



Liquefied Natural Gas

for a cleaner, brighter future

Low-Emission LNG Engines in Container Handling Equipment

January 2006

SES LNG Import Terminal & Vehicle Fuel Supply Depot



Natural Gas Delivery Via Existing Pipeline Network

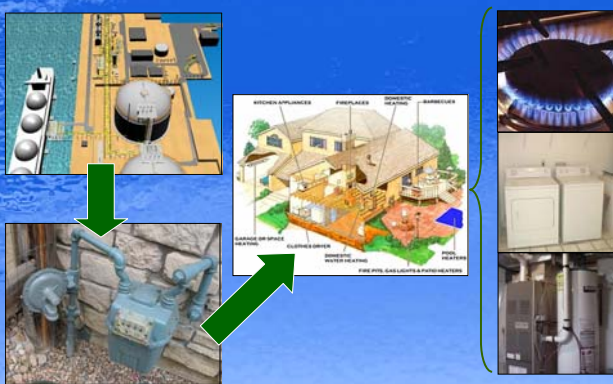


Diagram labels: OFFSHORE PLATFORMS, PIPELINES, STORAGE, BARRIERS, HOUSE, WATER HEATER, FURNACE, PIPE JOINT, GAS LEAKS & PARTICULATES

SES Vehicle LNG Fuel Supply



- SES is the only LNG import terminal to supply vehicle grade LNG
- SES will provide a stable and low-cost supply of LNG to California

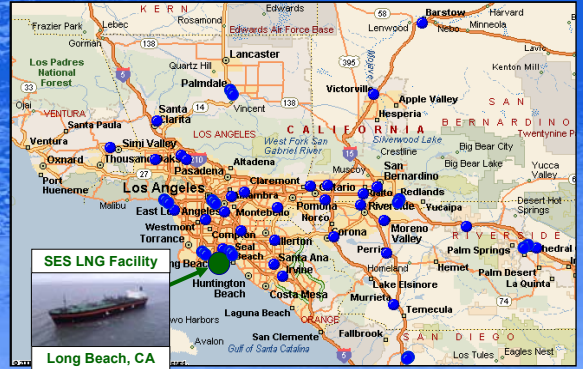


LNG as a Clean Transportation Fuel



 SOUND ENERGY SOLUTIONS

Southern California LNG Stations



 SOUND ENERGY SOLUTIONS

Comprehensive Outreach Program to LNG Industry

- CA NGV Partnership Steering Committee Member
- Outreach and meetings With Leading LNG Fleet Operators
- Meetings with Existing & Planned LNG Locomotive Projects
- MOU with ALT for Market Development Efforts
- Formal Partnership w/ Waste Management for LNG Fuel & Infrastructure
- Multiple Meetings with Major Terminal Tractor & Engine OEMs
- Outreach & Presentations to Major POLB & POLA Container Terminal Operators and Intermodal Rail Operators
- Yusen Terminals Inc. (YTI) LNG Terminal Tractor Project
- LBCT LNG Terminal Tractor Demonstration Project
- BNSF LNG Yard Tractor Project in Commerce

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SES LNG Fleet Operator Outreach

- Omnitrans
- Harris Ranch
- OCTA
- LAX
- SM Big Blue Bus
- City of Los Angeles
- Phoenix Transit
- Waste Management
- Sysco Food Services
- United Parcel Service
- Vons / Safeway
- Hunter & Hunter Trucking
- Allied Port Transporters



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SES LNG Locomotive Project Outreach

- Los Angeles Junction Railroad (BNSF)
- Clean Air Partners Transportation System (CAPTS)
- Metrolink
- BNSF
- UP



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Oct. 2005 CARB Report on Diesel PM from the Ports

Diesel Pollution from the Ports of LA and Long Beach:

- Spreads at least 20 miles inland
- Creates a cancer risk of 50 in 1 mil. w/in 15 miles
- Creates a cancer risk of 1 in 2,000 adjacent to the ports
- Causes 29 premature deaths per year (age 30+)
- Causes 750 asthma attacks per year
- Causes 6,600 lost workdays per year



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Port & Rail Terminal Operator Outreach

- Hanjin
- Marine Terminals Corp. (MTC)
- APL Terminals
- APM/Maersk
- Yusen Terminals
- SSA Terminals
- P&O NedLloyd
- TraPac
- LBCT
- ITS
- BNSF
- UP



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SES Commitment to Emissions Reductions In and Around the Ports



- Extensive Outreach Efforts Led to Development of Several LNG Deployment Projects
 - Yusen Terminals Inc. (YIT) in the Port of Los Angeles
 - Long Beach Container Terminal (LBCT) in Port of Long Beach
 - BNSF Railway (Commerce Yard)
- Development of the World's First LNG Terminal Tractor

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YTI 's Initial Commitment: Spring 2003

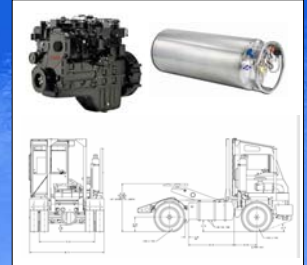


- Initial Meeting with YTI in the Spring 2003
- YTI agreed to consider a project
- Partners: SES and Applied LNG Technologies
- First steps: assess current operations and assess LNG tractor options available

ID Minimum Terminal Tractor Requirements for YTI

Must meet or exceed diesel terminal tractor capabilities

- Power and torque
- Fuel capacity
- Fueling requirements
- Turning radius
- "Drive-ability"
- "Crash-ability"
- Overall O&M



Evaluated LNG Terminal Tractor Options

- Initiated discussions with three terminal tractor manufacturers
 1. Kalmar
 2. Capacity
 3. Ottawa
- Traveled to each factory - Fall '03
- LPG was only alt. fuel option
- All three OEMs committed to provide an LNG unit
- Preliminary engineering commenced

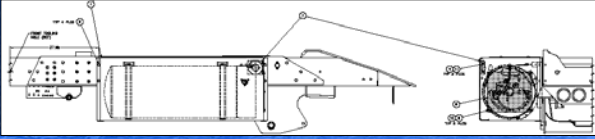


LNG Terminal Tractor Development

- Capacity was YTI's first choice for an OEM
 - Cummins B Gas Plus with modified rear axle
 - Pulling power and torque: key criteria
- Kalmar and Crane Carrier both committed to Cummins C Gas Plus (250 HP; 750 ft.-lbs.)
- Management change at YTI led to change in preference to Kalmar
- Engineering at Kalmar commenced in Spring 2004



LNG Terminal Tractor Development: Specifications



- Ottawa Commando 50 Terminal Tractors
- 132" wheelbase (vs. the typical 116")
- SISU SSND front axle for improved turning radius
- Cummins 8.3 liter C-Gas Plus Natural Gas Engine
 - 250 HP and 750 lbs-ft. torque
- 63-gallon LNG fuel tank (~ 30 equivalent diesel gallons)

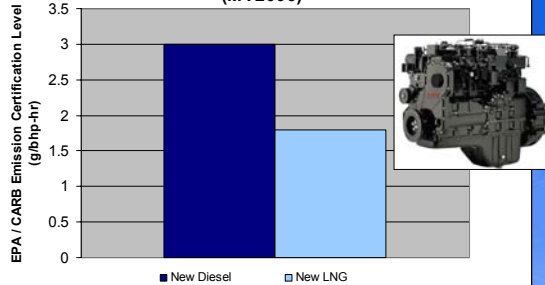
Cummins 8.3 liter C-Gas Plus Engine

- Dedicated natural gas engine
- Thousands in service world-wide
- 250 HP and 750 lbs-ft. torque
- Noticeably quieter than diesel
- Meets current ARB optional low certification level
 - 1.8 g/bhp-hr NOx
 - 0.03 g/bhp-hr PM (2006 MY meets 0.01 g/bhp-hr)
- Cleanest and most powerful engine now available for a marine terminal tractor
- Does not require exhaust after-treatment



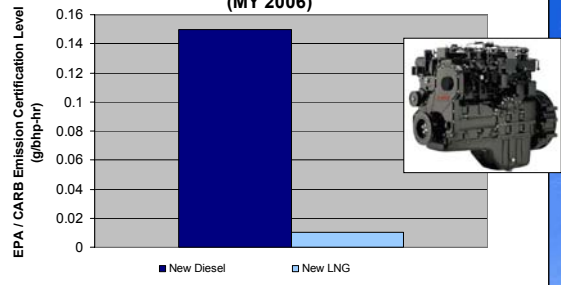
Cummins 8.3 liter C-Gas Plus Engine

Yard Tractor NOx Emission Certification Level (MY2006)



Cummins 8.3 liter C-Gas Plus Engine

Yard Tractor PM Emission Certification Level (MY 2006)



Cummins 8.3 liter C-Gas Plus Engine

- Cummins Engine Company participating in US DOE Next Generation of Natural Gas Vehicles Program
- Three (3) of nine (9) participating engines
- 8.3 liter C-Gas Plus to meet EPA 2010 on-road standards with 2007 model year
 - 0.2 g/bhp-hr NOx
 - 0.01 g/bhp-hr PM
- 2014 off-road diesel engine standards: 0.3 g/bhp-hr NOx and 0.015 g/bhp-hr PM
- "Sister" engine to the 8.3 C-Gas Plus, the 5.9 B-Gas Plus, achieved 0.15 g/bhp-hr NOx & 0.01 g/bhp-hr PM in 2004 as part of NGNGVP
- July 2005: Mack 13-liter LNG engine with after-treatment: **0.049 g/bhp-hr and 0.002 g/bhp-hr PM (83% less NOx and 86% less PM than 2014 standards)**



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Emissions Comparison

	2006	2007	2010	2014
Off Road Diesel (NOx)	3.0	3.0	3.0	0.3
On Road Diesel (NOx)	2.5	1.5	0.2	0.2
Natural Gas (NOx)	1.8	0.2	0.049	0.049
Off Road Diesel (PM)	0.1	0.1	0.1	0.015
On Road Diesel (PM)	0.1	0.01	0.01	0.01
Natural Gas (PM)	0.01	0.01	0.002	0.002

*LNG Terminal Tractor – Cleanest Available Technology
Commercially Available Now & In the Future*

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NexGen On-Board LNG Fuel Tank



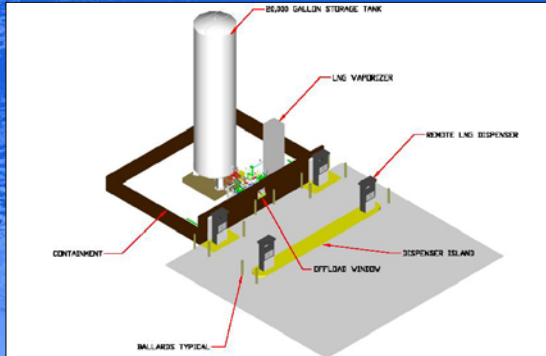
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Initial Fueling Infrastructure



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Permanent Fueling Infrastructure



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LNG Training Program



- LNG 101
 - Management
 - Mechanics
 - Fuelers
 - Drivers
 - Fire Dept.
 - Police Dept.
 - Harbor Dept.
 - Anyone else upon request



- Mechanic Training
- Fueler Training
- Driver Survey Orientation
- On-Board LNG Tank System

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YTI LNG Project Funding

- South Coast AQMD Carl Moyer Program – Oct. 2003
 - Funding for 10 LNG Terminal Tractors
 - \$291,280 Secured
- Port of LA Air Quality Mitigation Program – April 2004
 - Funding for 27 LNG Terminal Tractors and Permanent LNG Refueling Infrastructure
 - \$974,000 for LNG Tractors and \$188,541 for Station
- Purchase Order Placed – April 2005
- First Units Delivered - October 2005
- *World's First LNG Terminal Tractor*
Now Commercially Available



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World's First LNG Terminal Tractor



- October 2005 Ribbon Cutting



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LBCT LNG Yard Tractor Project



Long Beach Container Terminal (LBCT) LNG Terminal Tractor Project

- Initiated in July 2004 by the Port of Long Beach, SES was invited to jointly sponsor the project
- First purchase order – August 2004
- 3 units delivered Oct. 2005
- Received US EPA grant funding
- 6 month test period



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LBCT LNG Demonstration Project



- Very similar project to YTI: same tractors / engines and similar fueling infrastructure



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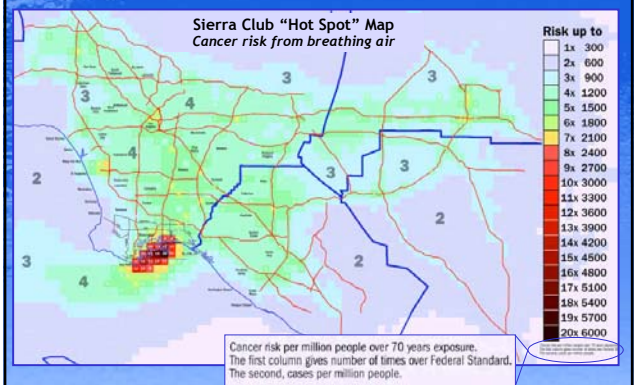
BNSF Commerce Yard LNG Project

- BNSF: Long History Using LNG
- Project with SES Initiated: April 2005
- Submitted Application to South Coast AQMD Carl Moyer Program for 10 LNG Yard Tractors
- BNSF has Committed to 100% LNG Yard Tractor and Switch Locomotive Operation for New Near-Dock Facility

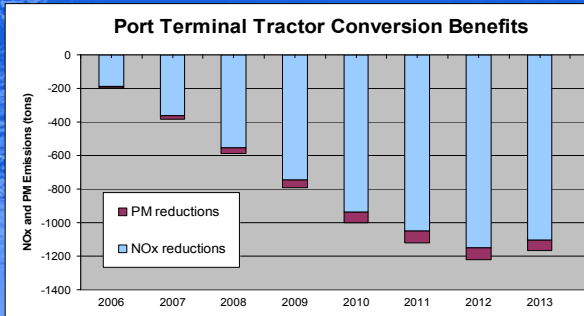


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SES is Committed to Air Quality Improvements in POLA & POLB



Benefits of POLA / POLB Fleet Conversion to LNG Terminal Tractors (SES' Goal)



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LNG: The Cleanest Option



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