The Potential Implications of the Expanded Panama Canal on Western Hemisphere Trade

American Association of Port Authorities & the European Sea Ports Organisation

Transatlantic Exchange on Ports and Transportation Logistics Policy

March 23, 2011

Norbridge

Today's Objectives

Provide a brief synopsis of the potential effects of the expanded Panama Canal on Hemispheric trade patterns:

- ✓ Overview of the Panama Canal
- ✓ The Asia-US Container Trades
- ✓ The Hemispheric Bulk Trades

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Panama Canal Overview

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Panama Canal Overview

- ✓ Major businesses
- ✓ The expansion
- ✓ Potential market implications

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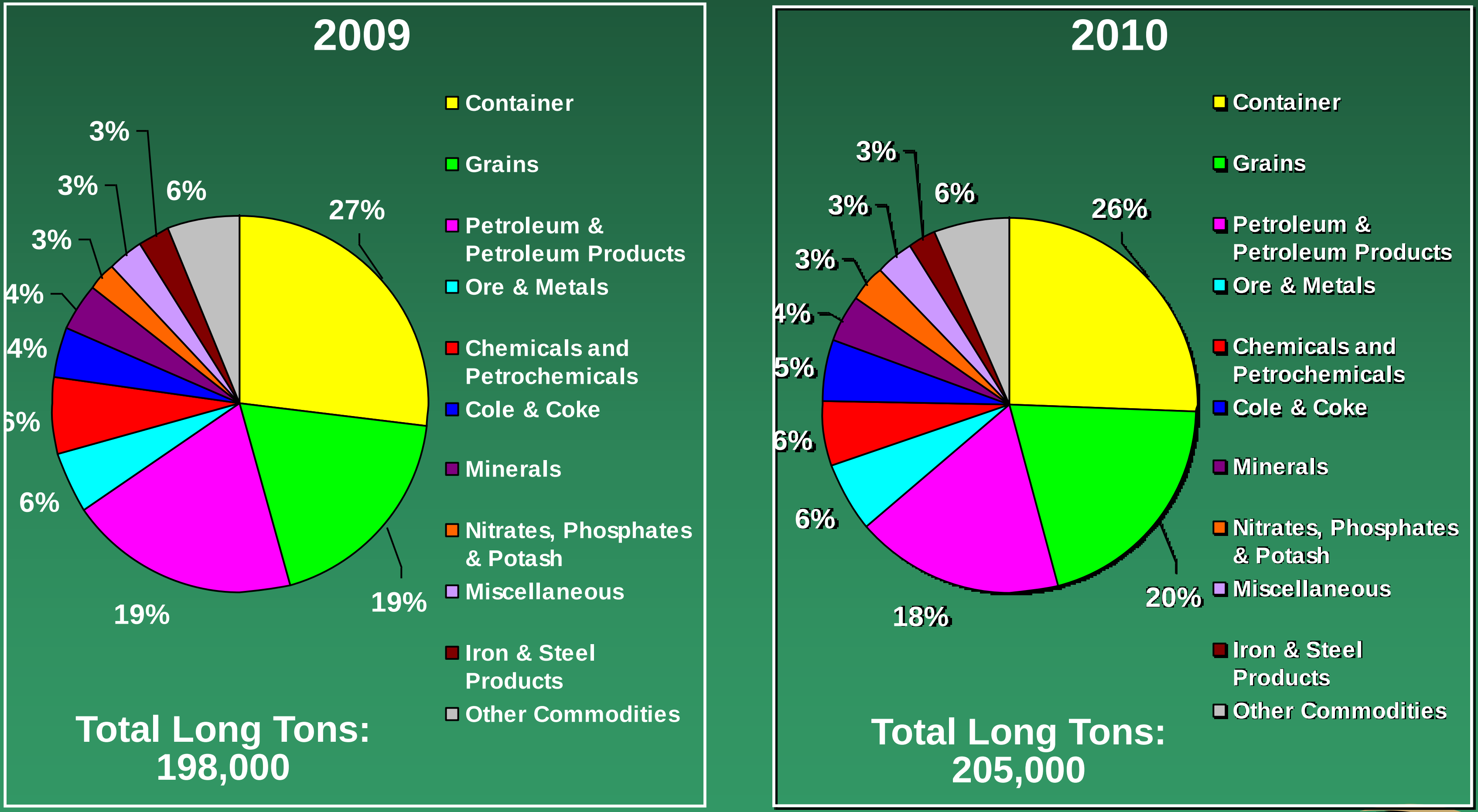
Container, grain and petroleum products are the Panama Canal's largest trades

Panama Canal Traffic by Commodity



Source: ACP (Panama Canal Authority); Norbridge research and analysis

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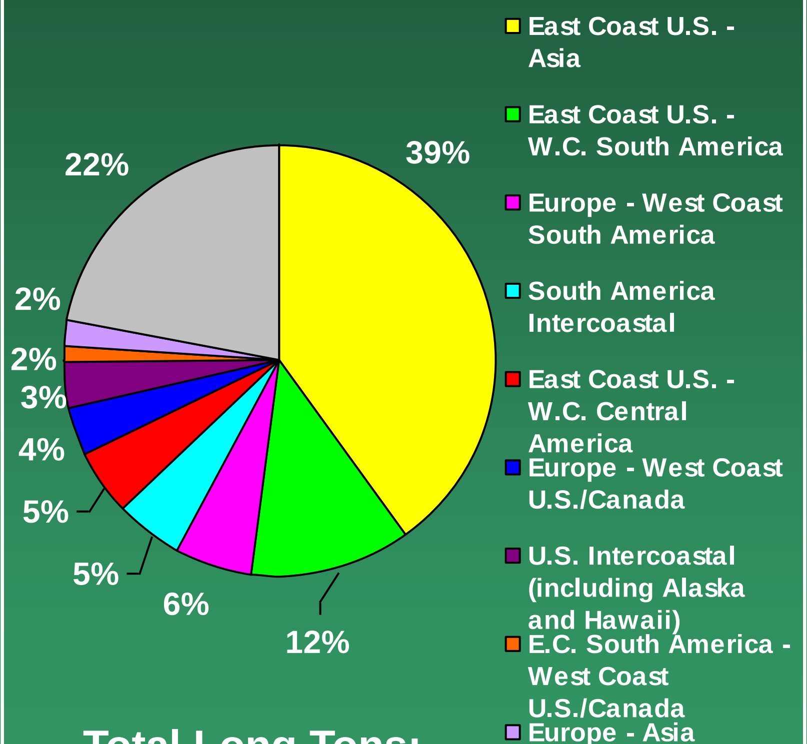
The Asia-US East Coast trade lane accounts for about half of the Panama Canal's total trade

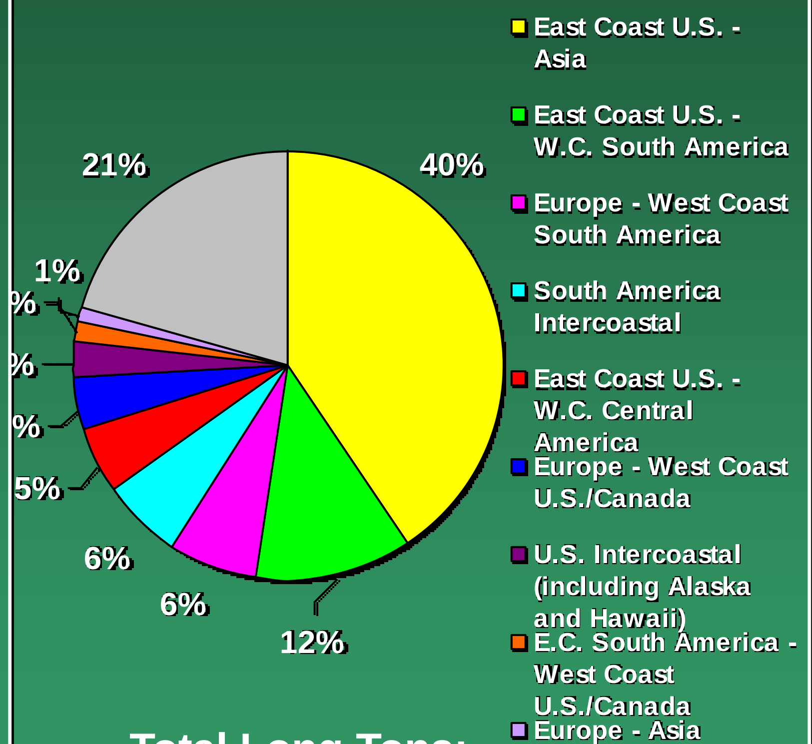
Panama Canal Traffic by Trade Lane

2009



Total Long Tons: 198,000

2010



Total Long Tons: 205,000

Source: ACP (Panama Canal Authority); Norbridge research and analysis

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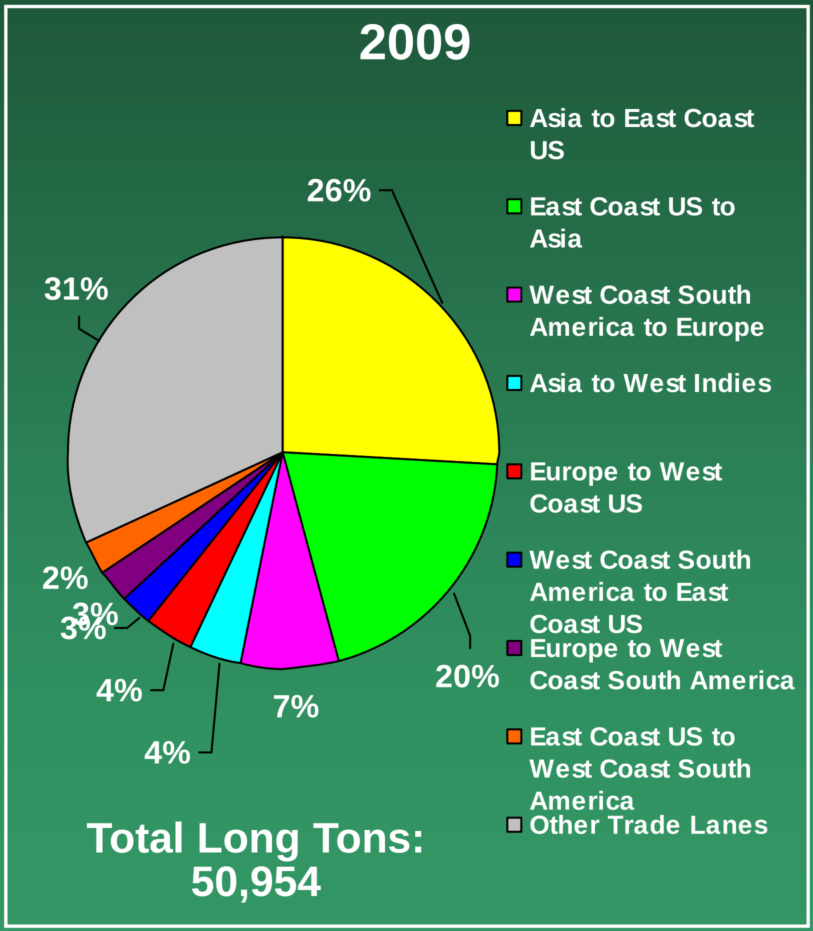
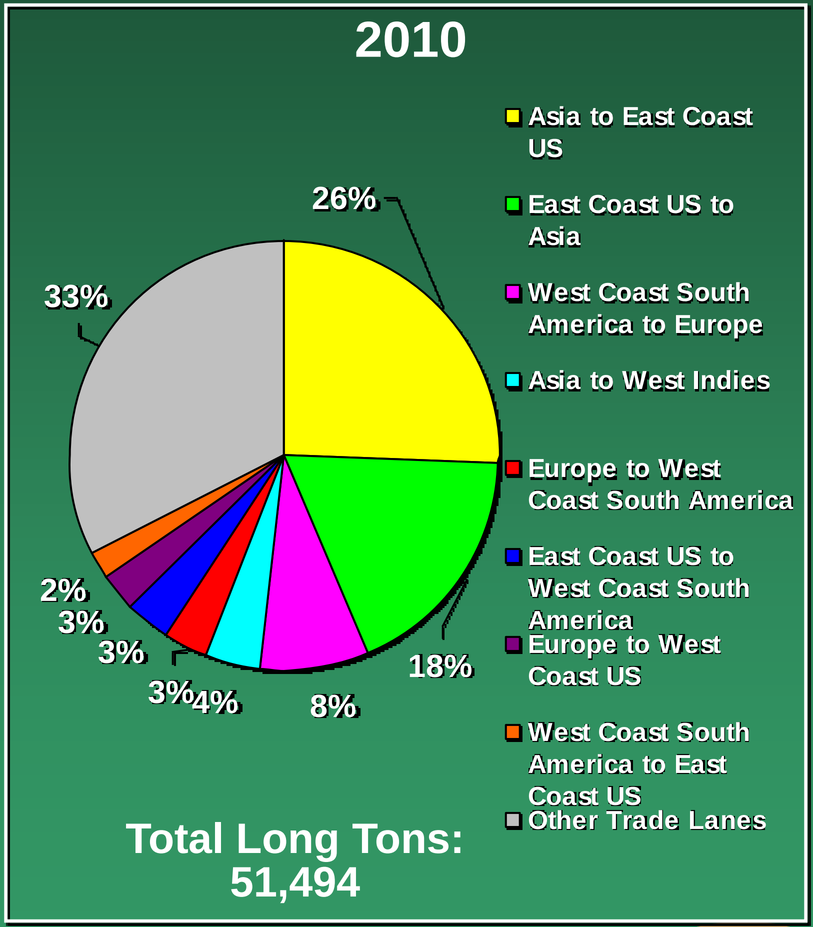
The Asia-US East container trade accounts for nearly half the Panama Canal's total container trade

Panama Canal Container Traffic by Trade Lane





Source: ACP (Panama Canal Authority); Norbridge research and analysis

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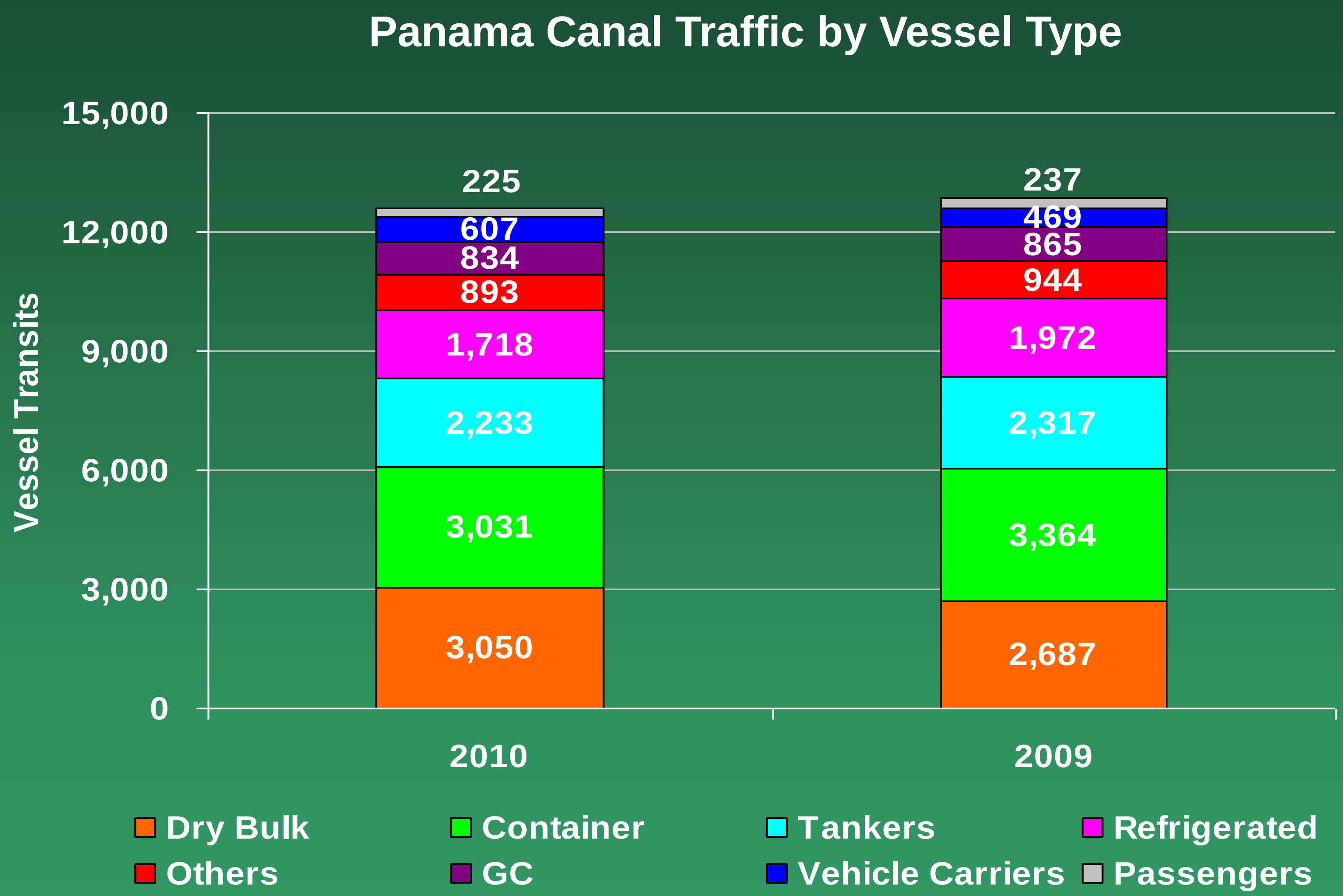
Dry bulk, container and tankers account for more than half of the Panama Canal vessel transits



Source: ACP (Panama Canal Authority); Norbridge research and analysis

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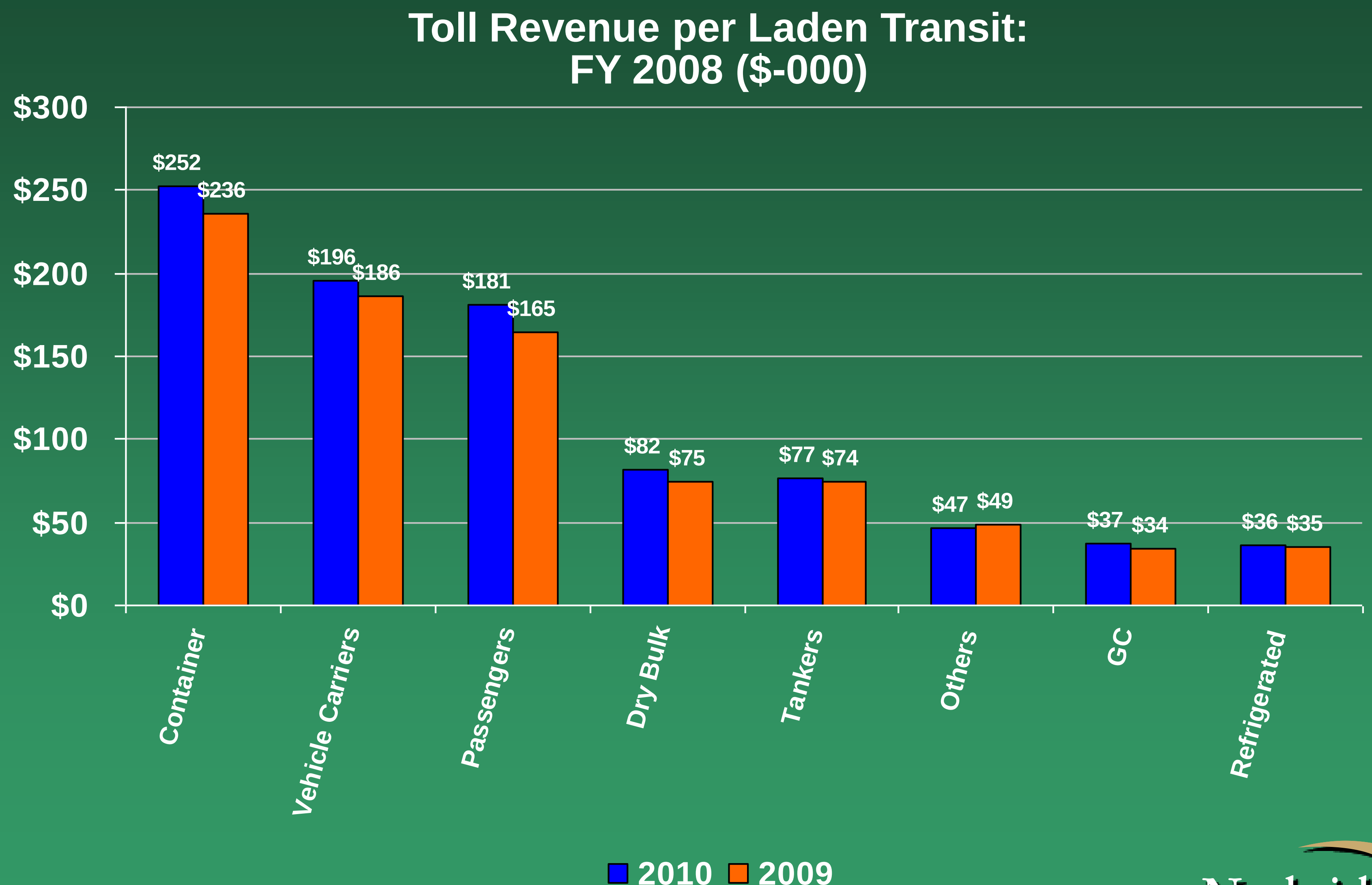
While container vessels generate the most revenue per transit



Source: ACP (Panama Canal Authority); Norbridge research and analysis

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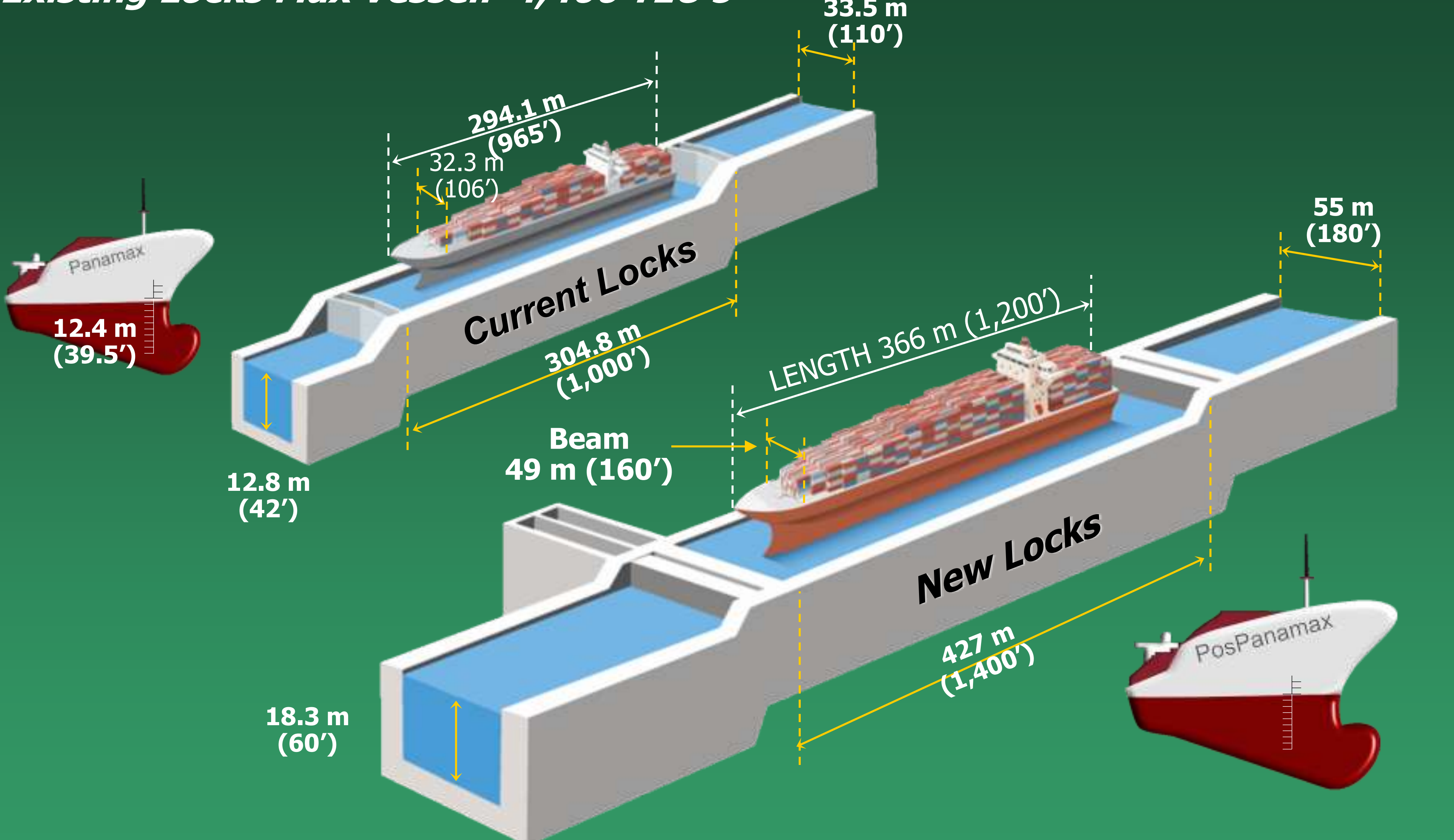
Canal Expansion Project

1. Deepening of the Pacific and Atlantic Entrances
2. Deepening and widening of the navigational channels of Gatun Lake and deepening of Culebra cut
3. Construction of the new locks and water-saving basins in the Atlantic and Pacific
4. Raising Gatun Lake to its maximum operational level

Existing Locks Max Vessel: 4,400 TEU's



New Locks Max Vessel: 12,600 TEU's

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The Expanded Panama Canal will be able to handle vessels 2 to 3 times larger than present

	Current Panama Canal	Expanded Panama Canal
Maximum Ship Draft	39.5’	50+’
Maximum Ship Length	965’	1200’
Estimated Maximum TEU Capacity	**5,000 TEUs**	**12,600 TEUs**
Estimated Maximum Bulk Carrier DWT*	**52,000**	**119,000**
Estimated Maximum Tanker DWT*	**54,000**	**117,000**
Capacity (Estimated Annual Transits)	13,500-14,000	16,000
Lock Width	110’	180’
Lock Length	1,050’	1,400

*Note: Based on analysis of current bulker and tanker fleet

Source: ACP (Panama Canal Authority); Norbridge research and analysis

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Some Potential Trade Implications

- ✓ **Container:** potential to double or ultimately triple vessel size in the Asia-US East Coast trade
- ✓ **Coal & Grain:** potential for Capesize vessels in the US Gulf/NCSA to Asia trades
- ✓ **Crude Oil:** potential for Aframax vessels in the Venezuela-China trade
- ✓ **Fruit:** potential containerization of the WCSA-Europe banana trades

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Asia-USEC Container Trades

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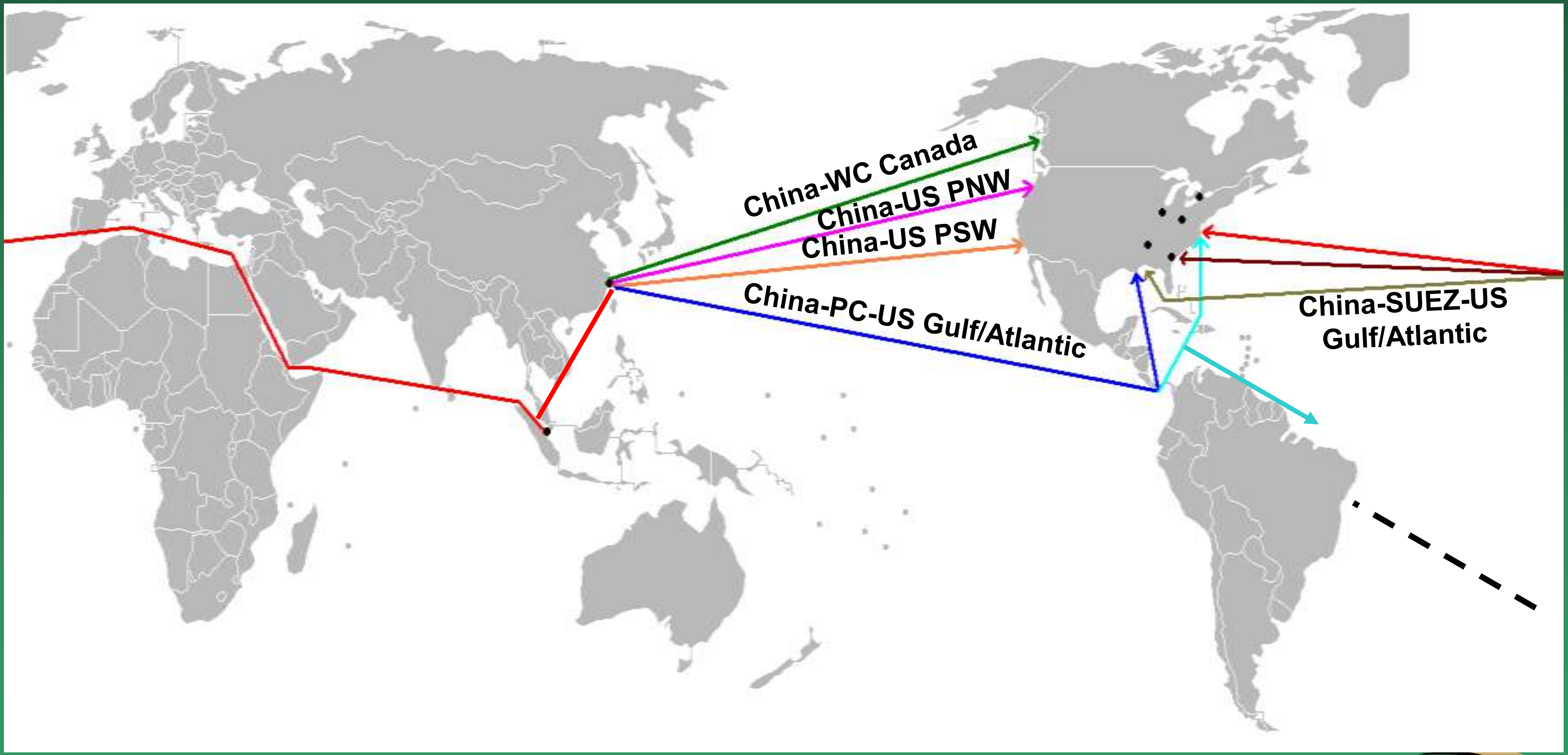
There are multiple options for Asia (China)-North American container trades

Asia-Americas Routing Options



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Popular Perceptions & Market Realities

Popular Perceptions

- West Coast ports are out of capacity
- Western railroads have priced themselves out the market
- East Coast ports will need 50’ of water and 12,000 TEU vessel capability

Market Realities

- West Coast ports continue to expand
- Western railroads have not and will not price themselves out of the market
- The USEC trades cannot support 12,000 TEU vessels

Popular Perceptions & Market Realities

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The West Coast Port Industry has significant capacity expansion potential

Prince Rupert:
Phase 1: 500K TEU

Vancouver Terminal 2, Lynnterm

Tacoma: Evergreen Puyallup, NYK

POLA / POLB
Middle Harbor
Pier 500
LAXT Conversion
Pier S

Densification & automation offer additional, significant upside

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Significant expansion opportunities exist on both coasts

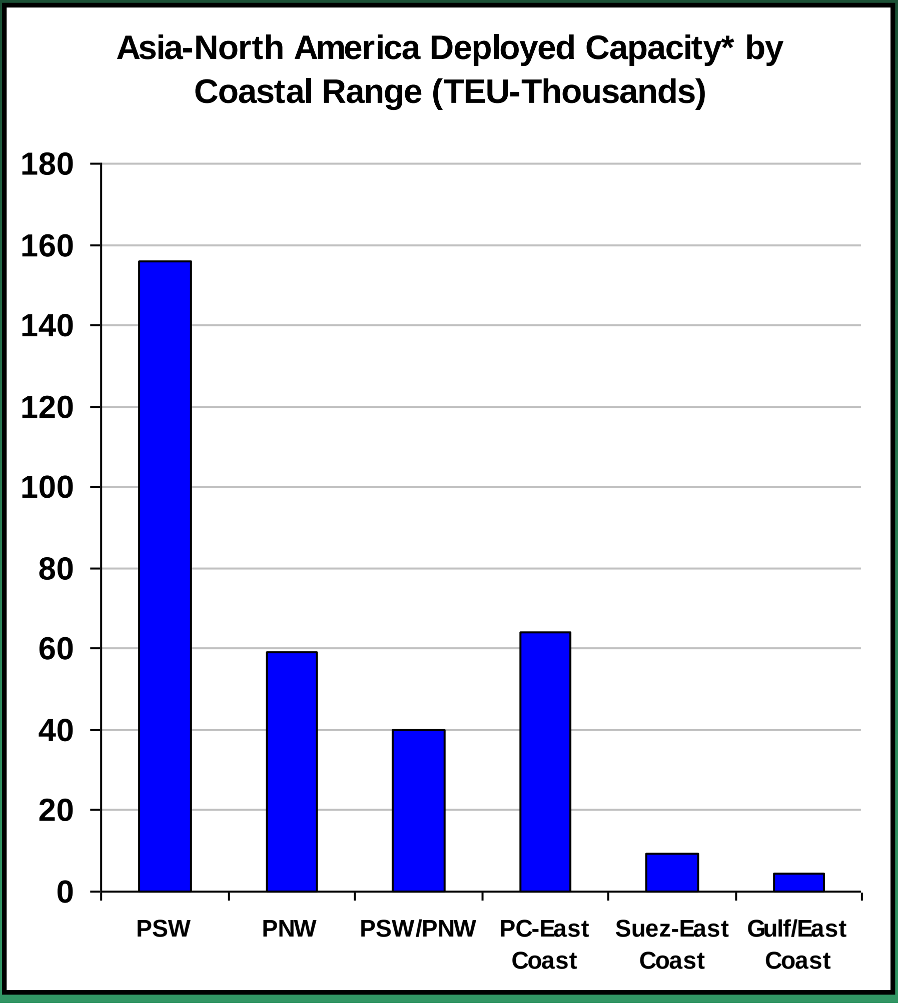
USWC

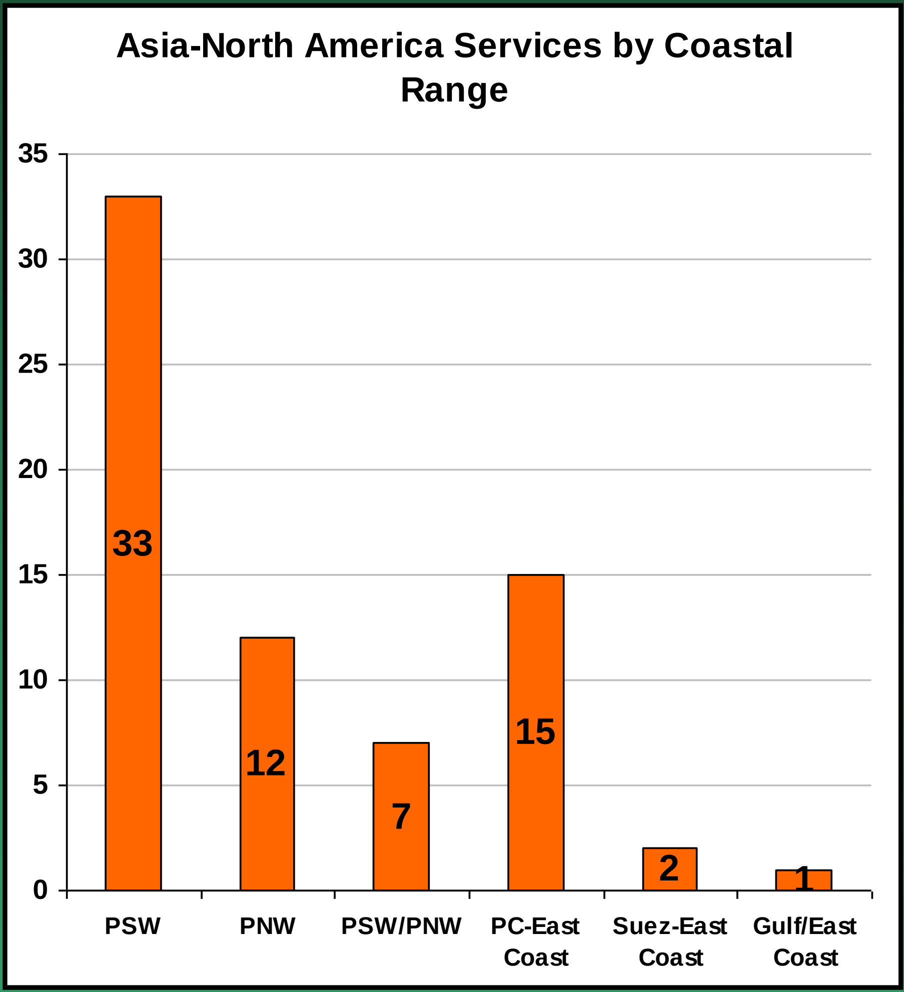
- Pier 500
- Middle Harbor
- LAXT conversion
- Tacoma: multiple developments
- Terminal 2 Deltaport
- Prince Rupert Phase II

USEC

- Bayonne & Global
- Craney Island
- Navy Base
- Jasper County
- Hanjin Jacksonville

Asia-West Coast services represented approximately 75% of Asia-North America services and capacity in 2007.





Source: Compair Q3 2007
*Noted: Deployed capacity equal to sum of one-way capacity on all vessels deployed on the trade (all on weekly services)

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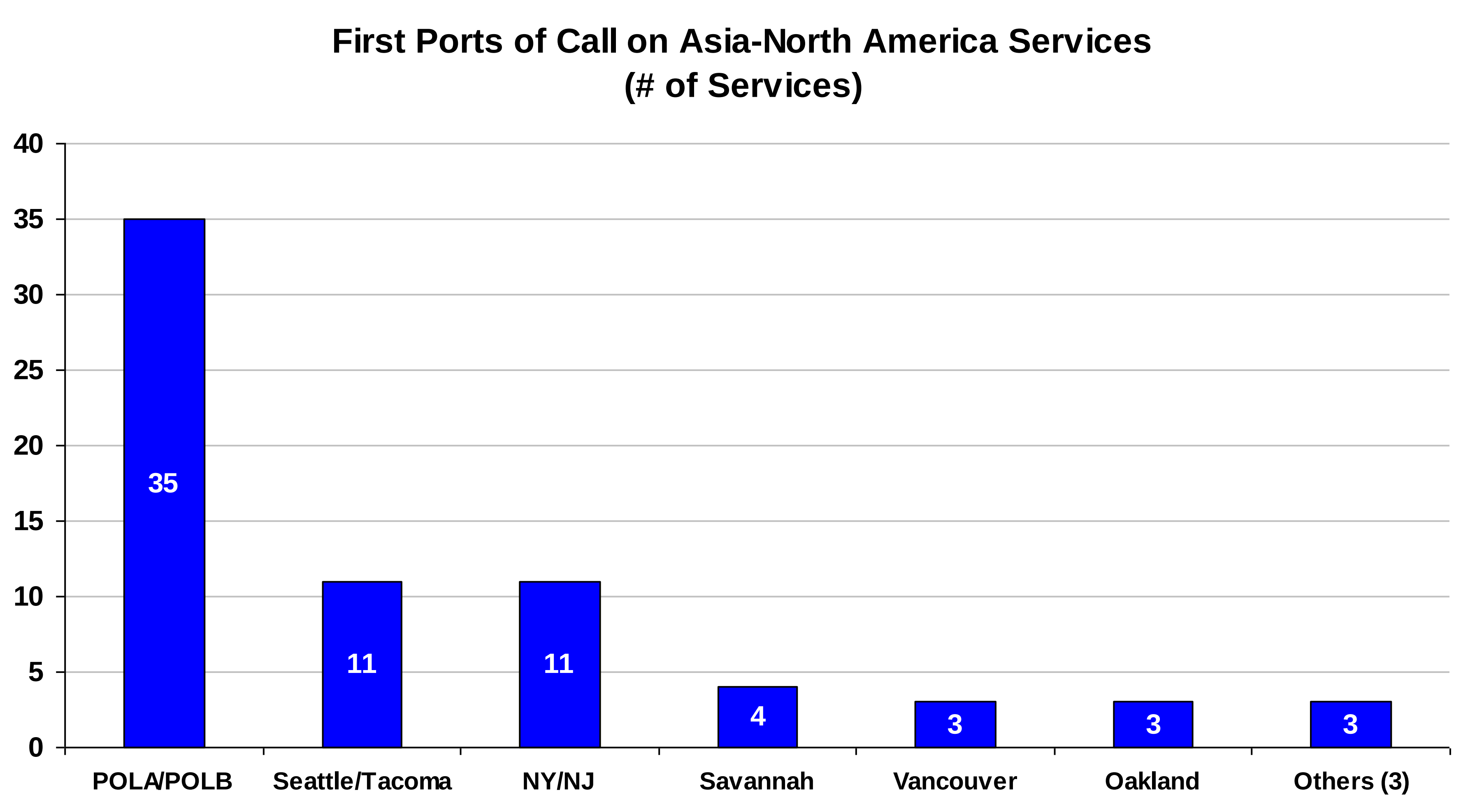
Los Angles and Long Beach have more first port of call inbound container services than the remainder of the US



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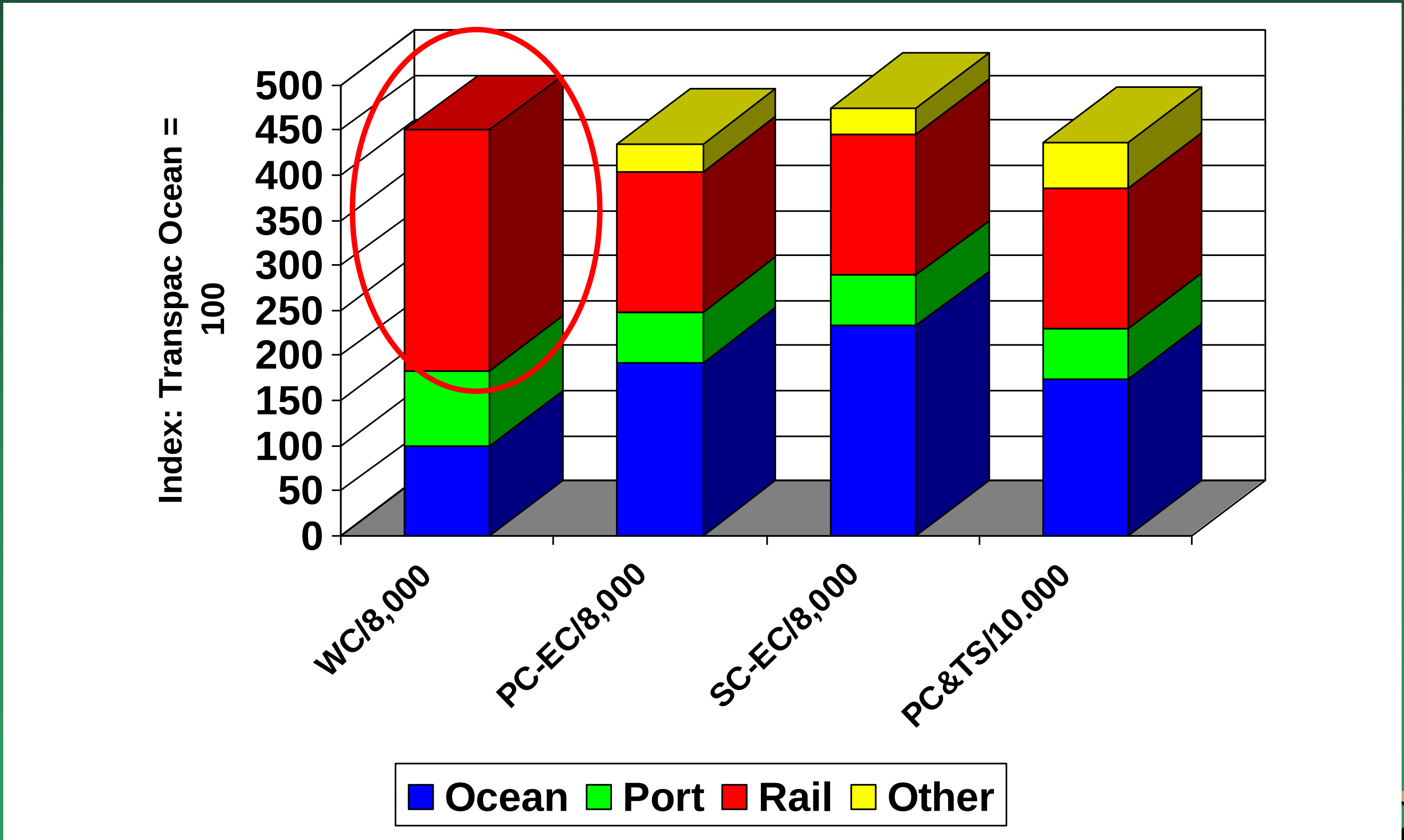
The Economics-A Comparison
China to Chicago



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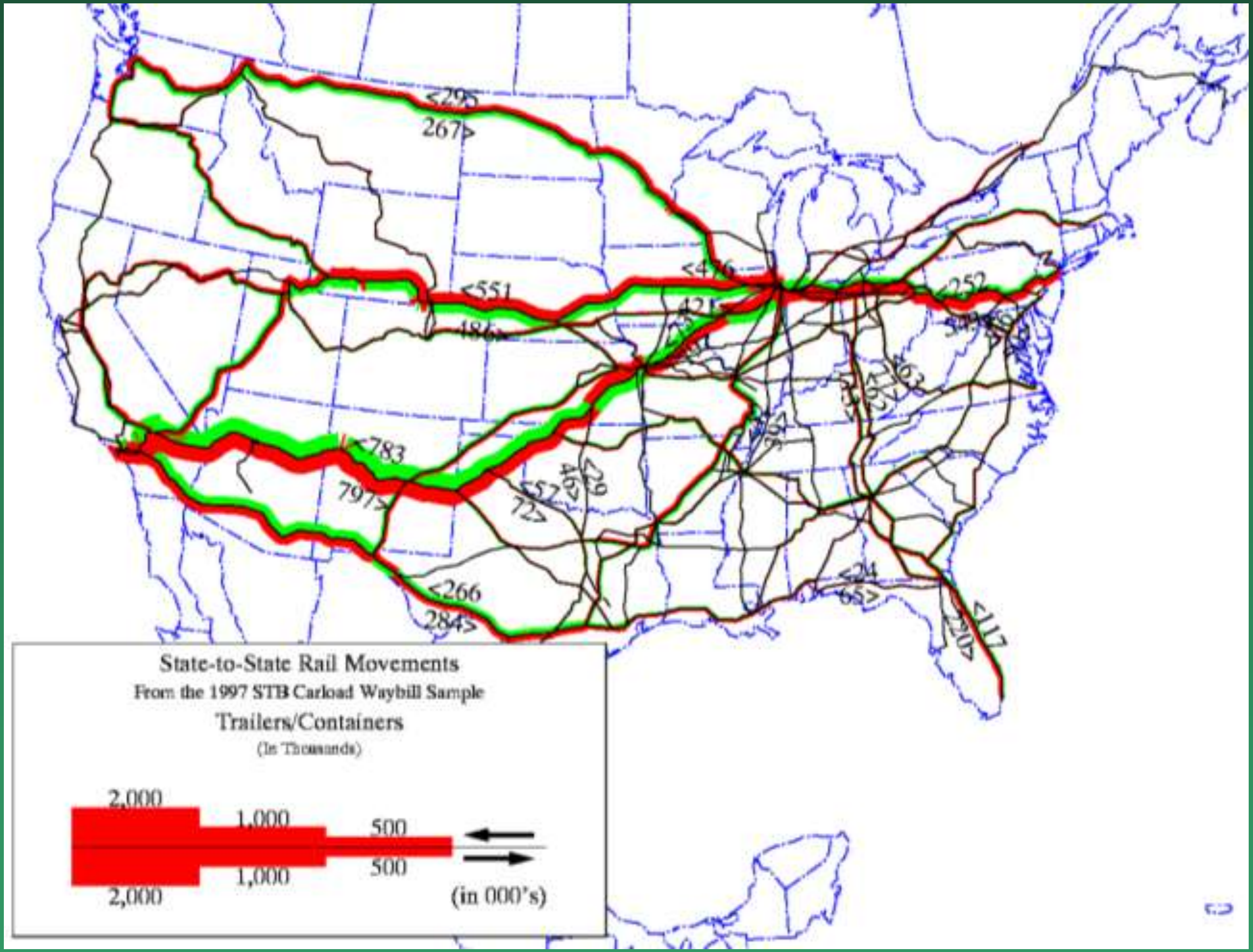
The western railroads have significant scale advantages

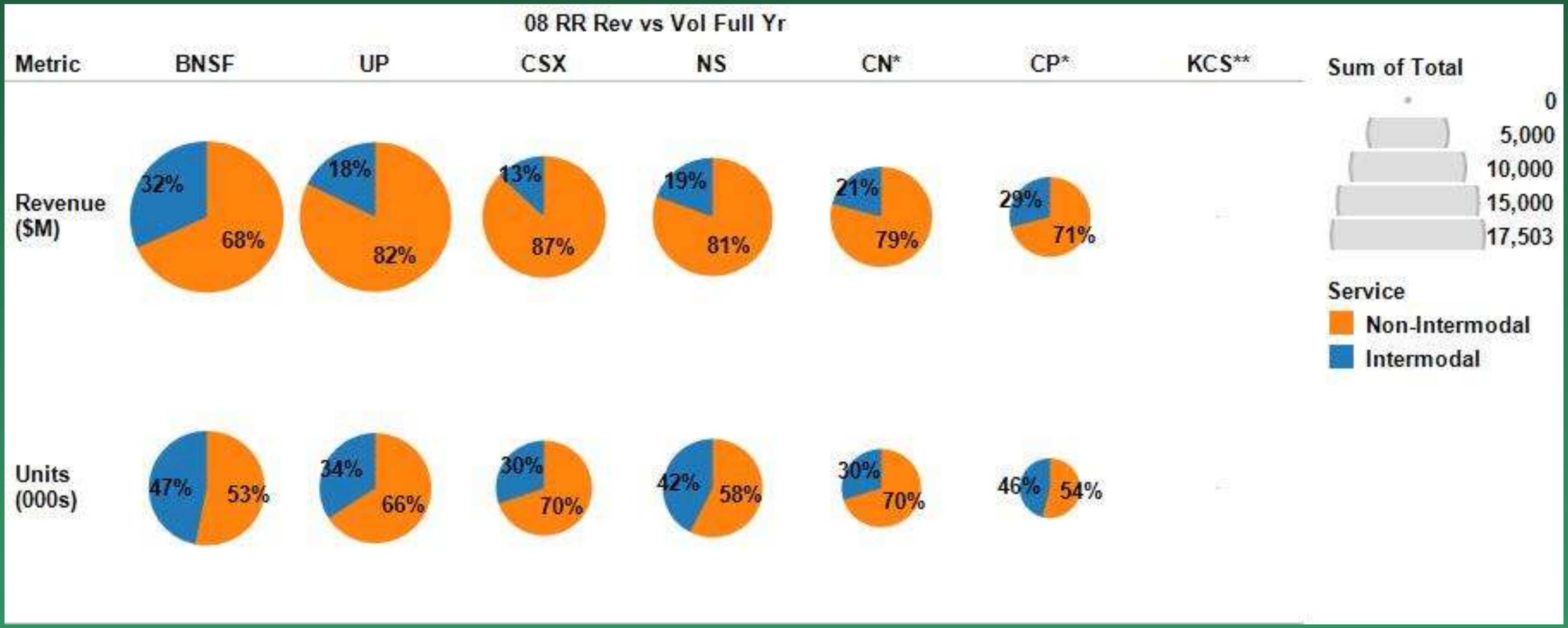


Source: ALK

Intermodal business is an important source of revenue, volume, growth and profitability for the North American rail industry

2008 Railroad Revenues and Volumes

2007-2008, Revenue in $M, Volumes in Carloads



Source: Company SEC Filings
*CN and CP revenue figures are in CAN $
**KCS has not yet released full year 08 figures

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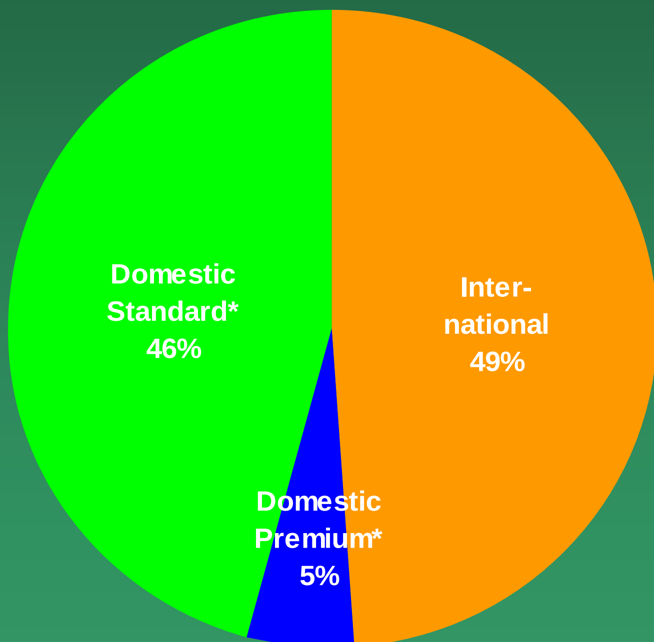
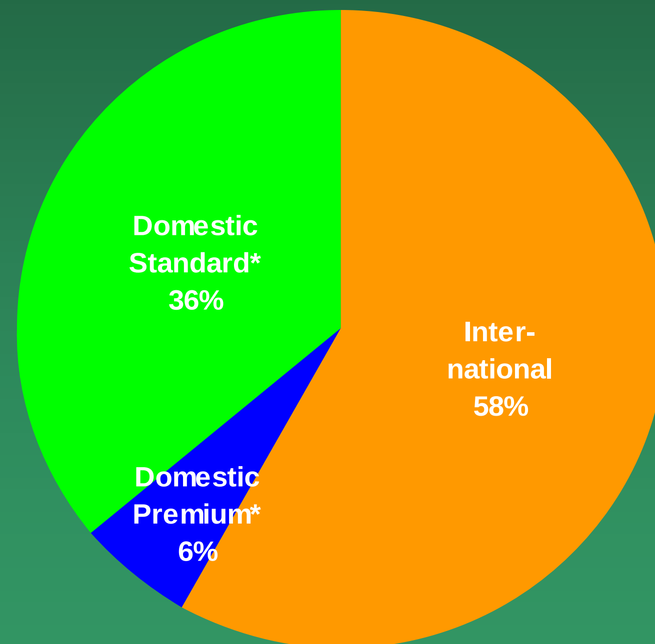
International traffic is the largest segment of BNSF's and UP's intermodal business

BNSF and UP Intermodal Business Segments

Estimates; Based on 2008 Revenue



$5.8B



$3.0B

Source: Company Reports, Norbridge assumptions
Note: UP 2007 business segment distribution applied to 2008 volume

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Popular Perceptions & Market Realities

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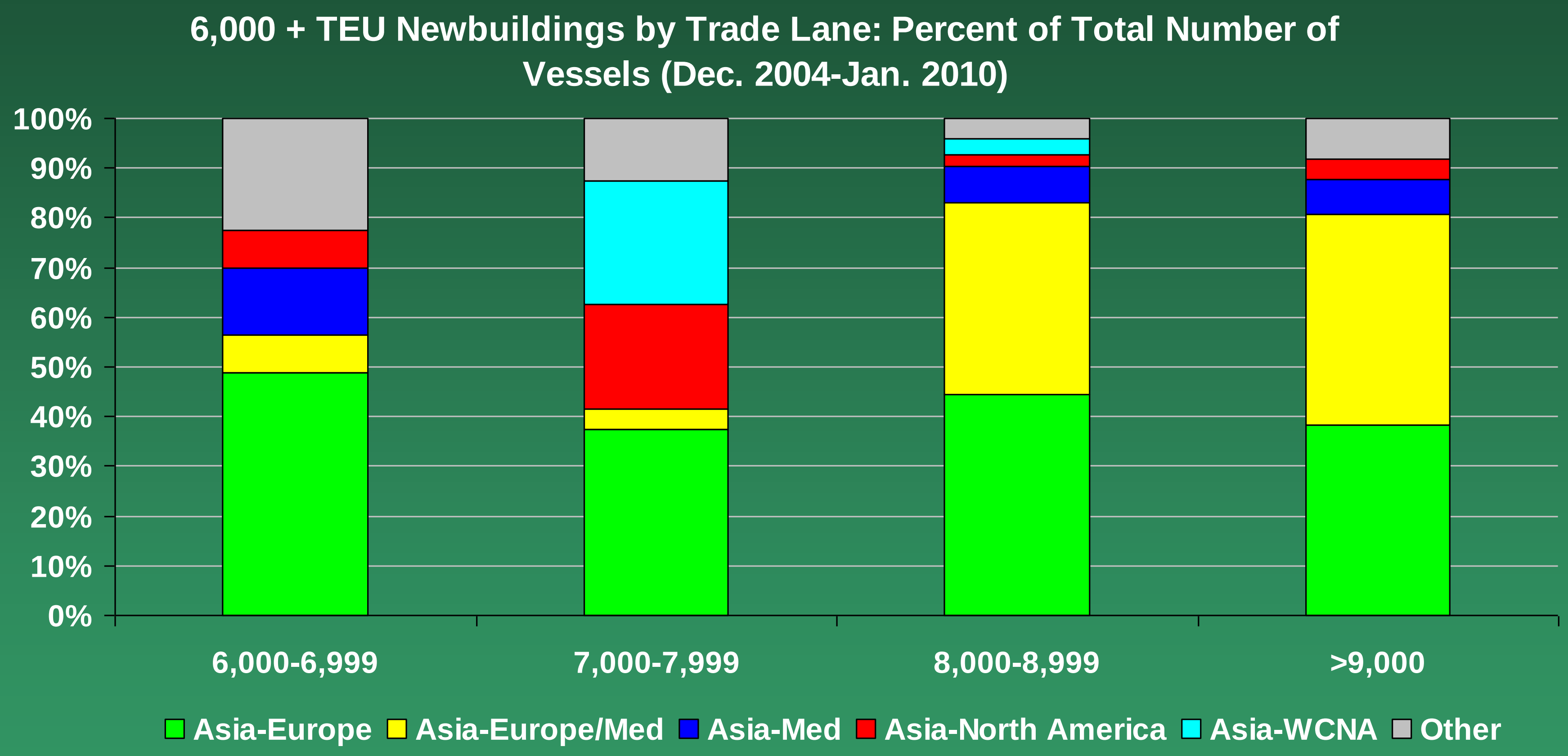
The world's largest ships continue to be deployed in the Asia-Europe trades



Note: Asia-Europe, Asia-Europe/Med, and Asia-Med Trade Lanes can also include stops in the Middle East and India Subcontinent

Note: "Other" Trade Lane is a bucket of Trade Lanes that have less volume than some of the more well traveled ones.

Source: Containerization International Magazine; Dec 2004 –Jan. 2010

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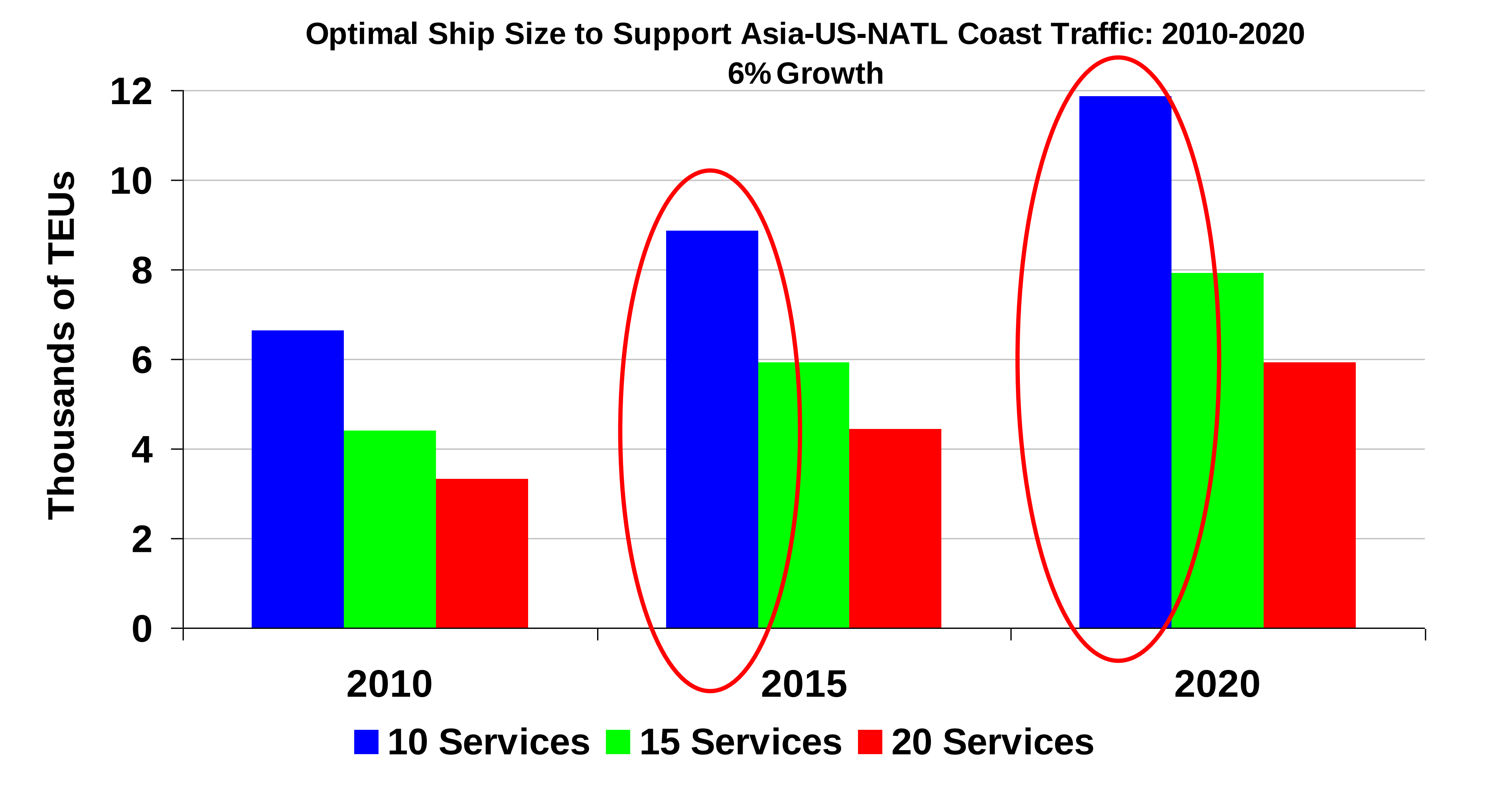
Given 6% growth, the largest service vessel size scenario for the Asia-US NATL trade is estimated to approximate 12,000 TEUs in 2020.



Note: US NATL represents ports from Jaxport to Boston
Note: Asia includes SEA, NFE, and China
Source: PIERS data; Norbridge Analysis

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Big Ship Draft Requirements: Some Realities

- ✓ The eastbound trade is the driver
- ✓ The eastbound trade is a cube, not a weight trade
- ✓ The expanded Panama Canal will have a draft of 50’ freshwater = about 14.5 meters or 47.5-48 feet salt water
- ✓ Containerships burn 40-50% of their bunkers in route from Asia to the East Coast of North America
- ✓ Most large containerships traversing the Panama Canal will likely arrive at vessel drafts significantly less than 14.5 meters or 48 feet

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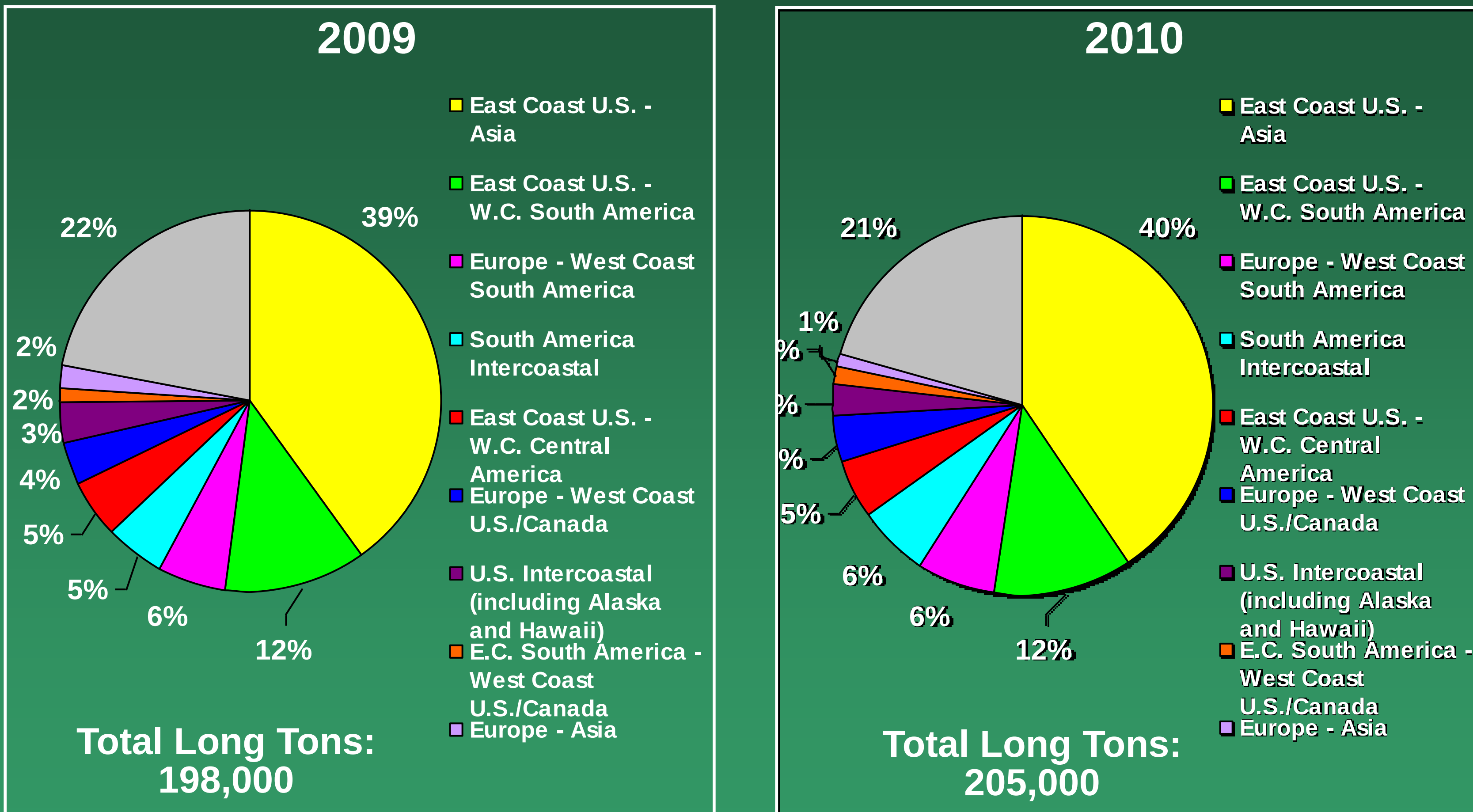
The Asia-US East Coast trade lane accounts for about half of the Panama Canal's total trade

Panama Canal Traffic by Trade Lane



Source: ACP (Panama Canal Authority); Norbridge research and analysis

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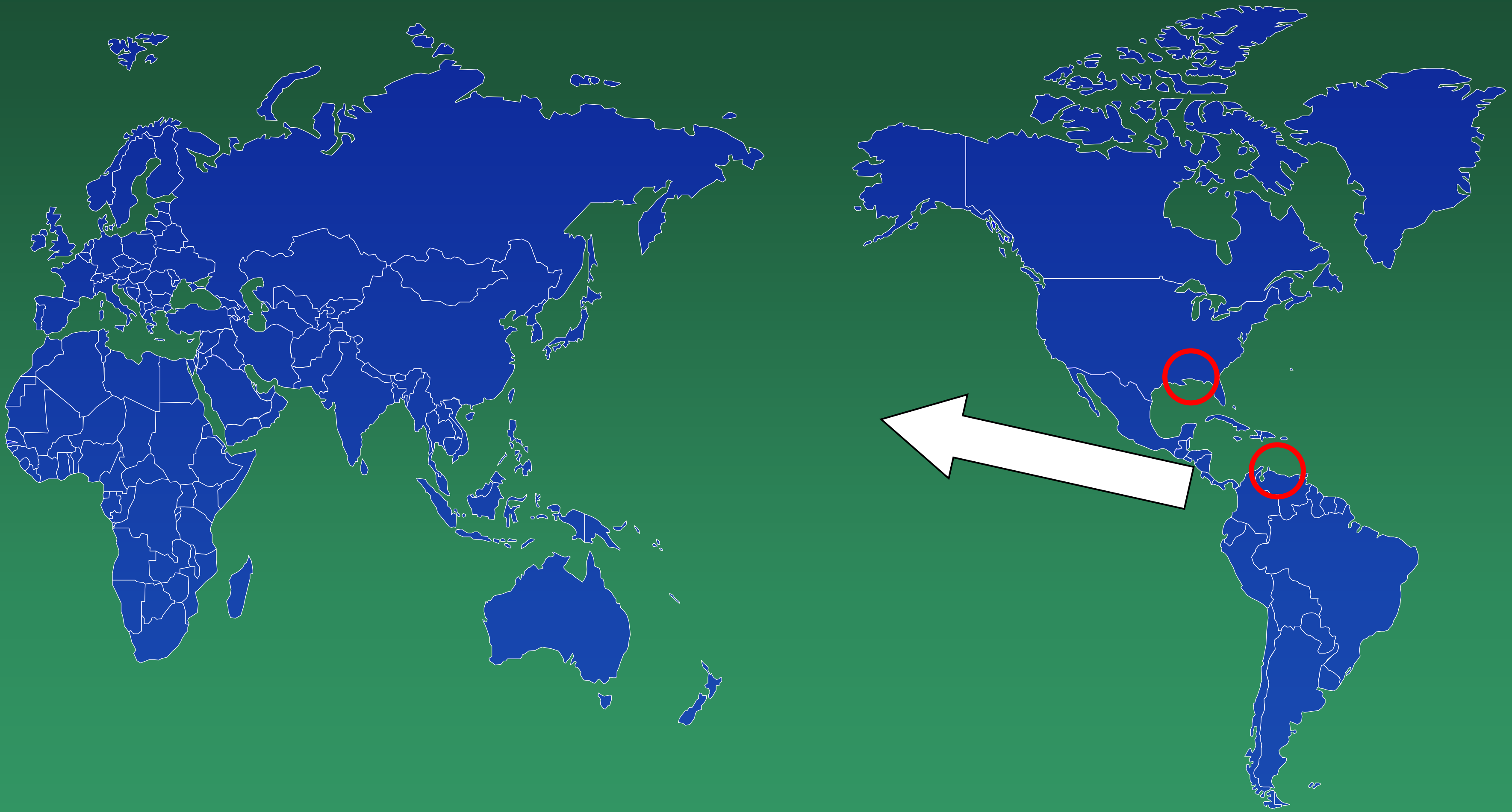
Steam Coal to Asia



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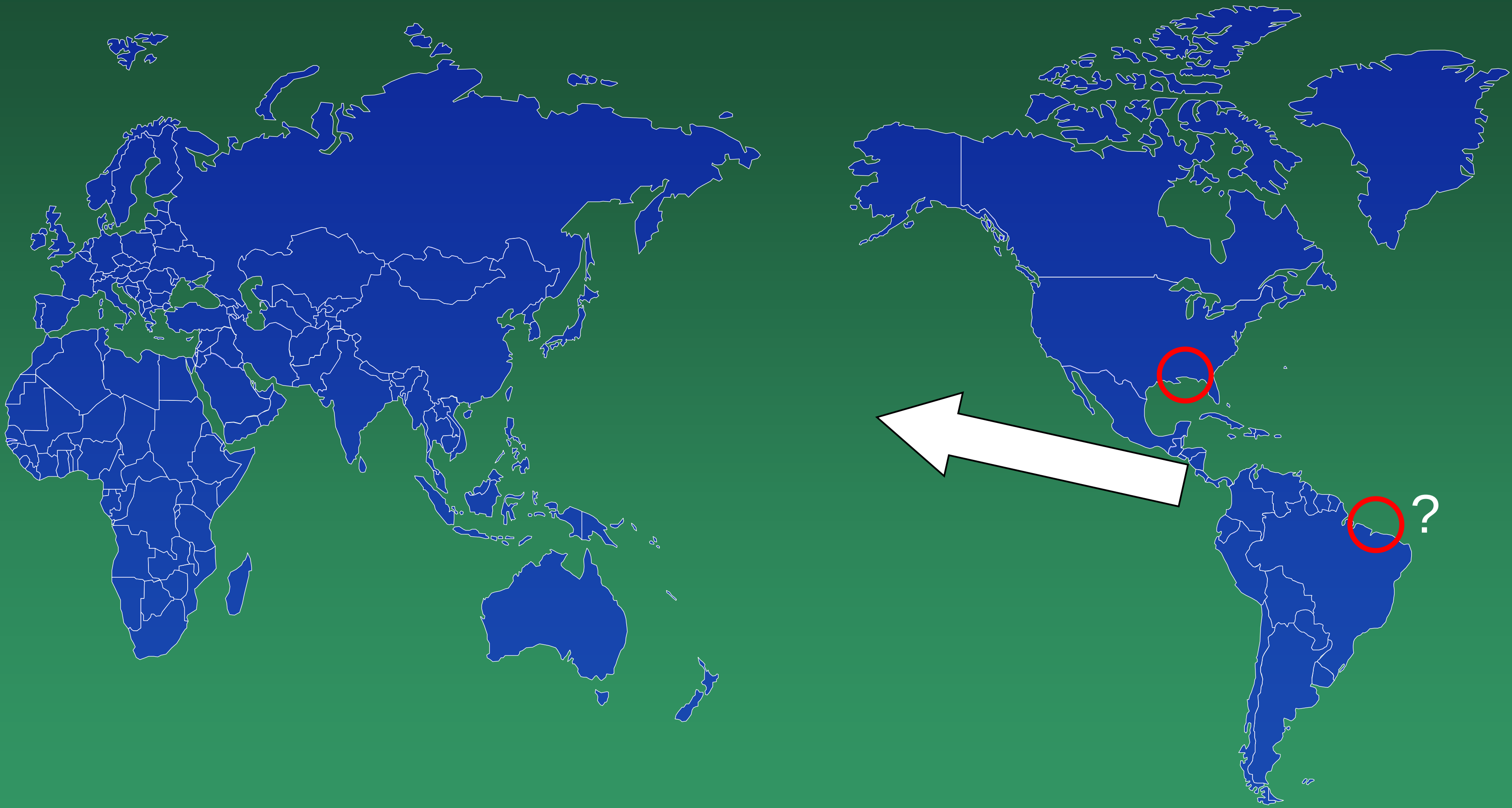
Grain to Asia



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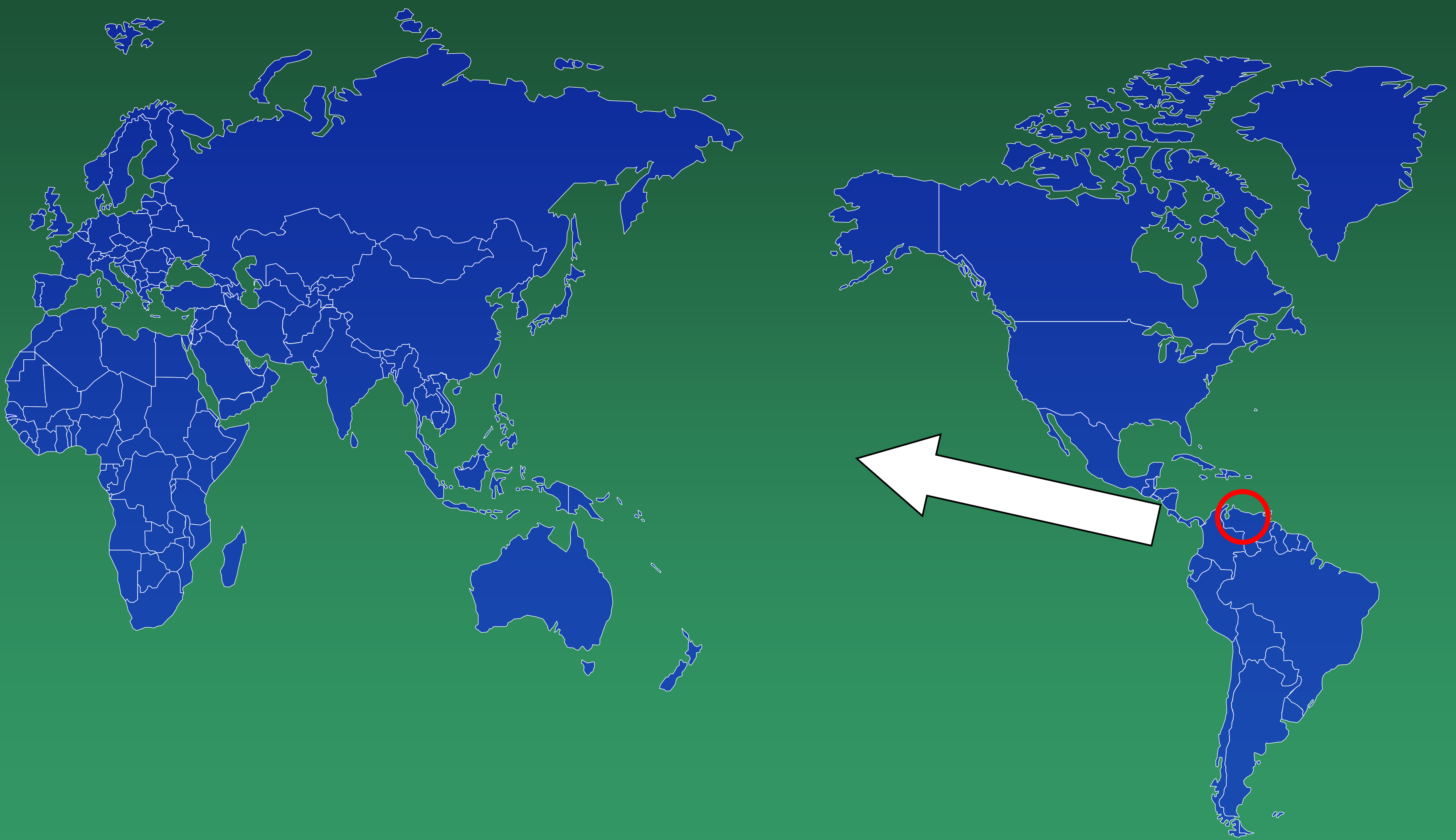
Venezuelan Crude to Asia



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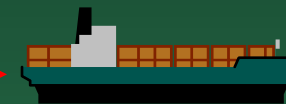
Some Market Realities

Chinese Factory

Local Truck - Guangdong

Freight Forwarder CFS

Container Terminal – Yantian, China



Container Terminal – Long Beach

Rail Ramp – Long Beach

Intermodal Train LA-Chicago

Rail Ramp – Chicago

Local Dray to DC

Distribution Center

Truck to store

Store Shelf

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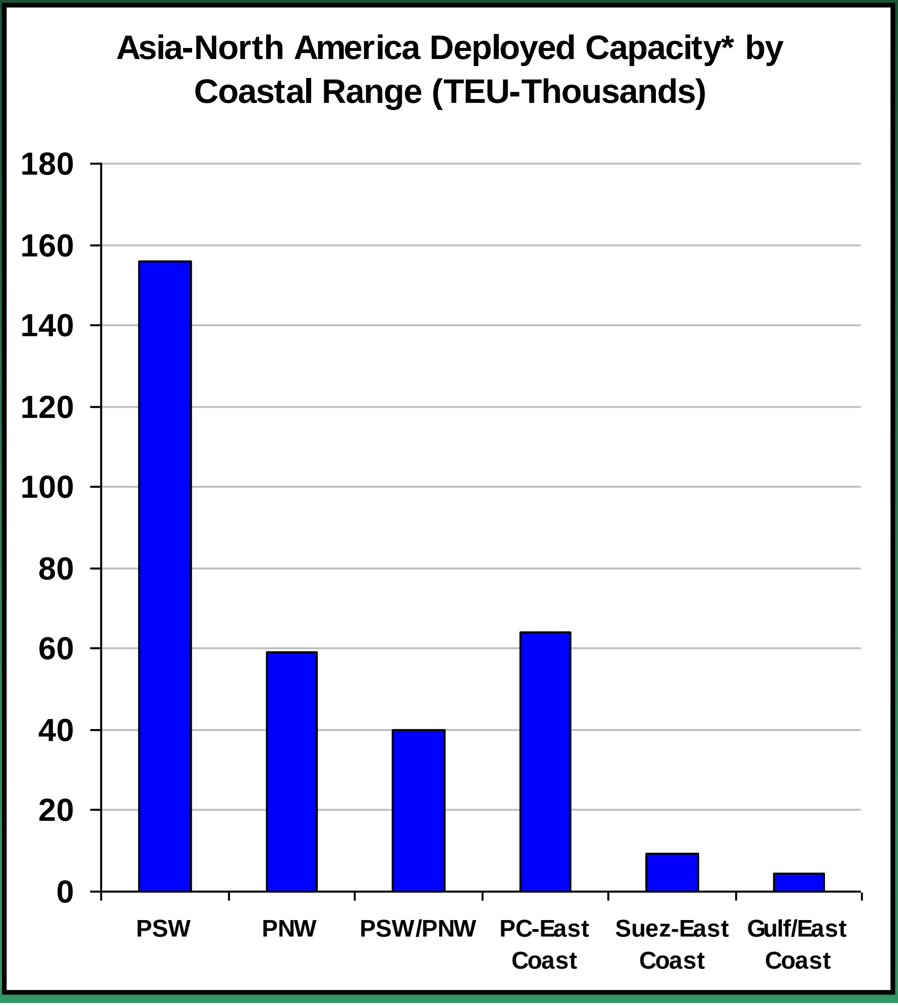
Some Market Realities

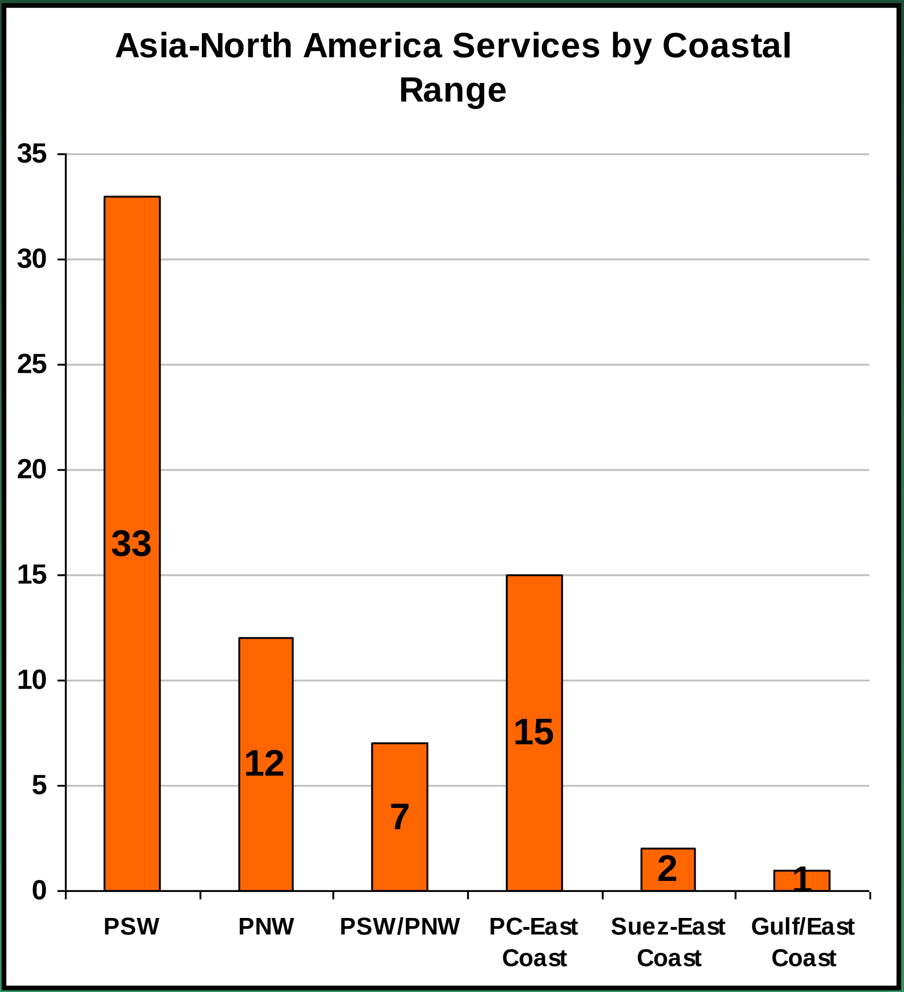
- The Players
- Services
- Big Ships
- Port Capacity
- Rail Capacity

There are a lot of players and options

- 100-150 significant BCOs
- 50-100 third party vendors
- 15 global shipping lines offering over 70 services per week
- Three basic routing options
- 10 major North American gateway ports
- Six railroads

Asia-West Coast services represented approximately 75% of Asia-North America services and capacity in 2007.





Source: Compair Q3 2007
*Noted: Deployed capacity equal to sum of one-way capacity on all vessels deployed on the trade (all on weekly services)

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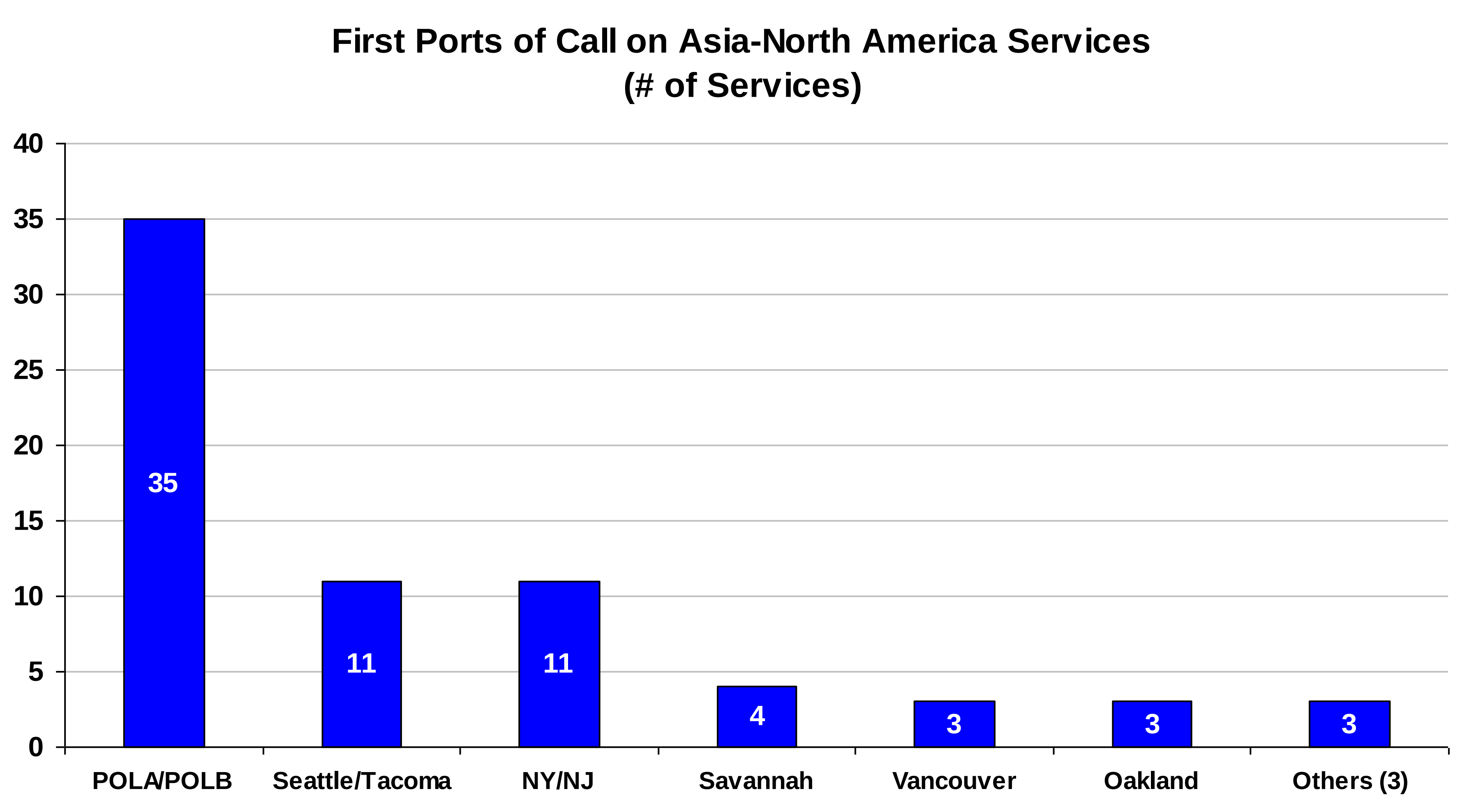
Los Angles and Long Beach



Source: Compair Q3 2007

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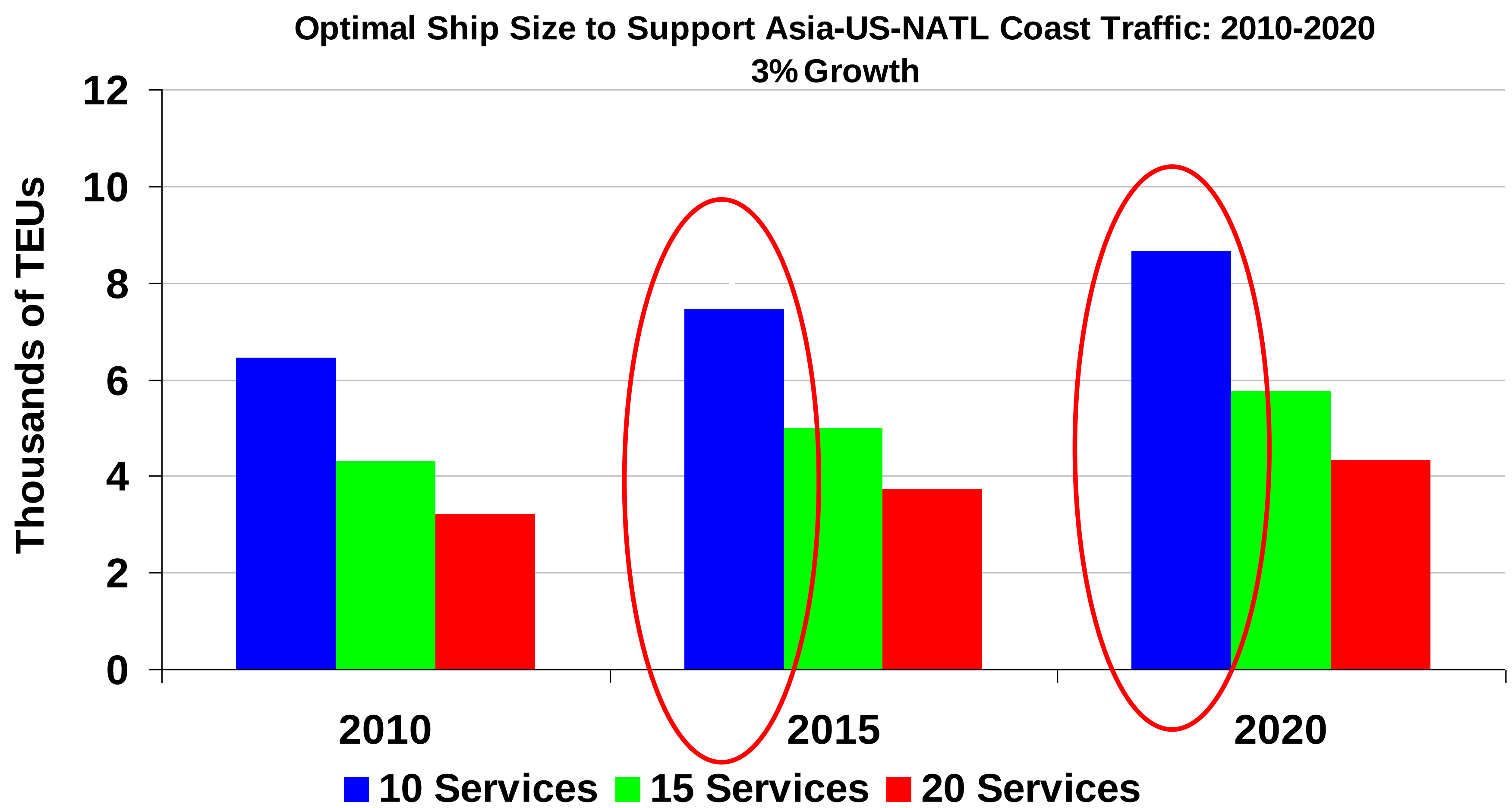
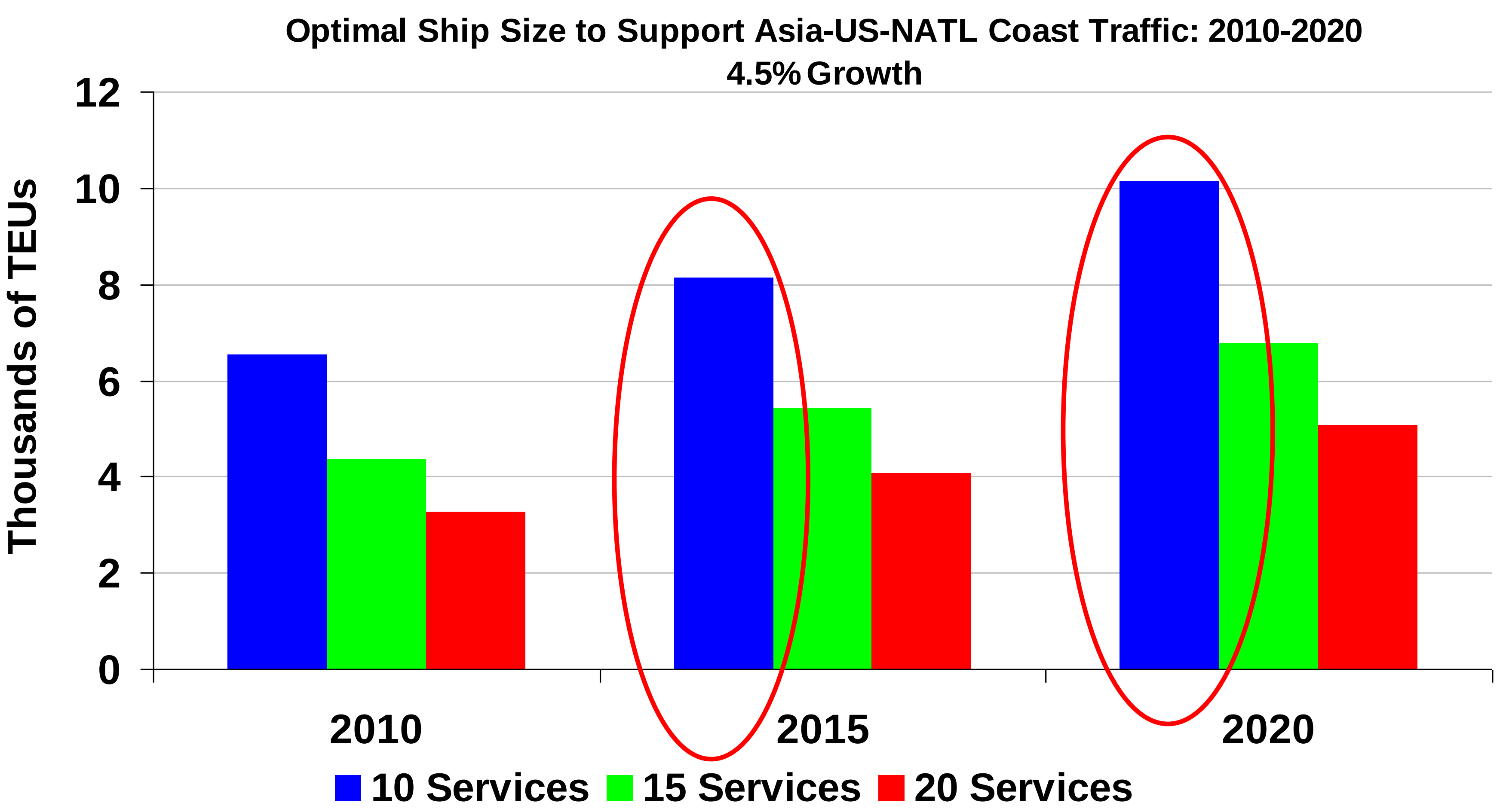
Given 3% growth, the largest service vessel size scenario for the Asia-USEC trade is estimated to be approximately 8,600 TEUs by 2020.



Note: US NATL represents ports from Jaxport to Boston
Note: Asia includes SEA, NFE, and China
Source: PIERS data; Norbridge Analysis

Given 4.5% growth, the largest service vessel size scenario for the Asia-US NATL trade is estimated to be approximately 10,000 TEUs by 2020.



Note: US NATL represents ports from Jaxport to Boston
Note: Asia includes SEA, NFE, and China
Source: PIERS data; Norbridge Analysis

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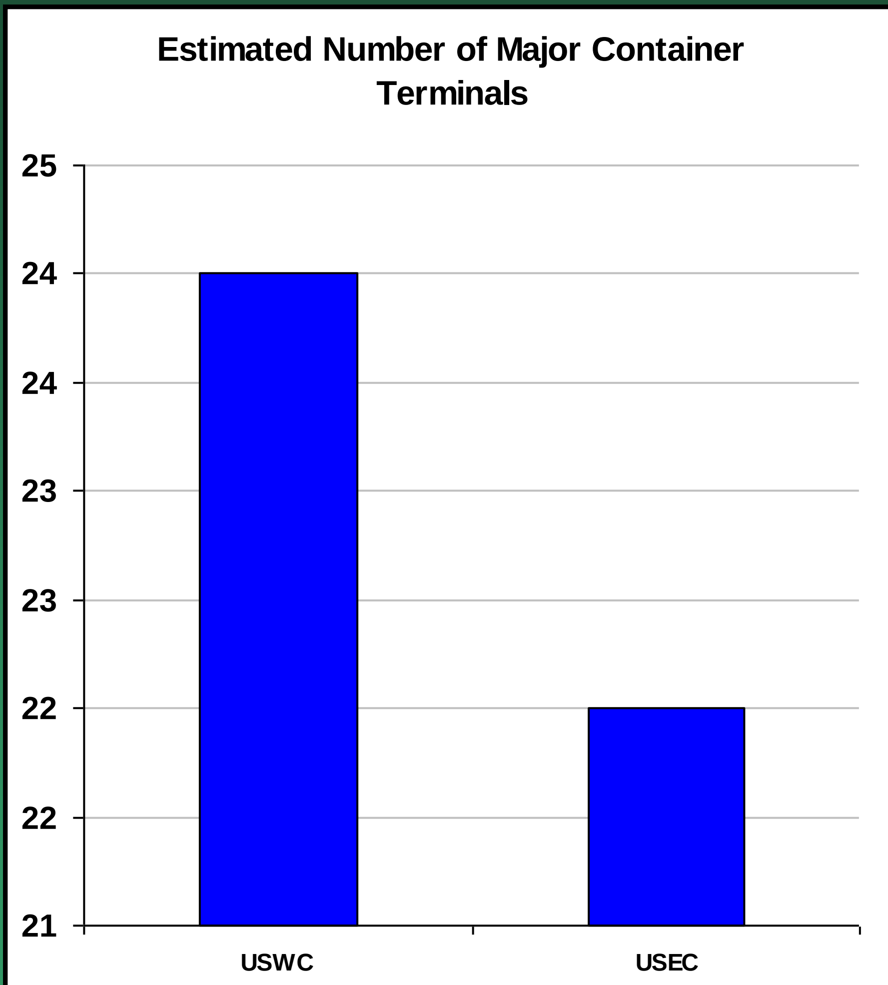
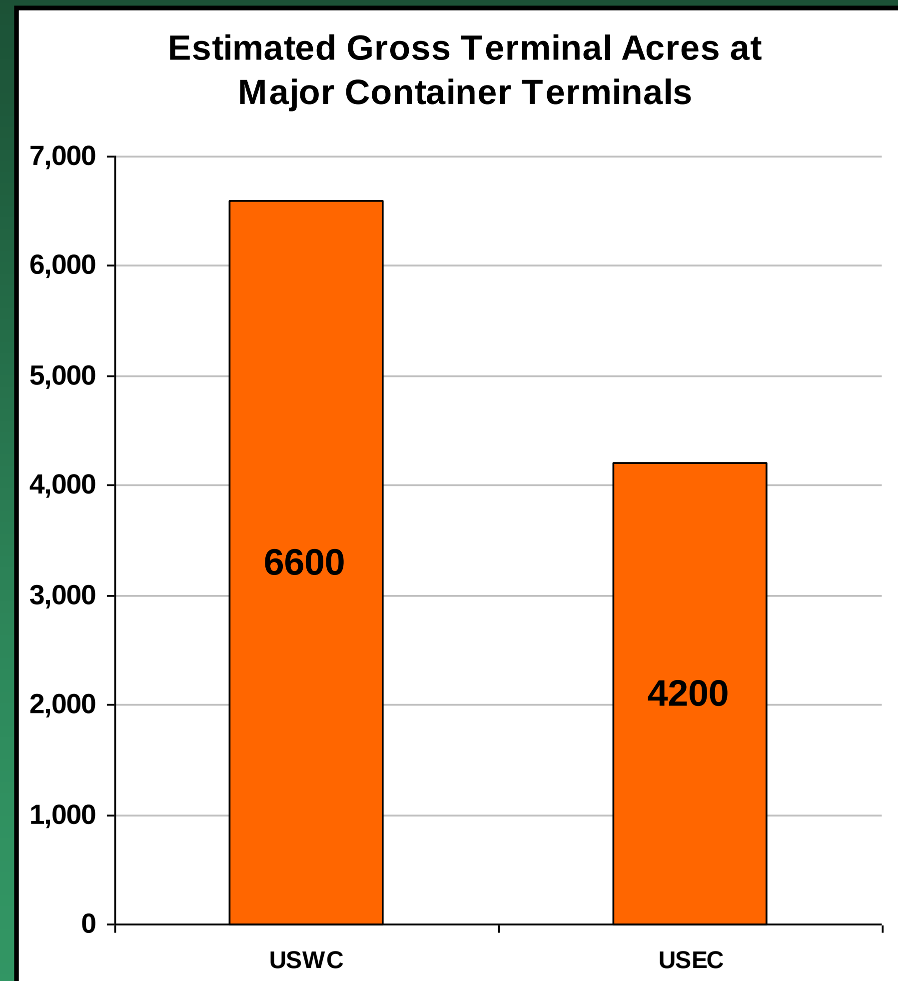
Ample port capacity likely exists on both coasts.





Source: Compair Q3 2007
***Noted: Deployed capacity equal to sum of one-way capacity on all vessels deployed on the trade (all on weekly services)**

Significant expansion opportunities also exist

USWC

- Pier 500
- Middle Harbor
- LAXT conversion
- Tacoma: multiple developments
- Terminal 2 Deltaport
- Prince Rupert Phase II

USEC

- Bayonne & Global
- Craney Island
- Navy Base
- Jasper County
- Hanjin Jacksonville

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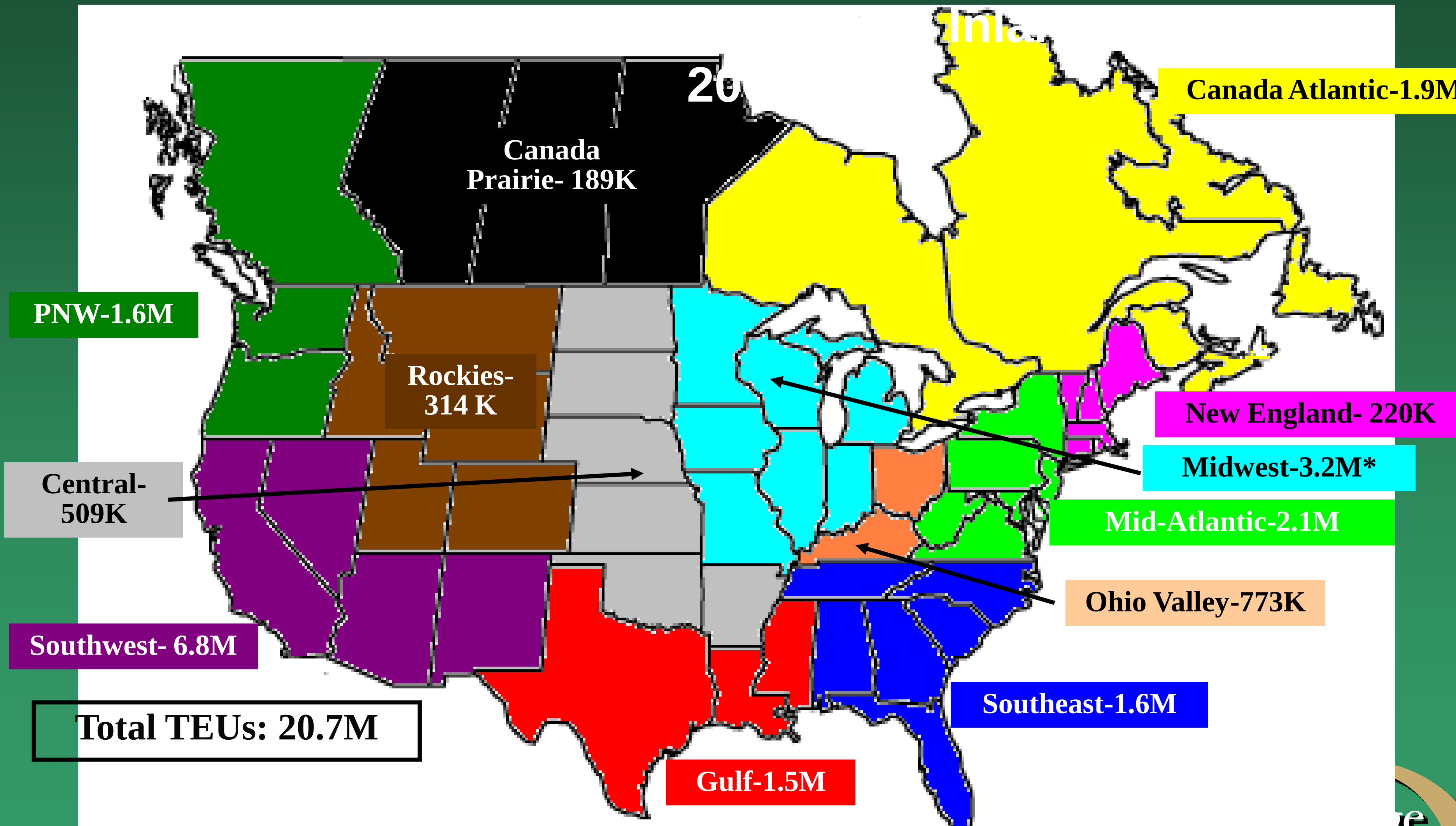
The Southwest (6.8M TEUs), Midwest (3.2M TEUs) and Mid-Atlantic (2.1M TEUs) are the largest inland markets for U.S.-Asia traffic moving over West Coast ports.

China, Southeast Asia, and Northern Asia Container



Source: PIERS 2008. Norbridge Estimates.

The Potential Opportunities

The no-brainers

- Mid-Atlantic
- Southeast

The battlegrounds

- Ohio Valley
- Atlanta
- Texas
- Memphis
- Chicago

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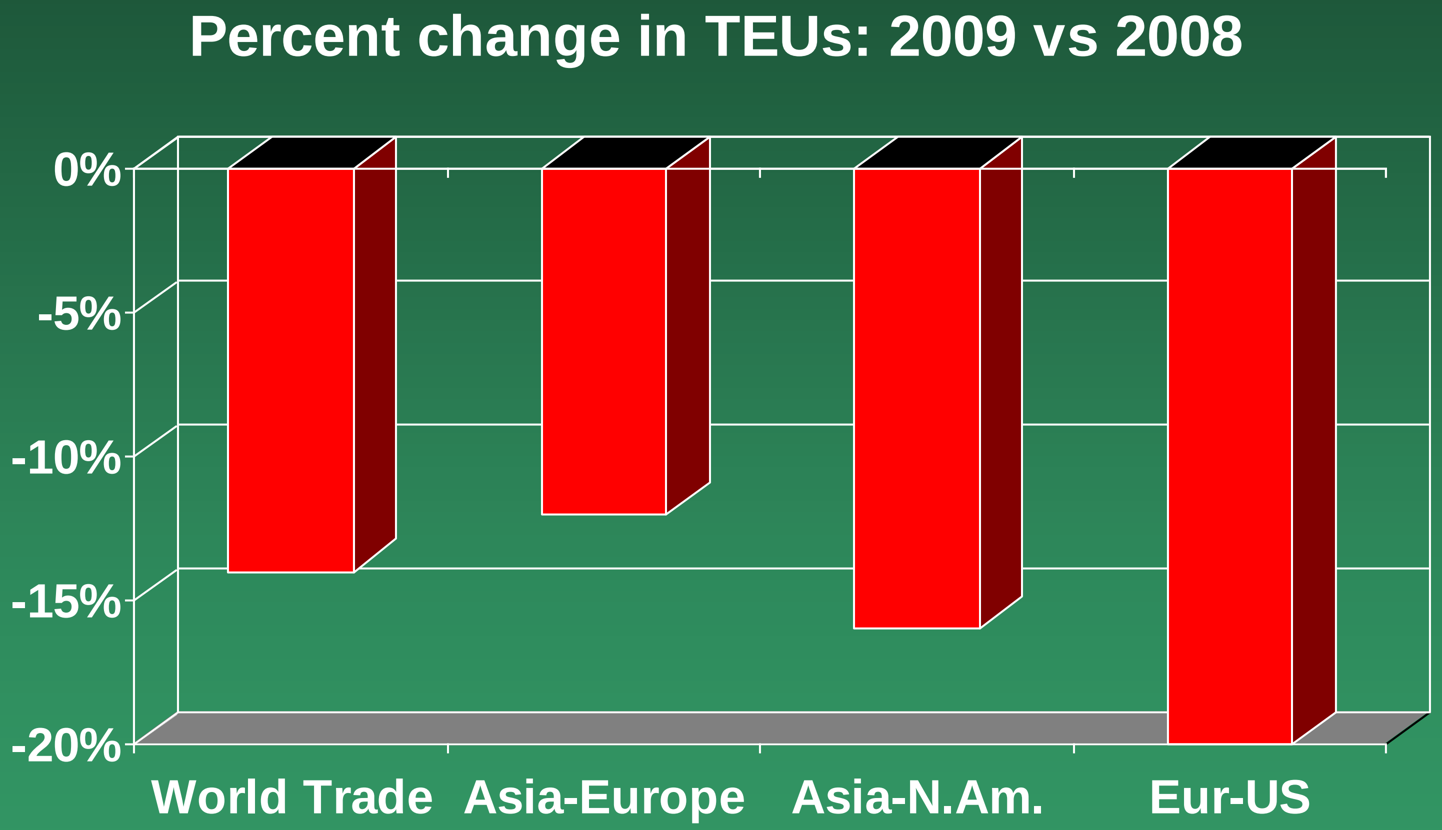
Panama Canal Expansion: Potential

2009: "The worst of times"



Global & North American Container Shipping Industries

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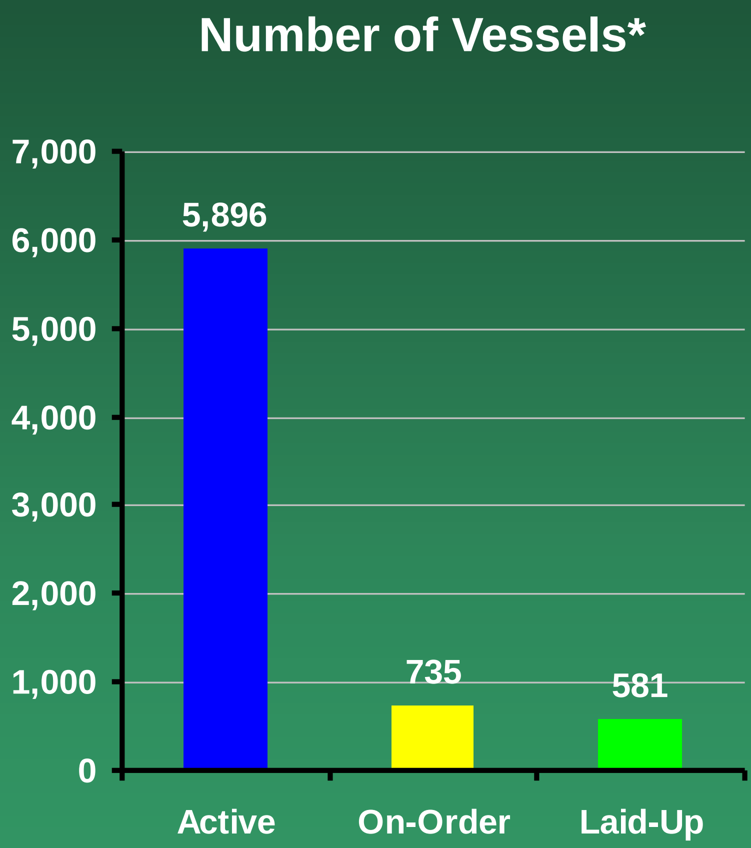
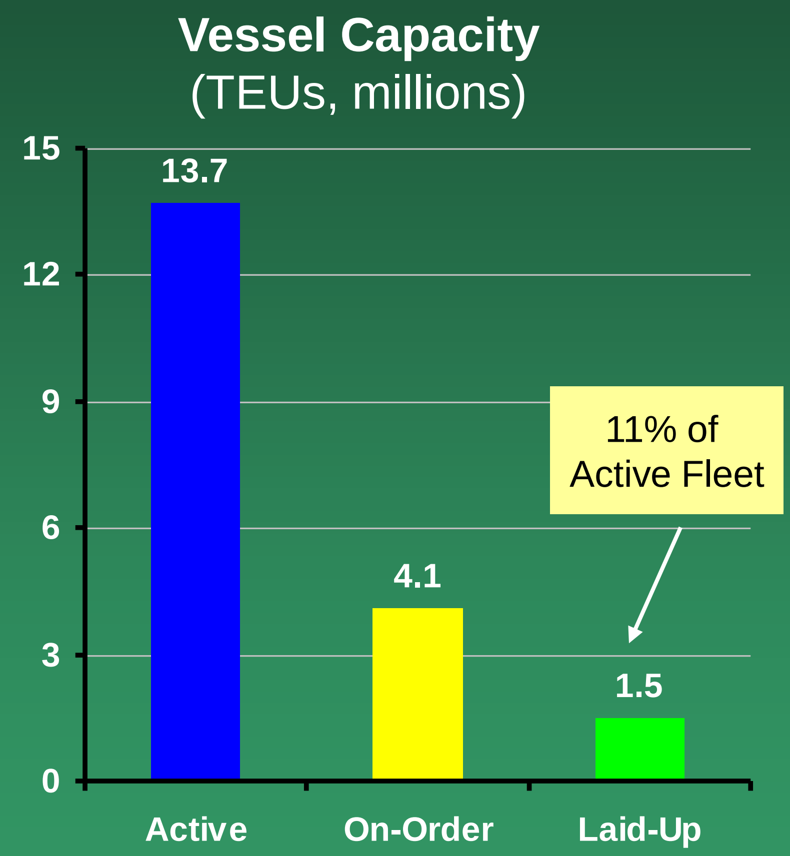
The Global Container Shipping Industry

- ✓ 400+ companies
- ✓ Operating 4,718 fully cellular container capable ships
  - 13.1M TEU of capacity
- ✓ On 400+ trade routes
- ✓ Carrying about 140M total TEUs per year (2008)
  - Estimated to have dipped by about 15% in 2009 to approximately 122M TEUs

Source: Containerisation International; AXS Alphaliner

The increasing supply of container ships may pose challenges for years.





Note: All container capable vessels
Source: January 2010 AXS Alphaliner; Norbridge analysis

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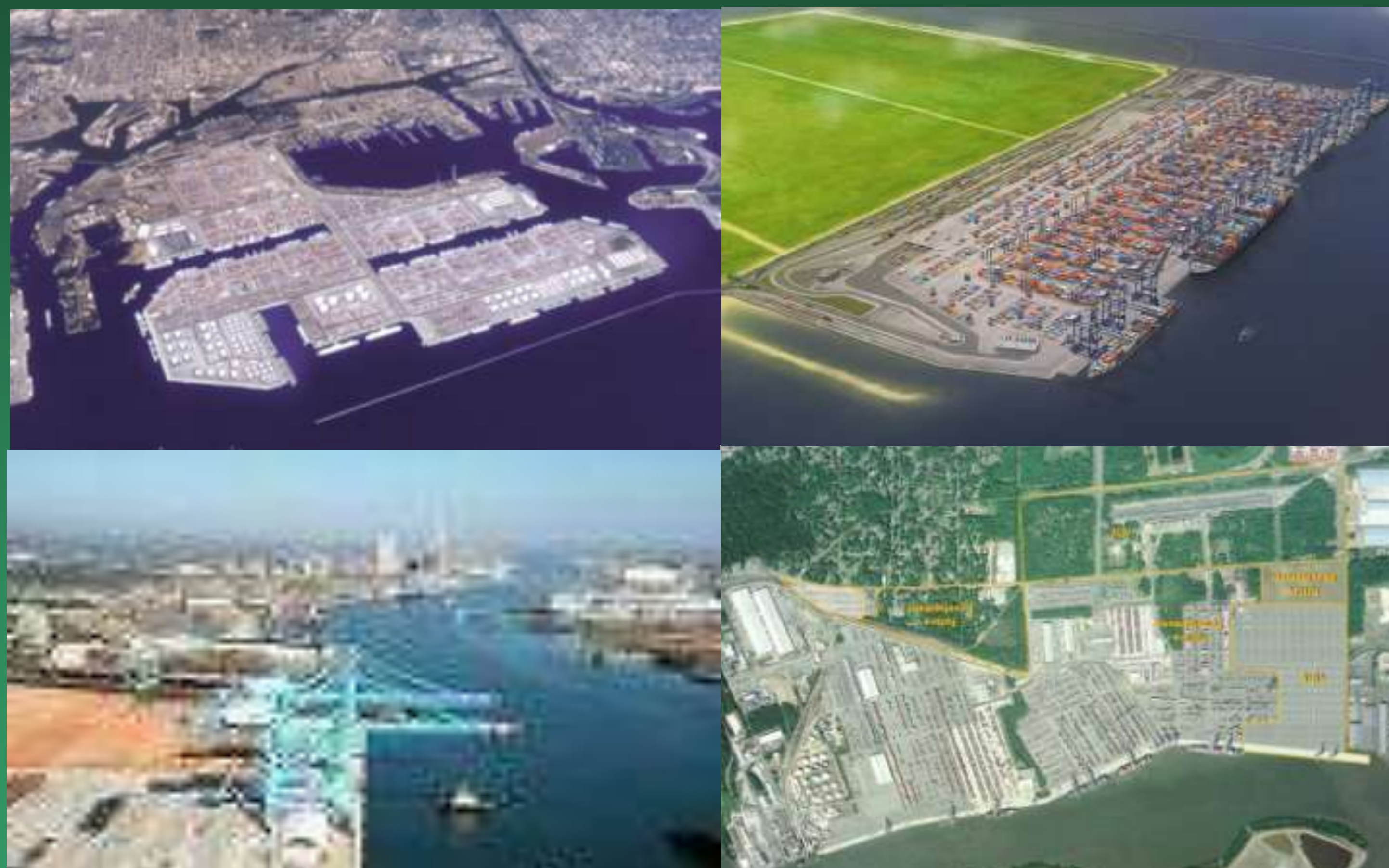
North American Container Port Industry



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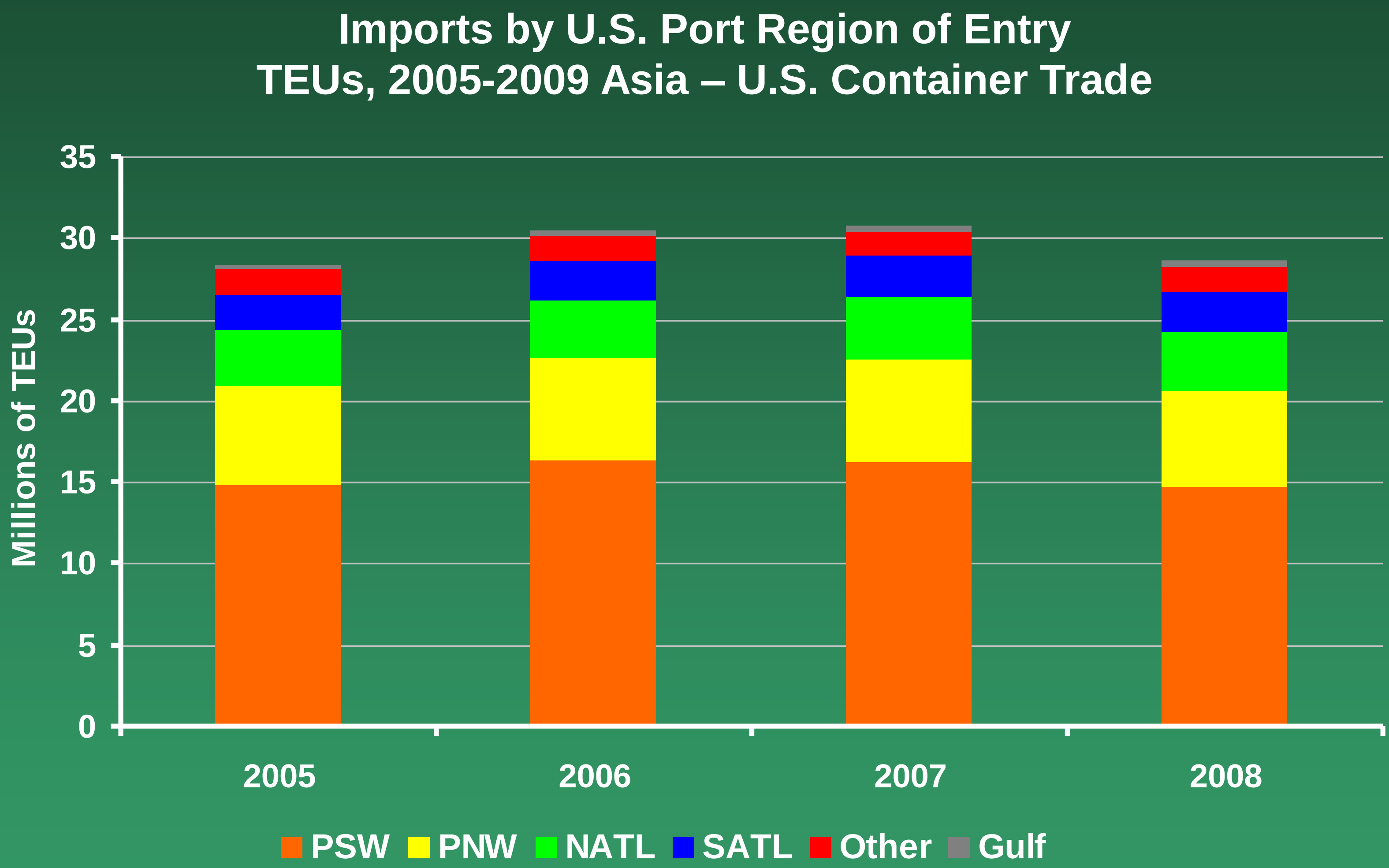
Asian Imports have declined across all coasts.



Source: PIERS 2005-2009

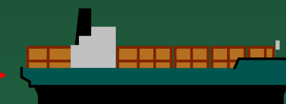
Supply Chain Trends

Chinese Factory

Local Truck - Guangdong

Freight Forwarder CFS

Container Terminal – Yantian, China



Container Terminal – Long Beach

Rail Ramp – Long Beach

Intermodal Train LA-Chicago

Rail Ramp – Chicago

Local Dray to DC

Distribution Center

Truck to store

Store Shelf

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Norbridge Supply Chain Research

Global Sourcing

- China will remain dominant global source for US imports
- Near-shoring may grow at the margin (exchange rates, fuel costs)

Supply Chain Strategies

- Start with customer locations, then sources, then DCs, then flow routing
- Speed (high value product) and cost (low value) are key; also reliability

Port Selection

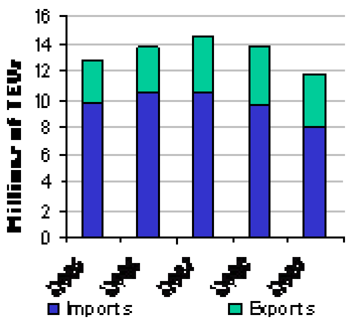
- End-to-end supply chain cost and service considerations are key
- All else equal, shippers seek rapid cargo transit and low inland costs
- Shippers select port if they deconsolidate or transload on the coast
- Carriers and 3PLs make port selection otherwise (port-to-door routing)

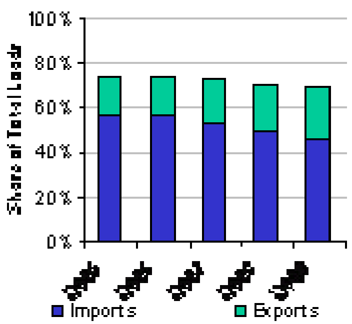
Transloading will wax & wane

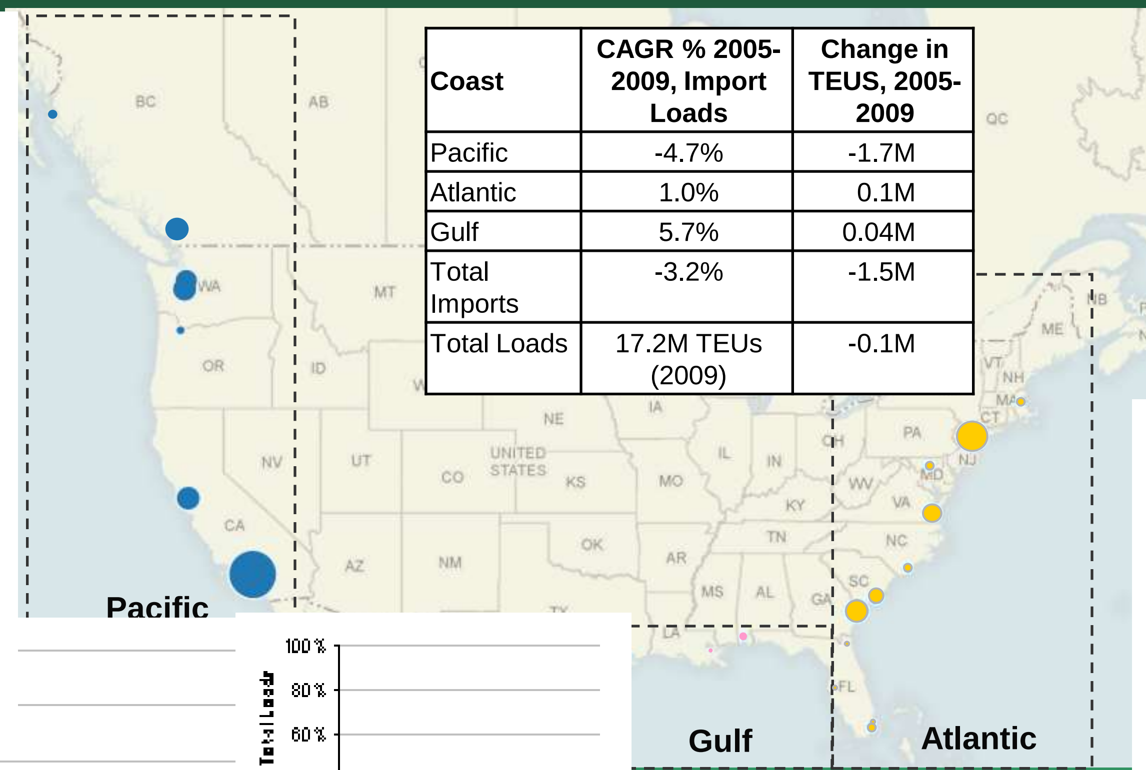
- Compelling economics under many circumstances
- Equipment, inland service, rate differentials and capacity are key considerations

Asian Import & Export Loads: By Coast

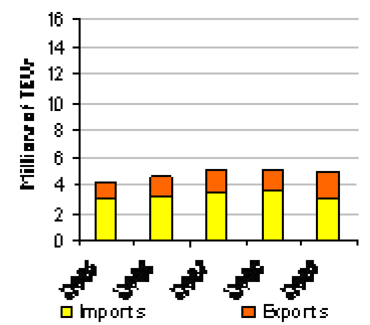
Asia Import and Export Loads by Coast, 2005-2009

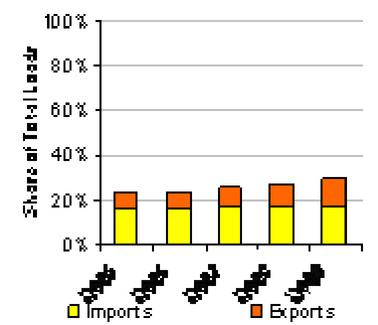




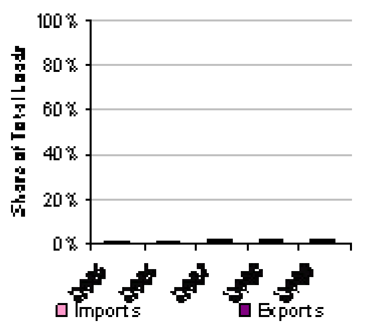


Coast	CAGR % 2005-2009, Import Loads	Change in TEUS, 2005-2009
Pacific	-4.7%	-1.7M
Atlantic	1.0%	0.1M
Gulf	5.7%	0.04M
Total Imports	-3.2%	-1.5M
Total Loads	17.2M TEUs (2009)	-0.1M





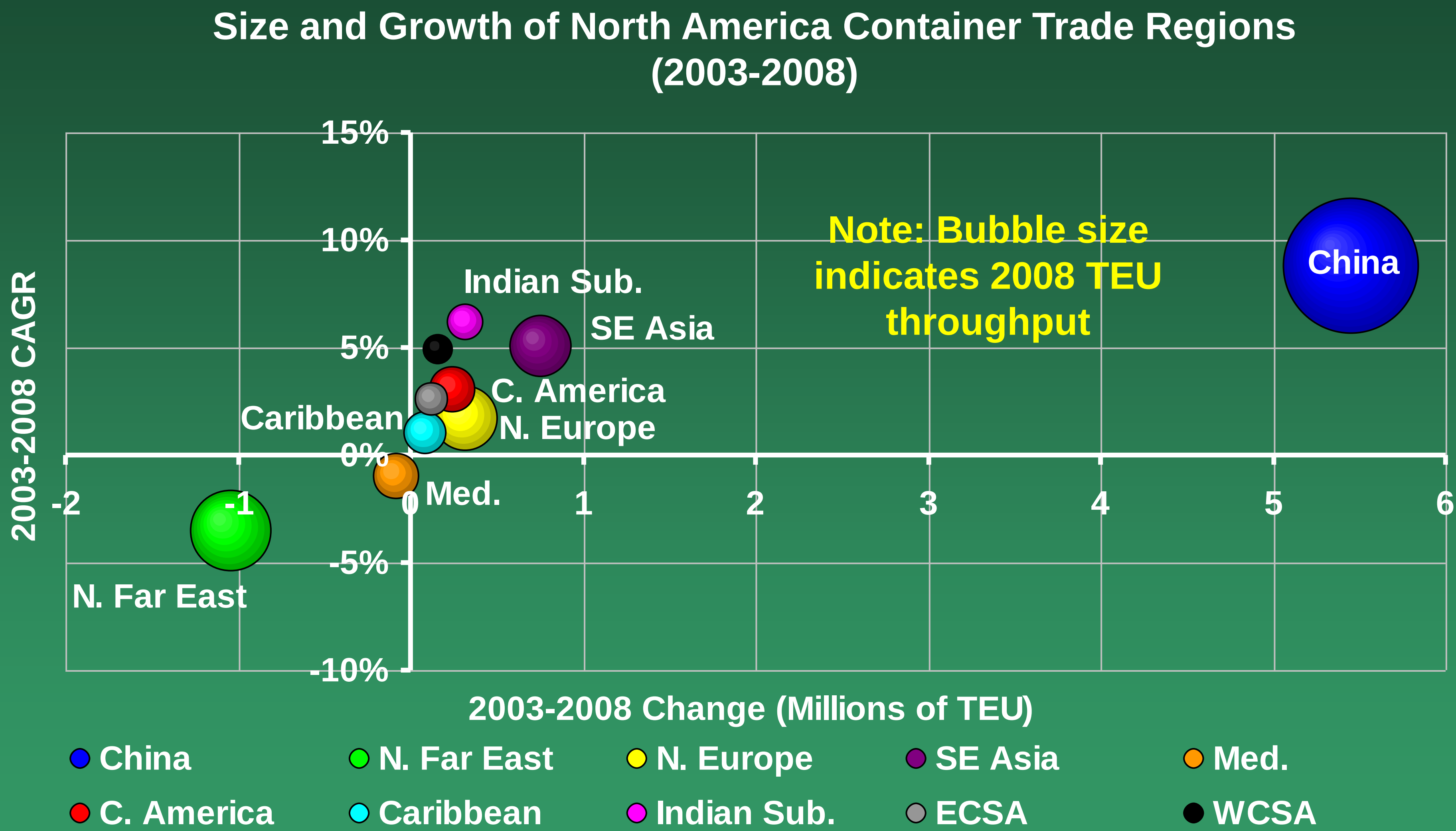
Note: different scale for the Gulf



Source: PIERS data 2009, NBI Analysis
Note (1): Pacific region includes traffic into Canada West Coast ports
Note (2): Total Loads shown (excludes empties)

Norbridge

China continues to dominate North American container trade.

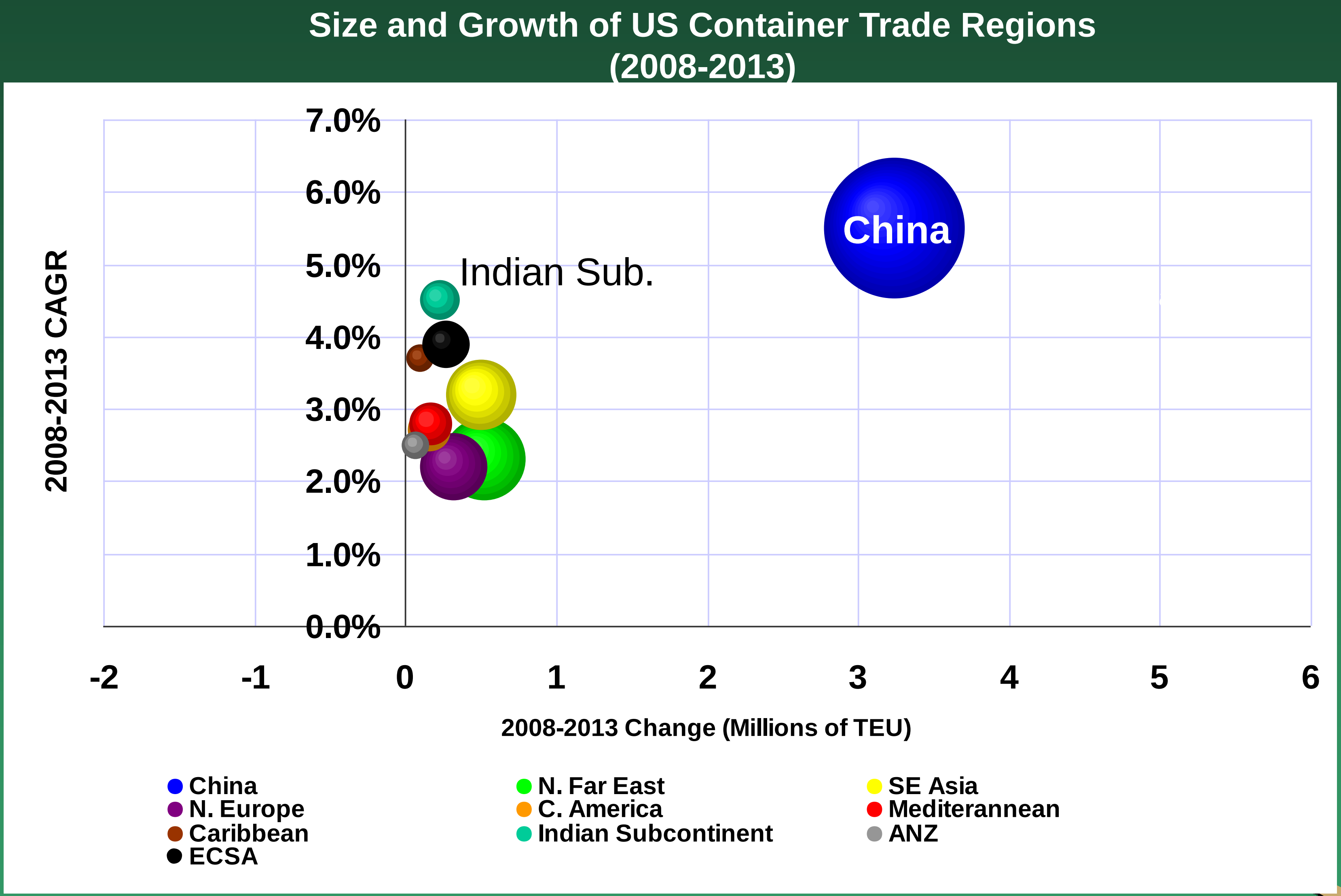


Note: Excludes AK, HI, Guam and Puerto Rico ports

Source: 2003 and 2008 PIERS data; Norbridge Analysis

Norbridge

Global Insight projects China will continue to drive U.S. container growth



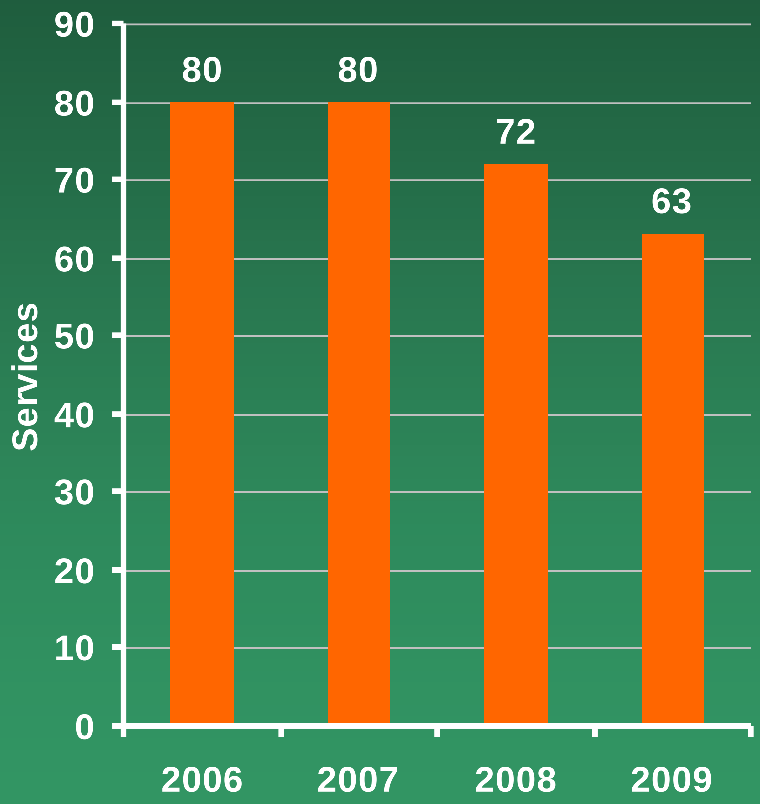
Source: GI; Norbridge research and analysis

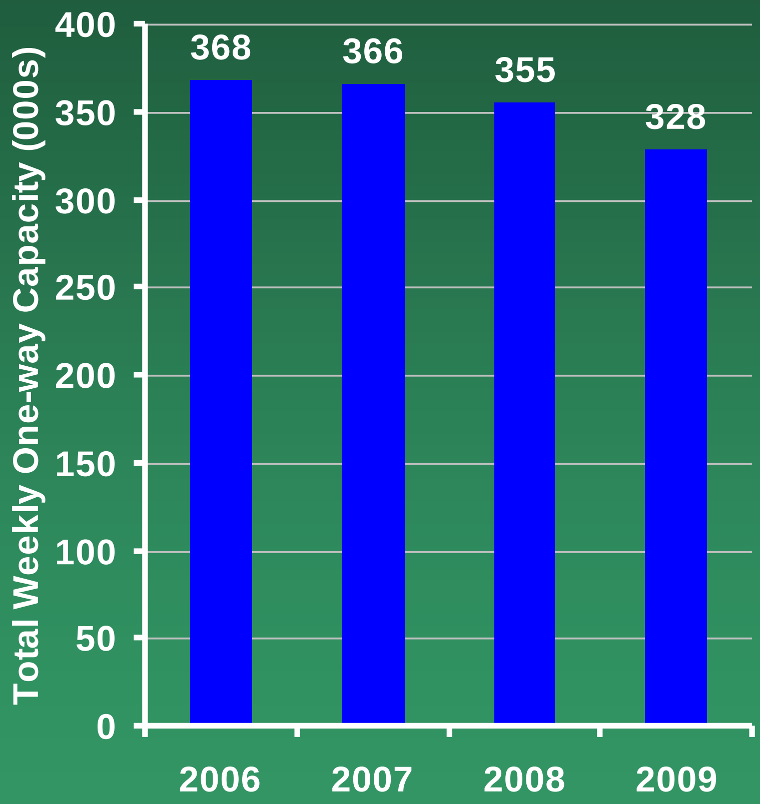
Note: Bubble size indicates projected 2013 throughput

Norbridge

Asia-North America container services have steadily declined

Total Number of Services & Average Weekly TEU Capacity by Year to North America from India, SE Asia, N. Asia, and China (3Q)

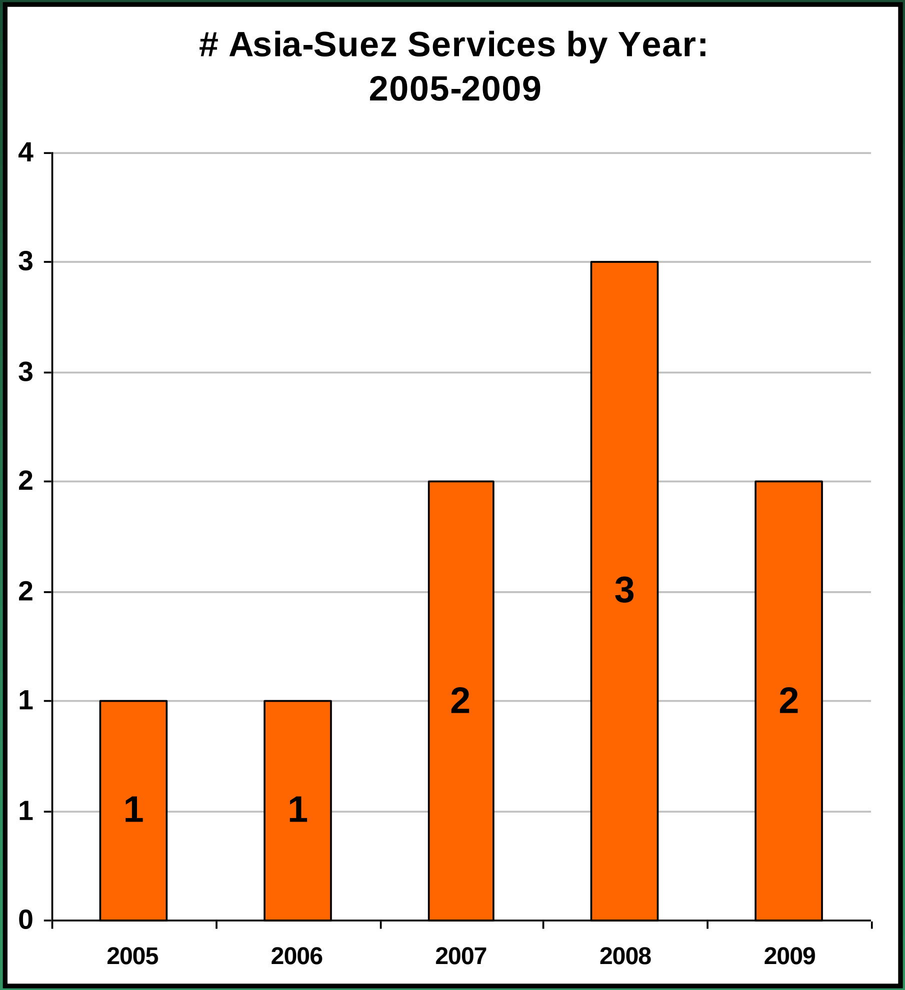


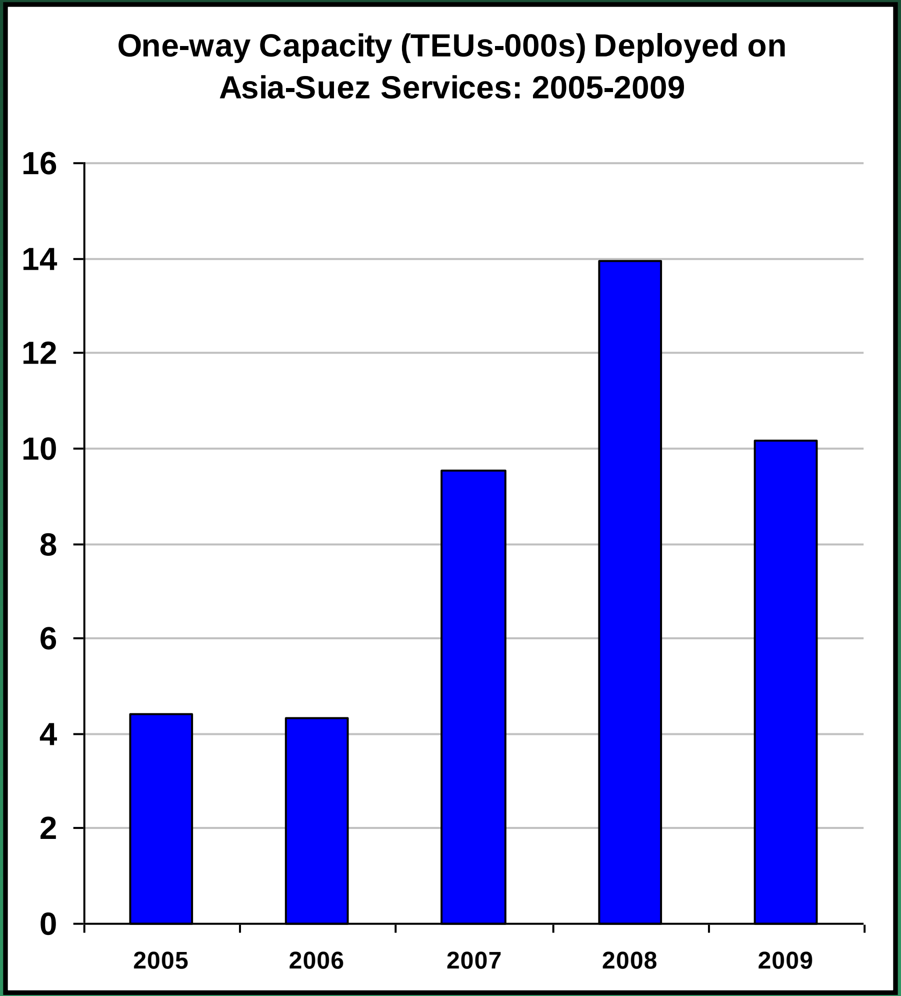


Source: Com Pair Q3 2006-2009

Norbridge

The maximum number of Asia-Suez services peaked in 2008 with three services.





Source: Compair Q3 2005-Q3 2009

Norbridge