

# NAVIGATOR GAS



Capital Link International Shipping and Offshore Forum  
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Navigator Holdings Ltd. "NVGS"



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# A global shift to gas

- Natural Gas share of energy mix has increased from 16% to 21% over the past 40 years- and continues to grow.
- Oils share has declined, along with coal.
- Global buildout of LNG plants is expected to accelerate the shift to Gas.
- Environmental policy is a strong force behind the growth.
- LPG is really a substitute for oil and natural gas and is participating in the growth.



# What is LPG?

Liquid Petroleum Gas consists of three main components:

- Propane (-46°C)
- Butane (-5°C)
- Ethane (-88°C)

# What are the sources of LPG?

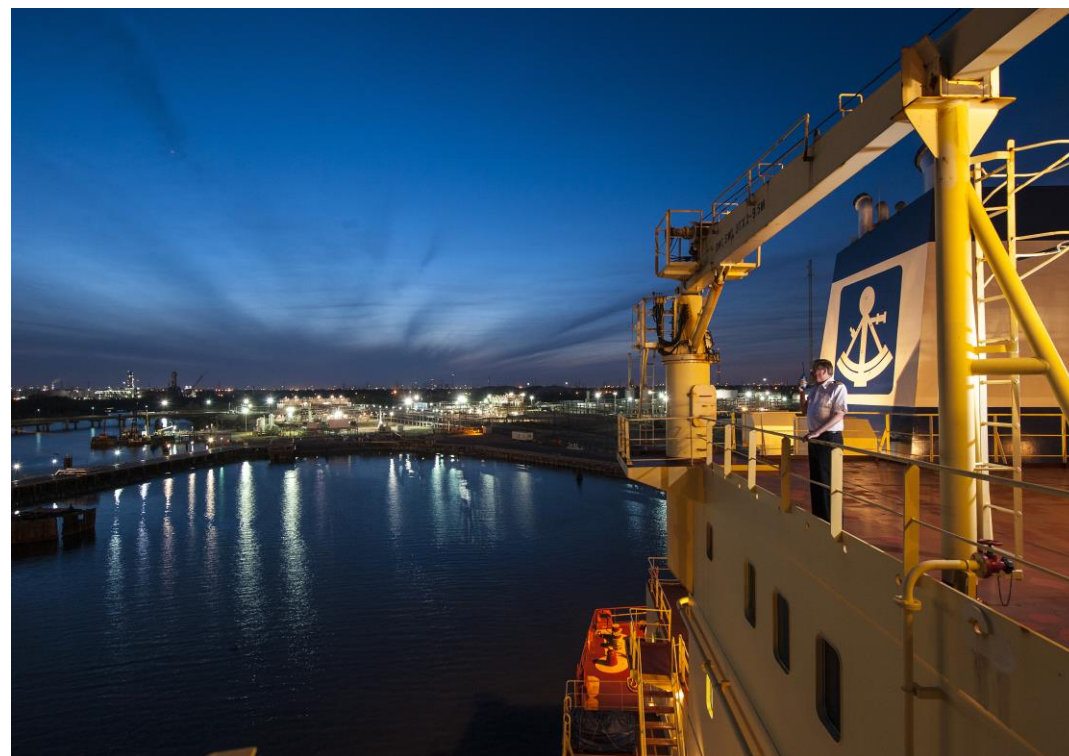
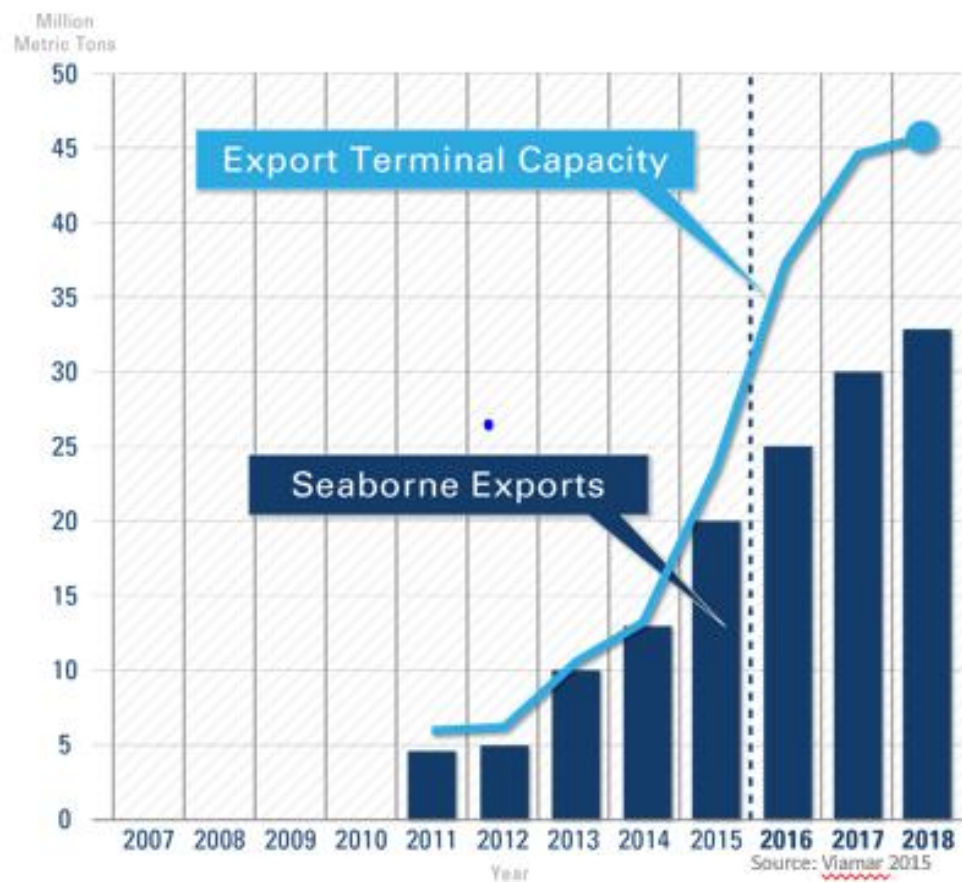
- Oil and Gas production
- Shale Gas (Fracking)
- Oil refining
- LNG Production, 6-8% LPG.

# Where is LPG produced?

- LPG is a global product
- Until 2011, the U.S was a net importer of LPG
- Today the U.S is the largest exporter, principally Propane
- Middle East, Russia and Australia are expected to continue as being LPG exporters.



# Big growth in U.S terminal export capacity





# Industry fundamentals

## SOURCE

NATURAL GAS  
PRODUCTION



CRUDE OIL  
REFINING



SHALE GAS



## CARGO

LIQUEFIED  
PETROLEUM  
GASES (LPG)

PETROCHEMICAL  
GASES

AMMONIA  
GASES

## DRIVEN BY

SUPPLY

DEMAND

DEMAND

## USE

### ENERGY

Propane and butane  
Derivative of other fuels and LNG



### PETROCHEMICAL FEEDSTOCK

Produced from saturated hydrocarbons;  
used in the chemical industry






### AGRICULTURE

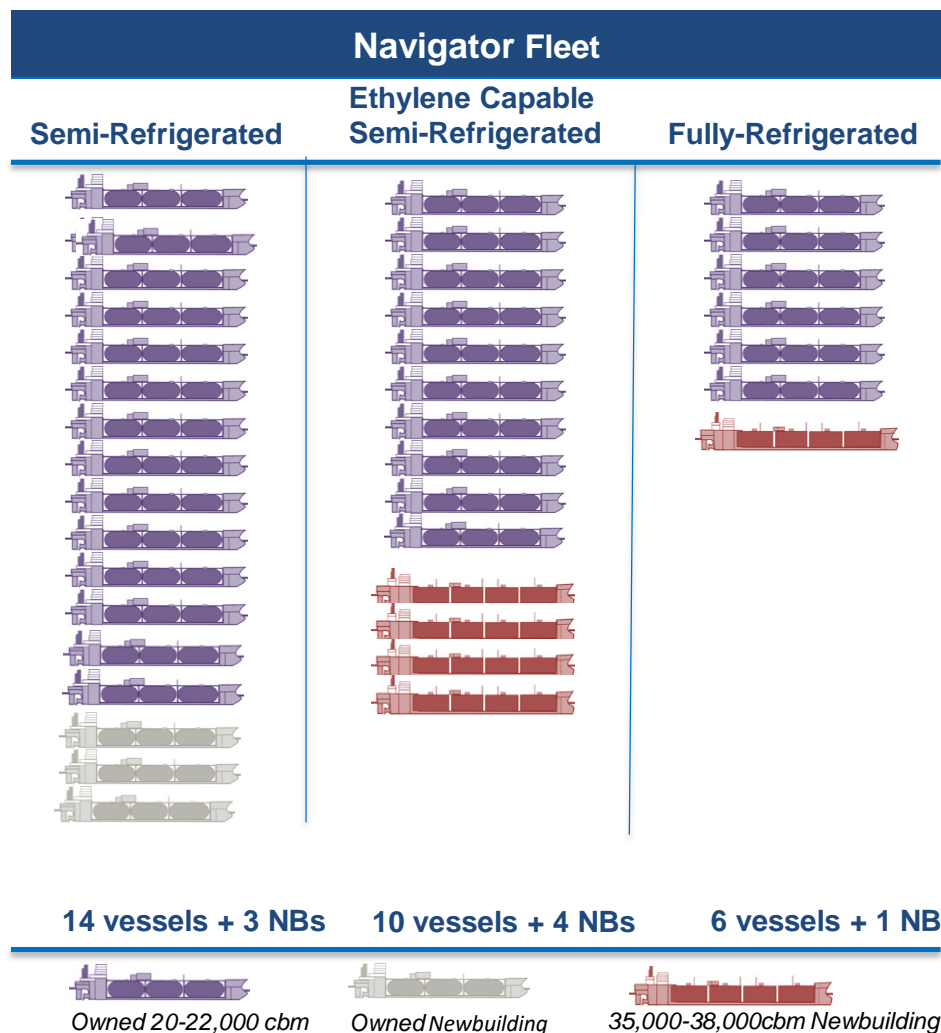
Methane gas used in producing  
ammonia for agricultural fertilizers



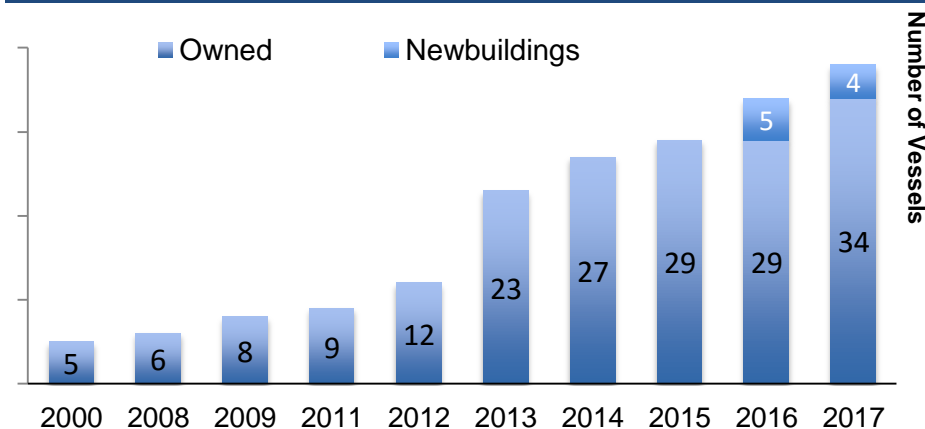
# Vessel specification

		Fully Refrigerated	Semi Refrigerated	Pressurised
		<b>Prismatic tanks</b> <b>Steel thickness</b> = 10mm <b>Max pressure</b> = 0.2 bar <b>Typical size</b> = 15,000 - 80,000+ cbm (95,000-500,000 barrels)	<b>Cylindrical Bi Lobe</b> <b>Steel thickness</b> = 20mm <b>Max pressure</b> = 5.9 bar <b>Typical size</b> = 5,000 - 25,000 cbm (30,000-150,000 barrels)	<b>Cylindrical Bottle</b> <b>Steel thickness</b> = 32mm <b>Max pressure</b> = 18 bar <b>Typical size</b> = 500 - 11,500 cbm (3,000-7,000 barrels)
				
<b>Load Cargo type</b>	Cooled	✓	✓	—
	Pressurized	—	✓	✓
<b>Cargo Capability</b> (Boiling Temp)	Butane (23°F/-5°C)	✓	✓	✓ Ambient
	Ammonia (-27°F/-32°C)	✓	✓	
	Propane (-52°F/-46°C)	✓	✓	✓ Ambient
	Ethane (-128°F/-88°C)	—	✓	—
	Ethylene (-155°F/-103°C)	—	✓	—

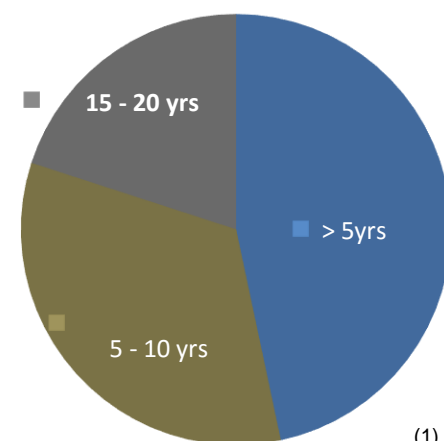
# Navigator fleet



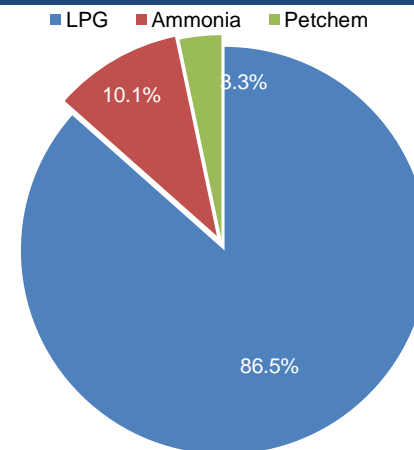
## Navigator Fleet Development



## Age profile



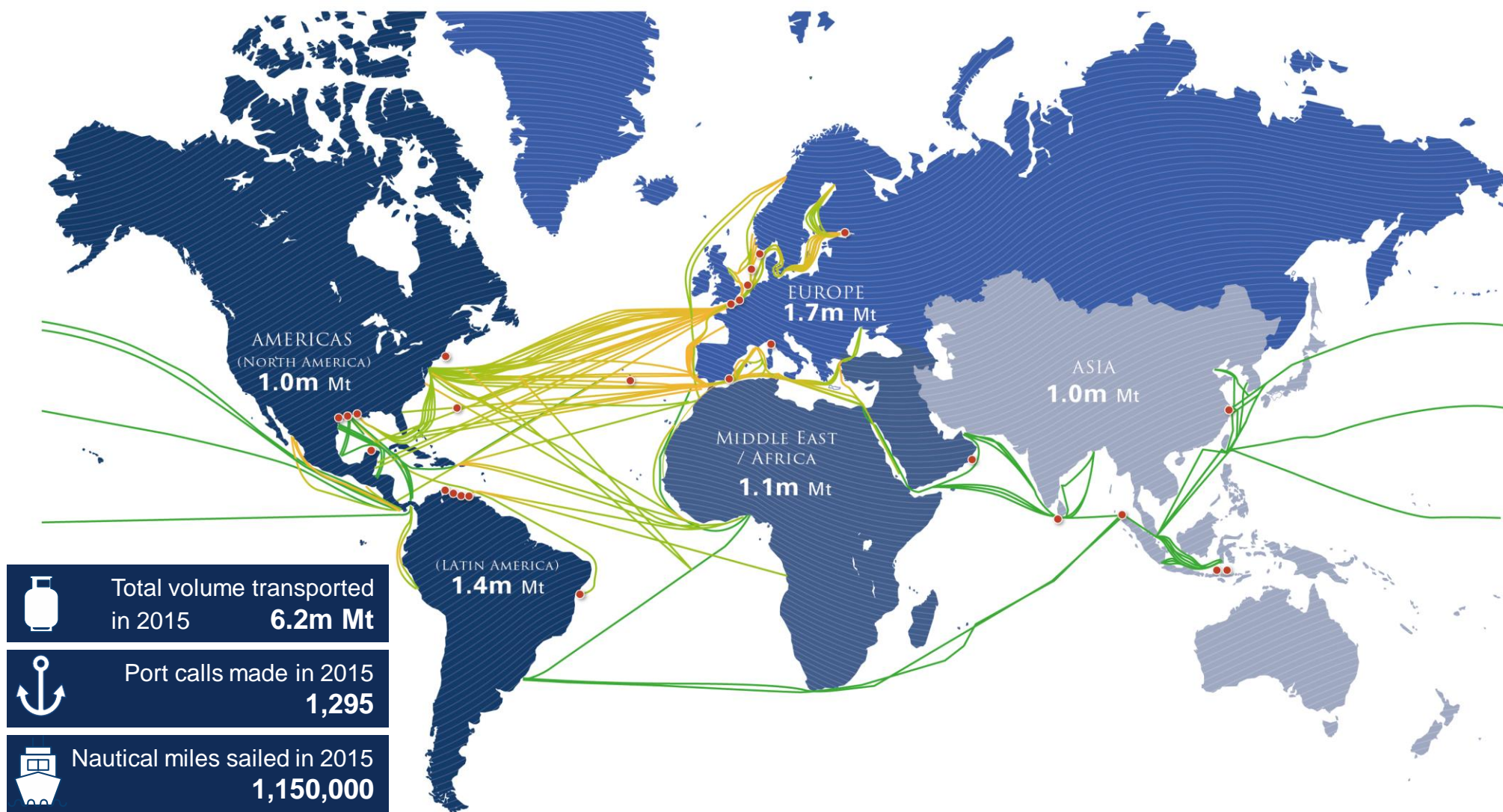
## Cargo Mix1



(1) Based on vessel carrying volumes, for the twelve months ended 12/31/15



# Global reach



\* Fleet as of 31<sup>st</sup> December 2015

# Strategic growth expected for transport of petrochemical gases

What are Petrochemical Gases?

- Butadiene
- Propylene
- Ethylene

Main shift in trading taking place from the U.S to Europe and the Far East using Natural Gas Liquids as a feedstock replacing Naphtha

- U.S is undergoing a massive expansion of Ethylene and Propylene production capacity





# U.S Ethylene – a compelling trade!



- Targa has the only Ethylene exporting terminal in the U.S
- Navigator has a 12 month COA to move Ethylene to Asia.
- The economics:
  - Ethylene is bought in the U.S for \$350/400 p/ton.
  - Terminal fees cost \$100 p/ton.
  - Transport (Navigator) \$300 p/ton
  - Total costs \$750/800 p/ton
  - Ethylene sells for \$1,000-1,100 p/ton in Asia.
  - Trading margin \$250-300 p/ton
- MORE ETHYLENE TERMINALS NEEDED!

# Ethylene revolution

- 6 new ethylene crackers under construction to start 2017-20
- +4 crackers under consideration
- U.S Ethylene Capacity to grow +51%

## US Ethylene Capacity 2013-18

US Ethylene expansions 2013-18												
Company/plant	Exp. Tons/yr	Startup	Comment	Status	Downstream	2013	2014	2015	2016	2017	2018	
Dow Chemical, Lake Charles	390	2012	Restart	Operating		390						
INEOS/Chocolate Bayou	210	2013	Debottleneck	Operating			210					
Williams Geismar, Louisiana	270	Oct 2014	Expansion	Operating			45	225				
Westlake Chemicals, Calvert City	90	2014	Expansion	Operating			45	45				
Chevron Phillips, Sweeny Texas	90	2014	Expansion	Operating			45	45				
LyondellBasell, Laporte	363	3Q 2014	Expansion	Operating			36	327				
Westlake Chemicals, Lake Charles	105	2015	Expansion	Operating				53	53			
LyondellBasell, Channelview	115	2015	Expansion	Operating				86	29			
LyondellBasell, Corpus Christie	365	2015	Expansion	Operating				91	274			
Aither Chemicals, West VA	270	NA	New									
ExxonMobil Chemical Co., Baytown Tx	1 500	2H 2017	New	Under constr	PE					300	1 200	
Chevron Phillips, Cedar Bayou Tx	1 500	2H 2017	New	Under constr	HDPE LLPE					300	1 200	
Formosa Plastic, Point Comfort Tx	1 590	2018	New	Under constr	LDPE					-	1 000	
Occidental Chemical, Ingleside Tx	545	1Q 2017	New	Under constr	EDC VCM					300	245	
Dow Chemical Freeport/Tx	1 500	1H 2017	New	Under constr	LDPE PE EPO					500	1 000	
Sasol, Lake Charles La	1 500	2018	New	Under constr	LDPE EO MEG						750	
Axiall, Louisiana	1 000	4Q 2018	New	Permitting	MEG						100	
Shell Chemicals, Monaca Pennsylvania	1 200	2019	New	FEED								
Odebrecht/Braschem, Wood county West VA	1 000	Post 2020	New	Feasibility								
Total, USGcoast	1 000	2019	New	Permitting								
PTT Global/Marubeni, Belmont Ohio	1 000	2021										
Sum		15 603										
Reserve	100% Utilisation	1 963										
Total		17 566	KTY			390	381	872	355	1 400	5 495	





# Navigator future

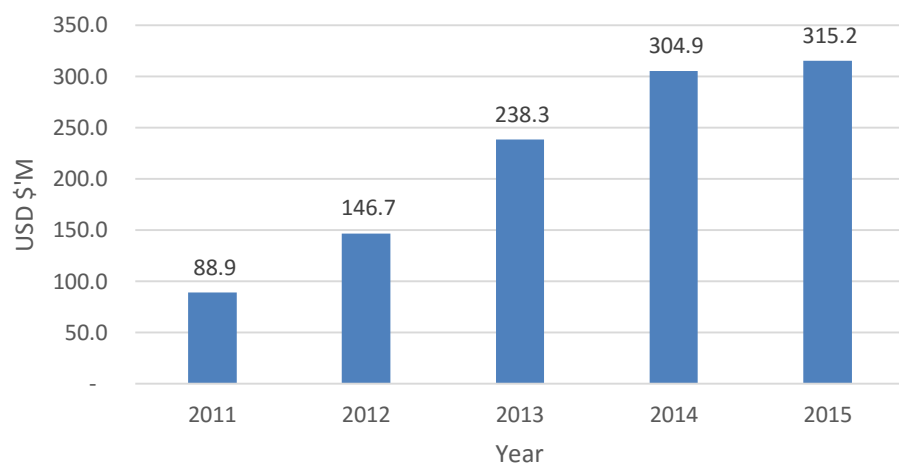
- Expand with the global growth of LPG supply:
  - More U.S exports
  - More M.E. exports
- Position ourselves as the leading transporter of Petrochemical Gases:
  - Dominant position
  - Experience of U.S exports
  - Experience M.E. exports



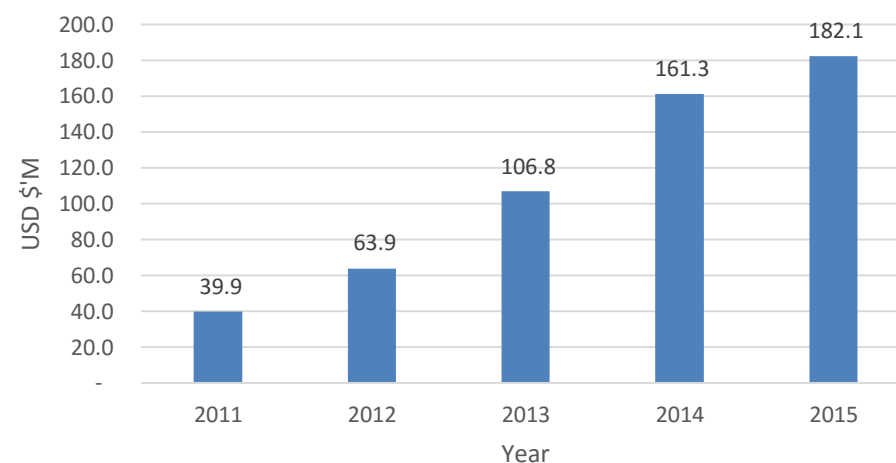
# Financial strength



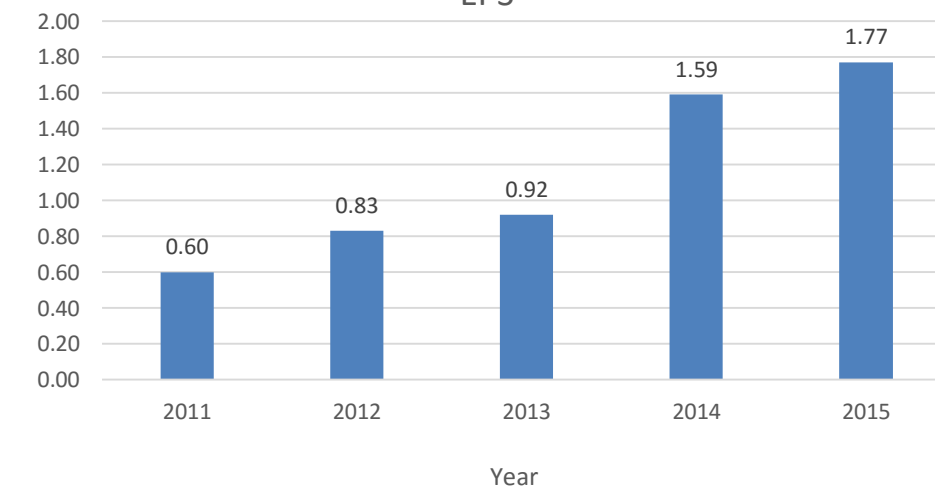
Revenue USD \$'M



EBITDA USD \$'M

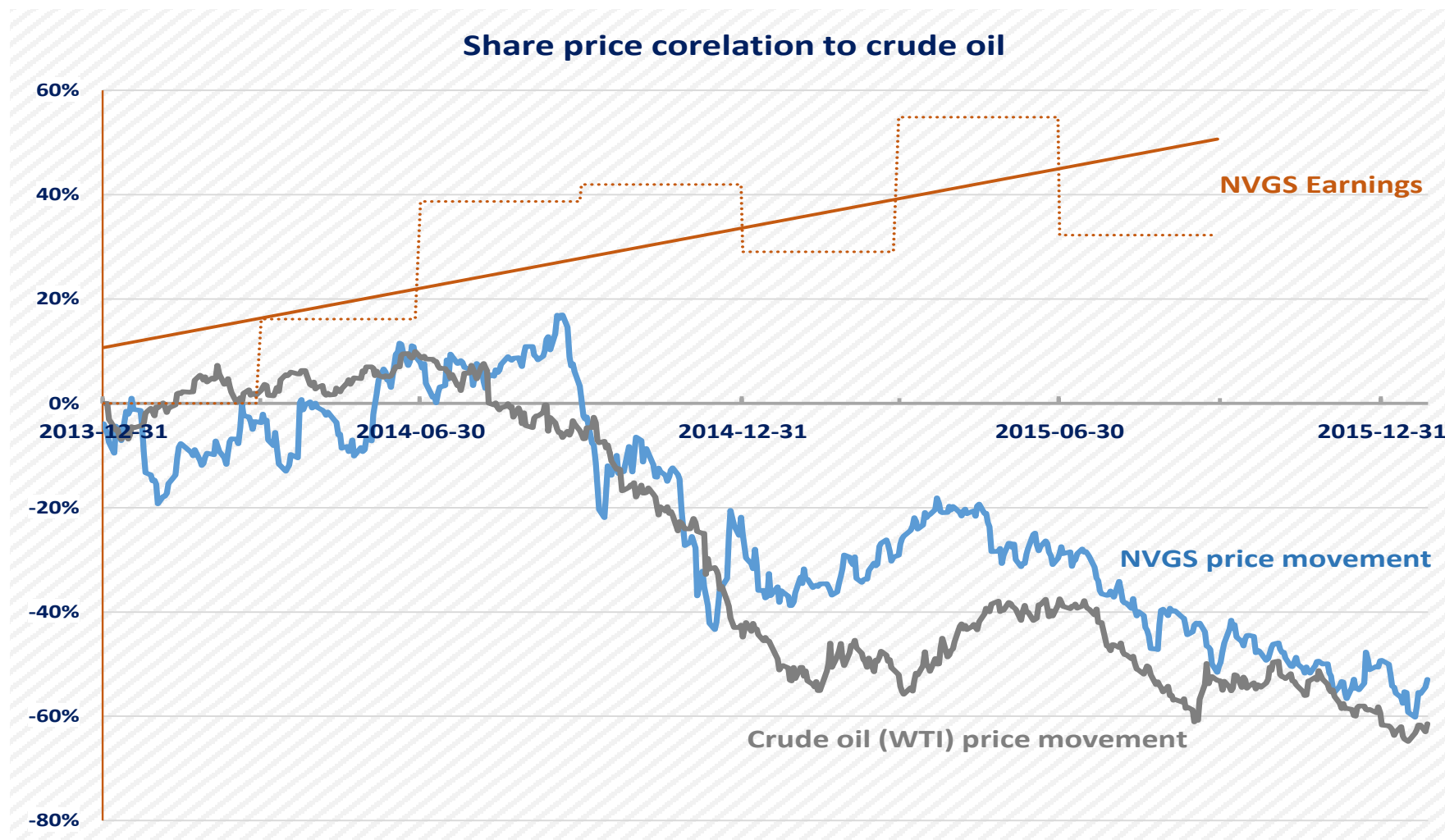


EPS





# NVGS share movement



**NGT Services (UK) Limited**

21 Palmer Street, London  
SW1H 0AD  
United Kingdom

Tel: +44 (0) 20 7340 4850

**Navigator Gas US, LLC**

399 Park Avenue  
New York NY 10022  
United States of America

Tel: +1 (212) 355 58930

**[www.navigatorgas.com](http://www.navigatorgas.com)**