Algeria-Europe gas pipeline via Spain
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II. Project Scope

III. Project Phases

IV. Key Points

V. MEDGAZ: A Strategic Project

VI. Timetable

VII. Construction Process
I. INTRODUCTION TO THE PROJECT

Background:

➢ 1970’s:

- The idea of building a direct gas pipeline between Algeria and Europe arises.
- Several feasibility studies take place.
- Technical limitations prevent the construction and operation of an ultra deepwater pipeline.

➢ Year 2001:

- The construction of an ultra deepwater pipeline is feasible.
- CEPSA and Sonatrach found MEDGAZ.
Objective:

MEDGAZ is a company specially constituted to design, build, and operate an Algeria-Europe gas pipeline via Spain, to improve security of energy supply and meet growing demand for natural gas.
I. INTRODUCTION TO THE PROJECT

Shareholding:

- **Founding members:** CEPSA and Sonatrach
- **Rest of shareholding:** Iberdrola, Endesa and Gaz de France
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II. PROJECT SCOPE

Route

- Spanish Onshore
- Transversal Axis
- Algerian Onshore
- Reception Terminal
- Compressor Station
- MEDGAZ

Cartagena LNG import terminal
Start-up: 1989
Receiving source: Algeria

MEDGAZ

Route from Algerian Onshore to Spanish Onshore via the Transversal Axis, passing through Cartagena.
II. PROJECT SCOPE

Technical Summary:

- Length: 210 km
- Diameter: 24 inches
- Capacity: 8 bcm/year
- Maximum Depth: 2,165 m
- Estimated Investment: 900 M€
- Workforce:
  - Over 2,000 people (construction phase)
  - Over 100 persons (operation phase)
II. PROJECT SCOPE
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III. PROJECT PHASES

Completed Stages

- Conclusion of marine surveys
- Conclusion of basic engineering (FEED)
- Conclusion of Environmental Impact Assessment (EIA)
- End of public Information
- Administrative Authorization
- MEDGAZ, priority project
- MEDGAZ submits the project for approval
- Environmental Impact Declaration (DIA)
- Algerian Concession

Timeline:
- MEDGAZ Company for Study
- MEDGAZ becomes a company for construction
- MEDGAZ submits the project for approval
- Algerian Concession

Years:
- 2004
- 2005
- 2006
- 2009
III. PROJECT PHASES

2004 – Marine Surveys

- HUGIN 3000-GC
- 509 Km. Visual inspection
- Triton XL-14
- 15 km Geophysical
- 130 km Visual inspection
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- Improves **security of supply**
- Is the **most cost-effective** way of supplying natural gas to Spain
- Meets **growing demand** for natural gas in Europe
- Makes a positive contribution towards the **Kyoto Protocol** implementation
IV. KEY POINTS

Improves security of supply:

“It is advisable to maintain a balance between NG/LNG supplies, in a way that neither of these two sources should fall below 1/3 of the total (...) to optimize the coverage(...).”

(Planning of Electrical Power and Gas Sectors. Development of Transportation Networks 2002-2011)
IV. KEY POINTS

Improves security of supply:

- MEDGAZ does not increase the Algerian energy dependence.

<table>
<thead>
<tr>
<th>Year</th>
<th>2003</th>
<th>2005</th>
<th>2007</th>
<th>2011</th>
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<tbody>
<tr>
<td>Spanish gas supply, bcm/year</td>
<td>23.7</td>
<td>34.0</td>
<td>35.5</td>
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<td>Algerian gas importation, bcm/year</td>
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<td>• LNG, bcm/year</td>
<td>13.7</td>
<td>14.4</td>
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<td>• NG through GME, bcm/year</td>
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<td>5.0</td>
<td>6.0</td>
<td>6.0</td>
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<tr>
<td>• NG through MEDGAZ, bcm/year</td>
<td>6.4</td>
<td>9.4</td>
<td>9.3</td>
<td>9.3</td>
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<tr>
<td>Algerian gas share, % s./total volume</td>
<td>57.1</td>
<td>42.0</td>
<td>43.1</td>
<td>48.4</td>
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</table>

Sources: MITYC, CNE and Sonatrach
IV. KEY POINTS

Most cost-effective way:

- Most direct route
- Shorter length (than GME*)
- Lower energy cost and no transit tolls
- Most cost-effective way of supplying natural gas to Southern Europe

*GME: Gasoducto Magreb Europa
Conclusion: The increase in electrical power generation through combined cycle facilities, which are highly efficient and environmentally friendly, is the main cause for the increase of the Spanish demand for natural gas.
IV. KEY POINTS

Meets growing demand:

Source: Spanish Ministry of Industry and CNE
IV. KEY POINTS

Respects Kyoto Protocol:

- **MEDGAZ** will deliver to the European market natural gas: a clean, efficient, versatile and safe hydrocarbon.

- One of the main objectives of the countries that have ratified the **Kyoto Protocol** is to progressively reduce its CO$_2$ emissions. In order to do so, they are increasingly relying on natural gas.
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V. STRATEGIC PROJECT

- Europe
  - "Project of Priority Interest within Trans-European Networks in the Energy Sector"
  - "Quick Start" Program
  - Financial aid for preliminary studies

- Spain

- AACC
  - The autonomous authorities have shown there firm support to the project

MEDGAZ is a strategic project for Spain, Algeria and the rest of Europe
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1. Global Project

MEDGAZ will adapt its schedule according to the agreements between the Spanish and Algerian authorities.
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VII. CONSTRUCTION PROCESS

Pipe lay methods:

- **S - lay**
  - Both shallow and deepwater areas
  - Welding and tending in horizontal position
  - Pipeline forms an “S” shape during tending process
  - Between 400 y 3,500 meters depth
  - Welding and tending in vertical position
  - Pipeline forms a “J” shape during the tending process

- **J - lay**
VII. CONSTRUCTION PROCESS

1- Pipeline supply

- Pipe section length: 12m
- Diameter: 24 inches
- Triple layer coating

2- Transfer to the welding tower

The pipe sections are placed in the middle of the platform and raised up to the welding tower where they are to be welded at the girth joint using submerged arc welding equipment.
VII. CONSTRUCTION PROCESS

3 - The pipes are aligned in the tower and welded using automated welding machineries.

4 - Each welded joint is individually tested by nondestructive techniques (NDT).
VII. CONSTRUCTION PROCESS

5 - The exposed welded joints are coated with two layers, one made of epoxy resin and the other of polypropylene to maintain continuity with the rest of the pipe.

6 - While these operations are taking place, the vessel slowly lays the pipeline on top of the seabed. The average velocity of construction is three kilometers per day.
VII. CONSTRUCTION PROCESS

The deep sea pipeline is mostly laid on top of the seabed, except in near-shore areas, where it is physically buried in order to minimize the effects of human activity and protect the pipeline from sea currents and storms. An automatic robotic trenching machine digs the trench where the pipeline is to be lowered.
Thank you for your attention

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