Panel I: North American Economic Trade Outlook for the Port Industry

Presented by
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Principal

Williamsburg, Virginia
International Port External Industry Pressures Driving Today’s Logistics
More than 98% of everything we consume, wear, eat, drive and construct is brought to us via ships through the North American port system.
To Be Competitive Today...

Marine/Intermodal Terminals Must **Reduce** Throughput **Cost** & **Increase** Cargo **Velocity** Securely and as Stewards of the Environment
Poll of the Top 1000 “Blue Chip” Multinational Shipper Priorities

- 38% Competitive Freight Rate
- 43% Schedule Reliability & Consistency
- 12% Transit Time & Speed
Today’s Logistics Truth:

“The customer wants more and is willing to pay less for it.”
International Maritime Cargo Demand Trends
Global Shipping Routes Plotted by AIS GPS

2010 Busiest Routes:
(1) Panama Canal, (2) Suez Canal, (3) Shanghai Port

Shorter – Faster Arctic Ocean Route

2+ Months A Year Using Convoys

Half the Time & Distance

Europe

Asia
A Turning Point in Global Economic History

The Advanced Economies Will Decline From 2/3 share of the Global Economy to a 1/3 Global Share. The Global Economy Will See Higher Average Pace of Growth in the Future…

Source: IMF - Forecast by TD Economics, December 2009
Growth in Global Merchandise Trade
(Intra Europe Trade Excluded)

(Trillions of U.S. dollars)

Source: IHS Global Insight – World Trade Service
Southeast Asian Manufacturing Centroid Shift

Current Inbound U.S. Cargo Flow

U.S. Intermodal Rail Flow

Western Centroid Shift

Expanded Asian Panama Canal 2014 Flows

Eastbound: All Water Flow
Eastbound: US Intermodal Rail Flow
Southeast Asian Manufacturing Centroid Shift

Current Inbound U.S. Cargo Flow

U.S. Intermodal Rail Flow

Western Centroid Shift

Westbound All Water/Suez Flow

Westbound Intermodal U.S. Flow

With Manufacturing Centroid Shifts Into Vietnam and/or India, The North American East Coast will See Dramatically More Westbound Suez Traffic
2014 Suez Canal Pricing Strategy: The Suez Canal has an opportunity to competitively alter global shipping patterns by undercutting 2014/15 Panama Canal new pricing strategy.
The Growing Asian Import Trade Challenge
China Breaks Container World Records

Of the 10 busiest ports in the world in 2010, Nine are in Asia; of the top 10, Six are on the Chinese mainland.

Chinese Ports hit an all-time monthly high of 12.44 Million TEUs in May 2010 with Six of the Top 10 Chinese Ports reporting Record Volumes.
The World’s Top 20 Ports Posted a 15.1% Volume Growth in 2010

2010: 260 Million TEUs

2009: 226 Million TEUs

This Recovery Reflects the Rebound in Global Container Trade Due Primarily to *Intra-Asia Volumes* and Supply Chain Inventory Restocking.

Source: Alphaliner Newsletter Volume 2011 Issue 5
Singapore vs. Shanghai Container Volumes
2000 through 2010 Volumes in Millions of TEUs

Total 2010 US Port Volume (14.7m)

Singapore: 5.2% CAGR
Shanghai: 17.9% CAGR

Source: Alphaliner Newsletter Volume 2011 Issue 2
Full Global Recovery:

Singapore-based PSA posted a 14.4 percent increase in throughput in 2010

65.12 million TEUs handled by the PSA Group, a new record for the Singapore (4.4 x total US volume)
Global Market Economic Shifts

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<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2010</th>
<th>2020</th>
<th>2030</th>
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<td>Italy</td>
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</table>

Dramatic Market Shifts are Underway that will Affect the Very Core of US Trade and Transportation

Source: HIS Global Insight
China: New World Economic Engine

Population:
US: 307 million
China: 1,338 million
(1/5 World)

The number of Chinese children in elementary school is equivalent to the total US population.
Shanghai International Shipping Center
Yangshan Deep Port & Logistics Park

New Port City

New Logistics Park

20 Mile New Port Access Bridge Constructed in 3 yrs

54 New Berths
Shanghai International Shipping Center
Yangshan Deep Port - 20 Mile Bridge Access

“Second Longest Ocean Bridge in the World”
Shanghai Yangshan Deep-Water Harbour
Yangshan Deep Port – 54 Berths East China Sea
North American Cargo Demand Trends
(Déjà vu Experience)
Transpacific Container Trade Recovery
(Millions of TEUs)

“Note the 2 to 1 Asian Import Imbalance”

Source: IHS – Global Insight - The Global Outlook – October 14, 2010
Transatlantic Container Trade Recovery

(Millions of TEUs)

Source: IHS – Global Insight - The Global Outlook – October 14, 2010
San Pedro Bay (POLA +POLB) Container Volume Forecast

344% Increase by 2035 From 2009 Levels

Source: IHS Global Insight 2010 Forecast
Maritime Vessel Technology Trends
World Container Ship Evolution

1st Generation (Pre-1960 - 1970) - Ideal X
2nd Generation (1970 - 1980) - Full Cellular
3rd Generation (1985) - Panamax
4th Generation (1986 - 2000) - Post Panamax
5th Generation (2000 - 2006) - Super Post Panamax
6th Generation (2006-2012) - Ultra Post Panamax

TEU Capacity
- 1,700 TEU
- 2,305 TEU
- 3,220 TEU
- 4,848 TEU
- 8,600 TEU
- 14,000+ TEU
A.P. Moller-Maersk L Class M/S Emma Maersk
(15,000 TEU Vessel - 22 Containers Wide)

Maersk Line's E-class Container Vessel: *Ebba Maersk*, set a world record for the number of slots when it carried 15,100 TEU

- Length: 1,302 ft, Width: 207 ft, Net Cargo: 123,200 tons
- **Quay Cranes:** 10, **Engine:** 14 in-line cylinders diesel engine (110,000 BHP)
- Cruise Speed: 31 mi/h, Full Crew: 13, Construction cost - US $145 M+


- 2013 Triple-E Maersk Class
  - 18,000 TEU
- 2006 Emma Maersk Class
  - 15,500 TEU
- 1997 Sovereign Maersk Class
  - 8,100 TEU
- 1996 Regina Maersk Class
  - 7,100 TEU

23 Containers Wide – 9 Tiers Above the Hatch
Daewoo Shipbuilding & Marine Engineering has won a US$2 billion order from A P Moeller-Maersk to build 10 vessels of 18,000 TEU capacity each. Daewoo is in talks with Maersk to build a further 20 ships of same capacity for a total order worth $6 billion, Korean firm's biggest ever single order.
Future Mega Container Vessel Characteristics:

**Capacity** = up to **22,000 TEUs**

**Deck Stow:** 23 wide & 7-9 Containers above hatch

**Length** = up to **1,445 ft** (4.5 Football Fields)

**Beam** = up to **194 ft**

**Deadweight Tonnage** = **220,000 Long Tons**

**Draft** = up to **54 ft**

*Far Exceeds the 2014/15 Panama Third Lane Capacity*
Vessel Size Expansion - Terminal Impacts
(Port Terminal Infrastructure & Equipment Geometry Impacts)

Source: Georgia Ports Authority and Vickerman & Associates

- New Panamax (2014/15): 12,600 TEU
- Current Panamax: 4,800 TEU
- Super Post Panamax: 18,000 to 22,000 TEU

Increased Terminal Throughput

Storage Area Impacts

Height Above Deck

Boom Outreach

Depths 48 to 54 ft
NYK Super Eco Ship
NYK Super Eco Ship

NYK Super Eco Ship 2030
Green Ship Design for the Future

TOTAL CO₂ reduction 70%

Nominated for the Clean Innovation award at Nor-Shipping 2009

NYK Logistics & Megacarrier
Panama Canal Expansion: New Capacity
The Panama Canal will more than double its capacity by 2014.
Panama Canal Expansion

More than 14,000 ships a year pass through the 50 mile long 1914 manmade link between the Pacific Ocean & Caribbean Sea carrying 275 million tons of Cargo and $100 billion in container shipping.

A $5.25 Billion Investment in a 3rd Set of Locks Equating to 16% of Panama’s National GDP

Source: ACP Data
Panama Canal Transit & Tonnage Traffic
(Transits and PCUMS Tonnage 1914 to 2009)

Source: ACP Data
Panama Canal Third Lane Expansion Capabilities

2011: 4,800 TEU

2014-2015: 12,600 TEU

Source: ACP Expansion Project
The New Post Panamax Capacity Favors All - Water Service Routes with the Following Vessel Characteristics:

- Vessel Capacity: 9,000 to 10,000 TEUs
- Vessel Draft: 46 to 50 feet (tropical fresh water)
- Required Port Channel Depths: 50 to 54 feet
- LOA: 1,000 to 1,200 feet
- Beam: 140 to 160 feet
The Container Ship Colombo Express (8750 TEU)
Typical Container Vessel Service Route
Asia to USEC: Weekly Service with 8 - 4,320 TEU Vessels
Generating 104 Yearly Transits and $150 million in Annual Canal Transit Fees

Source: ACP Data
## 2025 Summary of Canal’s Financial Results
(To 2025 In Millions of Dollars – Annual Fees)

### Summary of the Expanded Canal’s Financial Results

<table>
<thead>
<tr>
<th>Financial Results¹</th>
<th>Year 2005</th>
<th>Year 2025</th>
<th>Annual average growth rate</th>
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<tr>
<td>PCUMS Tons²</td>
<td>279</td>
<td>508</td>
<td>3.0%</td>
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<tr>
<td>Transit Revenue</td>
<td></td>
<td>6,101</td>
<td>8.9%</td>
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<tr>
<td>Other Revenues</td>
<td>92</td>
<td>125</td>
<td>1.5%</td>
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<tr>
<td>Total Revenues</td>
<td>1,209</td>
<td>6,227</td>
<td>8.5%</td>
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<tr>
<td>Operating Costs</td>
<td>444</td>
<td>1,016</td>
<td>4.2%</td>
</tr>
<tr>
<td>Fee per Net Ton³</td>
<td>218</td>
<td>668</td>
<td>6.5%</td>
</tr>
<tr>
<td>Public Services Fees³</td>
<td>2</td>
<td>2</td>
<td>0.0%</td>
</tr>
<tr>
<td>Depreciation</td>
<td>61</td>
<td>231</td>
<td>6.8%</td>
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<tr>
<td>Net Income</td>
<td></td>
<td>4,310</td>
<td>11.6%</td>
</tr>
</tbody>
</table>

### Source:
ACP Financial Data

- **546% Increase**
- **890% Increase**
Alternative “Dry Canal” Proposals
to Counteract Anticipated Canal Fees/Costs

APM Terminals announced $1 billion Container Port in Costa Rica

China’s proposal: 136-mile “dry canal” (Pacific Port of Buenaventura & Atlantic Coast Port of Cartagena in Colombia.)
Non-Transit Panama Canal “Feeder Services” May Be the Real Boom from the Canal Expansion

Weekly Through Transits
Feeder Services – No Transit

Source: ACP and Compare, 2008 Data
Panama Maritime Authority Becomes A Major Transhipment Center

Port Development in Panama

Manzanillo International Terminal (MIT)

Colon Container Terminal

Panama Ports Company – Cristobal

Panama Ports Company Balboa

1996: 235 Thousand TEUs
2009: 4.23 Million TEUs
2015: 7.4 Million TEUs

Source: Panama Maritime Authority
Panama Canal Expansion Impacts: Prediction Scenarios
Panama Canal Vessel Deployments Will Determine New US Logistics Patterns

The Distance to New Orleans and Savannah Via the Panama Canal is Identical... But Each Port Has Very Different Access to the US Heartland.

A Competitive & Robust Landside Access to the Gateway Port’s Inland Market will be a Key Success Factor!
The Primary North American Competitor to the Panama Canal is the Class I Rail Intermodal System

(Potential Increased Service Offerings and System Capacity)

Source: USDOT Maritime Administration (MARAD) 2009
$47 million Tiger II Port of Miami – FEC On-Dock Intermodal Container Transfer Terminal

PORT OF MIAMI INTERMODAL AND RAIL CONNECTION
TIGER II Discretionary Grant Application

A project to reduce heavy truck container traffic on greater Miami-Dade County's interstate and local roadway system in an effort to:

Reduce dependence on oil;
Reduce greenhouse gasses;
Improve safety; and
Reduce road degradation.

August 30, 2010

Exhibit 1
Summary of Project Construction and Total Cost (*)

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
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<tbody>
<tr>
<td>Bridge Reconstruction</td>
<td>$3,500,000</td>
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<tr>
<td>POM Rail Intermodal Apron</td>
<td>$15,284,000</td>
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<tr>
<td>POM Intermodal Rail Line Tracks</td>
<td>$3,983,000</td>
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<td>Port Lead (4.40 miles)</td>
<td>$21,840,800</td>
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<td>Total Cost of Construction</td>
<td>$44,607,800</td>
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<tr>
<td>Equipment Purchase</td>
<td>$2,300,000</td>
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<tr>
<td>Total Rail and Intermodal Facility Project Cost</td>
<td>$46,907,800</td>
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(*) A detailed analysis of these costs is included in the Appendix “F”
Panama Canal Vessel Deployments Will Determine New US Logistics Patterns

The Round trip Distance to Miami Via the Panama Canal is Could Substantially Cut the North American Delivery Costs....
Post 2015 Expanded Canal: Predicting the Future Impacts for the US East & Gulf Coasts?

IF:
✓ West Coast Ports & Rail become/remain congested…
✓ East Coast Ports Accommodate the big ships…
✓ Canal Cost Remains Price Competitive with Suez…
✓ Cargo Trade Volumes Continue to Increase…
✓ Canal’s infrastructure keeps pace with Growth…

Then:
✓ Global Carriers will route as much traffic via the expanded Panama Canal as it can handle…
Post 2015 Expanded Canal: Predicting the Future Impacts for the US East & Gulf Coasts?

IF:

✓ Panama Canal Tolls are Set to Maximize Revenue and not Container Volumes…
✓ East Coast Ports *Can’t* Accommodate the big ships – Channel Draft & Terminal Impacts…
✓ Class I Railroads Exert Their “Pricing Flexibility”…
✓ All-Water Time is not competitive for High Value Time Sensitive Intermodal Landbridge Cargo…

Then:

✓ The Panama Canal Market Shift to the East and Gulf Coast May Not Occur at All!
Panel I: North American Economic Trade Outlook for the Port Industry

Thank You