Flexible LNG bunkering value chain in the Spanish Mediterranean Coast

Follow-up meeting

Cartagena, 25\textsuperscript{th} September 2014
Business Model – Analysis of the supply and results

Jorge Miguel Lara López
Fundación Valenciaport
1. Main objectives and tasks related to the supply analysis
The overall objective of the report is to describe and analyse the supply of Short Sea Shipping services defining their main features and those related to the fleet in order to calculate potential LNG demand in the Mediterranean Sea.

Activity 4 of this project also provides a description for the current situation thanks to a statistical tool, which suggests a real scenario that measures the market. In addition, it represents a starting point for a future business decision for the construction of an LNG bunkering vessel.

**Processing data about Short Sea Shipping for the four studied ports thanks to LINEPORT tool:**
- Description of lines
- Fleet characterisation
- Consumption and emission calculations

**Evaluate and elaborate a report using data processing of the Short Sea Shipping regular lines and the technical features of the vessels that operate these routes. The consumption of the vessels is analysed as well as their environmental effects**
2. Business Model – Analysis of the supply and results
Business Model – Analysis of the supply and results

A tool for the analysis of Short Sea Shipping in Spain

Shipping Companies
Shipping Agents
Port Authorities
Specialised press
Databases (Fairplay, Ocean Schedules)
Fieldwork with Shipping Companies and Shipping Agents

LINEPORT Database

It provides a homogeneous information source

It provides information about certain features related to the supply and the vessels that operate these routes
Methodology

Main Features of the Vessel
- Type of vessel
- Name of the vessel
- Year of built
- DWT
- Engine power
- Fuel Consumption
- Speed
- HSC

Main Features of the Route
- Name of the SSS service
- Type of service
- Class of service
- Route
- Frequency
- No. of Shipping companies
- Port of Origin
- Distance
- Transit time

Calculations
- Fuel consumption
- Hypothetical LNG consumption
- CO2 emissions
- SOx emissions
- NOx emissions
- PMx emissions

Current situation vs LNG

Business Model – Analysis of the supply and results
Analysis of the results – Regular services

Global indicators

- No. of ports: 4
- No. of lines: 123
  - Container: 78
  - Ro-pax: 21
  - Ro-Ro: 15
  - Car-carryer: 9
- No. of shared lines: 51
- Average frequency (weekly departures): 3.44
  - Container: 0.97
  - Ro-pax: 15.31
  - Ro-Ro: 1.32
  - Car-carryer: 0.64
- No. Of shipping companies: 67
- No of shipping companies by line: 1.91

No. of vessels by type of freight/line
Analysis of the results – Regular services

**ALGECIRAS**
- No. of ports: 1
- No. of regular services: 40
  - Container: 32
  - Ro-Ro: 7
- No. of shared lines: 25
- Average frequency (weekly departures): 7.28
- No. of shipping companies: 34
- No. of shipping companies by line: 2.4

**BARCELONA**
- No. of ports: 1
- No. of SSS services: 61
  - Container: 40
  - Ro-pax: 10
  - Ro-Ro: 3
  - Car-carrier: 8
- No. of shared lines: 20
- Average frequency (weekly departures): 1.47
- No. of shipping companies: 51
- No. of shipping companies by line: 1.8

**CARTAGENA**
- No. of ports: 1
- No. of SSS services: 4
  - Container: 2
  - Ro-Ro: 2
- Average frequency (weekly departures): 0.98
- No. of shipping companies: 8
- No. of shipping companies by line: 2.5

**VALENCIA**
- No. of ports: 3
- No. of SSS services: 67
  - Container: 48
  - Ro-pax: 10
  - Ro-Ro: 5
  - Car-carrier: 5
- No. of shared lines: 31
- Average frequency (weekly departures): 1.53
- No. of shipping companies: 54
- No. of shipping companies by line: 2.1
**Business Model – Analysis of the supply and results**

**Analysis of the results – Regular services**

<table>
<thead>
<tr>
<th>No. Of vessels</th>
<th>CONTAINER</th>
<th>RO-PAX</th>
<th>RO-RO</th>
<th>GENERAL CARGO</th>
<th>CAR-CARRIER</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>556</td>
<td>35</td>
<td>28</td>
<td>18</td>
<td>80</td>
<td>717</td>
</tr>
</tbody>
</table>

**No. of vessels by DWT and type of vessel**

**No. Of vessels classified by age**

<table>
<thead>
<tr>
<th>Range of DWT</th>
<th>No. of Vessels</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10,000</td>
<td>10,000</td>
</tr>
<tr>
<td>10,000-50,000</td>
<td>100,000</td>
</tr>
<tr>
<td>50,000-100,000</td>
<td></td>
</tr>
<tr>
<td>100,000</td>
<td></td>
</tr>
</tbody>
</table>

**High Speed Craft**

<table>
<thead>
<tr>
<th></th>
<th>RO-PAX</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Speed Craft</td>
<td>9</td>
<td>9</td>
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</tbody>
</table>
Business Model – Analysis of the supply and results

Analysis of the results – Regular services

<table>
<thead>
<tr>
<th>UNITS (Tonnes)</th>
<th>1,513,130</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL ANNUAL FUEL CONSUMPTION</td>
<td>1,513,130</td>
</tr>
<tr>
<td>HYPOTHETICAL LNG ANNUAL CONSUMPTION</td>
<td>1,313,224</td>
</tr>
</tbody>
</table>

LNG maximum bunkering potential demand by year (m³/year):

2,889,093

<table>
<thead>
<tr>
<th>LNG consumption</th>
<th>DWT Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>25,956 m³</td>
<td>10,000</td>
</tr>
<tr>
<td>91,562 m³</td>
<td>10,000 – 50,000</td>
</tr>
<tr>
<td>614,996 m³</td>
<td>10,000</td>
</tr>
<tr>
<td>10,677 m³</td>
<td>10,000</td>
</tr>
<tr>
<td>3,717 m³</td>
<td>10,000 – 50,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DWT Range</th>
<th>LNG consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>10,000</td>
<td>56,894 m³</td>
</tr>
<tr>
<td>10,000 – 50,000</td>
<td>124,868 m³</td>
</tr>
<tr>
<td>10,000</td>
<td>155,588 m³</td>
</tr>
<tr>
<td>10,000 – 50,000</td>
<td>500,387 m³</td>
</tr>
<tr>
<td>50,000 – 100,000</td>
<td>904,368 m³</td>
</tr>
<tr>
<td>100,000</td>
<td>400,083 m³</td>
</tr>
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</table>
Business Model – Analysis of the supply and results

Analysis of the results – Regular services

<table>
<thead>
<tr>
<th></th>
<th>UNITS (Tonnes)</th>
<th>% EMISSIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL ANNUAL CO2 EMISSIONS</td>
<td>4,762,079</td>
<td>96.42%</td>
</tr>
<tr>
<td>TOTAL ANNUAL SOx EMISSIONS</td>
<td>81,395</td>
<td>1.65%</td>
</tr>
<tr>
<td>TOTAL ANNUAL NOx EMISSIONS</td>
<td>85,181</td>
<td>1.72%</td>
</tr>
<tr>
<td>TOTAL ANNUAL PMx EMISSIONS</td>
<td>10,097</td>
<td>0.21%</td>
</tr>
<tr>
<td>TOTAL ANNUAL EMISSIONS in 2013</td>
<td>4,938,752</td>
<td>100%</td>
</tr>
</tbody>
</table>

Computed GHG emissions due to current fuels vs. LNG
THANK YOU

Jorge Miguel Lara López
Project Manager R+D+i
Fundación Valenciaport
Sede APV - Fase III, Av. Muelle del Turia, s/n
46024 · Valencia · (España)
Tel.: +34 96 393 94 00 - Ext. 11424
Fax: +34 96 393 94 61
fvalenciaport-jlara
www.fundacion.valenciaport.com