



# LAKE CHARLES LNG COMPANY

Wednesday, November 8, 2017

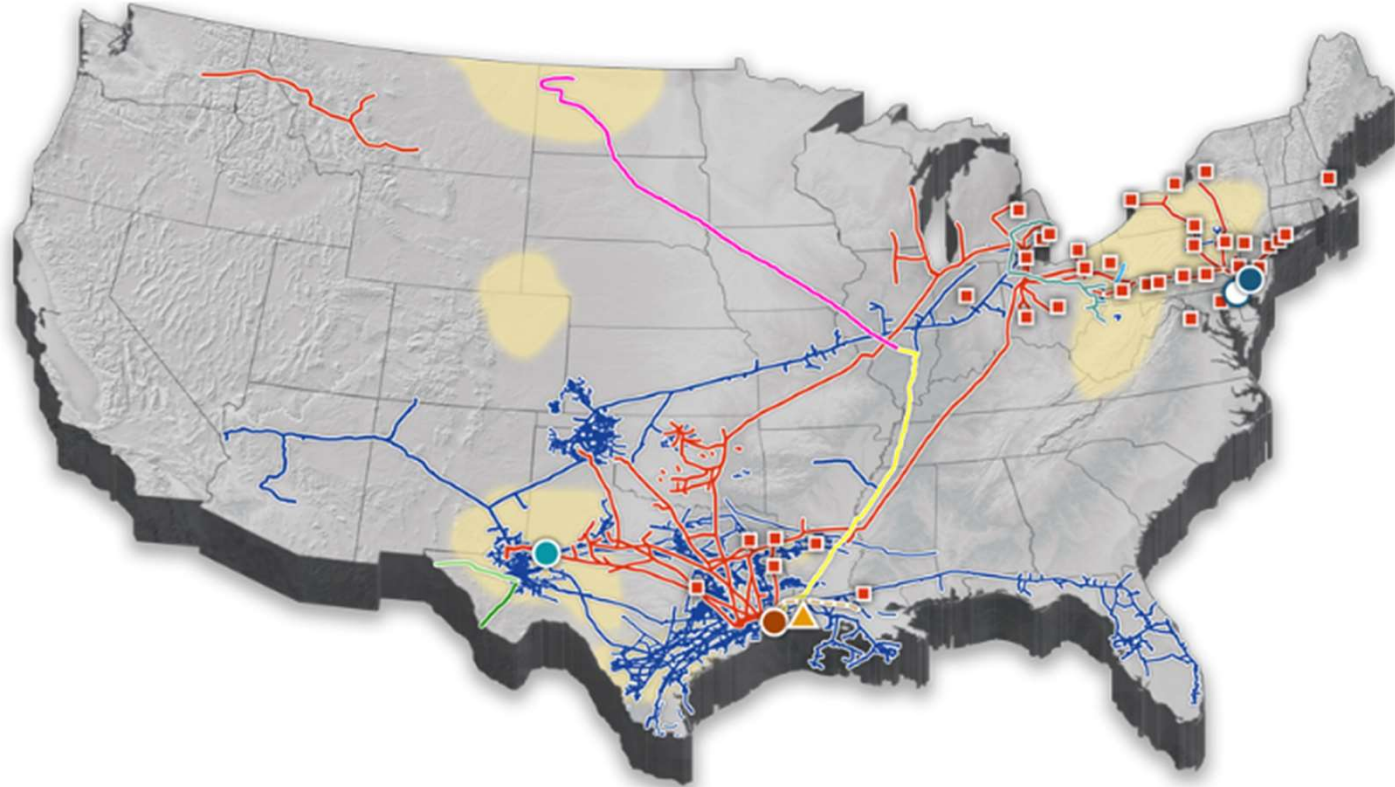


ENERGY TRANSFER

# ENERGY TRANSFER



LAKE CHARLES LNG COMPANY  
An ENERGY TRANSFER Company



## Asset Overview

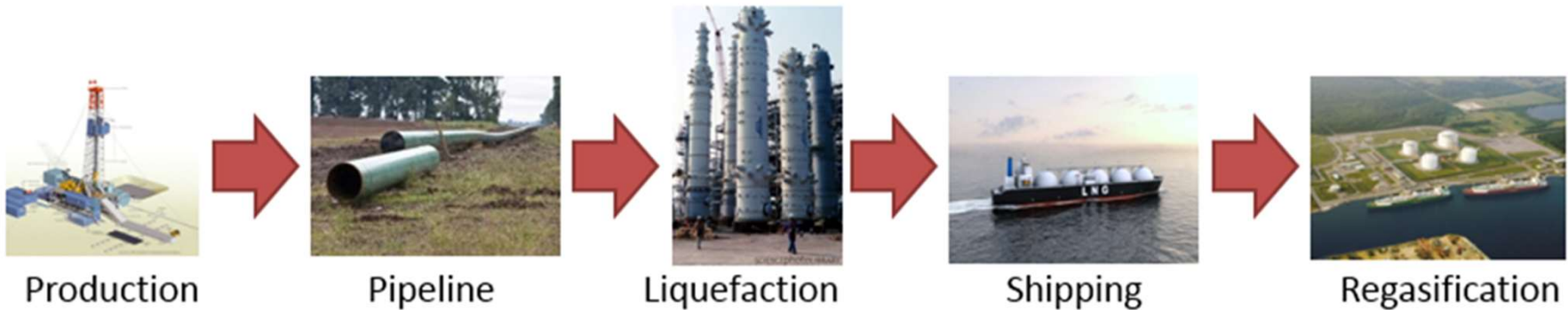
- Energy Transfer
- Legacy SXL
- Marcus Hook
- Eagle Point
- Nederland
- Midland
- Terminals

## Recently In-Service & Announced Growth Projects

- Lake Charles
- Dakota Access
- Crude Conversion
- Comanche Trail
- Trans-Pecos
- Bayou Bridge
- Rover
- Revolution
- Mariner East Phase 2



# THE LNG TRAIN



## Natural Gas/LNG Conversion

- Volume Reduction - 600:1
- LNG Temperature – Minus 260° F
- 1 mtpa = 130,000 Mcf/d

## Typical LNG Shipping/Tankers

- Length - 950'
- Width - 150'
- Draft (Underwater) - 38'
- Capacity - 125,000 m<sup>3</sup> (2.6 Bcf) to 250,000 m<sup>3</sup> (5 Bcf)



# TERMINAL HISTORY

Year	Milestone
1978	Construction begins
1982	Construction complete <ul style="list-style-type: none"><li>• 6.3 Bcf of storage/630 MMcf/d of sendout capacity</li></ul>
1984	Terminal placed in standby mode
1989	Terminal re-activated
2001	BG Group signs firm capacity agreement <ul style="list-style-type: none"><li>• Debottleneck project increased sendout to 1.0 Bcf/d</li></ul>
2006	Expansions placed in-service <ul style="list-style-type: none"><li>• Storage capacity increased to 9 Bcf (1 additional tank)</li><li>• Sendout capacity increased to 1.8 Bcf/d (2.1 Bcf/d peak)</li><li>• Addition of second unloading dock</li></ul>
2010	IEP placed in-service <ul style="list-style-type: none"><li>• Ambient Air Vaporization for regasification</li><li>• Liquids extraction capacity of 1.05 Bcf/d</li></ul>
2012	Terminal placed in standby mode



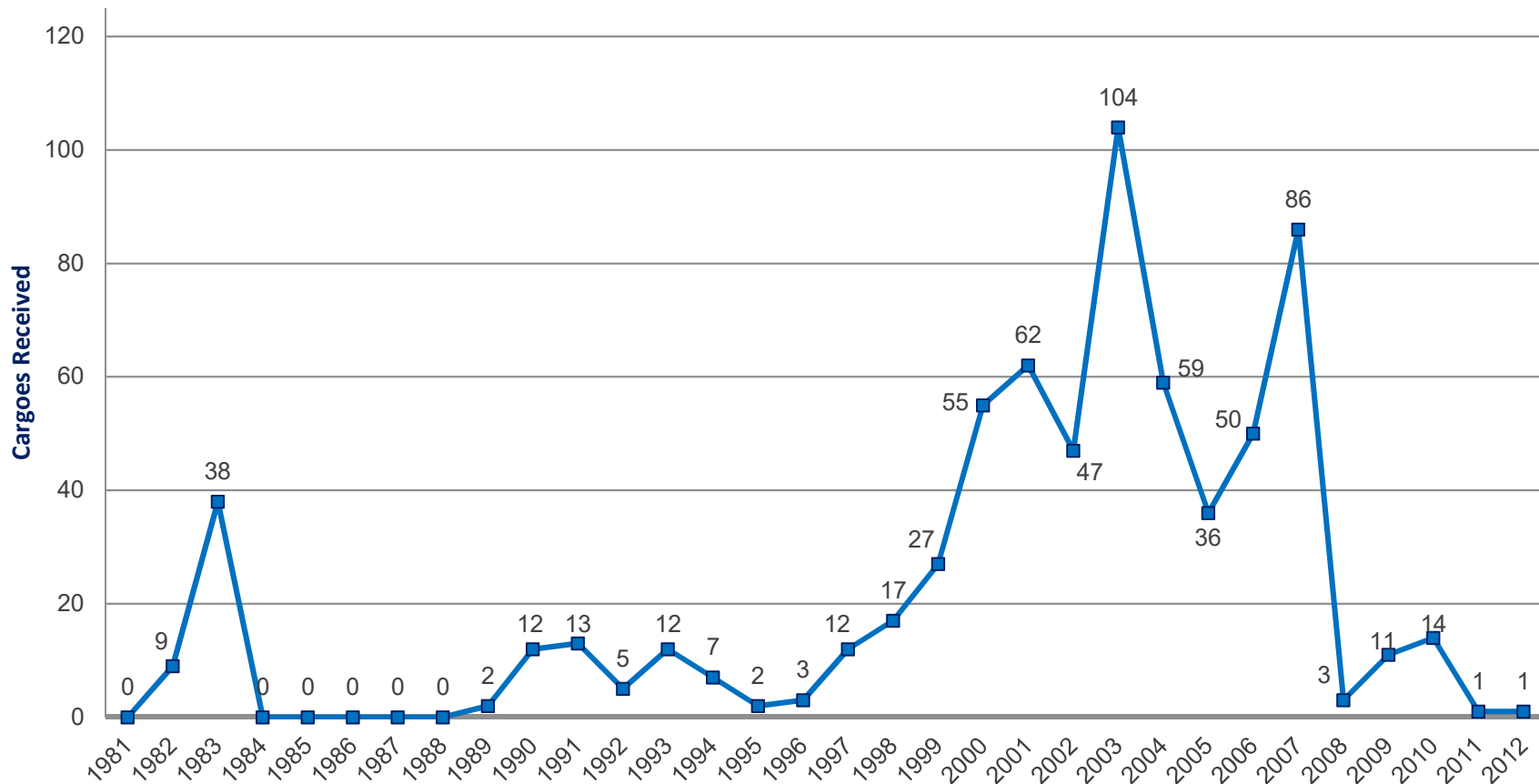
# IMPORT HISTORY

Year	Milestone
To Date	688 Cargoes received
2003	104 Cargoes received <ul style="list-style-type: none"><li>• Highest volume for a single year</li></ul>
2007	86 Cargoes received/46 in the 2 <sup>nd</sup> Quarter <ul style="list-style-type: none"><li>• Highest volume for a single quarter</li><li>• Averaged 1.5 Bcf/day for the quarter</li></ul>
2007	17 Cargoes in June <ul style="list-style-type: none"><li>• Highest volume for a single month</li><li>• Averaged 1.65Bcf/day for the month</li></ul>
2007	First time with two ships at the berths



# CARGO HISTORY

## Lake Charles LNG Total Cargoes Received = 688



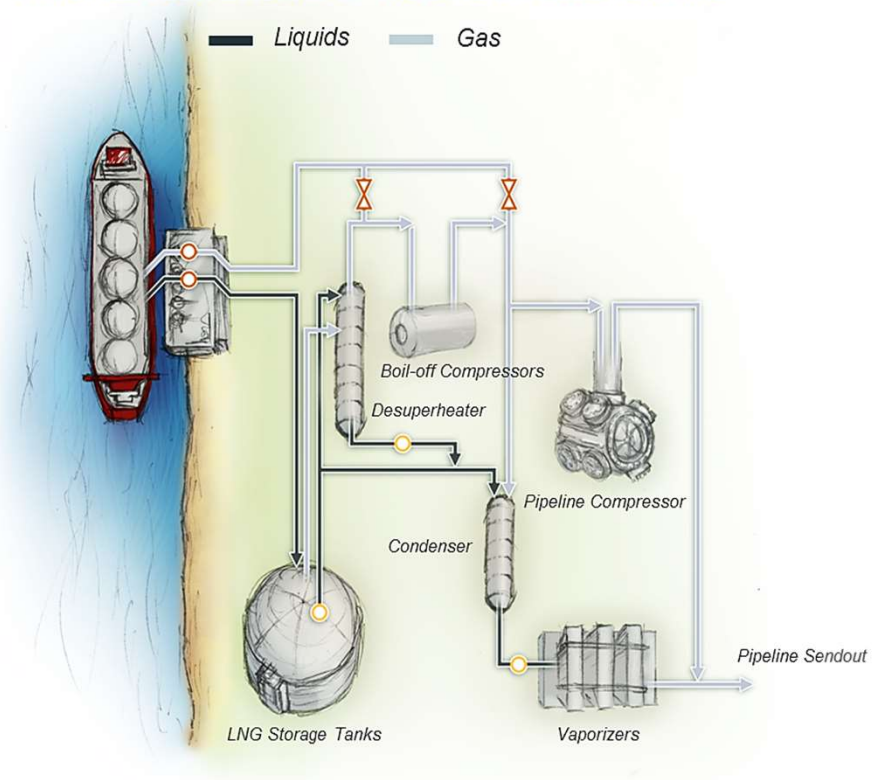


# REGASIFICATION

## Terminal Capacities

- **Sustained Vaporization**      **1.8 Bcf/day**
- **Peak Vaporization**            **2.1 Bcf/day**
- **NGL Processing**                **1.05 Bcf/day**
  - Ethane up to 50,000 bbl/day
  - Propane Plus up to 25,000 bbl/day
- **Storage**                            **9 Bcf**  
    **2.7 MM bbls**  
    **430,000 m<sup>3</sup>**
- **Peak Ships**                        **225/year**
  - East Dock up to 215,000 m<sup>3</sup> Ships
  - West Dock up to 150,000 m<sup>3</sup> Ships
- **Pipeline Compression**        **18 MMscf/day**

SIMPLIFIED FLOW DIAGRAM OF THE LAKE CHARLES TERMINAL

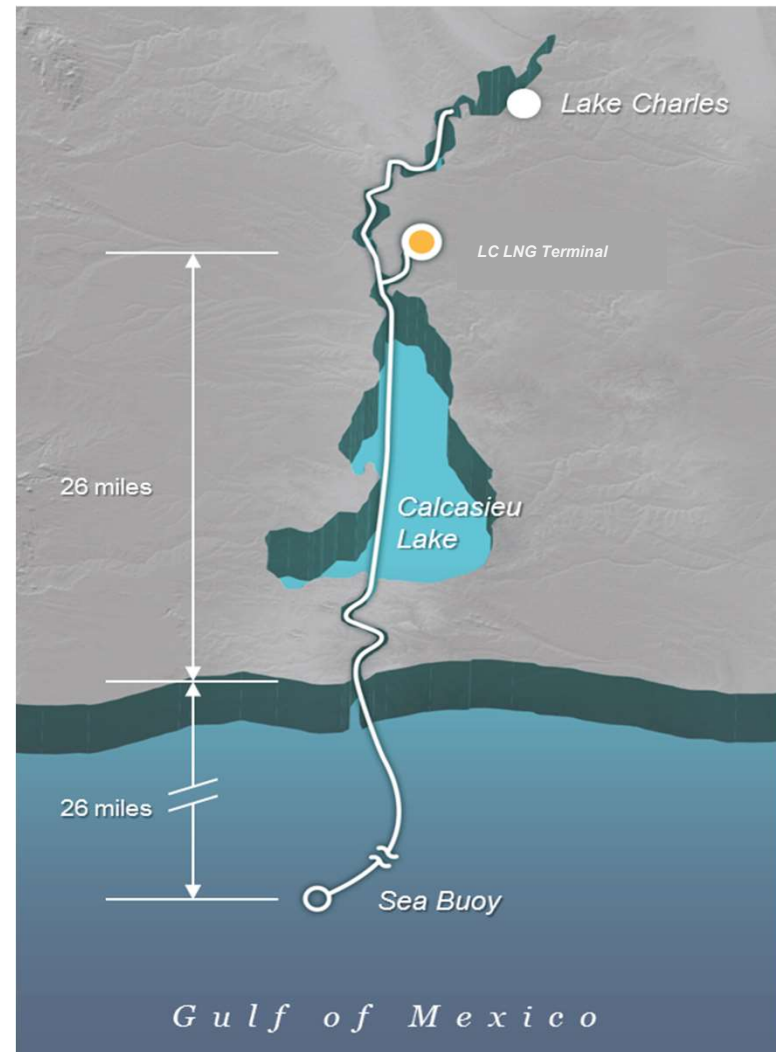




# VESSEL TRANSIT

## Calcasieu Ship Channel

- **52 mile channel**
  - 26 miles inshore
  - 26 miles offshore
  - 400 feet wide
  - 40 foot depth
- **6 to 8 hr. transit (one way)**
- **One-way channel traffic for deep draft vessels**
- **Moving Security Zone**
  - 2 miles ahead/1 mile astern







# CARGO OPERATIONS/ORIGINS

- **Typical Cargo Unloading – 12 to 14 hours**
- **Overall Vessel Turnaround – 24 to 36 hours**
- **Two Unloading Docks**
  - One discharge at a time
  - Limited by BOG capacity

- **Where is it from?**

Abu Dhabi	Egypt	Nigeria
Algeria	Equatorial Guinea	Oman
Australia	Indonesia	Qatar
Brunei	Malaysia	Trinidad

- **Over 100 different LNG vessels received**
- **Vessels ranging from 29,400 m<sup>3</sup> to 150,000 m<sup>3</sup> received**



# TERMINAL LAYOUT





# SAFETY SYSTEMS

The Detection and Controls System is designed to sense the presence of both fire and leaking LNG and NGLs and in doing so, to perform the following functions:

- Sound alarms.
- Visually annunciate the detected hazard(s) on the FPS display.
- Activate selected suppression system and provide supervisory information as to which suppression systems should be manually activated.
- Initiate emergency shutdown sequence (ESS).

There are eight detector types monitoring the facility.

Five extinguishing agents are employed at the facility – Firewater, HI-EX Foam, Dry Chemical, Halon 1301 and FM-200.



# SPILL CONTAINMENT AND DETECTION





# FIRE DETECTION





# FIREWATER SYSTEM





# DRY CHEMICAL





# LNG VAPOR CONTROL







# EMERGENCY SHUTDOWN SYSTEM

**Immediate  
Facility  
Shutdown in  
“Fail Safe”  
Condition**





# LNG FIREFIGHTING

