAL Innovative

The offshore Terminal is designed around a large concrete structure, which houses two LNG tanks, and includes a regasification plant and facilities for mooring and unloading LNG vessels. The facilities are connected to the national network of gas distribution by a new pipeline.

## COMPONENTS

- The concrete Gravity Based Structure (GBS) is resting on the sea floor in a water depth of approximately 29 meters.
- Inside the GBS are **two LNG storage tanks**, each with a capacity of 125,000 cubic meters, made of steel with 9% nickel to provide cold temperature performance, designed using ExxonMobil patented modular technology.
- On the top of the GBS is the **regasification plant**, with cryogenic pumps, compressors, LNG vaporizers and **auxiliary facilities** such as the power generation module with gas turbines.
- The Terminal also includes **facilities for mooring and**

**unloading LNG vessels**, designed and built to safely accommodate a variety of LNG carrier sizes, even during severe sea and weather conditions.

- The structure also includes **living quarters**, which house the operating and maintenance staff who attend the operations 24 hours a day.
- The final installed facility is 375 meters long, 115 meters wide and the main deck is 18m above the sea level, with the top of the flare tower rising 87 meters above sea level.

## PIPELINE

A 30-inch diameter pipeline, constructed by Snamprogetti for Adriatic LNG, will transport gas from the terminal 15 kilometers offshore, then through another 25 km onshore, to the metering station near **Cavarzere**, in the province of Venice. A 36-inch diameter and 84 km long pipeline owned by Edison will transport the gas from Cavarzere to the National distribution network near **Minerbio**, in the province of Bologna.

## SHORE BASE

The shore base is the critical link with the offshore Terminal. All the supporting activities to handle material and personnel to and from the Terminal are coordinated from this location. It is a 5000 square meter facility located along the Po di Levante River, in the municipality of **Porto Viro** (Rovigo). It includes a warehouse for all spares and supplies, a telecommunication system for constant communication with the Terminal, offices and a dock for the supply boat to the Terminal.

## MARINE SUPPORT

Adriatic LNG has established long term contracts for marine services to support terminal operations. These include **4 large dedicated tugs** to attend the LNG carriers, **Pilots** and **Line Handlers** to assist in mooring the LNG ships and a **dedicated Crew Supply Vessel** for terminal resupply. All services have been implemented consistent with the safety and security standards required by the competent Coast Guard authorities.

### Gas extraction →

The gas is produced in the export country.

### Gas liquefaction →

In the liquefaction plant, the gas is cooled to minus 162° C, at which point it liquefies reducing its volume by a factor of 600.

### LNG transport →

LNG is transported at atmospheric pressure by dedicated carriers designed and built to meet severe safety standards.

### Regasification

At Terminal LNG is unloaded from vessels, pumped up to the pipeline pressure, regasified and then the gas is dispatched to the national gas network through a pipeline.

## The LNG process





# THE TERMINAL Clean

Natural gas has long been recognized as the cleanest source of hydrocarbon energy, since its combustion mainly produces water vapor and carbon dioxide (though much less than petroleum and coal). Virtually no sulphur products, dust, soot or heavy metals are formed as a result of its combustion. This makes natural gas more compatible with human, animal or plant life, soil and water than other hydrocarbon fuels.

The Terminal has been designed to meet the growing national demand for natural gas while operating with the maximum energy efficiency in the full respect of the environment. Overall the project has completed four Environmental Impact Assessments,

to ensure that every aspect of the environment is respected. In consultation with Italian authorities, this has resulted in adopting more than 100 specified environmental protection measures and implementing an extensive monitoring program for both the construction and operation phases.

The goal of **safeguarding the environment** has been a priority in the design and planning of the works:

- Pipeline work was scheduled to respect the movement of migratory birds which make stopovers in the Delta;
- Pipeline construction techniques, such as the Horizontal Directional Drilling, and the installation of temporary barriers to reduce noise

levels and water turbidity have been used to safeguard the most sensitive areas;

- On the terminal, the heat to regasify LNG will be provided both by sea water, using the heat naturally stored in the sea, and by turbine flue gases, thanks to a recovery system, in line with Italian regulator direction;
- On the terminal, gas turbines, with emissions control systems, among the most modern in the world, are installed to reduce greenhouse gases emissions, as prescribed by the Italian regulator;
- Around the Terminal artificial reefs promoting enhanced marine life development have been approved for installation.

## August 2006

Construction of the Gravity Based Structure (GBS), Algeciras.



## March 2007

Moving LNG storage tanks into the GBS, Algeciras.



## February 2008

Pipeline under construction, Polesine (Italy).



## July 2008

Preparation for sail away, Algeciras.





# THE TERMINAL Safe

The terminal location off the coast was chosen to minimize the impact on the local community, and the project has been developed in accordance with the Italian regulations and the strictest international standards for safety.

The location of the terminal and the underwater pipeline were determined following in-depth seismic, geological and meteorological-marine studies. These studies led to the selection of this area as optimal for the Terminal's safe running and with minimal impact on the environment.

The Terminal is **equipped with the most modern radar tools**, in order to detect the presence of ships in

transit, in addition to anti-collision signaling systems. The Terminal features will allow plant operability under a wide range of environmental conditions and are designed to ensure the plant's integrity in any situation.

**Navigation around the structure is limited**, according to an ordinance issued by the Chioggia Harbor Master, which sets clear rules for navigating the waters surrounding the Terminal, to ensure the safety of operations. Two specific areas have been defined: the safety area and the Area To Be Avoided, "ATBA".

The safety area is a circular shape area which extends to a radius of two

kilometers from the center of the Terminal within which any activity not related to the operations of the Terminal is strictly prohibited. The "ATBA" is a circular shape area that extends to a radius of 1.5 nautical miles from the center of the Terminal. With the exception of the ships involved in the activities of the Terminal and Police boats, this area is off limits to all vessels with gross tonnage above 200 tons.

Moreover, a **"no fly zone"** over the Terminal has been established, with the aim of ensuring safety and security of the plant.

**May 2008**

Mooring dolphins under construction, Venice.



**September 2008**

The terminal in the Adriatic Sea.



**October 2008**

Terminal installation activities offshore of Porto Levante.



# THE TERMINAL International

The Adriatic LNG regasification Terminal is a first of its kind structure. Its design and construction have involved companies with International experience, with men and women from around the world.

## AN INTERNATIONAL COMMITMENT

Design and construction of the Terminal was awarded to Aker Kvaerner, with the involvement of numerous subcontractors for specific parts of the project. The Gravity Based Structure was built at the Campamento Basin in Algeciras, Spain. The LNG tanks were built in South Korea. Process modules for the Terminal were completed in Cadiz, Spain, with additional work completed in Singapore, Sweden and Italy.

Mooring facilities, in particular, have been built in Venice, in the basin of the Arsenal. More than 20 million hours in total have been worked in the project.

## THE JOURNEY OF THE TERMINAL

Once the installation of LNG tanks inside the GBS was completed and the topside facilities lifted onto the GBS, the Algeciras casting basin was flooded in May 2008. When ready to sail away, the GBS was deballasted until it floated and on the 30th of August was towed by four large ocean tugs to its final destination offshore of Veneto coast. The journey was about 1,700 nautical miles (3150 kilometers) in 17 days. After passing through the Strait of Gibraltar and the Channel of Sicily, then heading toward the

Adriatic Sea, the Terminal reached its final destination off the coast of Porto Viro.

## FINAL EFFORT

The Terminal then entered its final Hook-up and Commissioning phase. Since the arrival of the Terminal to Italy, key installation activities (such as GBS ballasting and Mooring Dolphin installation) have been completed and remaining hook-up progressed. Final commissioning commenced in spring 2009, leading to the planned arrival of the first LNG cargo for cool-down of the Terminal. Following cooldown the Terminal will commence gas send out to test performance before reaching full operational capacity later in 2009.



# THE TERMINAL For the community

Local content is an important part of the Adriatic LNG's development strategy. The Terminal not only offers a contribution to the diversification and security of energy supply, but also important opportunities for **local economic development and employment opportunities:**

→ Adriatic LNG has signed **important agreements** in the Province of Rovigo **for the provision of services** relating to the operations of the Terminal. These contracts include development of the Shore Base, design and construction of two tugs, environmental monitoring, waste management, furniture, catering and cleaning and security services. Other

opportunities will arise throughout the operating phase.

→ ALNG in consultation with local and national authorities has also made **a contribution of 12 million euro** toward economic development projects, environmental compensation and social welfare initiatives that will be managed by local Polesine institutions.

→ One hundred people will be employed when the Terminal will be fully operative. More than half are **new jobs created in Rovigo province**: 12 at the Shore Base and 44 on the Terminal. Moreover several local companies are indirectly involved in the activities

of the Terminal.

→ In 2005 Adriatic LNG launched a program of staff selection and recruitment in the area, and provided more than 30 months of **training in Italy and abroad in order to develop new and highly qualified professionals** for this world class facility.

The constant presence of Adriatic LNG in the territory has been developed through many working relationships with schools, local institutions and associations, and important sponsorship and promotion activities, consistent with ALNG's desire to positively take part in the economic, social and cultural life of the Polesine.



**The Terminal not only offers a contribution to the diversification and security of energy supply, but also important opportunities for local economic development and employment opportunities.**



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