




# Region 4

## Liquefied Natural Gas Ports



Onshore and Offshore LNG Ports  
March 2007

# Types of LNG Carrier

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# The Matthew enters Boston harbor.

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# Types of LNG Terminals (Side-by-Side and Turret)

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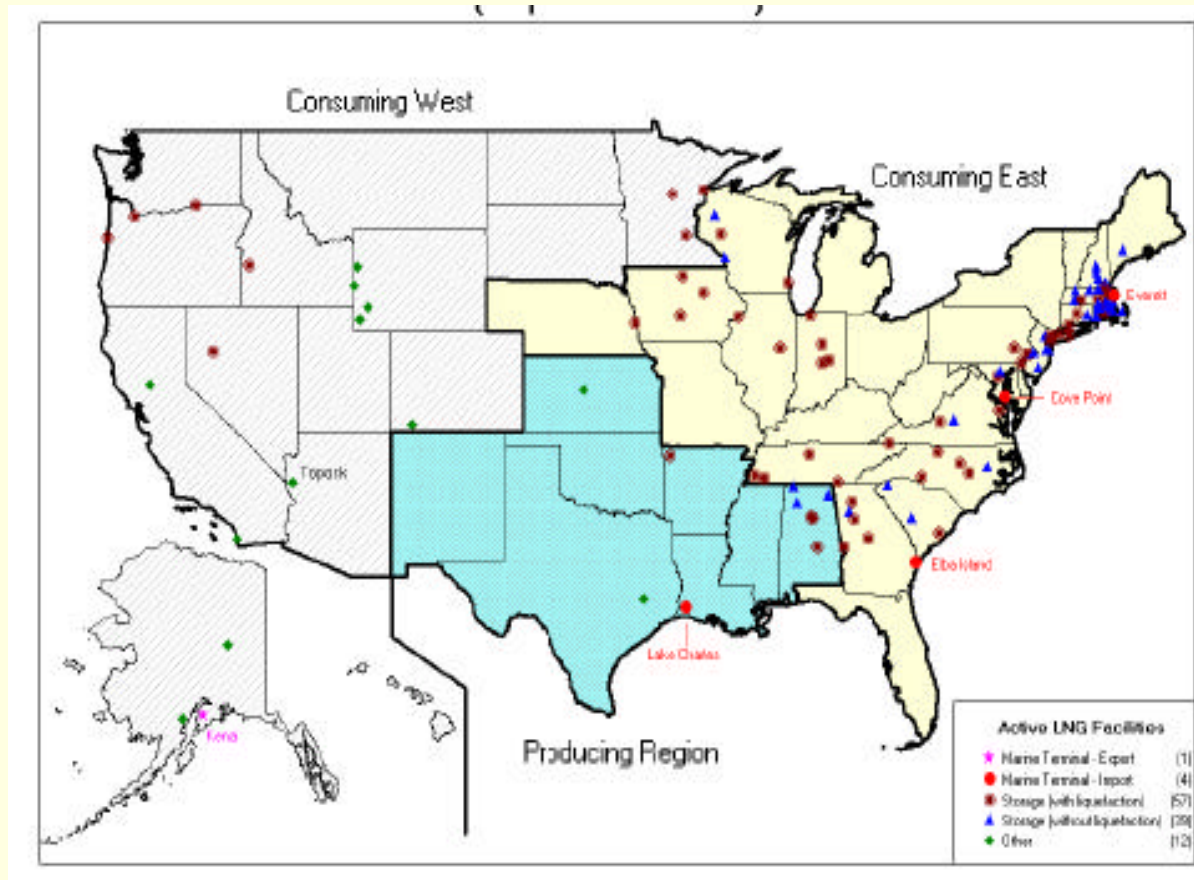
# Types of LNG Terminals

(Onshore and Gravitational)

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# U.S. Liquefied Natural Gas Facilities



# Region 4 Offshore LNG Projects

Company Name (Project Name)	ConocoPhillips (Compass Port)	TORP Terminal (Bienville)	Suez Energy (Calypso LNG)	Hoegh LNG (Port Dolphin)
Location	11 mi. South of Dauphin Is., AL	63 mi. South of Ft. Morgan, AL	9 mi. East of Ft. Lauderdale, FL	42 mi. West of Tampa, FL
Permitting Authority	EPA - Region 4	EPA - Region 4	EPA - Region 4	EPA - Region 4
Air Contacts	APS - Kelly Fortin Modeling - Stan Krivo	APS - Fortin/Forney Modeling - Stan Krivo	APS - Fortin/Forney Modeling - Stan Krivo	APS - Fortin/Forney Modeling - Stan Krivo
DWP/NEPA Contacts	Coast Guard	Coast Guard	Coast Guard	Coast Guard
Current Project Status	Withdrawn	Interim Draft EIS	Scoping comments being considered by USCG	Pre-Application
Interim Due Date	May 26th - Mueller	NA	NA	NA
Final Due Date	June 12th - MARAD	Feb 8th -> USCG	NA	NA
Next Step	Waiting for resubmittal	Draft EIS	Interim Draft EIS	Application Completeness
Air Permit Required	Pre-construction/ Minor Source Permit	Minor NSR & Title V	PSD Permit & Title V	PSD Permit & Title V
Proposed Annual Send-Out Capacity	TBD	1.4 BCFD	1.1 - 1.9 BCFD	1.2 BCFD (or larger)
Proposed Port (Vap.) Technology	GBS (ORVs) under reconsideration	HiLoad (STVs)	TRV (CL + boilers)	2 SRVs (CL w/boilers)
Proposed Fuel Usage	NG/LSFO	NG/diesel	NG (boilers)/NG/FO (engines)	NG/diesel
Proposed Control Technology			SCR/ Low S Fuel	SCR on boilers
Projected Operation	TBD	Late 2009	Summer 2012	Late 2010/2011

# Region 4 Onshore LNG Projects

Company Name (Project Name)	Chevron  (Casotte Landing)	Gulf LNG  (Clean Energy)	Southern LNG  (Elba Island)
Location	Pascagoula, MS	Pascagoula, MS	Savannah, GA
Permitting Authority	MDEQ	MDEQ	GEPD
Air Contacts	APS - Katy Forney Modeling - Stan Krivo	APS - Katy Forney Modeling - Stan Krivo	APS - Jim Little Modeling - Stan Krivo
DWP/NEPA Contacts	FERC	FERC	NA
FLM Contact & Review Status	Stan will Contact	Stan will Contact	Contacted by EPA
Current Project Status	Final EIS	Final EIS	Pre-Application
Interim Due Date	Dec. 20th -> OECA	Jan. 16th -> OECA	
Final Due Date	Jan. 3rd -> FERC	Jan. 29th -> FERC	
Next Step	Permitting	Permitting	Completeness Review
Air Permit Required	Pre-construction/ Minor Source Permit	Pre-construction/ Minor Source Permit	PSD Permit
Proposed Annual Send-Out Capacity	1.3 BCFD	1.5 BCFD	2.1 BCFD
Proposed Port (Vap.) Technology	IFV + 2 backup PHs	10 SCVs	
Proposed Fuel Usage	Wasteheat/NG	NG	
Proposed Control Technology			
Projected Operation	2010	apprx. 2010	
Comments	Comments sent to FERC on 1/3/07	Comments sent to FERC on 1/29/07	Will not go through NEPA process

# Example –TORP Terminal (Bienville)

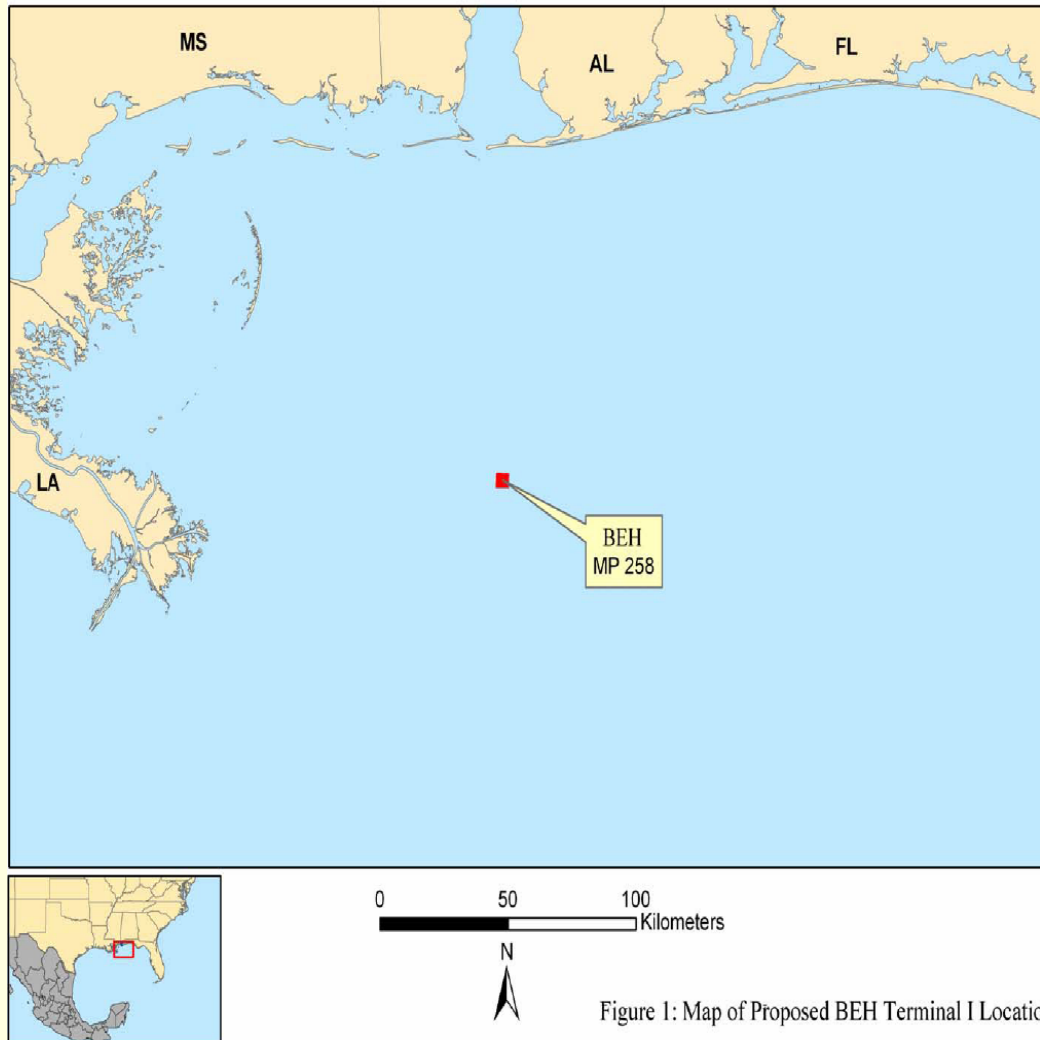
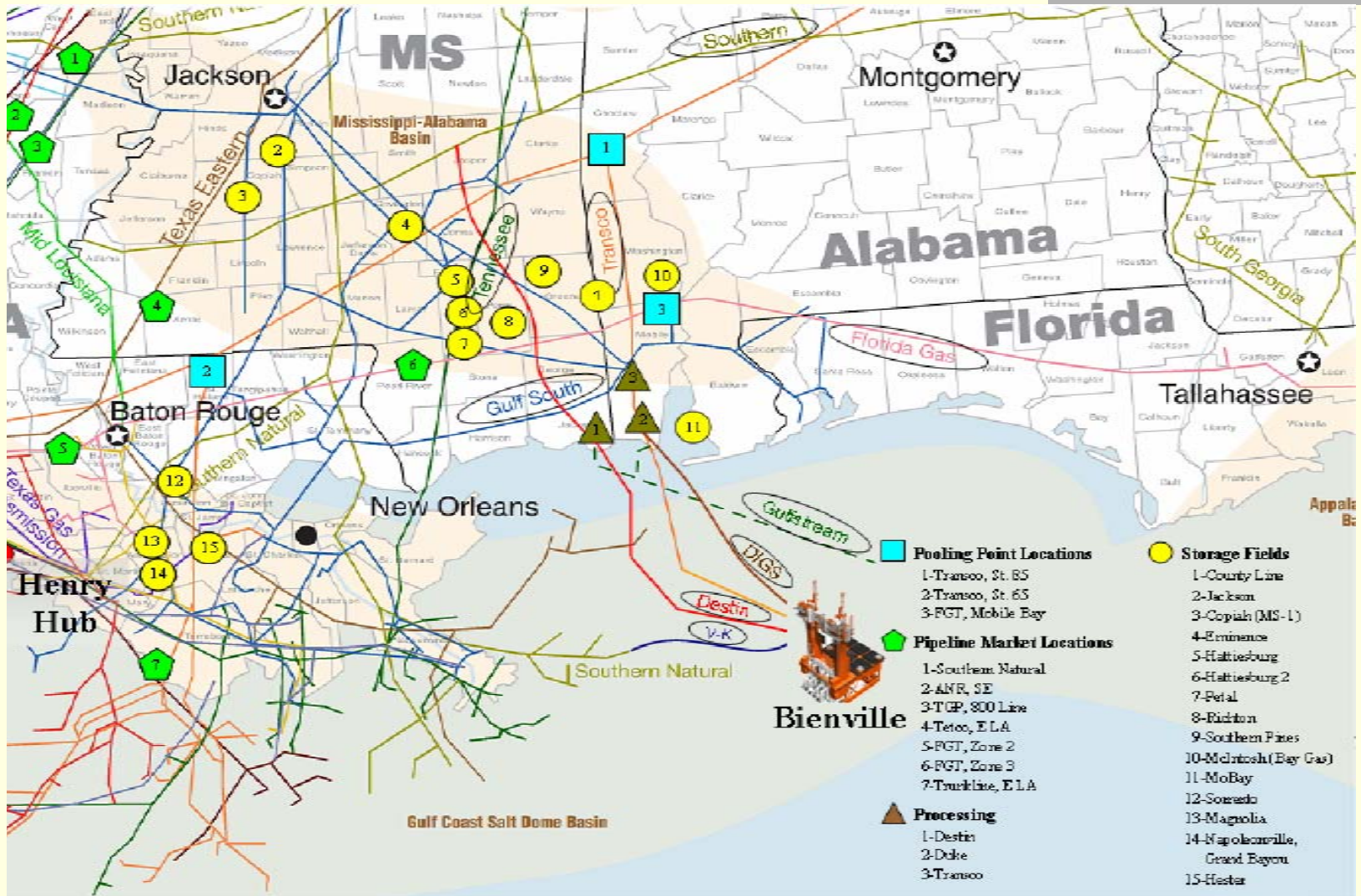


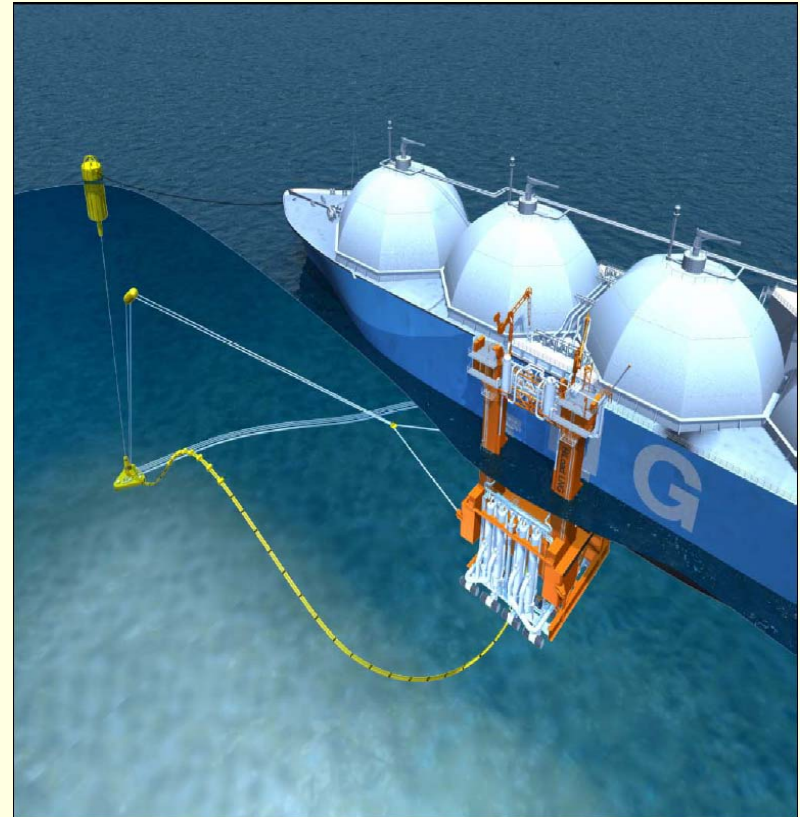
Figure 1: Map of Proposed BEH Terminal I Location

# TORP Location and Facilities



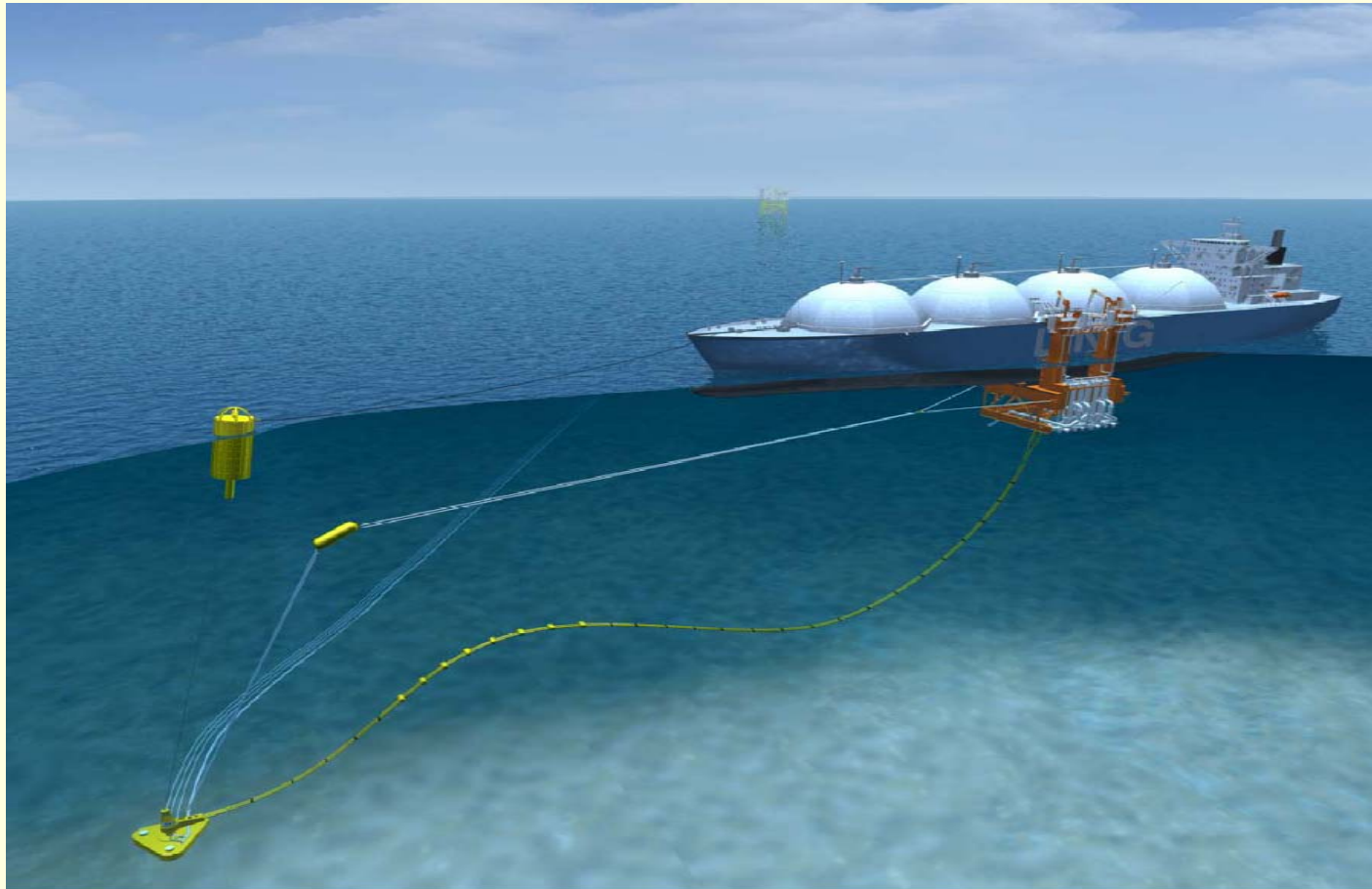
# Operational Configuration

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# LNG Carrier Mooring and Connection

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# Surface Features

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# Defining LNG Technical Issues

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- Vaporization Process
  - Heat obtained from Gulf/Ocean water
  - Heat Obtained from direct or indirect fires
- LNG Carrier Emissions
  - Steam boilers/Turbines/Engines
  - Fuel (marine fuel oil, diesel, natural gas)
- Treatment of Mobile Emissions
  - LNG carrier emissions - off loading, hotelling, maneuvering
  - Current carrier fleet vs. special designed fleet
  - Support vessel emissions
- Air Quality Impact Modeling (Air permit vs. NEPA EIS)
  - Site boundary
  - Air quality model
  - Modeling Procedures
  - PSD Class I and II Area Impacts
  - Inventory other sources

# LNG Scheduling Issues

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- NEPA Environmental Impact Statement
  - Statutory schedule and requirements
- EPA Headquarters' Oversight LNG Licensing

# LNG Port Emission Units

## Stationary Sources

### TORP (Natural Gas & Diesel)

<b>Emission Unit</b>	<b>NOx</b>	<b>VOC</b>	<b>SO<sub>2</sub></b>	<b>CO</b>	<b>PM10</b>
Power Turbines	103.35	7.19	0.71	125.82	7.41
Compression Turbines	30.67	2.13	0.21	37.34	2.20
Main Crane	0.75	0.06	0.05	0.70	0.04
Auxiliary Crane	0.50	0.04	0.03	0.68	0.04
Emergency Generator	17.47	1.42	0.44	9.64	0.96
Fire Pump Engines	0.14	0.01	0.00	0.07	0.01
Fugitive Emissions	--	7.92	--	--	--
VOC Storage Tanks	--	Negligible	--	--	--
LNG Carrier Offloading	31.92	3.42	0.36	8.31	10.41
<b>TOTALS</b>	184.80	22.19	1.80	182.56	21.07

# LNG Mobile Emission Sources

## TORP (Natural Gas & Diesel)

<b>Emission Unit</b>	<b>NOx</b>	<b>VOC</b>	<b>SO<sub>2</sub></b>	<b>CO</b>	<b>PM10</b>
LNG Carrier Hotelling	70.36	7.91	0.93	20.58	22.96
LNG Carrier Maneuvering	40.70	0.44	0.04	0.90	1.60
Offshore Service Vessels	70.36	5.66	1.51	39.30	3.85
Rescue Boats	0.24	0.02	Negligible	0.05	0.02
Helicopters	0.58	Negligible	Negligible	Negligible	0.01
<b>TOTALS</b>	152.48	14.03	2.48	60.83	28.44

# LNG Mobile Emission Sources

Elba Island (Marine Diesel Heavy Fuel Oil & Diesel)

<b>Emission Unit</b>	<b>NOx</b>	<b>VOC</b>	<b>SO<sub>2</sub></b>	<b>CO</b>	<b>PM10</b>
LNG Offloading	232	5	416	12	37
LNG Carrier Hotelling	32	0.7	47	2	4
LNG Carrier Maneuvering	38	7	58	15	1.60
Assist Vessel Standby	79	3	3	4	4
Assist Vessels Maneuvering/Transit	93	5	3	7	7
Coast Guard Escort	17	14	0.4	490	0.1
<b>Vessel Emissions at Berth</b>	<b>343</b>	<b>8</b>	<b>466</b>	<b>18</b>	<b>45</b>
<b>TOTALS</b>	<b>492</b>	<b>34</b>	<b>528</b>	<b>530</b>	<b>58</b>

# LGN Web Sites

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- <http://www.torplng.com/>
- <http://www.suezenergyna.com/ourcompanies/Ingna-calypso.shtml>
- <http://www.lngfacts.org/LNG-Today/Bringing-LNG.asp>