



*The Panama Canal Expansion  
and its Impact on Maritime World Trade Flows*



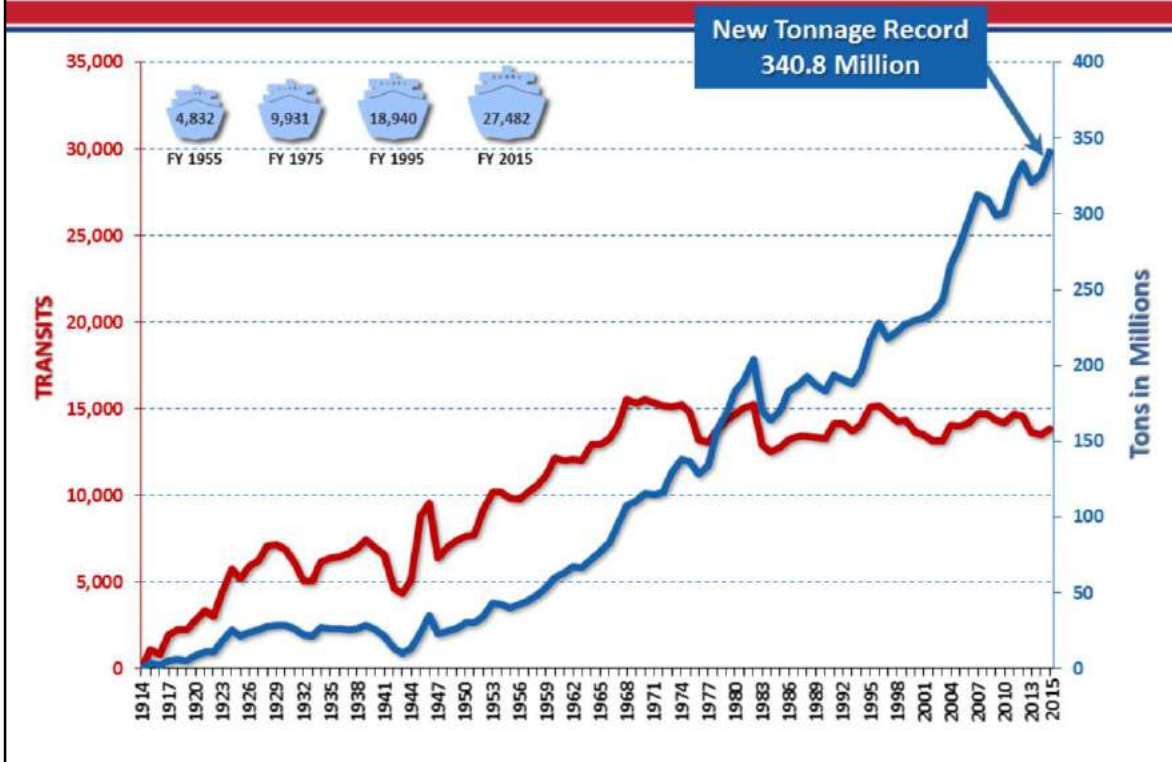
**Jorge L. Quijano**  
Administrator / CEO  
Panama Canal Authority  
January 21, 2016



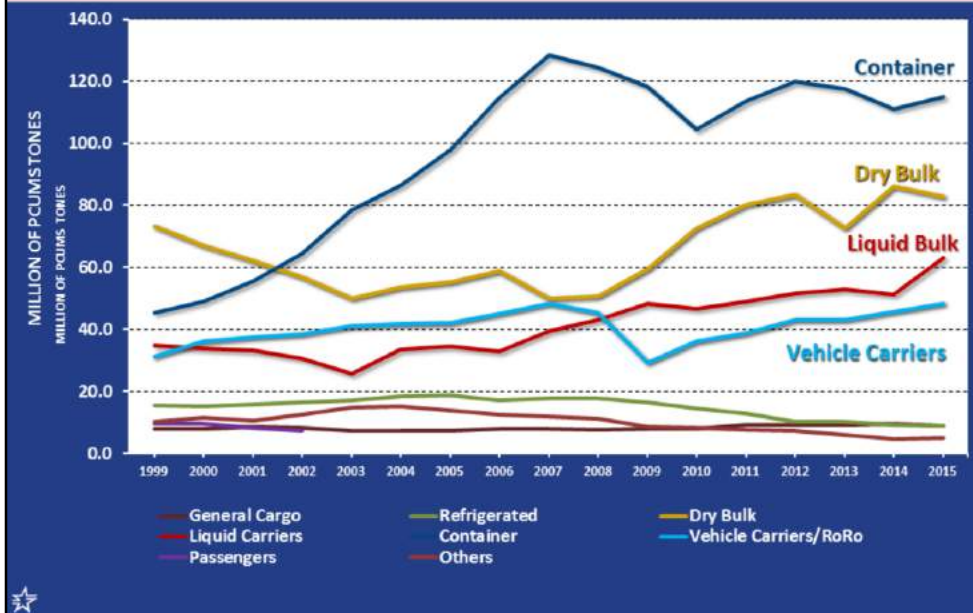
CANAL DE PANAMÁ

# TRAFFIC EVOLUTION

# Transits & PC/UMS Tonnage



## PCUMS Tonnage by Market Segment



# The Panama Canal Trade and Main Users

Total cargo movements  
229.1 million long tons

70% of Canal cargo  
traffic originates in,  
or is destined to, the  
United States



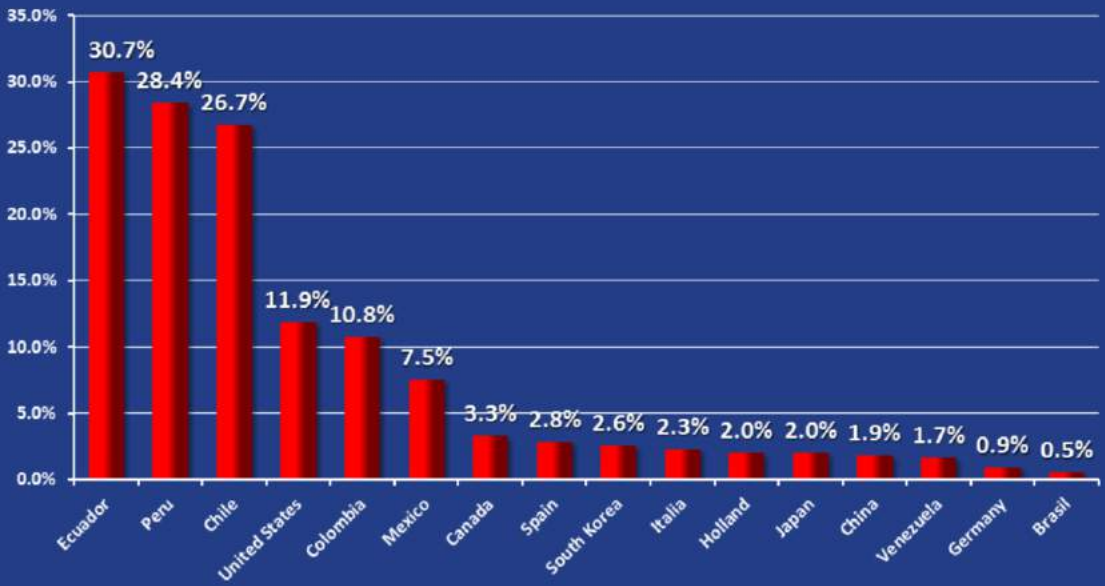
## Total Cargo Movement FY 2015

USERS	FY 2014*	FY 2015*	2015 (%)
United States	154.1	160.8	70.2
China	51.5	48.4	21.1
Chile	29.5	29.5	12.9
Japan	21.7	22.9	10.0
Peru	16.5	18.8	8.2
South Korea	19.1	18.5	8.1



\* Measured in Million of Long Tons

## Relative importance of the Canal on the International Seaborne Trade of Selected Countries 2014

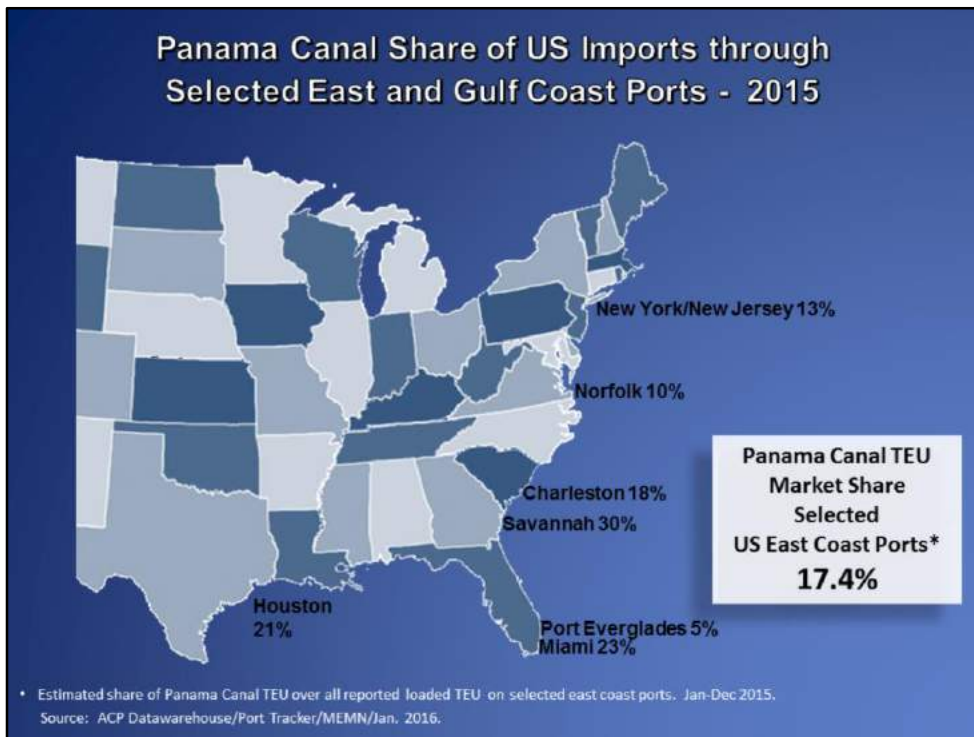


Source: ACP with IHS information, January 2015

## Liner Services Connectivity of Panama



And what you see on the screen is the network of liner services that use the Canal on a weekly basis. You can see that there are 33 liner services going from one ocean to another and 37 feeder services that transship cargo through the Canal, mostly to in the north south routes. This network will be further enhanced after the expansion with larger ships calling to the Canal and doing transshipment to the rest of the Americas...

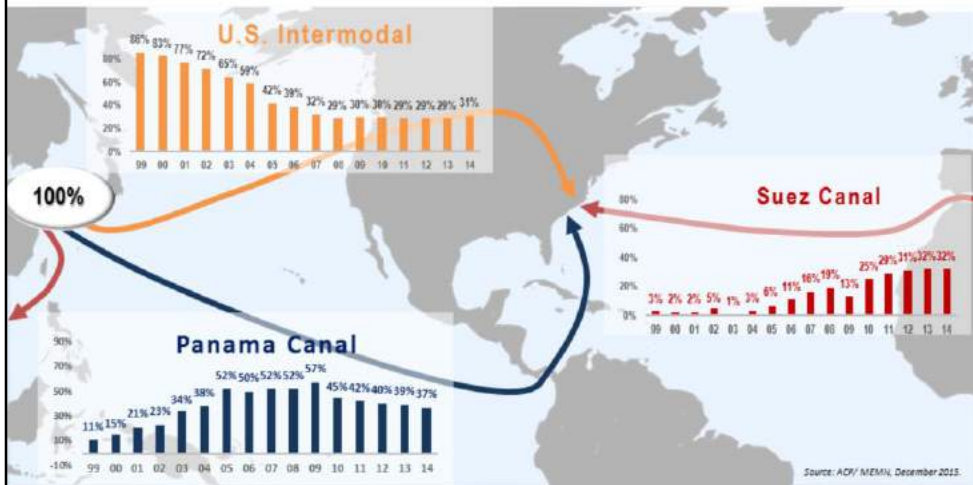


En cuanto a Servicios que llegan a TAMPA FL: ninguno transita el Canal de Panamá. Para propósitos de este slide se calcula el share utilizando los volúmenes de importaciones registrados en el año calendario 2015 de data de Port Tracker. No se registra información del puerto de TAMPA; por lo que no se incluye el cálculo. Los datos del Canal son los que registran en DW y tampoco tenemos data de TEU al puerto TAMPA.

	Total Imports (TEU)	LOADED TEU Imports thru Panama Canal	%
Houston	833,045	171,561	21%
NYNJ	3,213,569	412,672	13%
Virginia	1,085,530	112,098	10%
Charleston	830,657	149,684	18%
Savannah	1,631,473	494,382	30%
Miami	380,667	89,172	23%
Everglades	320,543	16,155	5%
	<b>8,295,484</b>	<b>1,445,725</b>	<b>17.4%</b>



# Container Cargo Market Share from Northeast Asia to the United States East Coast

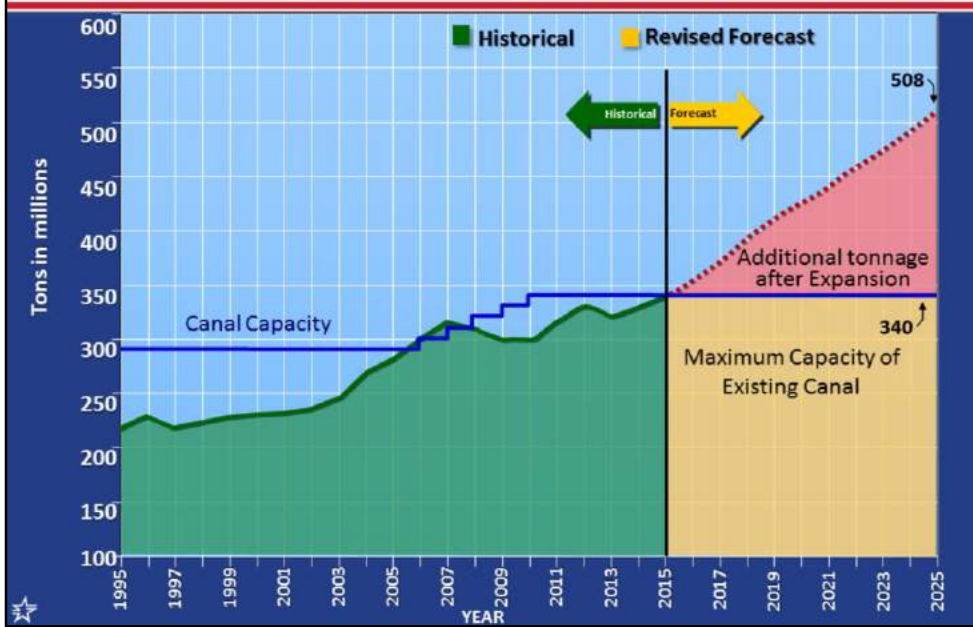


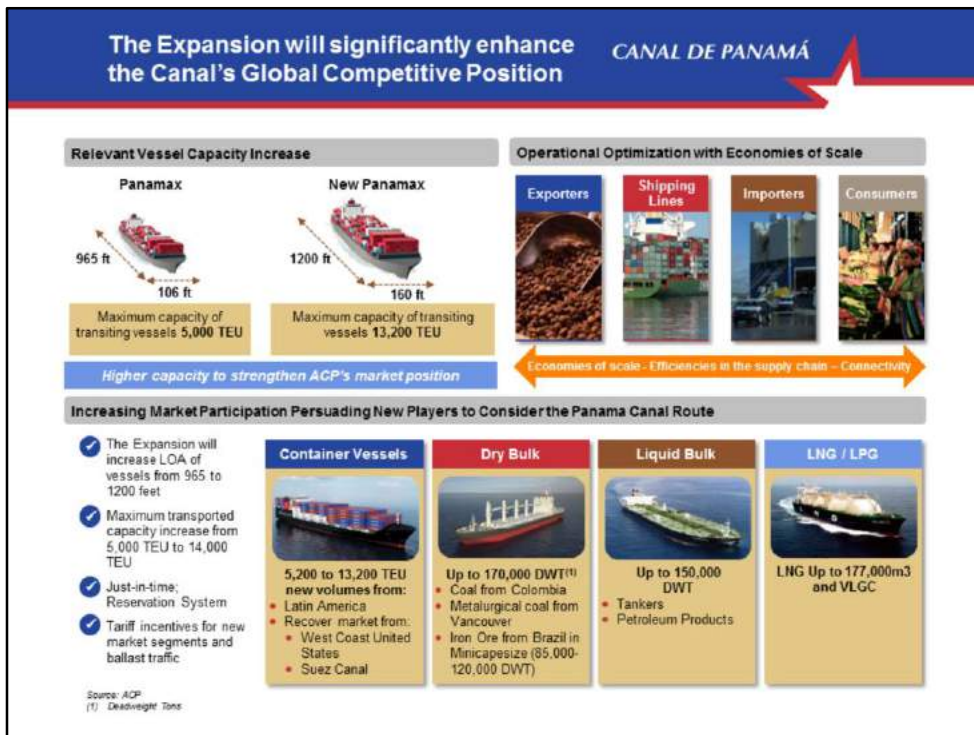


*CANAL DE PANAMÁ*

**IMPACT OF  
CANAL EXPANSION  
ON MARITIME TRADE**

# Long Term Demand



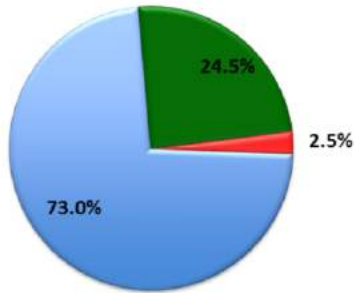


**Key message:** Upon completion, the Canal will be able to tend to an extra **24.3%** of global vessel fleets.

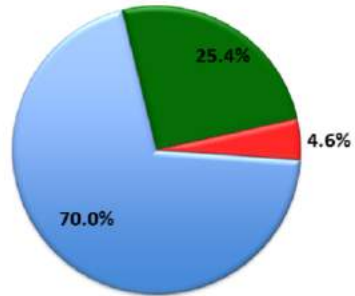
- The larger dimensions of the Canal locks will enable access of New Panamax-sized vessels, which carry almost three times as much cargo as Panamax counterparts (14k v 5k)
- The Expansion, in particular, will be able to accommodate New Panamax LNG vessels, which will also allow for transshipment opportunities by taking advantage of expected container terminal port capacity, railroad improvements and multipurpose capacity facilities
- Additionally, the ability to tend to New Panamax-sized, so we will have a reduced cost per unit of cargo because larger vessels will be able to transit the Panama Canal
- The Expansion will more than double the waterway's tonnage capacity, unlocking economies of scale and enabling a pricing strategy that incentivizes usage of the Canal, driving transportation costs down. Given that transportation comprises a significant part of the overall cost, the Expansion will create a virtuous circle of economic activity in the orbit of the Canal, enhancing its network capability and connectivity and benefitting exporters, importers, shipping lines, and ultimately customers

# Container Vessel Fleet


Existing Fleet 2015



Estimated Fleet in 2019



In 2019, **95.4%** of the containership fleet will be able to transit the Panama Canal

 Panamax or less

 Neo Panamax

 Post Panamax

Source: Fairplay World Fleet as of August 2015.



## Impact of Expansion on Container Services – Asia to the U.S.

As much as 10% of container traffic between East Asia and the US could shift from West Coast Ports to East Coast Ports



Source: Wide Open, How the Panama Canal Expansion is Redrawing the Logistic Map (White Paper), The Boston Consulting Group, 2015.

In recent years, the market share on the West coast ports has stabilized. West coast port growth rates in container volumes are quite conservative, contrary to the growth that in recent years have had East Coast ports. For example, last year the East Coast ports recorded an 8.9% growth versus 2013, while the West Coast ports recorded a 4.3% growth.

There are many aspects that could explain this situation, such as: labor problems at the West Coast Ports and ILWU negotiations, port congestion and productivity issues, among others. Today, cargo diversion from the West Coast port to the East Coast ports thru the Panama Canal and Suez Canal is taking place. Shippers want to ensure their cargo will be on time to their final destination.

However, in the last years the Suez Canal has benefited the most, capturing some of the intermodal market share with the deployment of new services using bigger vessels and taking advantage of the economies of scale that they provide, but this will not last for long.

The Panama Canal expects to recover the services that were redeployed thru Suez Canal, and in addition we expect an increase of cargo diversion from west coast ports, as soon as the new locks begin operations. The expansion project will have ripple effects on ports, railroads and the value of land adjacent to ports. It is expected, that we will be capturing approximately 5% to 8% of additional loaded container cargo coming from west coast ports. This additional volume will be distributed among the services coming from Northeast Asia to the US East Coast ports.

The Panama Canal expects for the first year of operations of the new locks: about 11 services of Neopanamax vessel (8 to be deployed between Asia to USEC), with an average vessel size of 7,500 TEU. For the first year, the 11 services represent around 3 Neopanamax transits a day.

The Panama Canal offers many advantages to the industry: not only it provides connectivity and a strategic location - saving time and cost, also we are in the process of implementing a more attractive price strategy and working in a new business development program to attract more cargo that will have a positive impact in the US East Coast Ports. (We are also implementing a loyalty program for containerships that will provide price reductions to those lines that use the Canal most frequently.)

East Coast is the major population center of the US and the major consumption center, its supplying requires substantial transportation infrastructures that you have already in place.

## Latin American Population / Projected Growth - 2010-2030

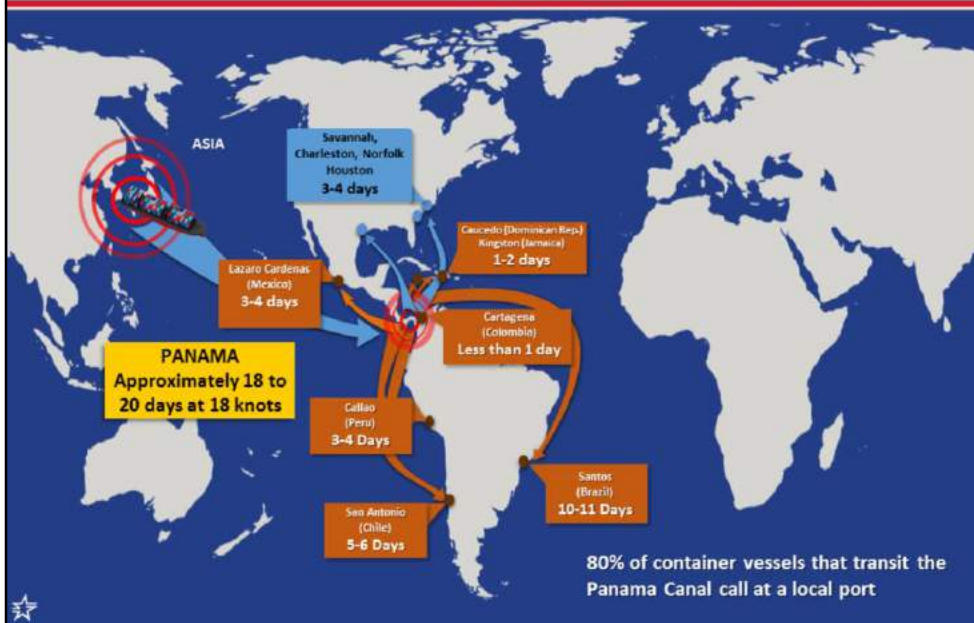


Panama is your gateway to Latin America. It is expected that by the year 2030, the Latin American population could grow by 19% to reach 700 million... markets in Ecuador, Peru, Chile and Bolivia will account for over 80 million consumers... a similar number as Colombia and Venezuela...

Many of these countries are dependent on the Panama Canal for their seaborne trade...

# The Panama Canal

It is all about reliability, connectivity, and value added services



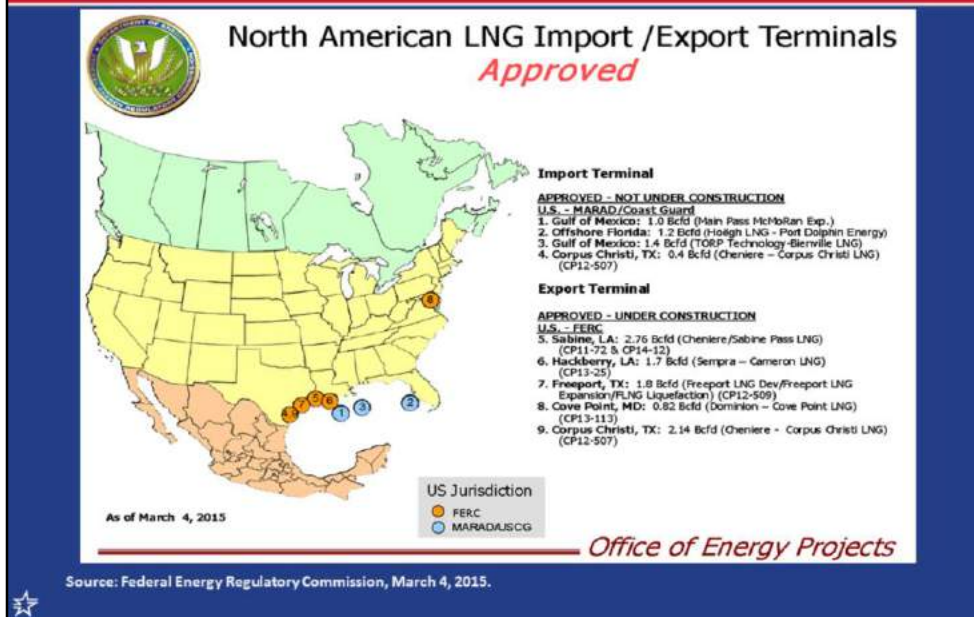




# Grain Exports from the United States



## Terminals approved by DOE/FERC



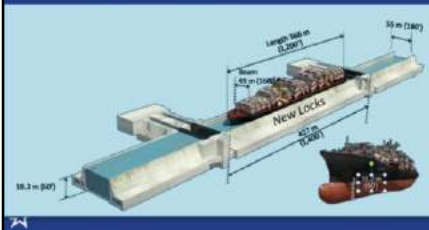
So far, 5 LNG export terminals in the United States have received full approval by the Federal Energy Regulatory Commission (FERC) and the Department of Energy (DOE) to export domestically produced natural gas. These projects are located in the Gulf of Mexico and the East Coast as we can see in the picture.

## LNG world fleet and orderbook

- Today  
Only 5.6% of the LNG world fleet can fit in the Panama Canal locks

	Existing Fleet	Orderbook
Beam	5.6%	21.6%
LOA	99.3%	82.4%
Draft	100.0%	80.0%

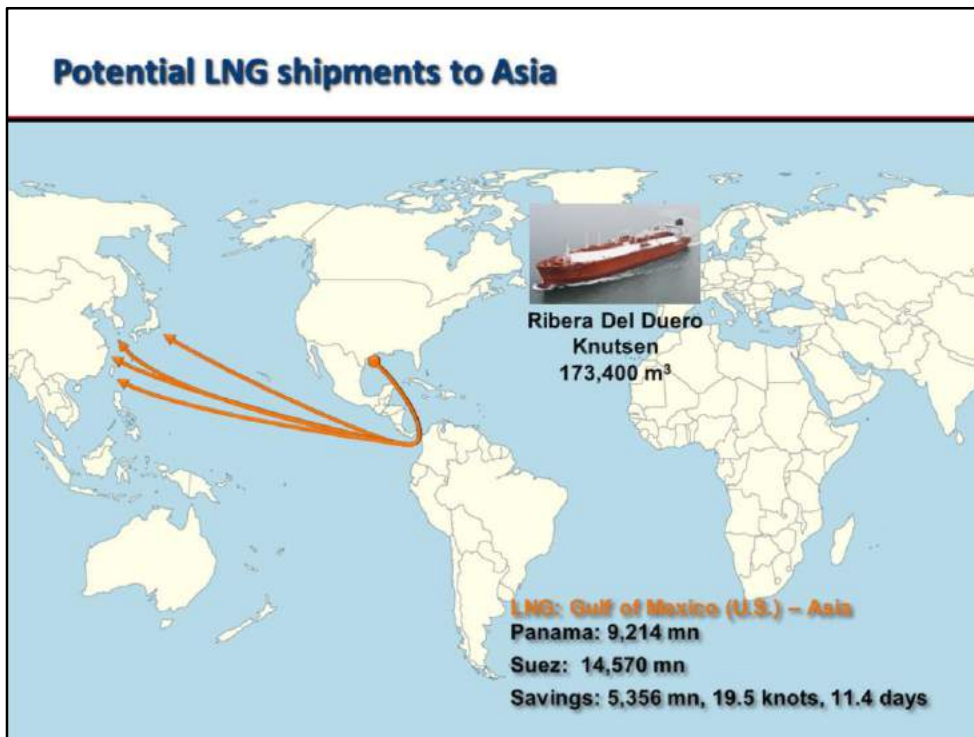
- By 2016...



	Existing Fleet	Orderbook
Beam	88.6%	92.6%
LOA	100.0%	100.0%
Draft	100.0%	100.0%

Well, the figures we have today show that only 5.6% of the LNG fleet can actually fit through the existing locks of the Panama Canal, and roughly 21.6% of the orderbook; these are vessels too small to take on a long haul voyage.

However, when the new locks open in 2016, this picture should change dramatically. By 2016 with the expanded Canal, around 88.6 percent of global fleet will be able to transit and around 92.6 percent of the orderbook.



The potential LNG trade for the new locks is the route from the Gulf of Mexico to Asian countries. This particular route will save around 11.4 days per leg and 22.8 day in roundtrip.

As I mentioned, shale gas discoveries in the United States can turn the country into a net natural gas exporter and the Panama Canal expansion would make competitive U.S. gas deliveries to major Asian importers.

\*Average LNG charter rates in 2014 were 75,000 usd/day

## Terminals Approved by DOE/FERC

PROJECT	LOCATION	STATUS	ANNOUNCED DATE FOR OPERATIONS	TRAINS	CAPACITY (MTPA)
SABINE PASS LNG	CAMERON PARISH, LOUISIANA.	UNDER CONSTRUCTION	2016	5 X (4.5 MMTPA E/O)	22.5
DOMINION COVE POINT	CHESAPEAKE BAY IN MARYLAND.	UNDER CONSTRUCTION	2017	1X (5.75 MMTPA E/O)	5.75
CAMERON LNG	LOUISIANA, U.S.	UNDER CONSTRUCTION	2018	3 X (4.0 MMTPA E/O)	12.0
FREEMPORT LNG	QUINTANA ISLAND, FREEPORT, TEXAS.	UNDER CONSTRUCTION	2018	3X (4.4 MMTPA E/O)	13.2
CORPUS CHRISTI	LA QUINTA CHANNEL, TEXAS	UNDER CONSTRUCTION	2018	3 x (4.5 MMTPA E/O)	13.5

Source: IHS Energy Liquefaction Database, January 2016.

**66.9**

\***MMTPA E/O** = million tons per annum each one.

**SABINE PASS LNG** is being developed by Cheniere in Louisiana, US. Initially proposed as a 4 train facility, Cheniere is also considering 2 expansion trains. Cheniere is responsible for securing feedstock. Capacity holders will pay Henry Hub prices plus a 15% premium for feedstock and a flat fee for liquefaction. Having sanctioned **Trains 1-4 in 2012**, Cheniere reached FID (Financial Investment Decision) on **Train 5** at Sabine Pass in June 2015. The train is underpinned by binding SPAs with Centrica and TOTAL; exports are slated to begin as early as 2018, with commercial operations to begin in early 2019. In developing Train 5, Cheniere will also gain access to TOTAL's regasification capacity at the existing terminal.

The engineering company in charge of the Sabine Pass construction, San Francisco-based Bechtel, said that it had continually been moving towards completion of the first liquefaction Train and was still “working through a few items” that will provide assurances to Cheniere on plant reliability and performance. The first commissioning cargo was expected to depart from Sabine Pass in late January 2016 but was delayed to late February/early March 2016 due to an instrumentation issue during the commissioning process.

**DOMINION COVE POINT** Located in Lusby, Maryland on the US East Coast, Cove Point LNG is an existing LNG import terminal that owner Dominion is now converting to

a 5.25 MMtpa liquefaction facility. The project began early site construction in October 2014. Dominion has received DOE approval to export LNG to both FTA and non-FTA countries. It received FERC approval in Sept 2014, after the EA was released in May. The EPC contract is held by a JV between IHI and Kiewit. Dominion started construction in late 2014. The company is targeting a late 2017 start date.

**CAMERON LNG** Operated by Sempra and located on the Gulf Coast of Louisiana, Cameron LNG is an existing import terminal that is being converted to a 12 MMtpa LNG export facility. The project will operate as a tolling facility and has signed tolling agreements with Mitsubishi, Mitsui and ENGIE. Each capacity holder also took a 16.6% equity stake in the project. Sempra has said it is also evaluating a possible fourth and fifth train, but has not announced a start date. Full FERC-approved capacity is 14.95 MMtpa, but Cameron LNG has DOE approval to export (and has signed LTAs for) only 12 MMtpa. It has filed to export the additional 2.95 MMtpa, but this has not been approved by DOE. Possible expansion trains (T4-5) would require additional approvals. Cameron LNG reached FID in August 2014 and is now under construction. It has received DOE approval for exports to both FTA and non-FTA countries and has full FERC approval. FEED was completed by Foster Wheeler; EPC is being done by a JV between CB&I and Chiyoda. Sempra originally announced a start date of December 2016, but this timeline was pushed back due to delays in the FERC environmental review. Sempra now expects to bring all three trains online in 2018.

**FREEPORT LNG** Located on the Texas Gulf Coast, Freeport LNG was proposed in late 2010 and began construction on Phase 1 T1-2 in November 2014. The second phase (T3) began construction in April 2015. The project was revised from four 2 MMtpa trains to three 4.0 MMtpa trains. FEED work was for three 4.4 MMtpa trains. However, each train is expected to be able to produce at a maximum capacity of 5 MMtpa (0.6 MMtpa above nameplate capacity). Construction on T1-2 began in November 2014; construction on T3 began in April 2015. Freeport has received FTA and non-FTA approval and received full FERC approval in July 2014. FEED was done by Zachry Industrial and CB&I. In December 2013, Zachry and CB&I were awarded the EPC contract for T1-2. The same firms were later awarded the EPC contract for T3. Train 1 is slated to be operational in mid 2018 with Train 2 coming online six to nine months later. We expect a slightly longer gap between T3.

**CORPUS CHRISTI** Located on the Gulf Coast of Texas, Corpus Christi LNG was initially proposed as a regasification terminal but is now being developed by Cheniere as a greenfield bi-directional facility with 13.5 MMtpa of liquefaction capacity. Construction began on T1-2 in May 2015. Corpus Christi will consist of

three 4.5 MMtpa trains, but Cheniere is expected to initially focus on only T1-2. Corpus Christi LNG is fully approved by both the DOE and FERC. In May 2015, Bechtel began construction on T1-2. A separate EPC was signed for T3. Bechtel is also constructing Cheniere's Sabine Pass LNG project. Cheniere took FID on T1-2 in May 2015. It expects to bring the first train online in early 2019, following a 46 month construction period. Each train is targeted to come online six to nine months after the previous train. T3 is contingent on Cheniere securing additional buyers, with FID scheduled for late 2015.

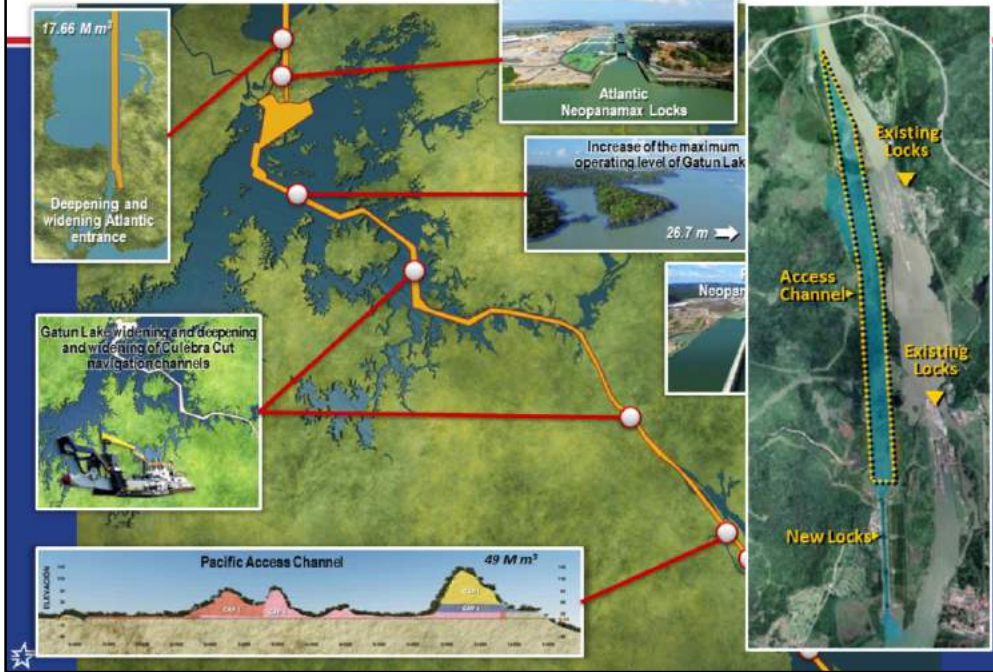




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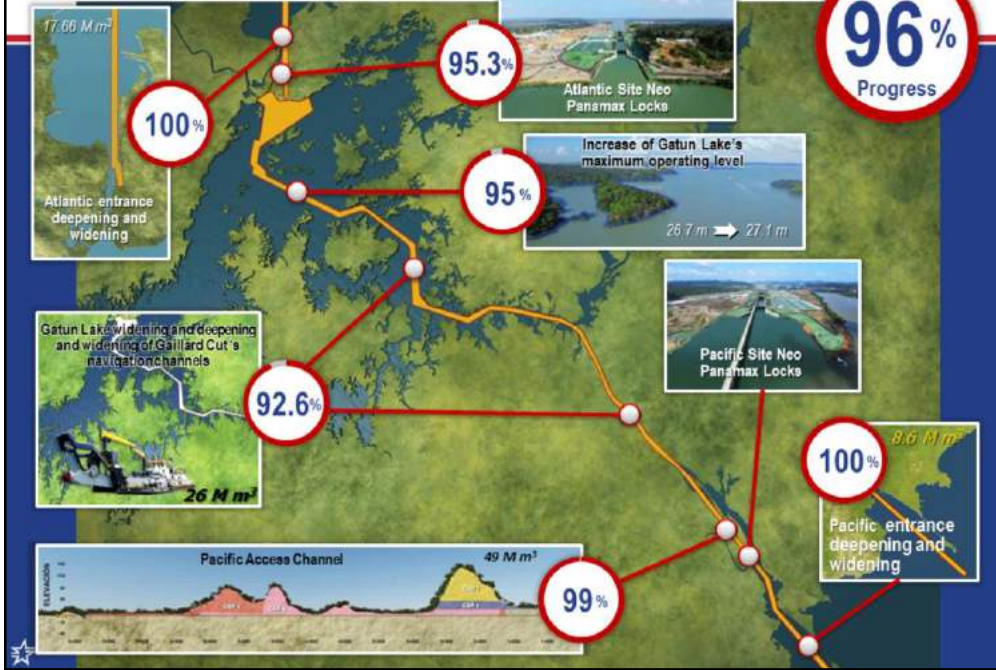
## EXPANSION PROGRAM UPDATE

# Expansion Program Components



# Program Components

Expansion Program



# Agua Clara Locks – Atlantic

2015



*Updated as of 28-Dec-2015*



# Agua Clara Locks



# Cocoli Locks - Pacific

2015



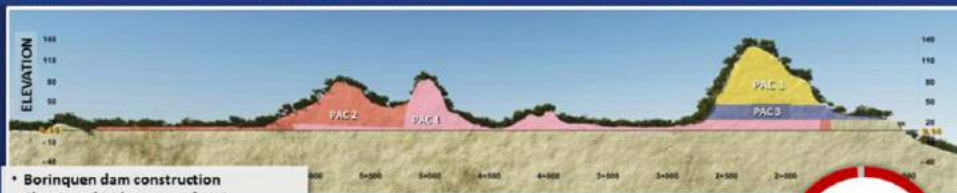
Updated as of 28-Dec-2015



# Cocolí Locks



# Pacific Access Channel



- Borinquen dam construction
- Clearing of 80 hectares of UXO.
- Amount (PAC-4): B/. 267,798,795.99
- Company: Consotium ICA-FCC-MECO

PAC: 48.9 M m<sup>3</sup> excavated  
(Phase 4: 26.2 M m<sup>3</sup> excavated)







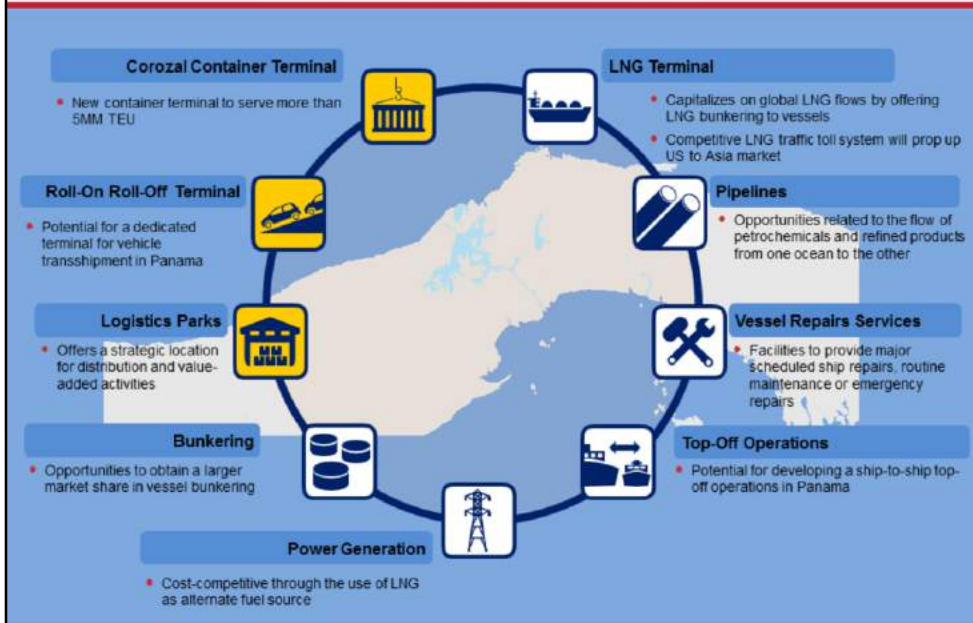


CANAL DE PANAMÁ

## Diversification Strategy

# Diversification Strategy

## Potential areas for development





## Proposed Container Terminal in Corozal (120 has)





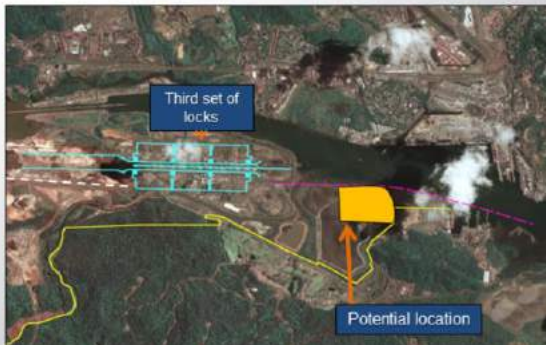
Maersk Edingburgh  
10-Dic-2015  
Entrando al Puerto de Balboa  
inicio @14:39 Final @15:09





**Ro-Ro Terminal:**

- Demand and capacity analysis
- Location alternatives
- Terminal conceptual design
- Feasibility study



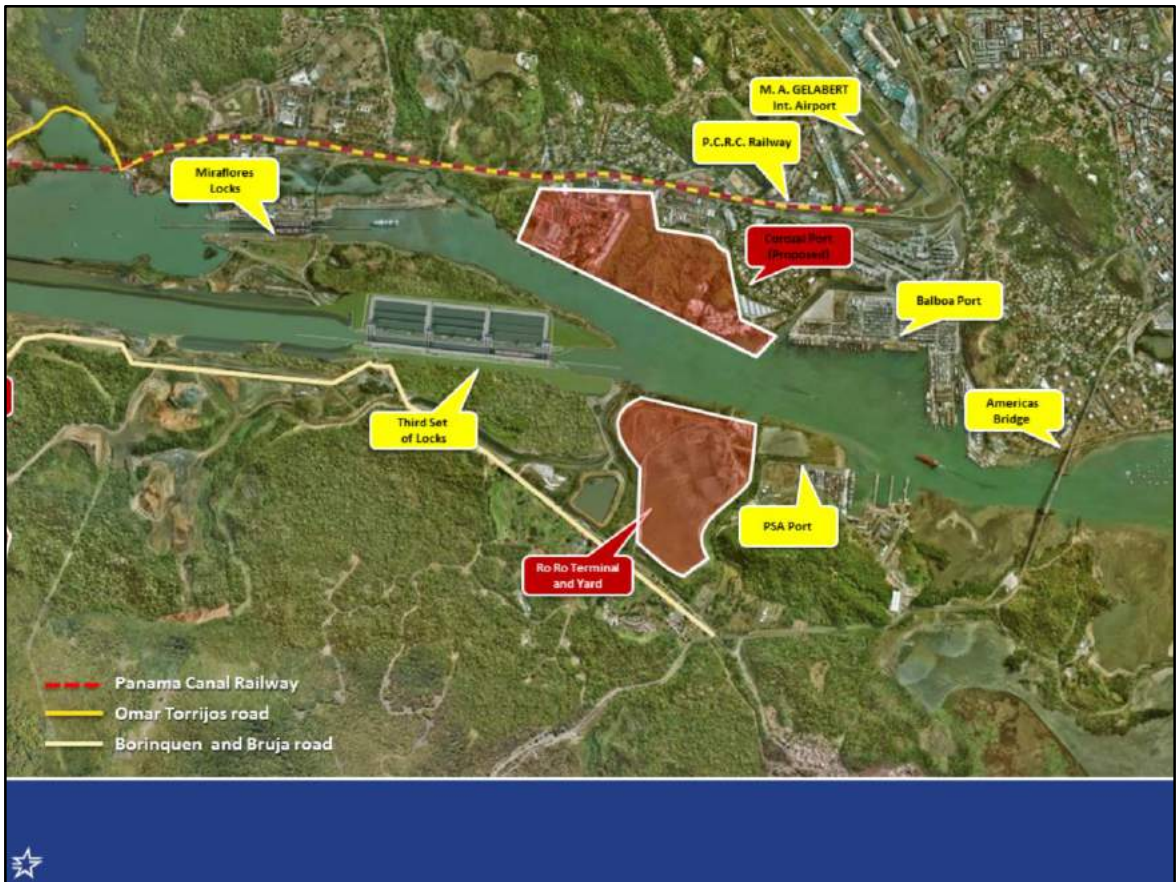
This feasibility study included market demand, capacity analysis and bottlenecks, conceptual design, financial analysis and legal framework. Industry is interested in the development of this type of terminal. Container trade has priority over vehicle trade in most ports. They are looking for specialization and dedicated locations. The minimum area for this development would be 20 Has handling about quarter million vehicles a year. A second phase of additional 20 has will increase the capacity to half a million vehicles a year.



# UXO Removal







Approximately 257.76 hectares with proximity to the Panama Canal and Centennial Bridge

Estimated distribution of warehousing sizes as follows:

Four plots of 74,320 square meters = 297,280 sq. feet

Eight plots of 28,985 square meters = 231,878 sq. feet

Twenty-two plots of 50,240 square meters = 1,105,287 sq. feet

Potential warehousing space compatible with warehouses near major ports such as Cedar Crossing Industrial Park, near the Port of Houston in Texas

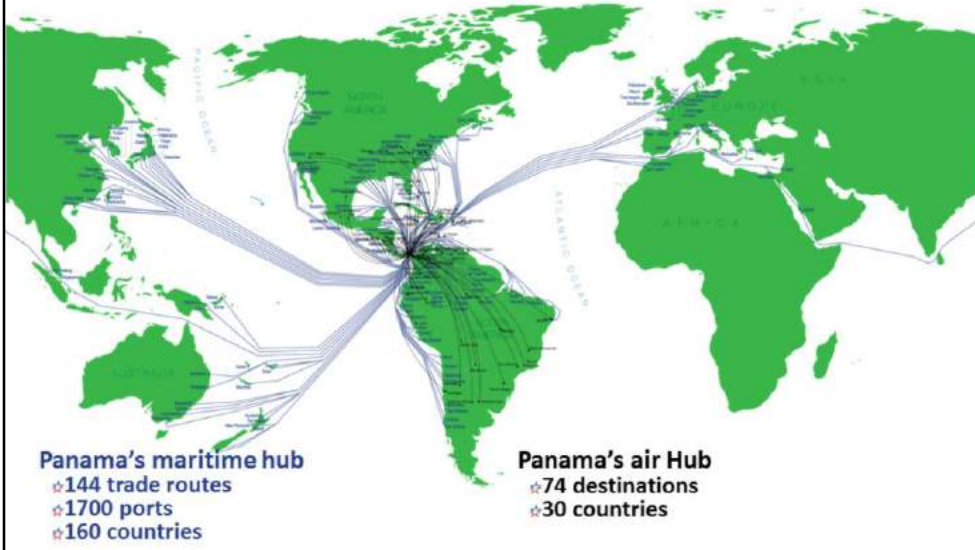
<http://www.cedarcrossingtexas.com/warehouses.cfm> and IKEA DC in Port Wentworth industrial park, Georgia. <http://savannahnow.com/exchange/2013-01-24/portside-georgia-leads-distribution-center-development>;



With enough potential warehousing space for very large DCs ranging between 312,000 to 800,000 square feet, depending on your needs..

## Panama: the transportation and logistics hub of the Americas

*Achieving the maximum potential of our geographical position*





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**Jorge L. Quijano**  
Administrator / CEO  
Panama Canal Authority  
January 21, 2016

## Liner Services calling at USEC Ports



Ports	Services Calling USEC Ports			Services Calling USEC Ports, transiting Panama			
	Services	Average Vessel Size (TEU)	Total Yearly Capacity (TEU)	Services	Average Vessel Size (TEU)	Total Yearly Capacity (TEU)	Market Share
Norfolk VA	34	5,587	9,843,100	9	4,650	2,176,728	22.1%
New York NY/NJ	50	4,243	10,886,055	15	3,832	2,922,152	26.8%
Savannah GA	42	4,533	9,648,134	14	4,125	2,936,159	30.4%
Charleston SC	31	4,596	7,373,720	11	3,926	2,246,356	30.5%
Miami FL	21	2,708	2,944,874	5	3,709	962,278	32.3%
Houston TX	41	2,064	3,834,689	8	1,617	576,079	15.0%
Port Everglades FL	25	1,817	2,340,073	3	3,085	467,873	20.0%

Source: ACP/MEMN/Compair Data, November 2015.

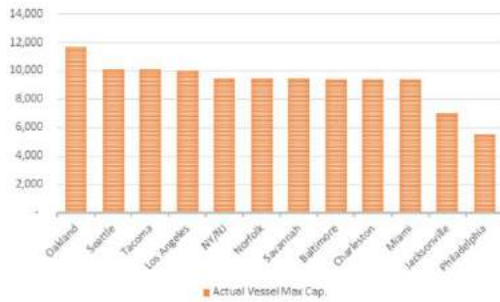
## Liner Services transiting through the Panama Canal and calling at USEC Ports



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Miami FL	5	3,709	952,278
Houston TX	8	1,617	576,079
Port Everglades FL	3	3,085	467,873

Source: ACP/MEMN/Compair Data, November 2015.

## Maximum Vessel Size - US Ports



Port	Actual Vessel Max Cap.
Oakland	11,660
Seattle	10,114
Tacoma	10,070
Los Angeles	10,000
NY/NJ	9,443
Norfolk	9,443
Savannah	9,443
Baltimore	9,400
Charleston	9,400
Miami	9,400
Jacksonville	7,024
Philadelphia	5,552

Note: Based on current Liner Services calling at US ports.  
Source: ACP/MEMN/Compair-October 2015

Maximum vessel size calling at US Ports.

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a 5.25 MMtpa liquefaction facility. The project began early site construction in October 2014. Dominion has received DOE approval to export LNG to both FTA and non-FTA countries. It received FERC approval in Sept 2014, after the EA was released in May. The EPC contract is held by a JV between IHI and Kiewit. Dominion started construction in late 2014. The company is targeting a late 2017 start date.

**CAMERON LNG** Operated by Sempra and located on the Gulf Coast of Louisiana, Cameron LNG is an existing import terminal that is being converted to a 12 MMtpa LNG export facility. The project will operate as a tolling facility and has signed tolling agreements with Mitsubishi, Mitsui and ENGIE. Each capacity holder also took a 16.6% equity stake in the project. Sempra has said it is also evaluating a possible fourth and fifth train, but has not announced a start date. Full FERC-approved capacity is 14.95 MMtpa, but Cameron LNG has DOE approval to export (and has signed LTAs for) only 12 MMtpa. It has filed to export the additional 2.95 MMtpa, but this has not been approved by DOE. Possible expansion trains (T4-5) would require additional approvals. Cameron LNG reached FID in August 2014 and is now under construction. It has received DOE approval for exports to both FTA and non-FTA countries and has full FERC approval. FEED was completed by Foster Wheeler; EPC is being done by a JV between CB&I and Chiyoda. Sempra originally announced a start date of December 2016, but this timeline was pushed back due to delays in the FERC environmental review. Sempra now expects to bring all three trains online in 2018.

**FREEPORT LNG** Located on the Texas Gulf Coast, Freeport LNG was proposed in late 2010 and began construction on Phase 1 T1-2 in November 2014. The second phase (T3) began construction in April 2015. The project was revised from four 2 MMtpa trains to three 4.0 MMtpa trains. FEED work was for three 4.4 MMtpa trains. However, each train is expected to be able to produce at a maximum capacity of 5 MMtpa (0.6 MMtpa above nameplate capacity). Construction on T1-2 began in November 2014; construction on T3 began in April 2015. Freeport has received FTA and non-FTA approval and received full FERC approval in July 2014. FEED was done by Zachry Industrial and CB&I. In December 2013, Zachry and CB&I were awarded the EPC contract for T1-2. The same firms were later awarded the EPC contract for T3. Train 1 is slated to be operational in mid 2018 with Train 2 coming online six to nine months later. We expect a slightly longer gap between T3.

**CORPUS CHRISTI** Located on the Gulf Coast of Texas, Corpus Christi LNG was initially proposed as a regasification terminal but is now being developed by Cheniere as a greenfield bi-directional facility with 13.5 MMtpa of liquefaction capacity. Construction began on T1-2 in May 2015. Corpus Christi will consist of

three 4.5 MMtpa trains, but Cheniere is expected to initially focus on only T1-2. Corpus Christi LNG is fully approved by both the DOE and FERC. In May 2015, Bechtel began construction on T1-2. A separate EPC was signed for T3. Bechtel is also constructing Cheniere's Sabine Pass LNG project. Cheniere took FID on T1-2 in May 2015. It expects to bring the first train online in early 2019, following a 46 month construction period. Each train is targeted to come online six to nine months after the previous train. T3 is contingent on Cheniere securing additional buyers, with FID scheduled for late 2015.