Dunkerque LNG
GROUPE EDF

LNG TERMINAL

KEY POINTS

On 27 June 2011, EDF and its partners Fluxys (independent operator of the natural gas transmission system in Belgium and Zeebrugge LNG terminal) and TOTAL reached a decision on the construction of the Dunkirk Liquid Natural Gas (LNG) terminal. Once all the permits and authorisations had been acquired and the contractors selected, the construction site was launched. It is scheduled to enable industrial and commercial deployment at the end of 2016.
The terminal, situated in the Commune of Loon-Plage, will have three main structures: the platform and marine structures managed by the Port of Dunkirk (Grand Port Maritime), the LNG terminal itself, managed by the subsidiary company Dunkerque LNG SAS, and the facilities for connection to the French and Belgian networks, developed by the operators GRTgaz and Fluxys.
The construction site represents an investment of €1 billion in the terminal alone. In addition to this is €150 million for the port construction site and €80 million to connect the terminal to the Pitgam compressor station.
The Dunkirk LNG terminal is currently the second largest industrial construction site in France.

Since 2006, EDF and Dunkirk Port have been working on the project for a new LNG terminal in the Commune of Loon-Plage, a Liquefied Natural Gas regasification infrastructure able to accommodate the world's largest LNG tankers in France, at the western outer harbour.

This LNG terminal will have an annual regasification capacity of **13 billion m^3 of gas, representing around 20% of France and Belgium's annual natural gas consumption.**

It will be composed of the following facilities:

- one reception station that will each year accommodate around **80 LNG tankers** of a maximum capacity of 270,000 m^3;
- one LNG unloading system;
- three LNG storage tanks of 190,000 m3 each; each tank is around 60 m high and 90 m in diameter;
- one regasification unit;
- one sea water inlet intended for the heating of LNG: some of the warm water from the Gravelines power plant will be used to heat the LNG;
- one connection to the gas transportation network.

Three project developers oversee this huge construction site:

- **The Port of Dunkirk** manages the port infrastructure, comprising a harbour basin and a platform for accommodating the industrial installation, partly occupying the western port and covering an area of around 50 hectares;
- **Dunkerque LNG, 65% of which is owned by EDF (25% by Fluxys and 10% by Total),** is responsible for the unloading, LNG storage and regasification installations, the circulation infrastructure and developments required for the terminal's operation;
- **GRTgaz** will lay the tunnels for evacuating the gas once it has been converted to a gaseous state and link them to the transport networks. In the middle of May 2012, GRTgaz and Fluxys decided to connect the terminal to the Belgian gas network, subject to administrative authorisations. The LNG terminal will therefore be connected to two gas transport networks, strengthening its status as a European LNH terminal.

An industrial site which strengthens the presence of the Dunkirk territory

The contractors of **Dunkerque LNG** are :

- **Techint Sener** for industrial processes on the terminal,
- **Entrepose Projets / Bouygues** for the construction of the 3 reservoirs,
- **CSM-Bessac Razel-Bec Soletanche-Bachy France** for building the tunnel which will bring the warm water from the Gravelines nuclear power station to the terminal;

The terminal will help to boost **port traffic**, **which will increase by over 7%**. In the Dunkirk region, there will be other economic knock-on effects for:

- Local authorities : the Nord Pas-de-Calais region, the Nord Department, the Urban Community of Dunkirk and the Commune of Loon-Plage will collect significant and regular tax revenues of more than €20 million per year over a 50-year period;
- job creations, including, during normal operations following the construction phase, around **60 jobs directly linked to the terminal's operation, as well as around 100 indirect jobs** (port professions: towing, pilotage and inshore pilotage in particular);
- the development of new economic activities connected with the "cooling" sector (use of cooling units), including a research centre as part of a cluster rationale and the development of maintenance activities;
- lastly, a more temporary effect, but which will make a significant difference to the local economy, the presence of more than **1700 people during the peak period** for development work on the terminal between 2012 et 2016 (1200 initially announced). Furthermore, a plan for redeployment of skills following the construction phase is being set up with local enterprises.

Orders on the Operation of ICPEs (Installation with Environmental Protection Classification) and Public Utility Easements were obtained on 9 April 2010 by BUNKERQUE LNG, as well as an Order under the French Water Act by the Port of Dunkirk. The latter also obtained an Order on Dispensation from article L411-2 of the French Environment Code on 31 July 2009. The Construction permit was granted to Dunkerque LNG in July 2009.

A remarkable site in terms of environmental integration

The terminal is located on the Clipon site, an artificial dune created some thirty years ago when Dunkirk's western outer harbour was created in the Commune of Loon-Plage.

The project developers have made all the necessary consultations at the local level. Due to the concerns raised at the public debate which took place in 2007, and the determination of the developers to make this an exemplary investment in terms of integration into the environment of a large industrial project, some important technical decisions were made regarding the location of the terminal (shifted towards the west of the platform in order to fully preserve the biodiversity of the most sensitive areas) and compensatory measures.

In addition, they chose a regasification solution which does not produce CO_2 (saving about 500,000 tons per year of CO_2 not emitted!), while using some of the warm waste water from Gravelines nuclear power plant.

A construction site of national and European status

The Dunkirk LNG terminal has taken shape against a backdrop of growing dependence in Europe and France in particular on natural gas imports from outside the European Union, as conventional gas production in the North Sea draws to a close.

There is also a strategic aspect to the Dunkirk LNG terminal, elevating it to a national and European status. It should lead to the opening of a flexible raw energy supply source, close to an area of high consumption, against a backdrop of tensions on the energy market.

Specifically, the Terminal in Dunkirk:

- will be connected, unlike any other terminal, to 2 markets: France and Belgium ;
- will significantly improve competition on the gas supply market;
- will strengthen the market presence of gas from a trusted supplier, EDF, and its European partners.

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LNG TERMINAL
OPERATION

Liquefaction and transport of Liquefied Natural Gas (LNG)

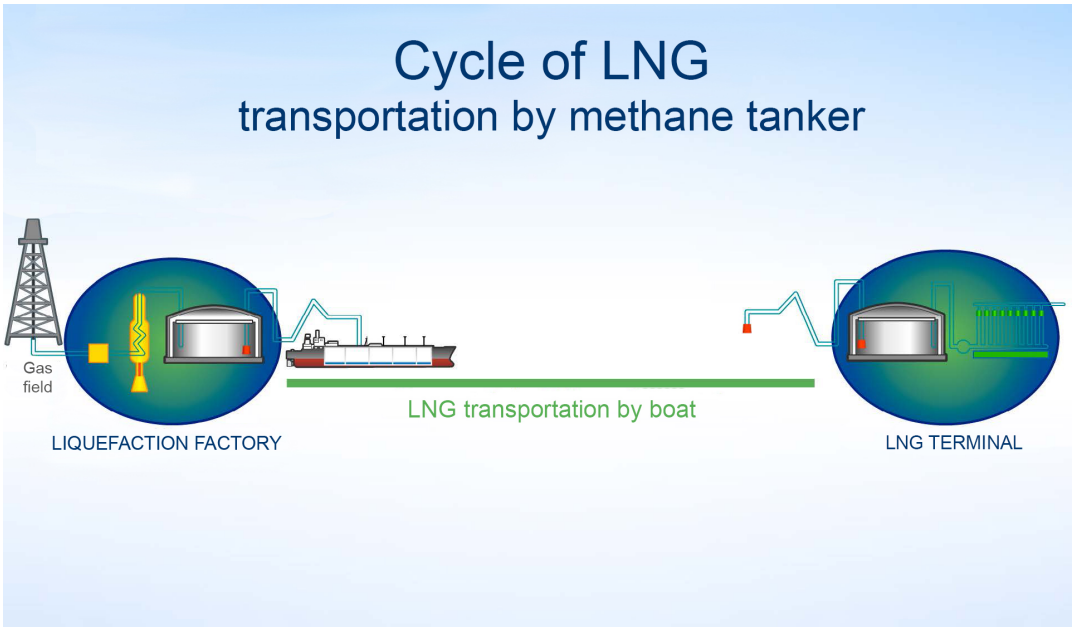
The gas, once it has been extracted, can be transported in two ways: in gas form through a gas pipeline or in liquid form. In the latter case, the gas is liquefied by cooling it to very low temperature (-160ºC), with the advantage that it takes up less volume (600 times less than in gas form). The LNG, in the terminals and in the storage reservoirs, is stored at close to atmospheric pressure. This liquefaction enables diversity of gas supply.

There are three steps in the GNL chain:

- liquefaction of the gas;
- transportation by methane tankers;
- reception at the LNG terminals, where the LNG is stored then regasified before transportation and distribution.

The upstream step of liquefaction is the most delicate part of the process, but as this takes place close to the gas production sites, it does not concern the Dunkirk LNG project.

The methane tankers, 200 to 350 m in length, have a reinforced hull. The internal tanks are equipped with an insulating inner coating. To boost propulsion, most of the vessels also use the small amount of LNG which evaporates as fuel. The capacity of most of the tankers ranges from 70,000 m3 to 155,000 m^3, but vessels with a capacity of up to 267,000 m^3 are already in operation.



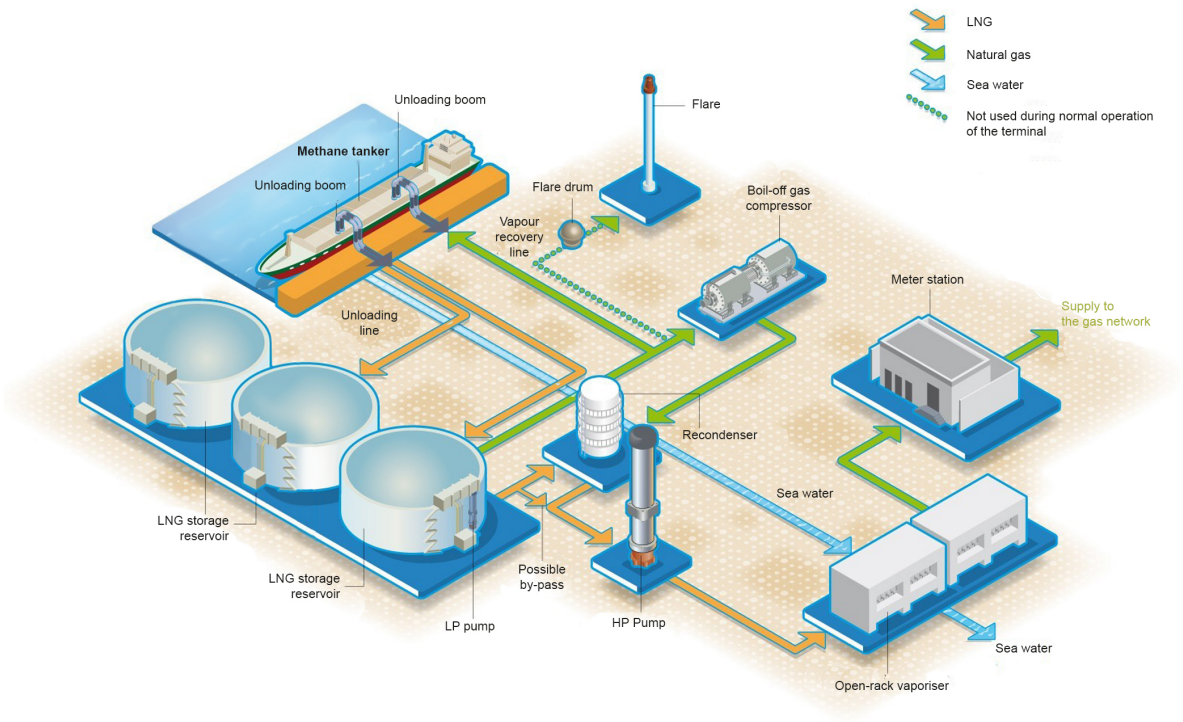
Operation of an LNG terminal

An LNG terminal is a port installation which enables tankers to be taken in and unloaded. It comprises:

- unloading facilities (wharf and articulated booms);
- storage facilities: the LNG is transferred to cryogenic reservoirs (where it is stored at a temperature of -160ºC and at atmospheric pressure);
- regasification facilities: the LNG is extracted from the reservoirs and reheated in order to be regasified.

Having returned to a gaseous state, the natural gas is injected under pressure into the transport network from the LNG terminal.

To date, 90 LNG terminals are in operation worldwide, three of which are in France (One in Montoir-de-Bretagne and two in Fos-sur-Mer).



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LNG TERMINAL
THE SUPPORT PROGRAMME

Following the public debate carried out in 2007, a programme of support and compensatory measures accompanying the LNG terminal project was publicly unveiled. This programme, which was deemed pertinent and comprehensive at the time by various local stakeholders, is now considered finalised. On this basis, Dunkerque LNG undertook a process of reflection with the parties concerned so that all of the programme's measures were ready to be launched when the investment decision was made on 27 June 2011.

Dunkerque LNG is particularly keen to ensure that all of the measures cohesively address the project's impact both in environmental terms and in terms of its usefulness and integration into the environment, in such a way that this infrastructure benefits the local area as a whole. Dunkerque LNG's planned budget for this programme is significant and totals **around €11,5 million.**

Compensatory environmental measures

Two compensatory environmental measures, aimed at offsetting the project's impact on fauna, flora and natural habitats, directly involve Dunkerque LNG:

- the creation of an area to accommodate migratory birds in the town of Gravelines, with a surface area of 20 hectares, named "Sensitive Natural Site of Hems Saint Pol"
- the development of an area measuring 4.5 hectares and located within the boundaries of the Gravelines nuclear power plant, which will be dedicated to the preservation of biodiversity.

The management of these two completed areas is today entrusted to the North Departmental Council.

Other measures have been undertaken by the Port of Dunkirk, for which the Nord Departmental Council is also responsible. They involve:

- the reconstruction of habitats and the dune ecosystem on the edges of the site
- the creation of a preservation area in Le Clipon Est, including the creation of salt evaporation ponds serving as a feeding area for birds
- the creation of a preservation area, which complements Dunkerque LNG's second measure and enables access developments for anglers.

All of the compensatory environmental measures are governed by an order of the prefect dated 31 July 2009.

Economic support measures

In this area, Dunkerque LNG is taking a local approach, involving other industries affected by the challenge.

- **Consequences of the construction site for the territory, in conjunction with the Opal Coast Chamber of Commerce and Industry**: information meetings have been organised by the Opal Coast CCI for the companies and an Extranet site has been made available, providing special access to information on contract opportunities.
  A representative who is responsible for providing information to companies and accompanying them around the site worked for 3 years at the site entrance.

- **Accommodation**: the Urban Community of Dunkirk and the Opal Coast CCI carried out a study to identify the needs of the site, resulting in the creation of a website for businesses looking for accommodation options for their staff, www.hebergementterminalmethanierdk.fr.

- **Research and development**: an agreement was signed with the University of the Littoral Opal Coast to finance two thesis topics related to cooling.

- **INNOCOLD:** also in the area of research and development, the Urban Community of Dunkirk (CUD), carried out a feasibility study focusing on the creation of a R&D subsidiary related to cooling in the Commune of Dunkirk. The private share of the public/private funding for this project comes from numerous industry players (Europipe, Arcelor, Dalkia Nord, Ponticelli, etc.) as well as from Dunkerque LNG. It gave rise to the creation of the association INNOCOLD.

- **Employment and training**: the job agency "Pôle emploi", the Regional Council and the association "Entreprendre Ensemble" have been working to identify the necessary training programmes for carrying out construction, with the aim of sourcing local workers. A discussion on the anticipation of these training schemes was launched, taking into account the professionalisation period of some jobs. An employment station located on the construction site of the terminal, run by Pôle Emploi and Entreprendre Ensemble, meets the employment needs of the businesses involved in the construction of the terminal.

Society/community support measures

- **Leisure activity compensation:** although access is prohibited, the Le Clipon site was frequented by anglers, hunters, kitesurfers and windsurfers, ramblers and birdwatchers. Measures have been put in place to take the location's community aspects into account: safety equipment for the kitesurfing association of Dunkirk, participation in the creation of a leisure lake nearby (Landscaped Garden on the Banks of the Aa River at Gravelines), authorisation of access to the terminal under certain conditions for scientists observing animal species, etc.
- **The creation of the "Aqualamé" nature centre and biological bathing area**: developed in close collaboration with Loon-Plage town council at a site dedicated to public access (Galamé Park), this measure will be extended through various developments, all connected with nature and biodiversity preservation.

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THE ANCHORING CONVENTION

Since the start of the project in December 2011, Dunkerque LNG has been actively involved in promoting employment. Since the end of 2013, Dunkerque LNG has also been anticipating the end of the project through a regional anchoring convention, which was signed with the State on 19 February 2014. This convention covers three systems:

THE PROACTIVA APPROACH TO ENDS OF CONTRACTS (GTEC)

The partners Pôle emploi, Entreprendre Ensemble, the Region, the Opal Coast CCI, local SMIs, companies involved in the worksite, the consortia of construction-industry and metallurgy employers and EDF have joined forces with the worksite project owners (Dunkerque LNG, Dunkerque Port and GRT Gaz) on the local management of employment and skills (GTEC: Gestion Territoriale des Emplois et des Compétences). It has been in place since early 2013 and enables all the people who have worked on the LNG terminal site to highlight to other local companies the professional experience and skills acquired on the site.

This approach has three components:

- The creation of a mapping of the worksite skills by conducting a survey of the contracting and sub-contracting companies.
- The identification of the local skill needs and prospective analysis of the evolution of the labour pool, in particular by studying employment opportunities related to future major projects to be conducted locally (Calais 2015, major overhaul, port development projects, etc.). This data is crossed with the worksite skills identified.
- The issuing of a "LNG-terminal worksite capacities and skills stamp", covering the expertise, perspective and experience acquired with one of the contractors or subcontractors of this worksite.

Borne by Dunkerque LNG, this proactive approach is based on mobilisation and commitments made with the companies involved in the worksite and local companies, resulting in a charter. Its aim is to create a network capable of identifying the business areas in difficulty and ensuring that worksite skills are adapted to these business areas.

Each month, the Dunkirk LNG newsletter publishes the available posts to be filled on the site.

THE "50 YOUNG PEOPLE" PLAN

The objective of this plan is to receive 50 students under the age of 26 on the site for professional training within the construction site (9 months contracts) in order to open doors to future recruitment with local companies following training and qualification.

This initiative, funded entirely by Dunkerque LNG (around €1.5 million) aims to help enhance local skills.
Dunkerque LNG has teamed up with several partners to carry out this plan: Entreprendre Ensemble, the operational driver, Pôle emploi, the consortia of construction-industry and metallurgy employers (GEIQ MI and BTP), the Regional Council, the Regional Department of Enterprise, Competition, Consumer Affairs, Labour and Employment (DIRECCTE), the Rives de l'Aa and Colme Local Initiative, the Loon-Plage Office of the Dunkirk Job Centre, the Flanders Maritime Union of Metallurgy Industries and Trades (IUMM) and the Movement of the Enterprises of France (MEDEF).

All are working to follow up on these training contracts by seeking companies for future employment: companies involved in the worksite, companies working with Gravelines Nuclear Power Plant (prospects for post-Fukushima and major overhaul worksites) and local companies.

51 posts have been identified (HSE technicians, quality technicians, mechanics, welders, monitoring coordinator, documentation manager, operators, pipe fitters, scaffolding builders, boilermakers, bookkeeper, administrative assistant, scheduling technician) in the companies working on or for the site: CMP, Entrepose Projets, ETMI, Eurovia, IREM, Prezioso, Razel-Bec, Rouvroy, Schoonberg, TS LNG and Techint.

Almost all recruitment is internal. The contracts are set up by the employer groups for integration and qualification « Metallurgy, manufacturing and construction ».

For some posts the contract is completed with on-site training in real life situations through the CETR project (Chantier Ecole à Taille Réelle) developed by the Opal Coast CCI.

"SME SMI SUPPORT" PROGRAMME

This programme aims to work with local organisations, in particular the Opal Coast CCI, in order to draw conclusions from the worksite in the area of subcontracting. Several components:

- Define the key factors of success in French companies working on the site.
- Define the difficulties faced by PMEs/PMIs when applying for tenders from the site.
- Offer support to PMEs/PMIs looking to develop in the oil & gas sector and in the area of cooling (with INNOCOLD).
- Lead a study on the overall implications of the construction site of the LNG terminal.

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