2012 Port Finance Seminar – Miami, Florida

Session 8: Infrastructure Investment for the Future

North American Trade & Transportation Future Trends

Presented By

M. John Vickerman

Principal

VICKERMAN & ASSOCIATES, LLC

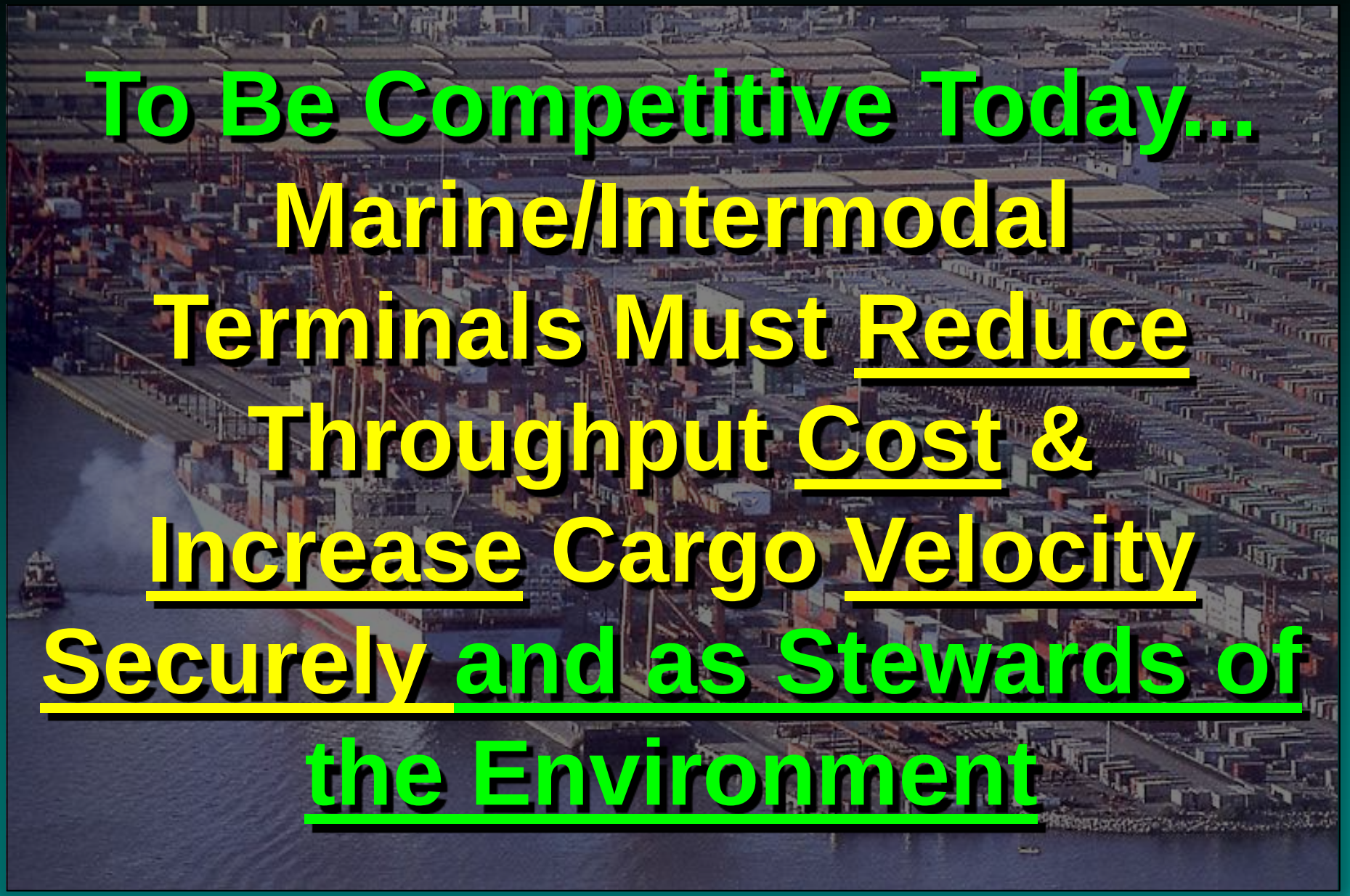
Williamsburg, Virginia

International Port External Industry Pressures Driving Today's Logistics

VICKERMAN

More than 98% of everything we consume, wear, eat, drive and construct is brought to us via ships through the North American port system.

VICKERMAN



VICKERMAN

Who Decides Where the Cargo Goes?

Who Owns & Controls Today's Cargo?

- The "***Shipper***" or "***Beneficial Cargo Owner***" *(BCO)*
- **BCO** = **Importer of record**, the entity that physically takes possession of cargo at destination and **does not act as a third party** in the movement of such goods
- The person or company who is usually the **supplier or owner of commodities shipped**.

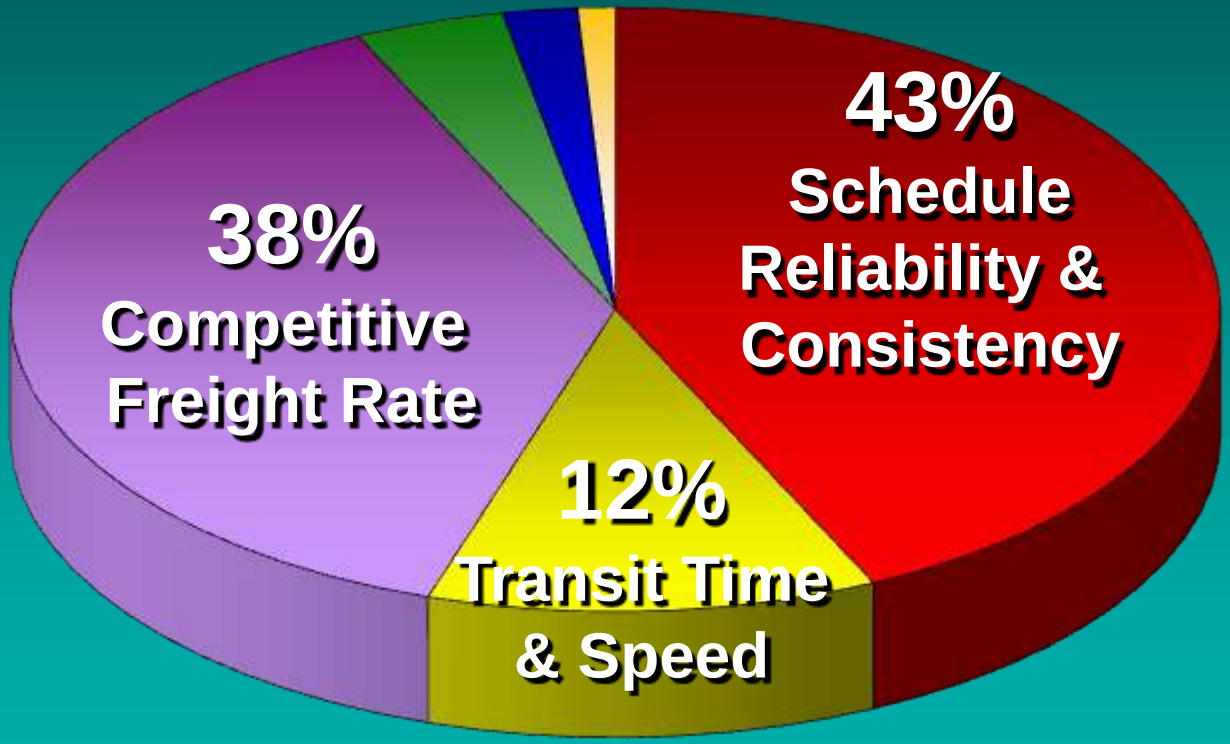
The Speed of Shipper – BCO Decisions Today:

E-Commerce Tools Speed Trade Decisions Instantly:

- **Freight Planning and Optimization** - Electronic Tender Management Tools: Rapidly gather & analyze multiple freight logistics bids instantly.
- **Data Visibility** - Shipment data is available electronically via the Web or Desktop E-tools, in real-time or close to it.

VICKERMAN

Poll of the Top 1000 "Blue Chip" Multinational Shipper Priorities



Today's Logistics Truth:

"The customer wants more and is willing to pay less for it."

What is the Value of a Single Container Load?

(Example 40 ft. Container, FEU)

					Example Value $
	=	1,890 Cases	@	$25.50/Case	=	$48,195
	=	432,000 Packs	@	$4.00/Pack	=	$1,728,000
	=	10,000 Pairs	@	$30/pair	=	$300,000
	=	315 20” TVs	@	$299/TV	=	$94,185

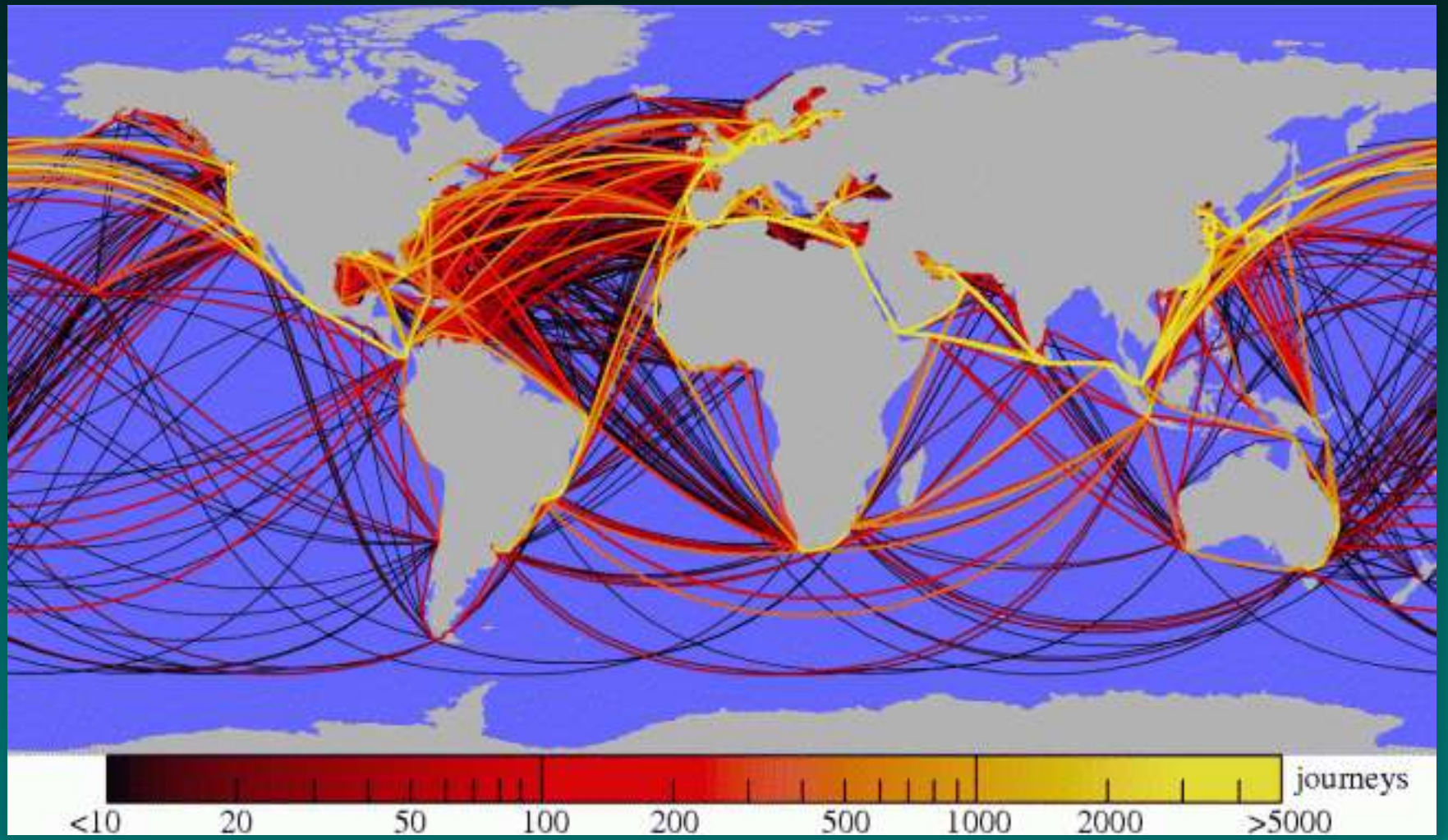
Source: Virginia Port Authority

International Maritime Cargo Demand Trends

Global Shipping Routes Plotted by AIS GPS

2010 Busiest Routes:

(1) Panama Canal, (2) Suez Canal, (3) Shanghai Port

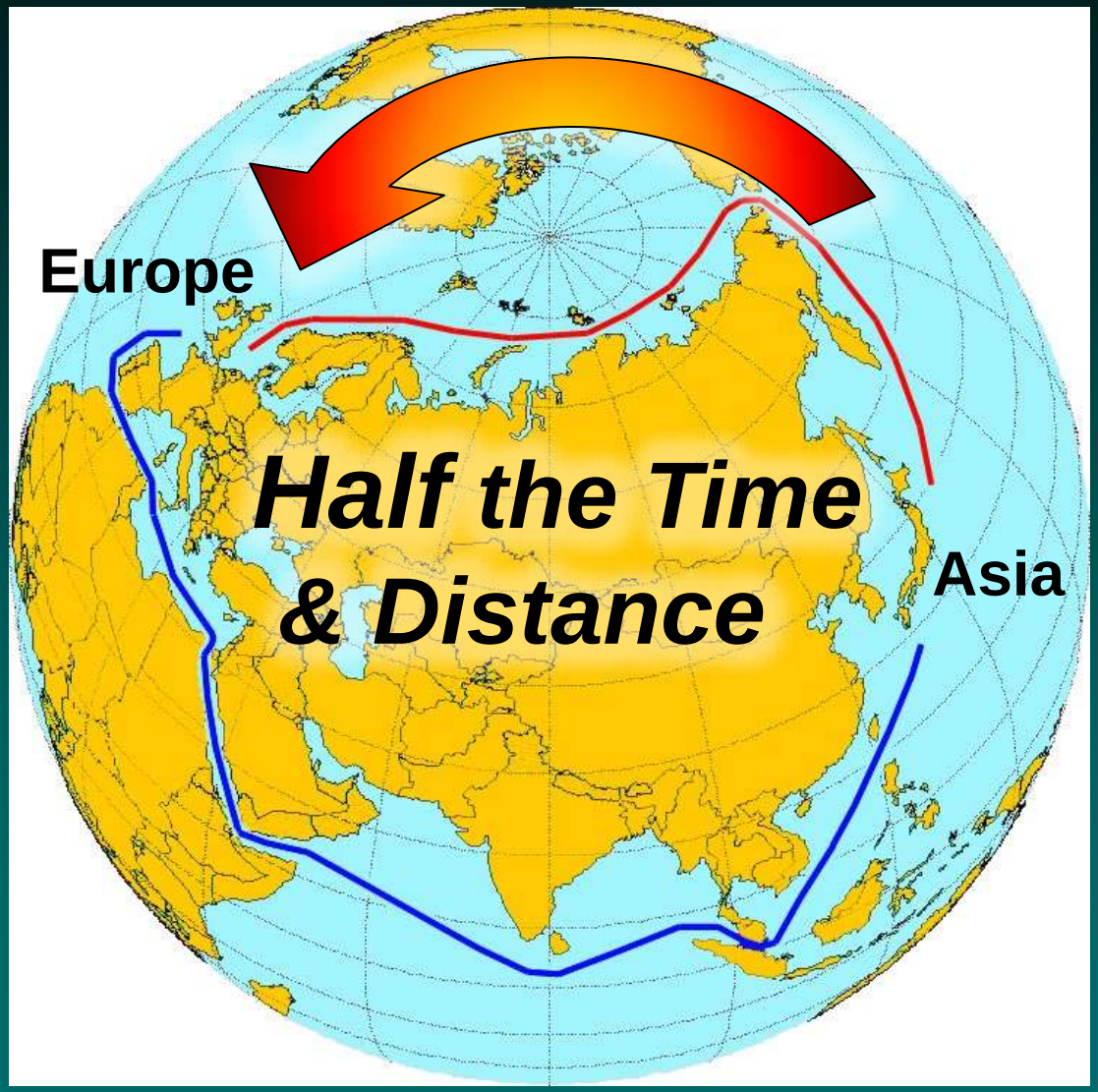


Source: Wired Science January 2010 Journal of the Royal Society: Interface

VICKERMAN

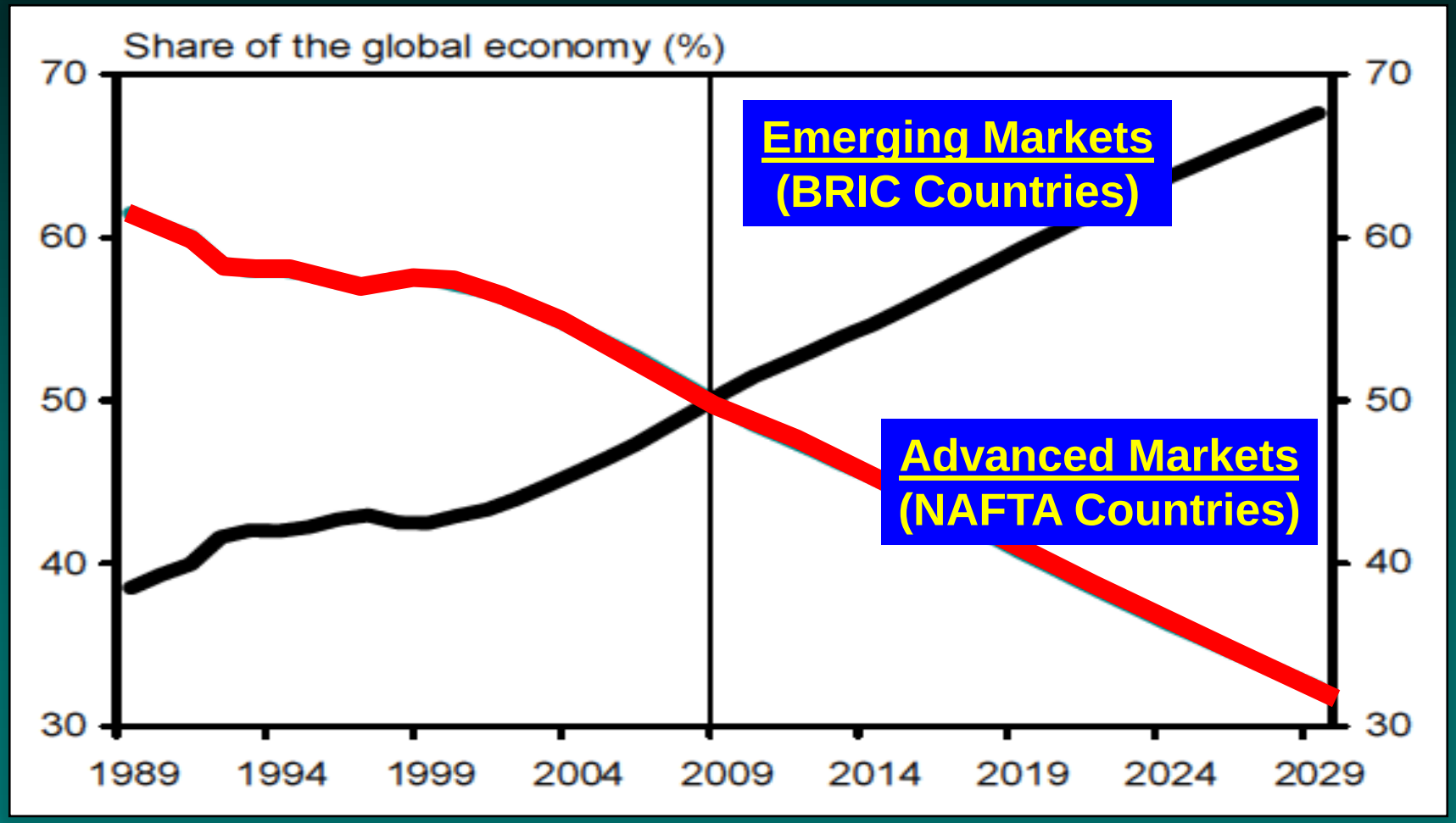
Shorter – Faster Arctic Ocean Route

2+ Months A Year Using Convoys



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…

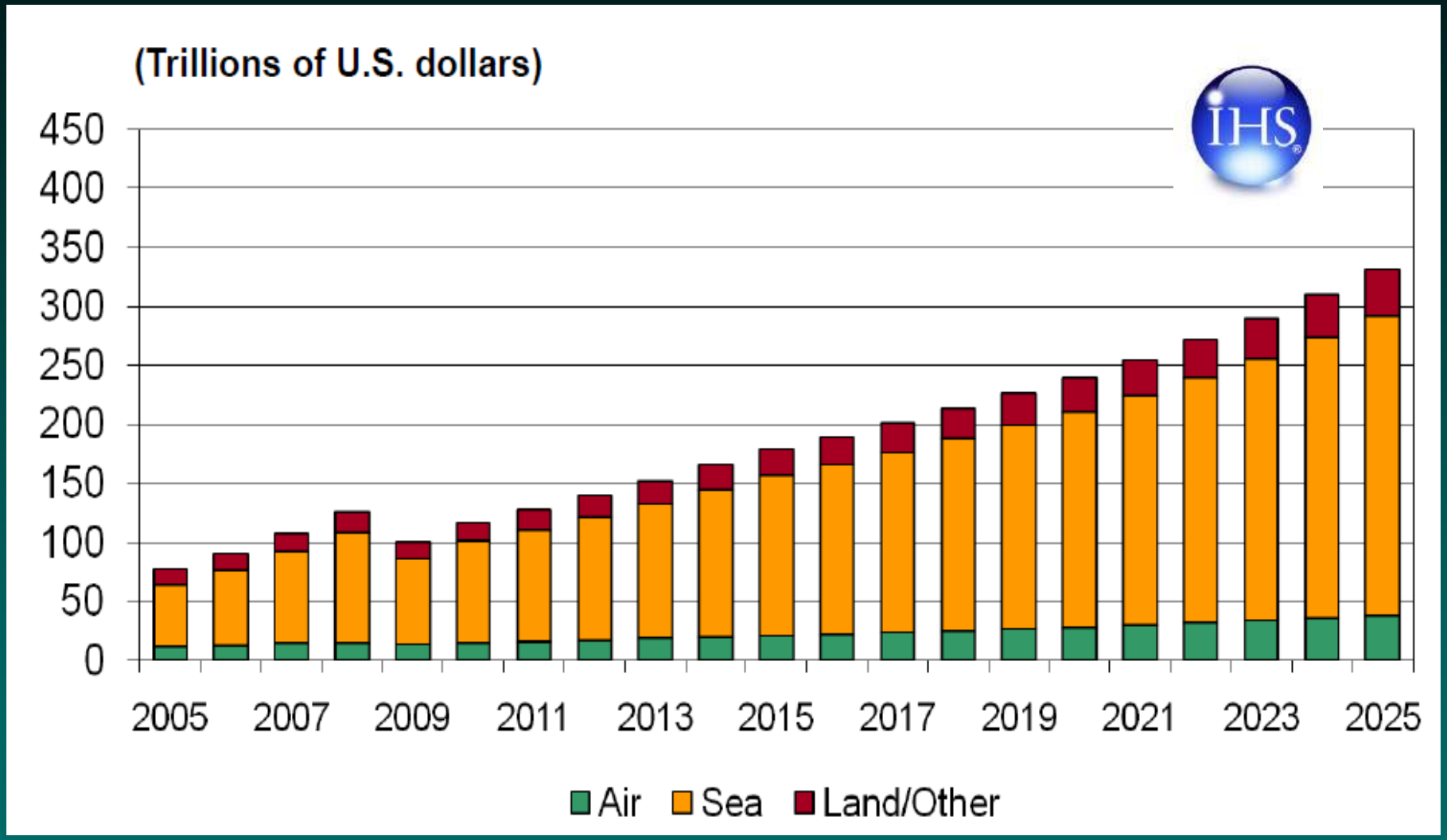


Source: IMF - Forecast by TD Economics, December 2009

VICKERMAN

Growth in Global Merchandise Trade

(Intra Europe Trade Excluded)

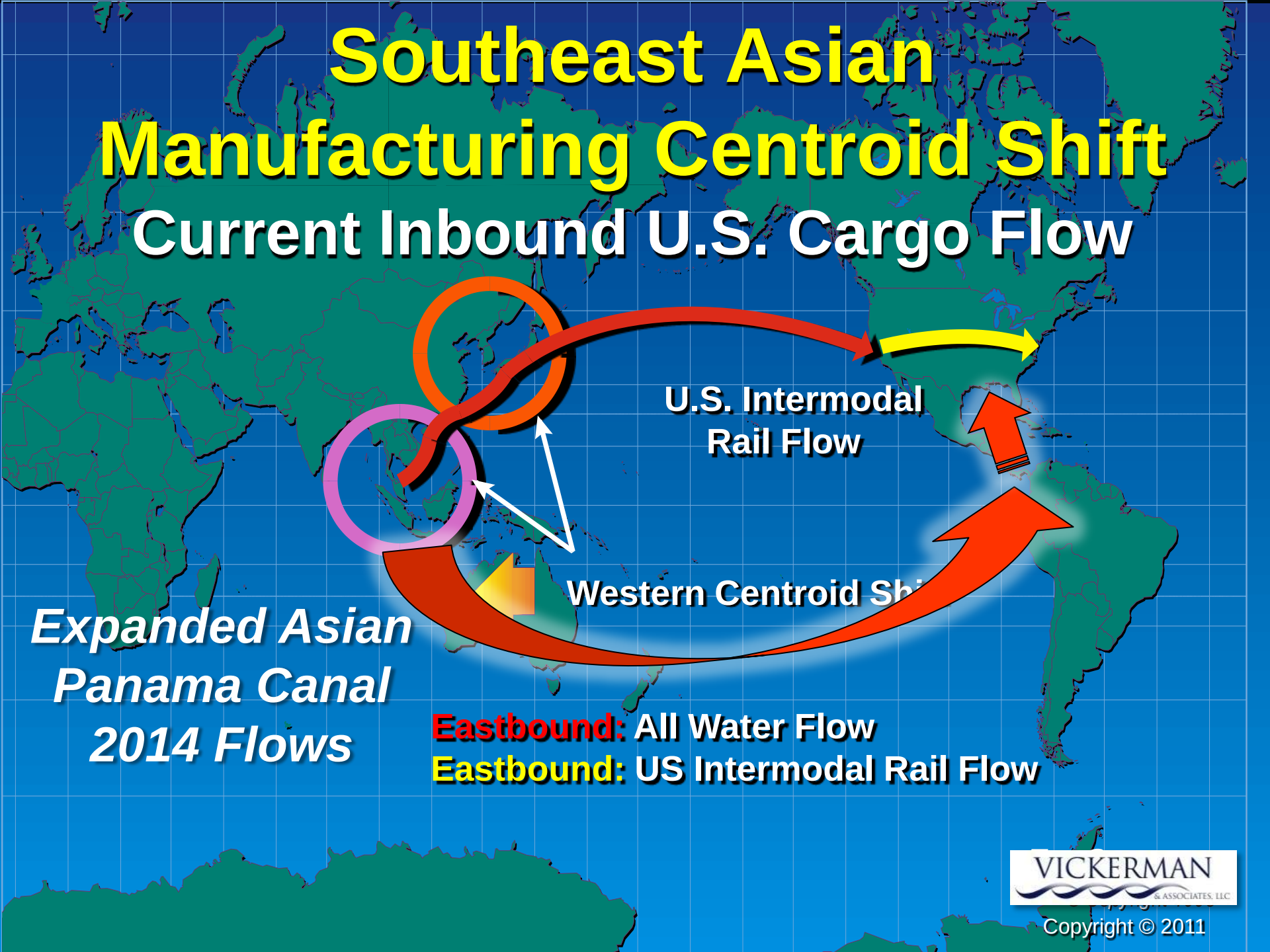


Source: IHS Global Insight – World Trade Service

VICKERMAN

Southeast Asian Manufacturing Centroid Shift

Current Inbound U.S. Cargo Flow



Expanded Asian Panama Canal 2014 Flows

Eastbound: All Water Flow
Eastbound: US Intermodal Rail Flow

VICKERMAN & ASSOCIATES, LLC

Southeast Asian Manufacturing Centroid Shift

Cu Flow

U.S. In
Rail Fl

With Manufacturing Centroid Shifts Into Vietnam and/or India, The North American East Coast will See Dramatically More Westbound Suez Traffic

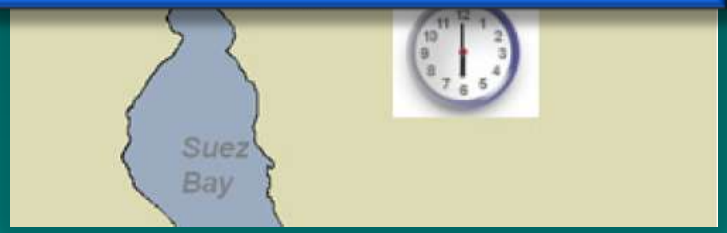
VICKERMAN & ASSOCIATES, LLC

Suez Canal Container Vessel Convoy Traffic

(Ships Currently Transit the Suez Canal in 3 Daily Convoys)

2014 Suez Canal Pricing Strategy:

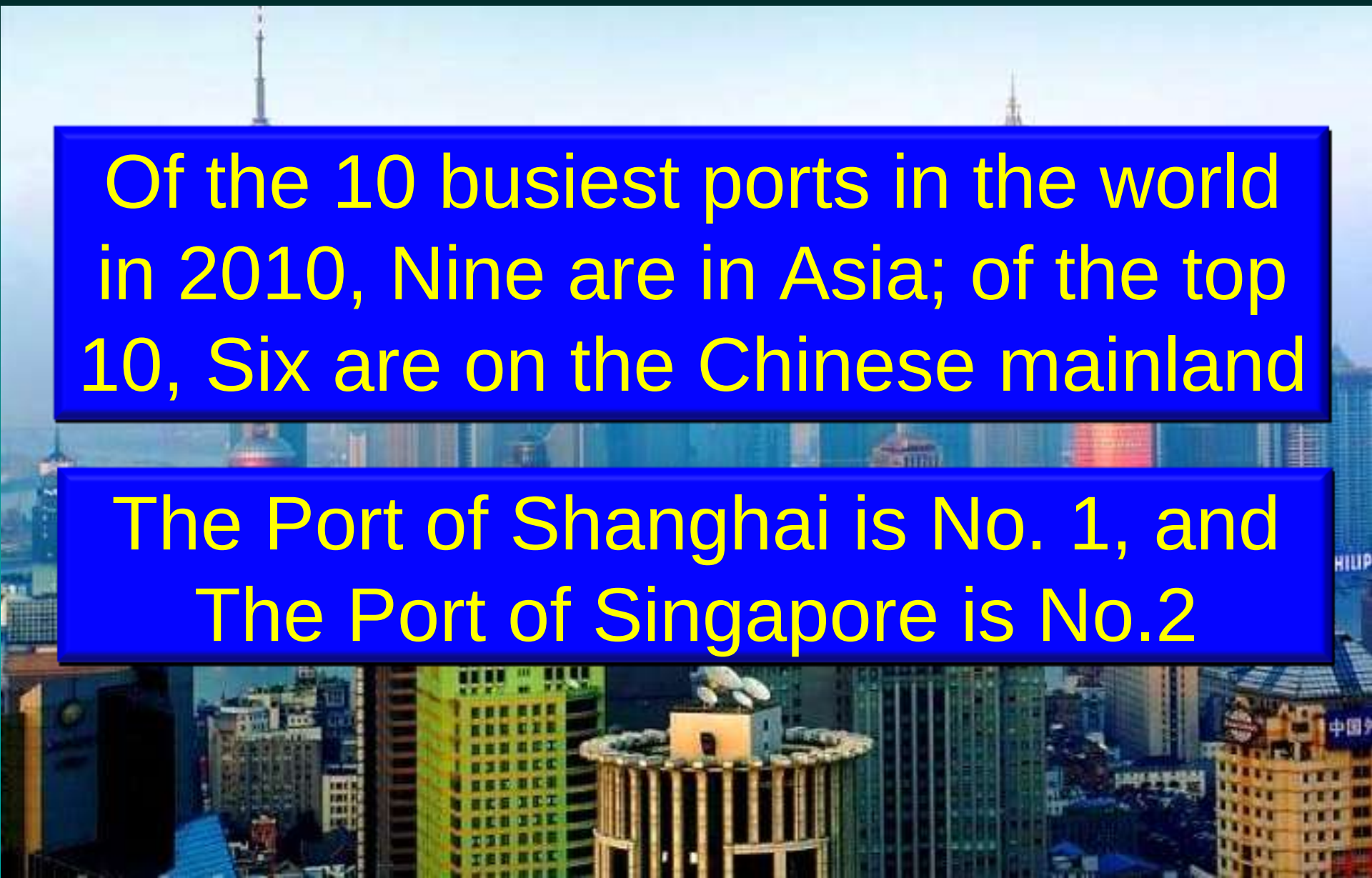
The Suez Canal has an opportunity to competitively alter global shipping patterns by undercutting 2014/15 Panama Canal new pricing strategy.



VICKERMAN


AAPA
The Growing Asian Import Trade Challenge
VICKERMAN
Copyright © 2012

Container Transhipment World Records

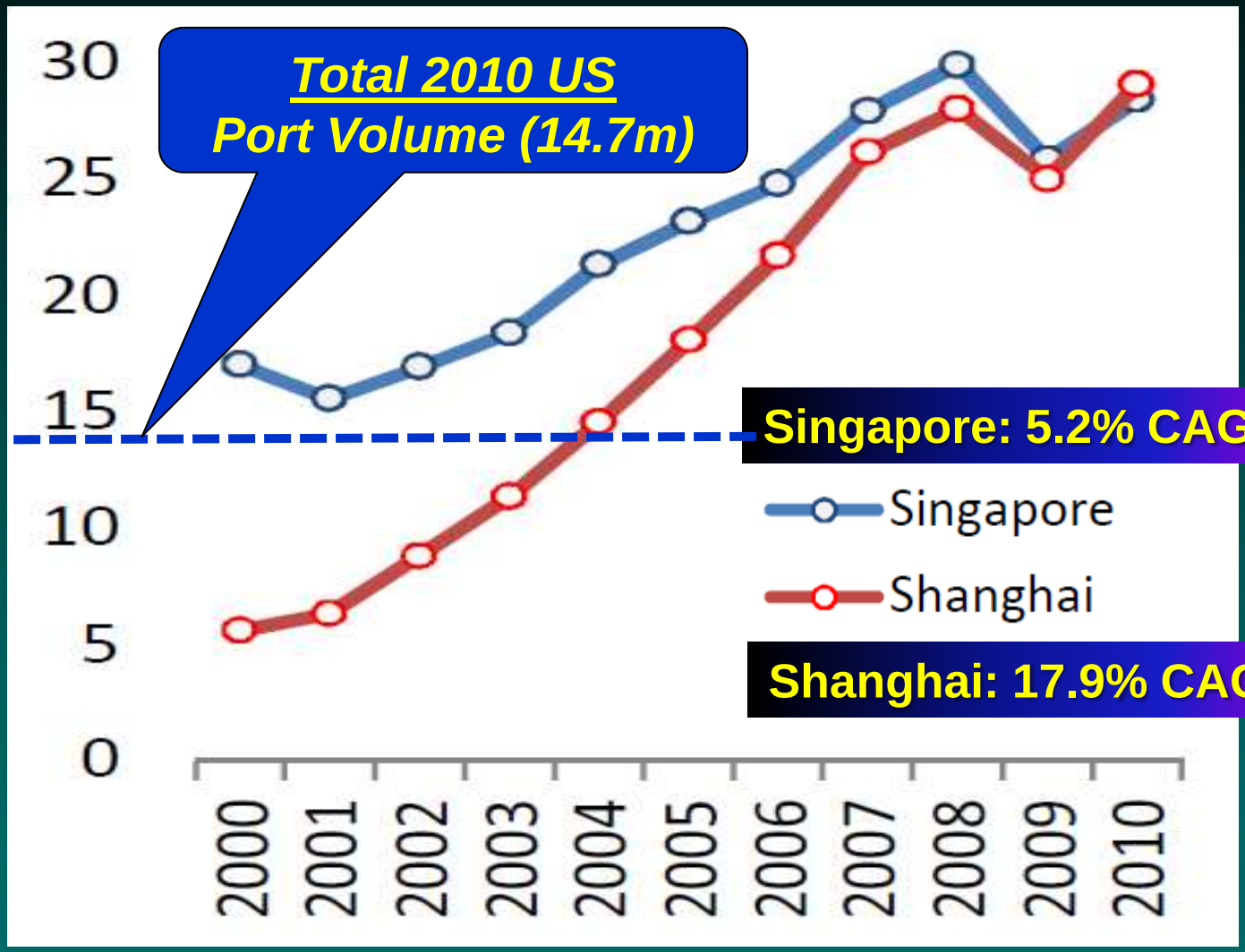


Of the 10 busiest ports in the world in 2010, Nine are in Asia; of the top 10, Six are on the Chinese mainland

The Port of Shanghai is No. 1, and The Port of Singapore is No.2

Singapore vs. Shanghai Container Volumes

2000 through 2010 Volumes in Millions of TEUs



Source: Alphaliner Newsletter Volume 2011 Issue 2

VICKERMAN

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)

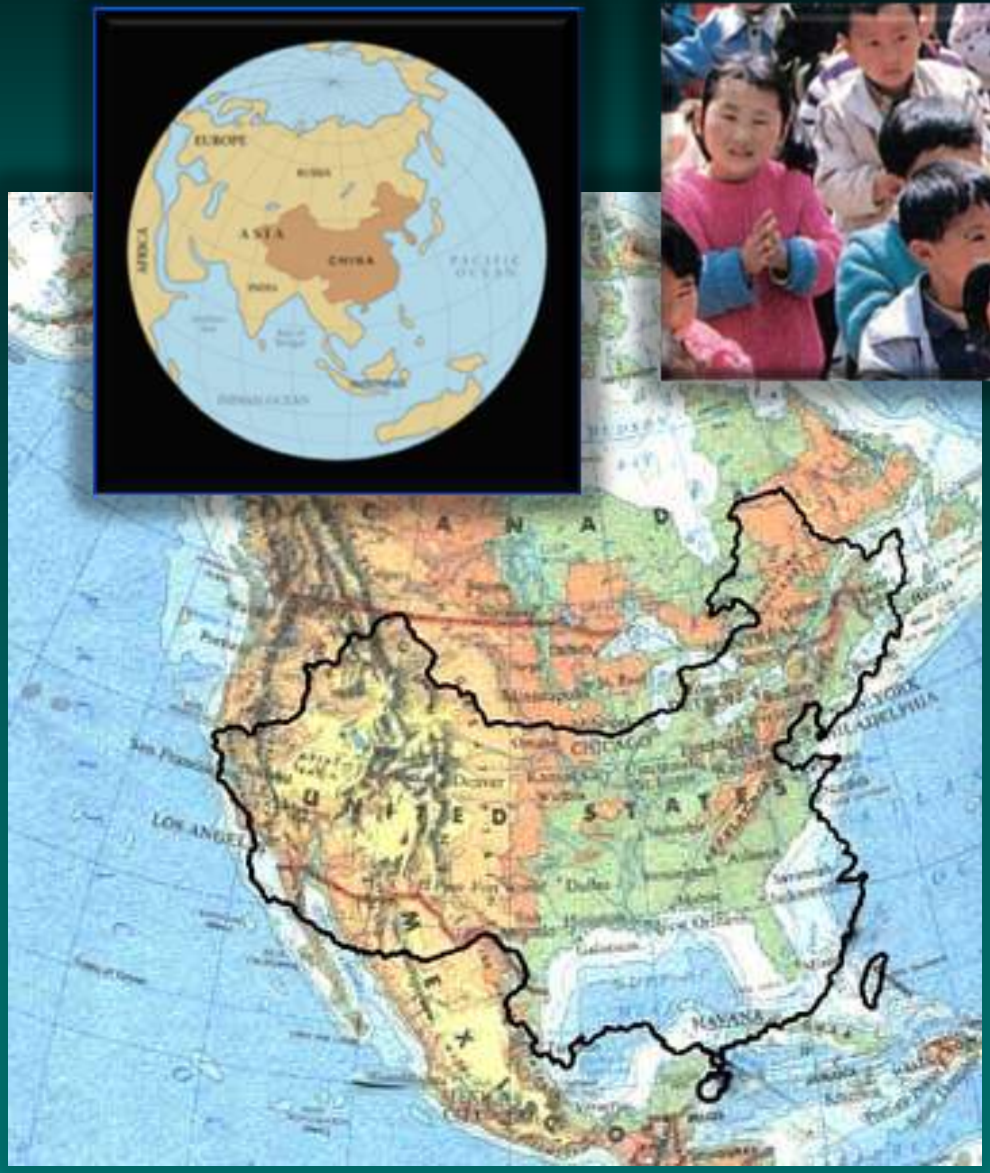
Global Market Economic Shifts

	2000	2010	2020	2030	2040	2050
#1	USA/CA	USA/CA	USA/CA	USA/CA	USA/CA	CHINA
	Japan	Japan	CHINA	CHINA	CHINA	USA/CA
	Germany	Germany	Japan	Japan	INDIA	INDIA
#5						
#6						
#7						
#8	Brazil	INDIA	Russia	France	Germany	Germany
#9	INDIA	Russia	Italy	Brazil	France	France
	Russia	Brazil	Brazil	Italy	Italy	Italy

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.

VICKERMAN

Shanghai International Shipping Center

Yangshan Deep Port & Logistics Park

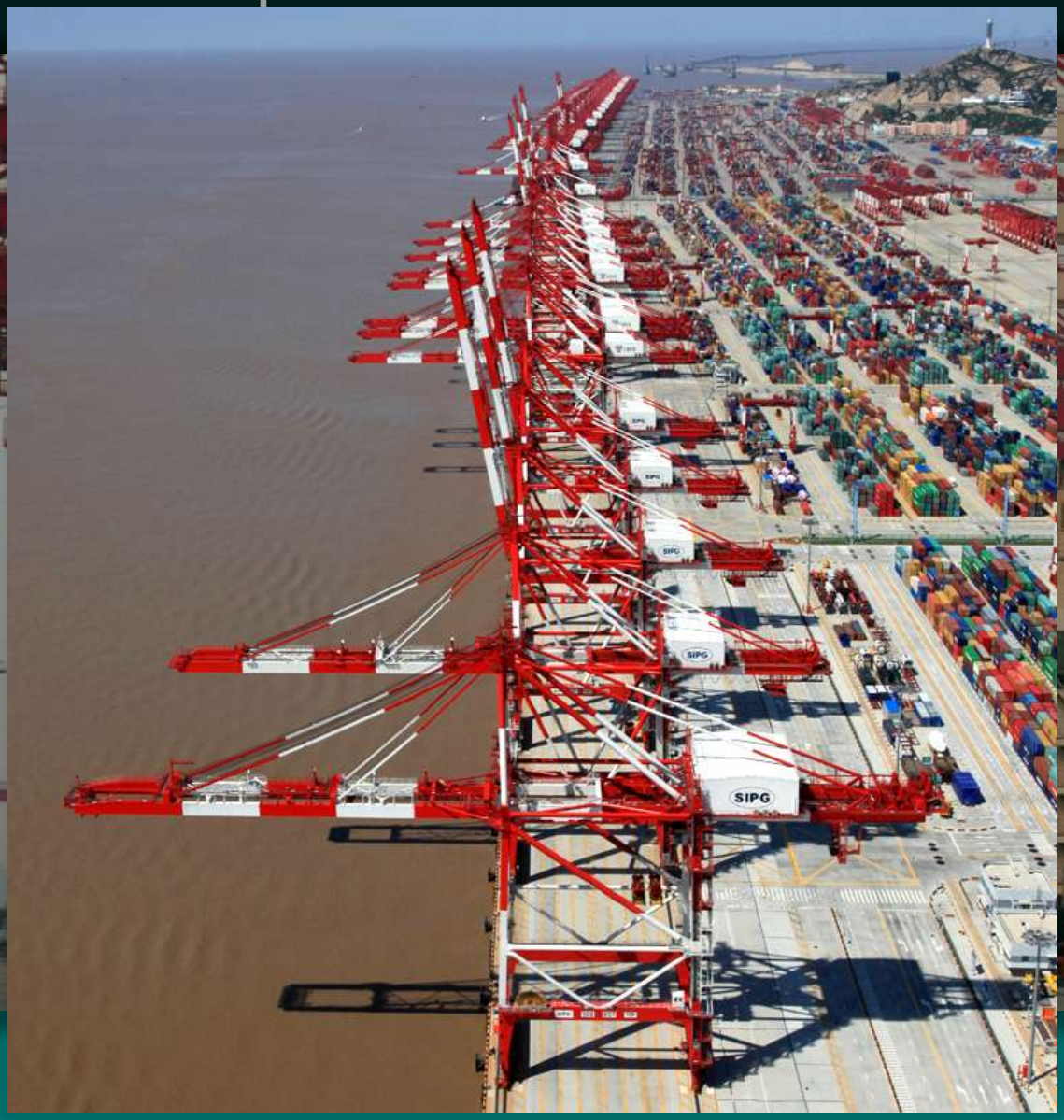
VICKERMAN

Shanghai International Shipping Center

Yangshan Deep Port - 20 Mile Bridge Access

Shanghai Yangshan Deep-Water Harbour

Yangshan Deep Port – 54 Berths East China Sea



VICKERMAN

Huge Population Growth Over Next Decade
Top 10 countries to add 422 million people by 2020

Country	2010	2020	Nominal Change	% Change
India	1,173,108,018	1,326,093,247	152,985,229	13.0%
China	1,330,141,295	1,384,545,220	54,403,925	4.1%
Ethiopia	88,013,491	120,420,018	32,406,527	36.8%
USA	310,232,863	341,386,665	31,153,802	10.0%
Nigeria	152,217,341	182,344,492	30,127,151	19.8%
Pakistan	177,276,594	204,274,257	26,997,663	15.2%
Congo	70,916,439	95,605,489	24,689,050	34.8%
Indonesia	242,968,342	267,532,450	24,564,108	10.1%
Bangladesh	158,065,841	180,753,264	22,687,423	14.4%
Brazil	201,103,330	222,607,506	21,504,176	10.7%

VICKERMAN

Asian Hourly Wage Rates in US Dollars

	2008	2009	2010*	2011*	2012*	2013*	2014*	2015*
CHINA	1.56	1.63	1.83	2.16	2.51	2.90	3.29	3.66
HONG KONG	7.24	7.27	7.42	7.64	7.95	8.27	8.68	9.11
INDIA	0.50	0.49	0.53	0.57	0.61	0.66	0.72	0.78
INDONESIA	0.51	0.51	0.59	0.67	0.77	0.88	0.98	1.08
JAPAN	24.30	26.23	22.59	21.70	20.41	19.81	19.51	18.73
SOUTH KOREA	13.21	11.27	13.31	14.54	16.49	18.70	20.91	23.38
MALAYSIA	2.99	2.80	2.97	3.18	3.38	3.58	3.80	4.03
PHILIPPINES	1.65	1.59	1.67	1.77	1.87	1.99	2.11	2.24
SINGAPORE	13.18	12.86	13.18	13.85	14.69	15.59	16.53	17.54
TAIWAN	7.24	6.56	6.95	7.19	7.50	7.85	8.19	8.52
THAILAND	1.08	1.06	1.04	1.08	1.19	1.27	1.35	1.42
VIETNAM	0.81	0.86	0.87	0.89	0.97	1.03	1.07	1.10

Source: JOC, IMA Asia – Asia Forecasts 2010

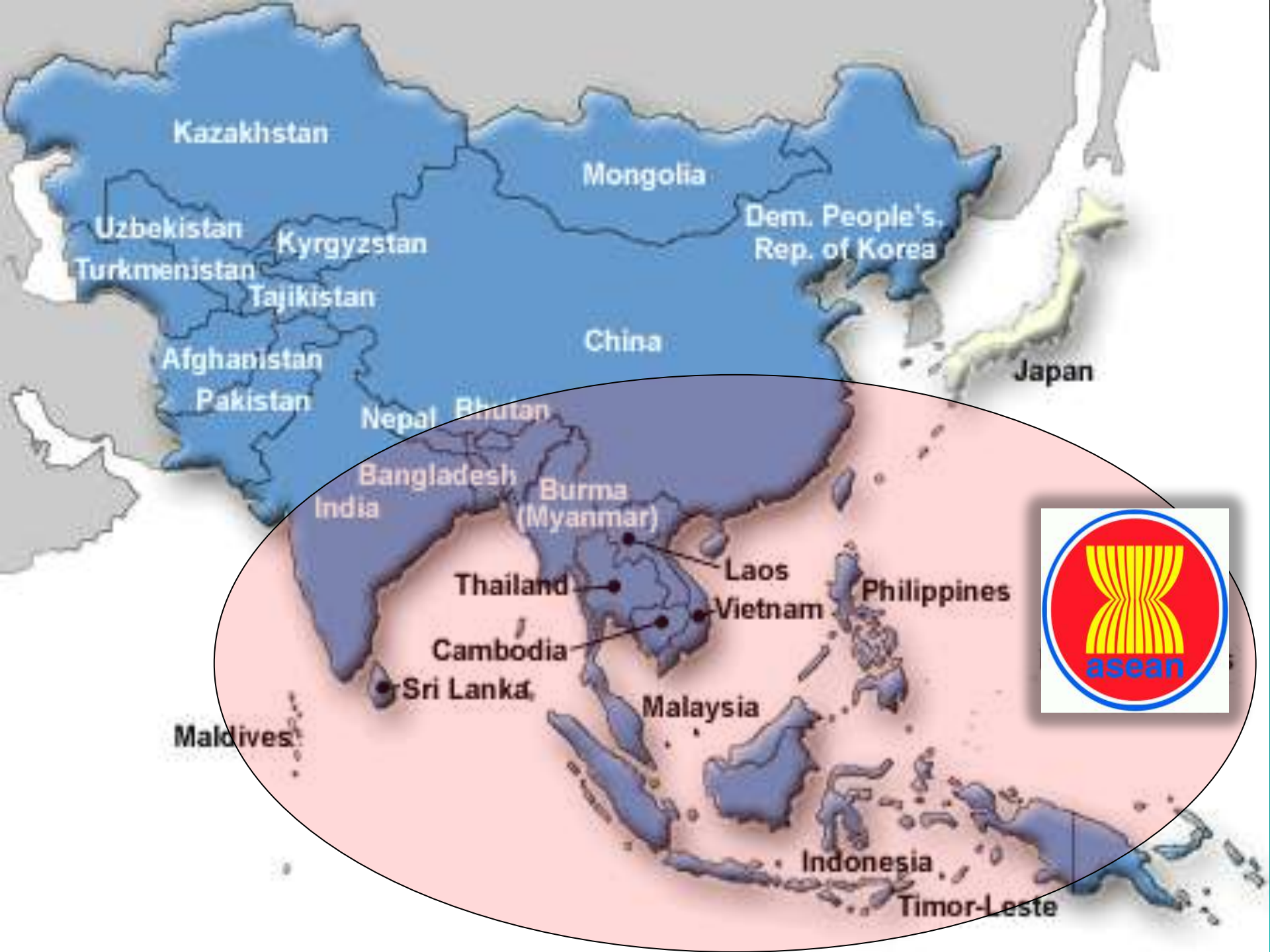
VICKERMAN

India's Current & Planned Container Port Developments

Majority of New Indian Container Port Capacity Favors Southeast Asian Continual Centroid Shift to the WEST

Source: Alphaliner Volume 2012 Issue 14

VICKERMAN


Kazakhstan
Mongolia
Uzbekistan
Kyrgyzstan
Turkmenistan
Tajikistan
Dem. People's Rep. of Korea
China
Afghanistan
Pakistan
Japan
Nepal
Bhutan
Bangladesh
India
Burma (Myanmar)
Laos
Thailand
Philippines
Vietnam
Cambodia
Sri Lanka
Malaysia
Maldives
Indonesia
Timor-Leste
asean

Ho Chi Minh City Regional New Port Container Terminal Development

(12 Port Terminals in 14 years)

VIETNAM – Has Become the <u>Apparel Distribution Capital</u> of the World – The "Apparel Shipper"

VIETNAM - Ho Chi Minh City, (Saigon)
Bitexco Financial Tower

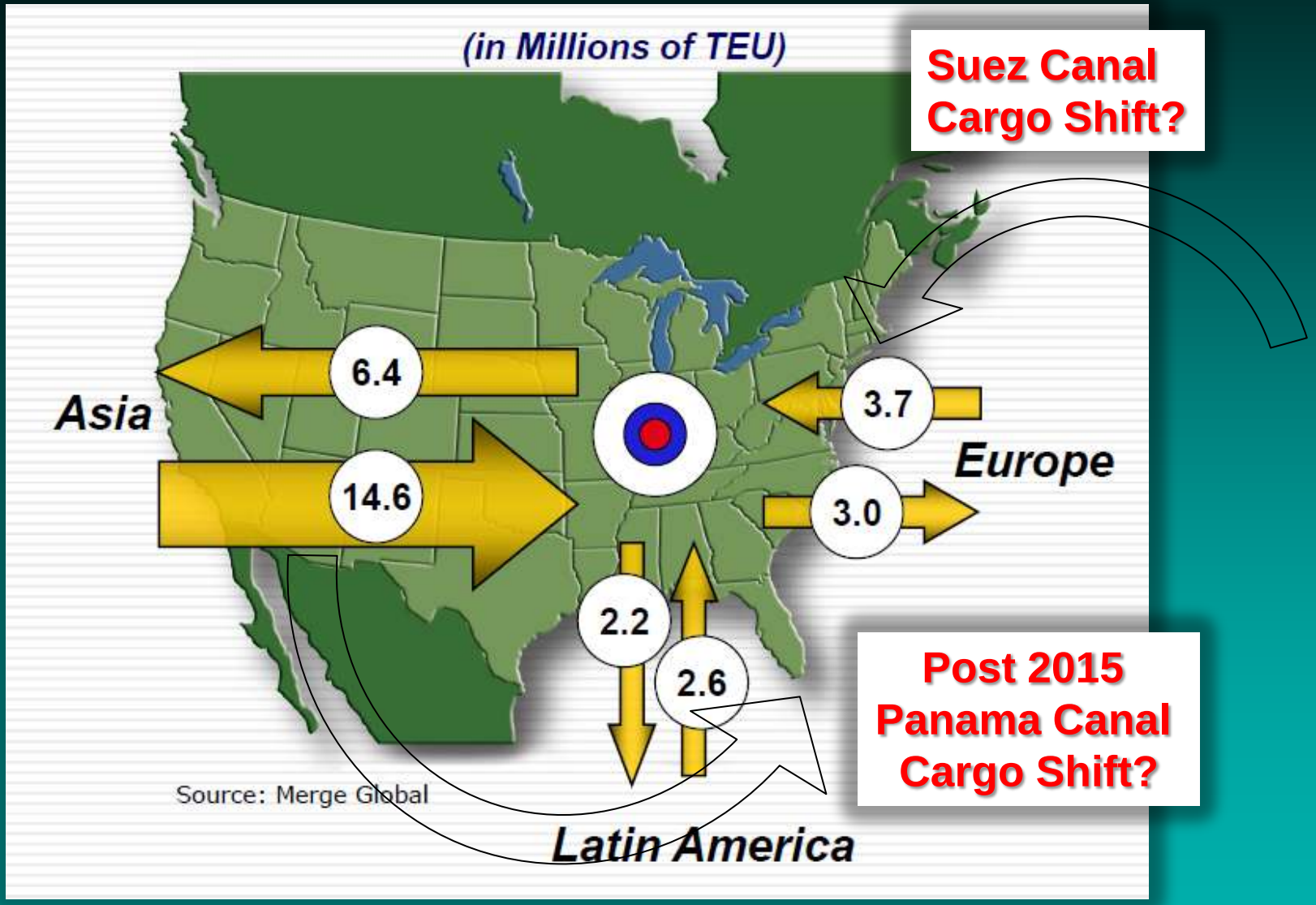
VICKERMAN

North American Cargo Demand Trends

(Dé jà vu Experience)

US Containerized Ocean Trade Flows (2007)

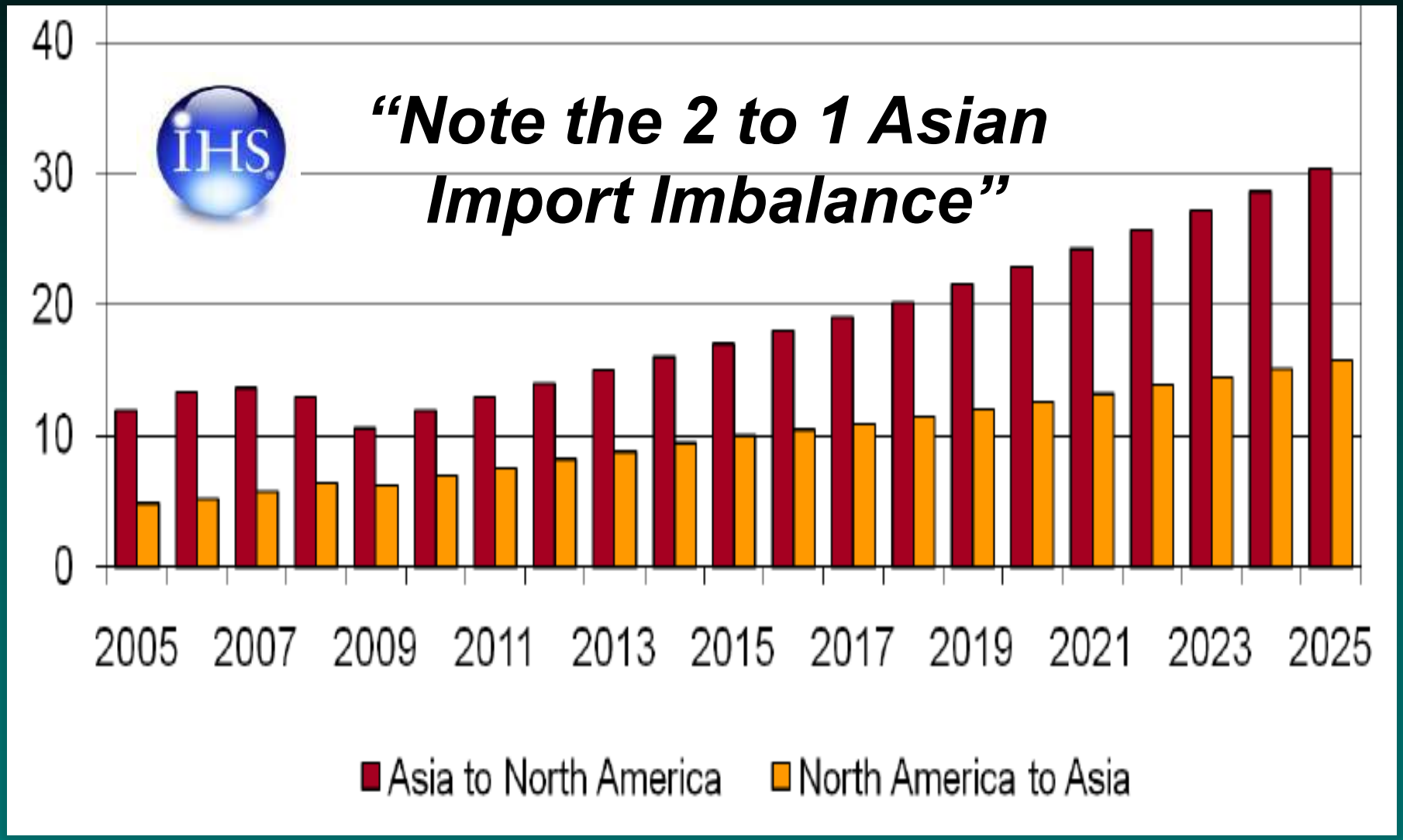
(West Coast Ports Handle 63% of Imports)



Source: CSX Transportation May 12, 2011 - Director of Strategic Analysis

Transpacific Container Trade Recovery

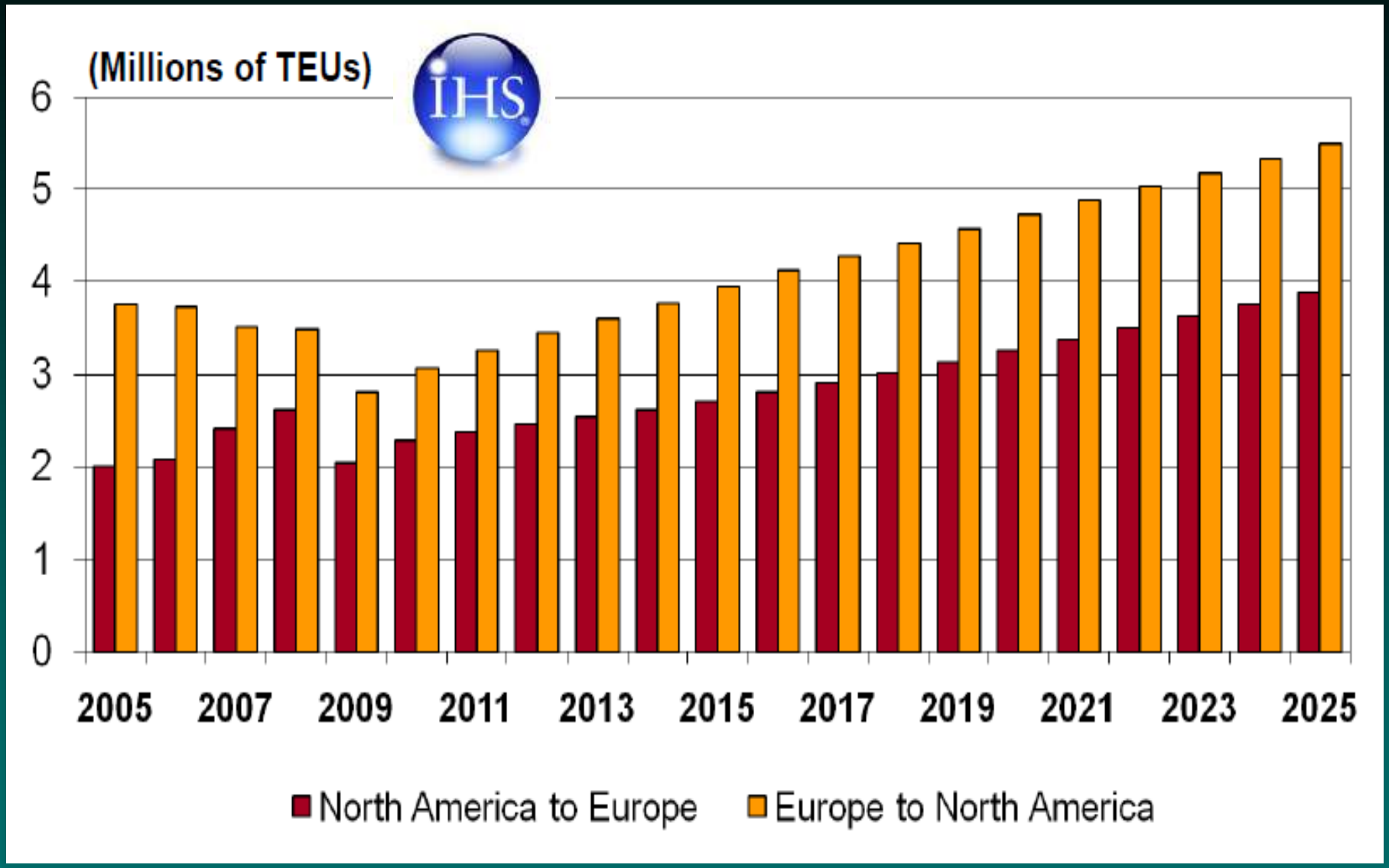
(Millions of TEUs)



Source: IHS – Global Insight -The Global Outlook – October 14, 2010

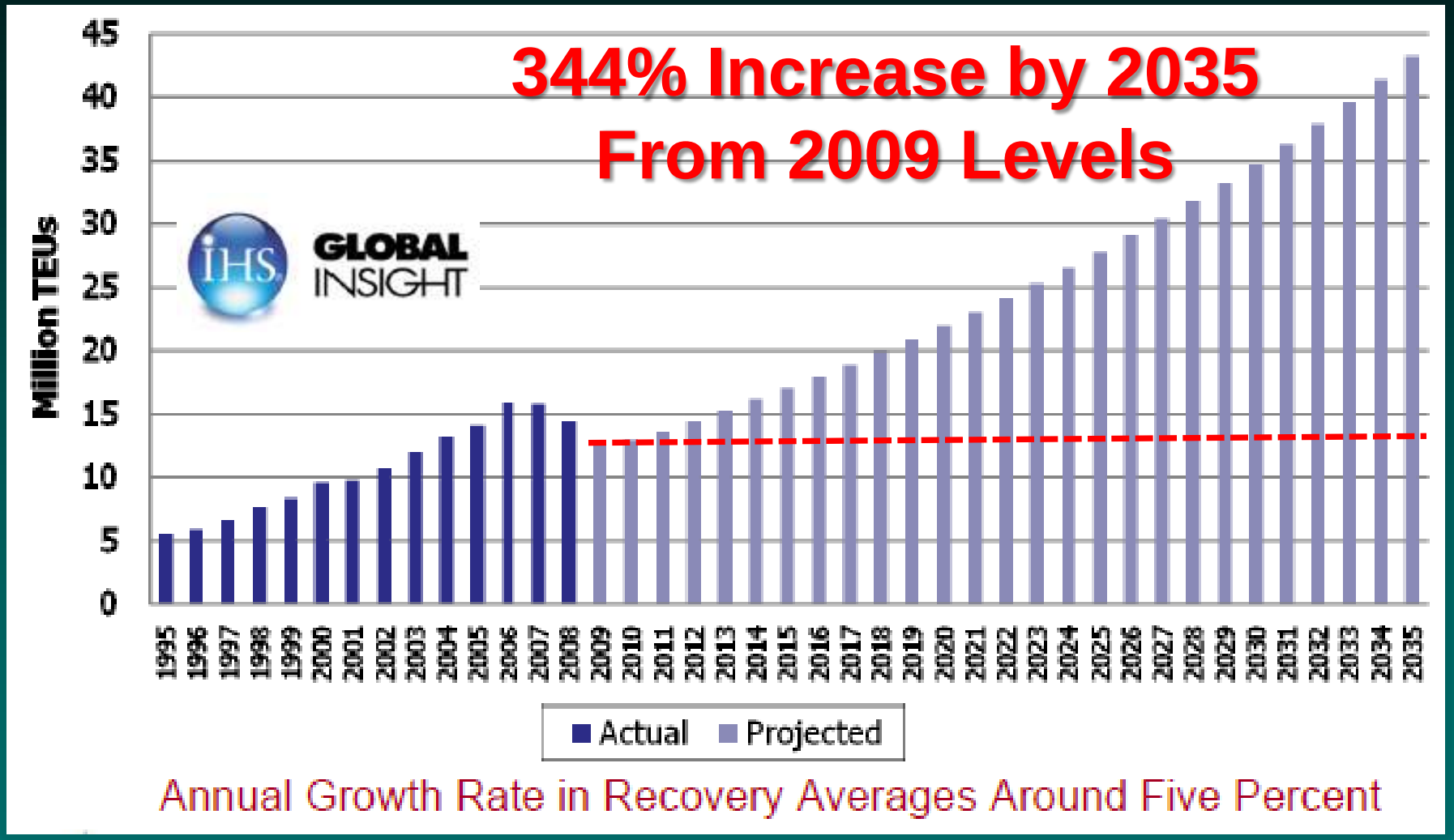
VICKERMAN

Transatlantic Container Trade Recovery



Source: IHS – Global Insight -The Global Outlook – October 14, 2010

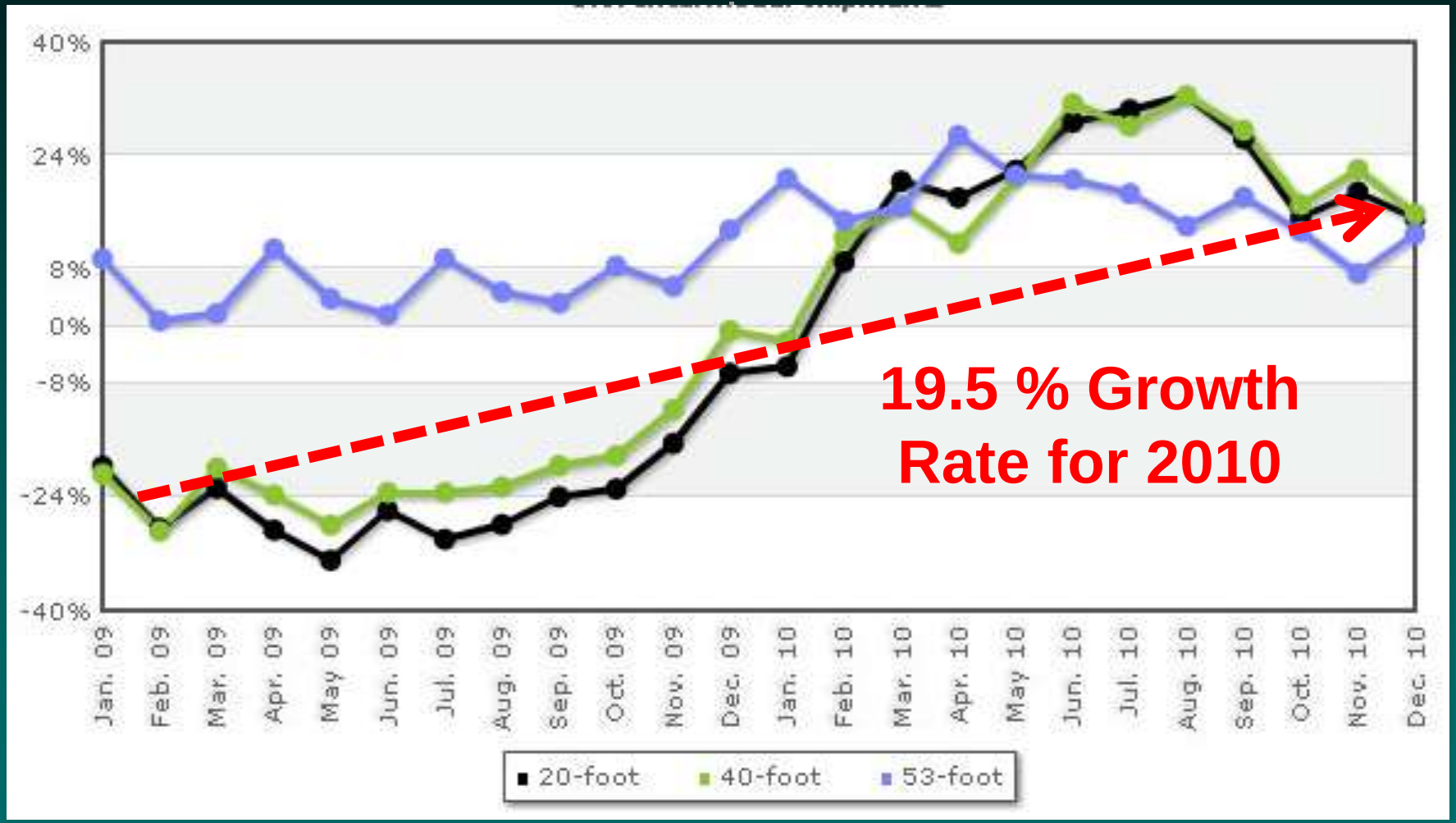
San Pedro Bay (POLA +POLB) Container Volume Forecast



Source: IHS Global Insight 2010 Forecast

2010 US Intermodal Rail Shipments

In calendar 2010, 40-footers led year-over-year growth at 19.5 percent, followed by 20-footers at 19 percent and 53-footers, 16.2 percent.

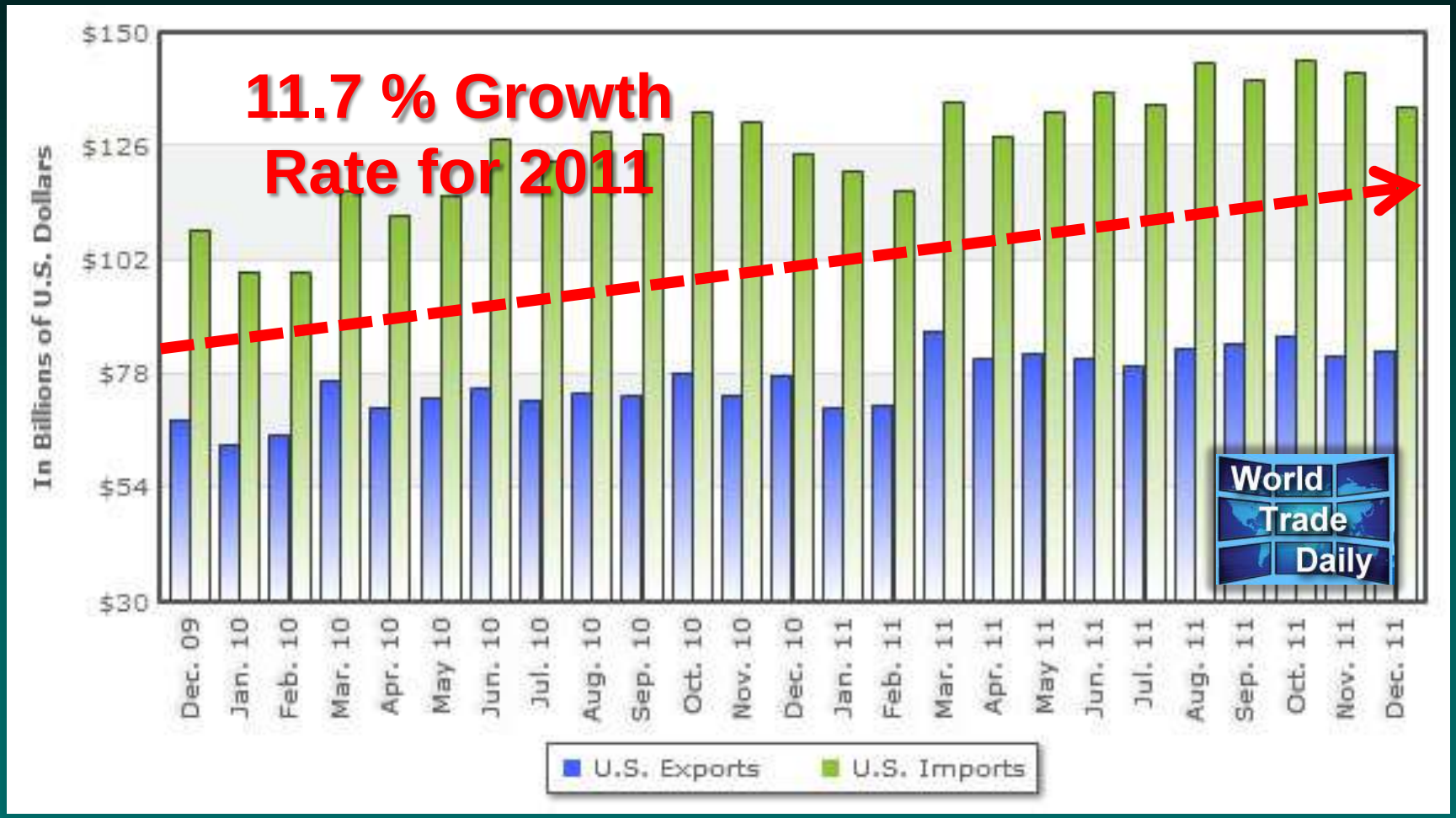


Source: Intermodal Association of North America, 2012

VICKERMAN

2011 US Manufactured Goods

U.S. Manufacturered goods trade increased 11.7 percent year-over-year during calendar 2011, with exports up 11.3 percent and imports, 11.8 percent.

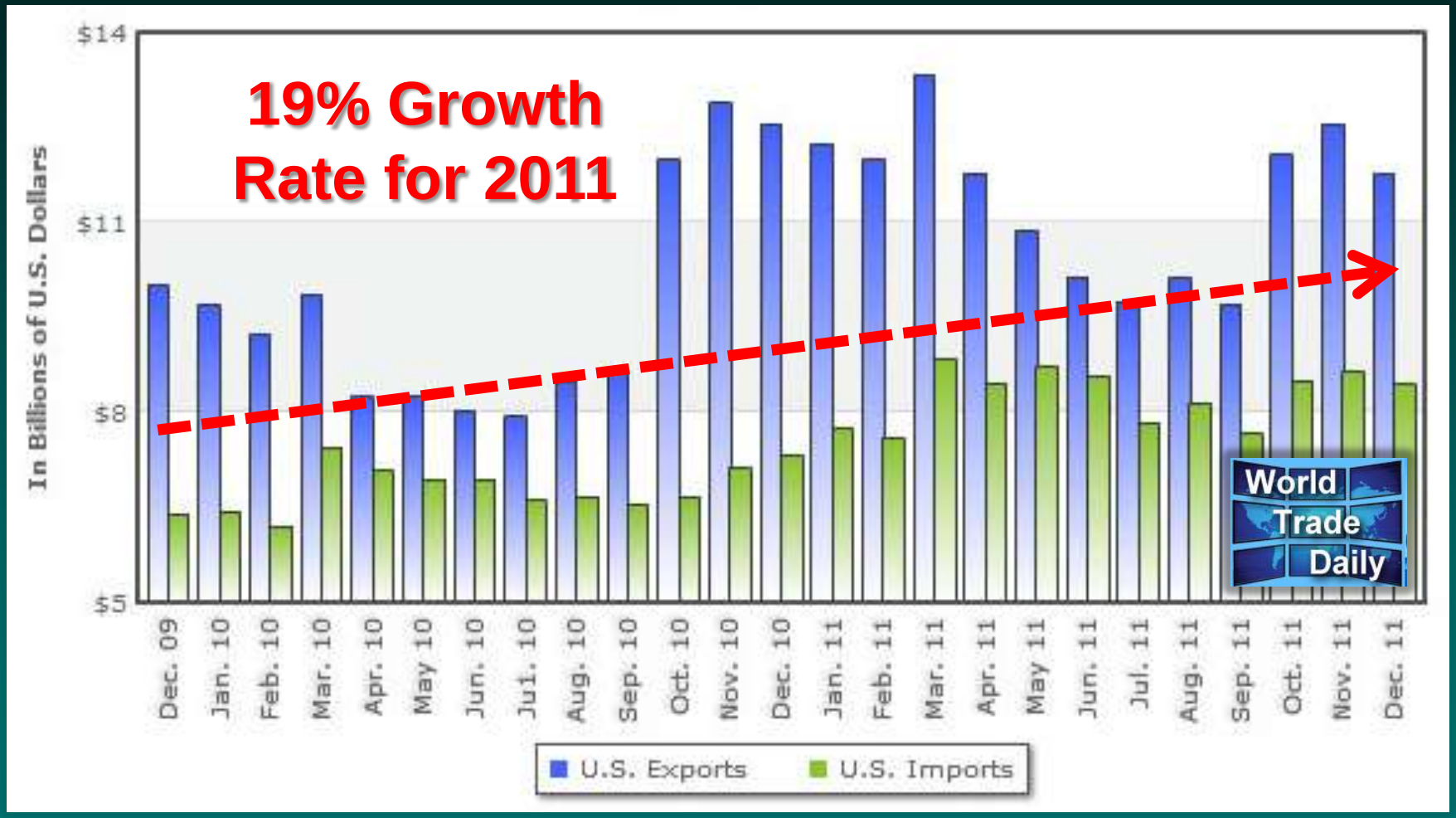


Source: US Department of Commerce, US Census Bureau, Foreign Trade Div

VICKERMAN

2011 US Agricultural Commodities

U.S. agricultural commodities trade increased 19 percent year-over-year during calendar 2011, with exports up 17.7 percent and imports, 20.9 percent.

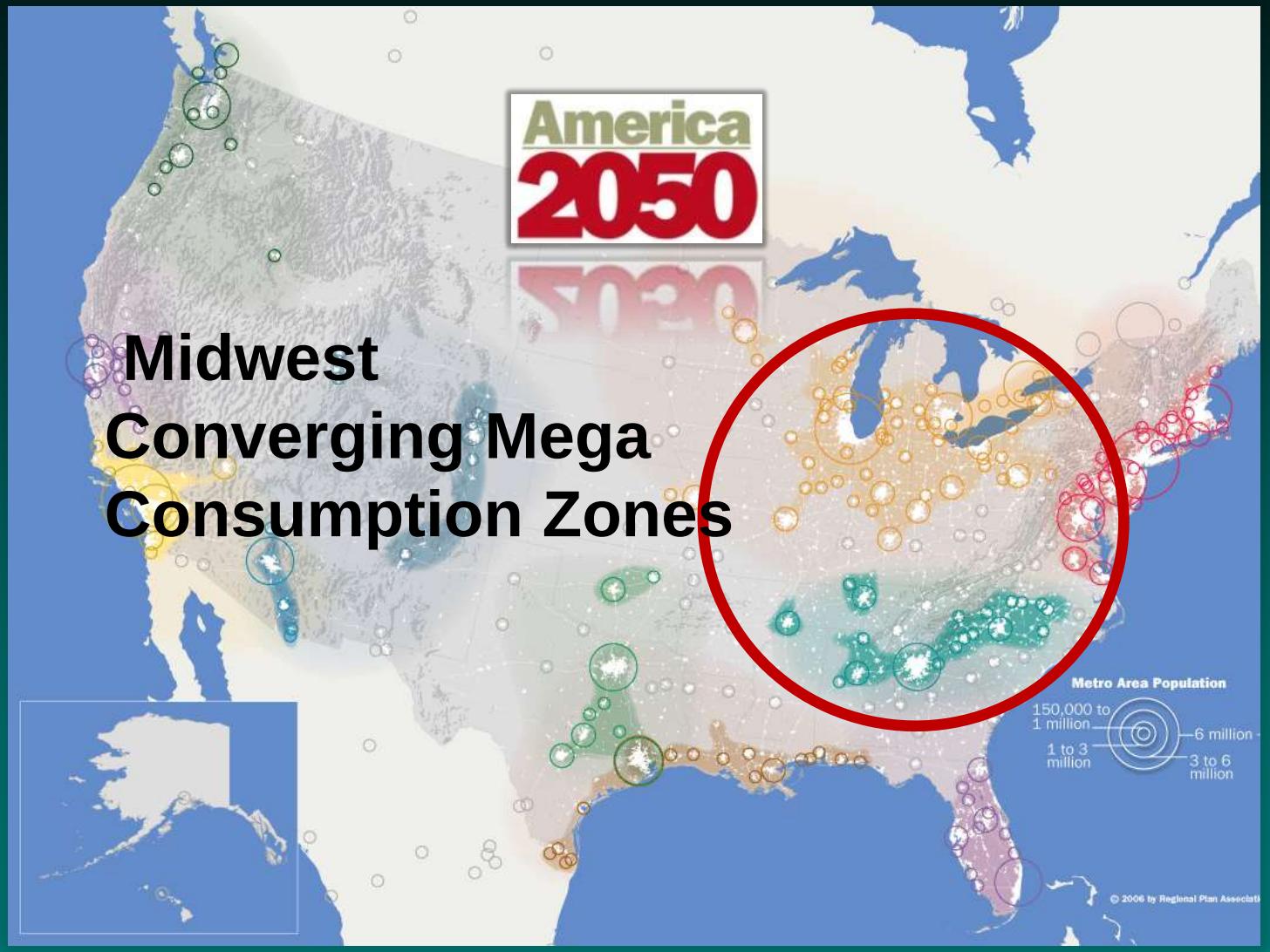


Source: US Department of Commerce, US Census Bureau, Foreign Trade Div

VICKERMAN

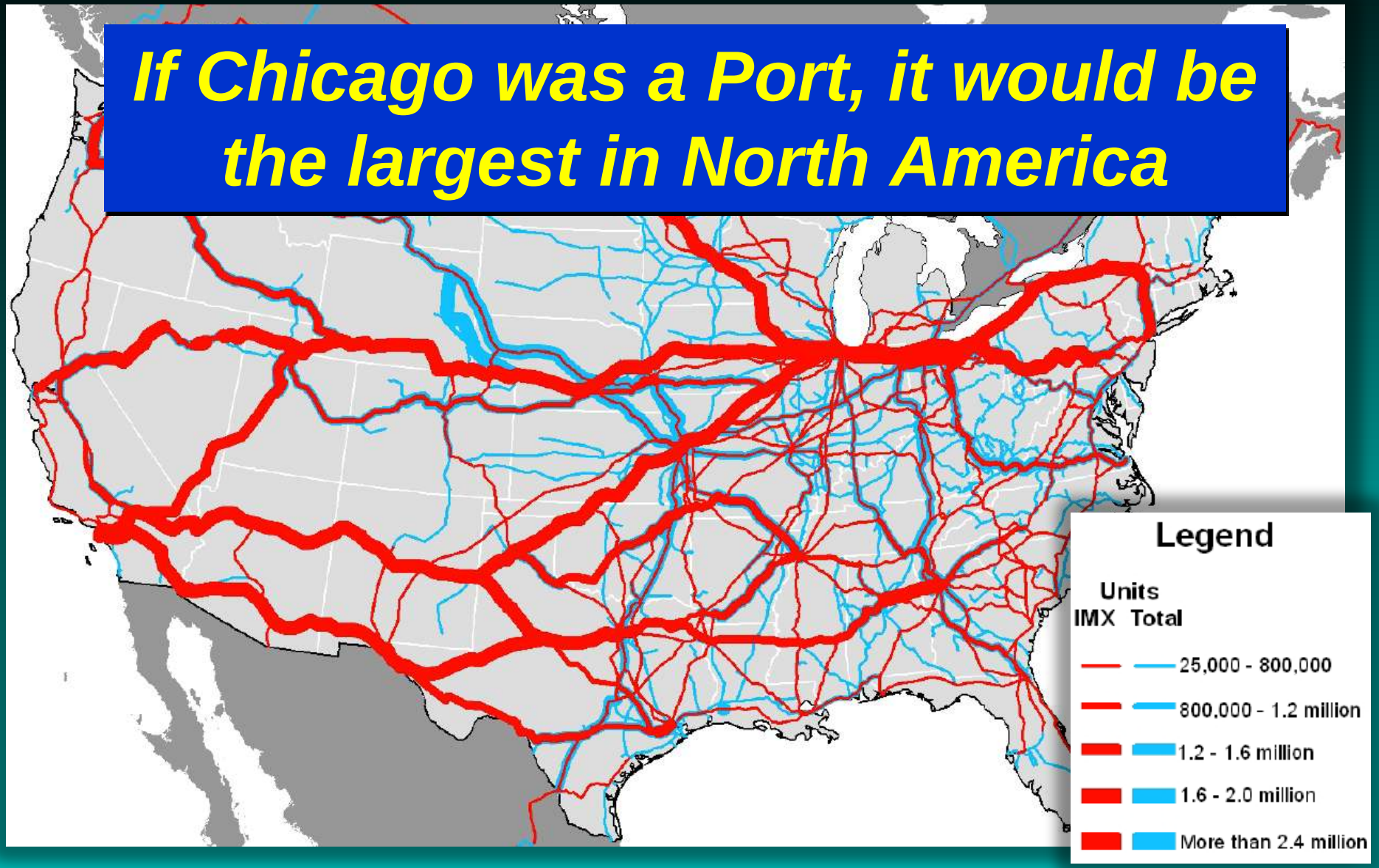
North American Emerging Mega-Regions

Future US Growth Areas



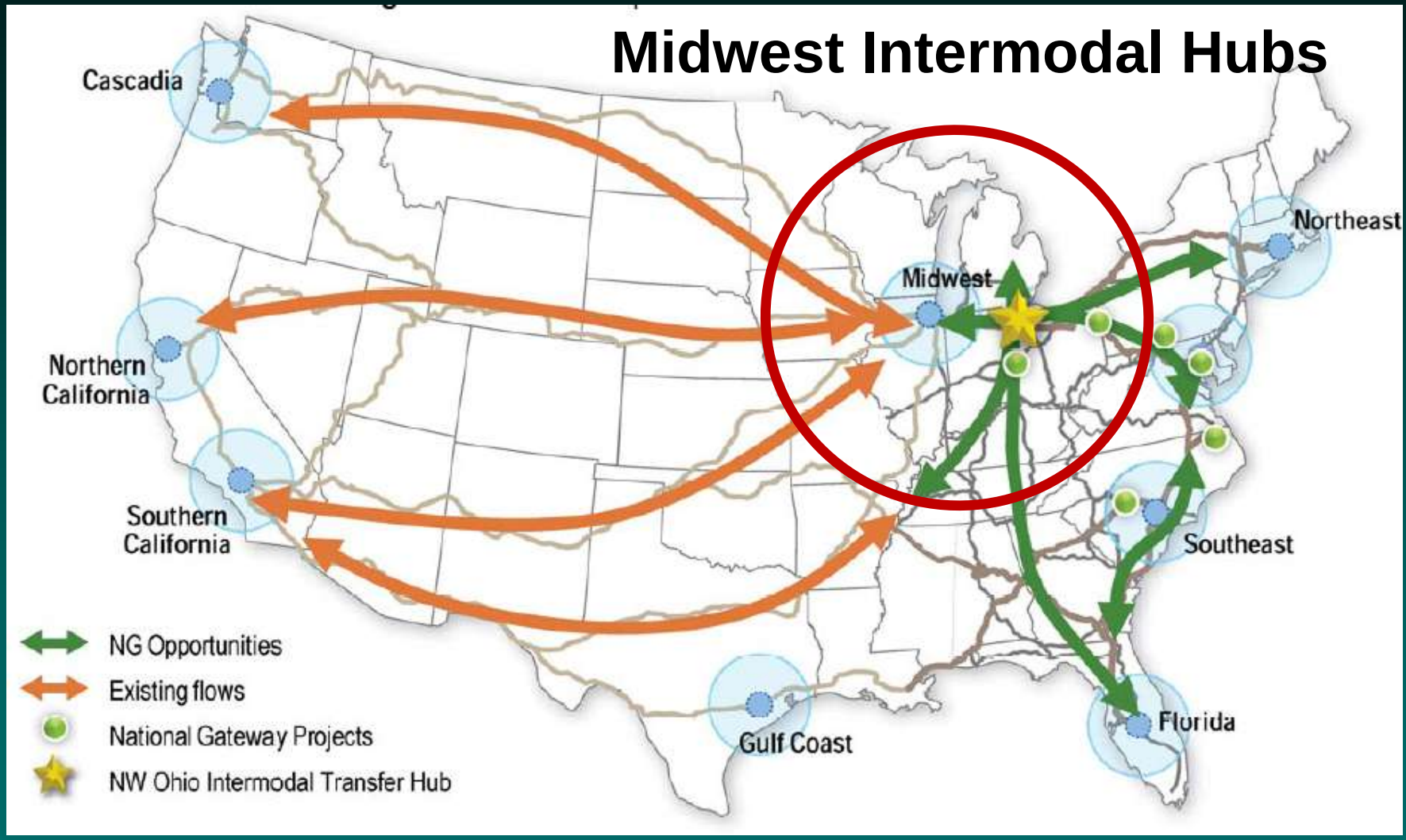
Source: America 2050 Prospects - Regional Plan Association

2035 Intermodal Rail Car Volumes



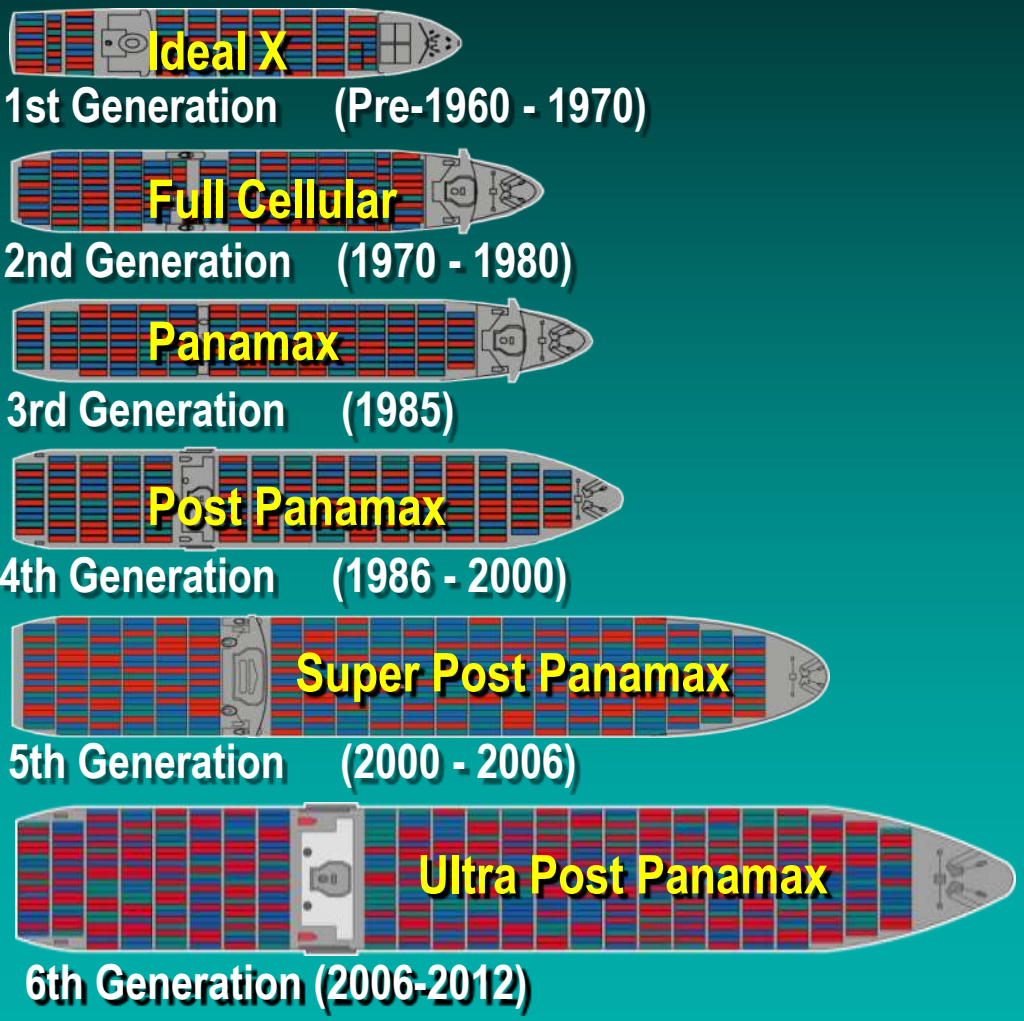
VICKERMAN

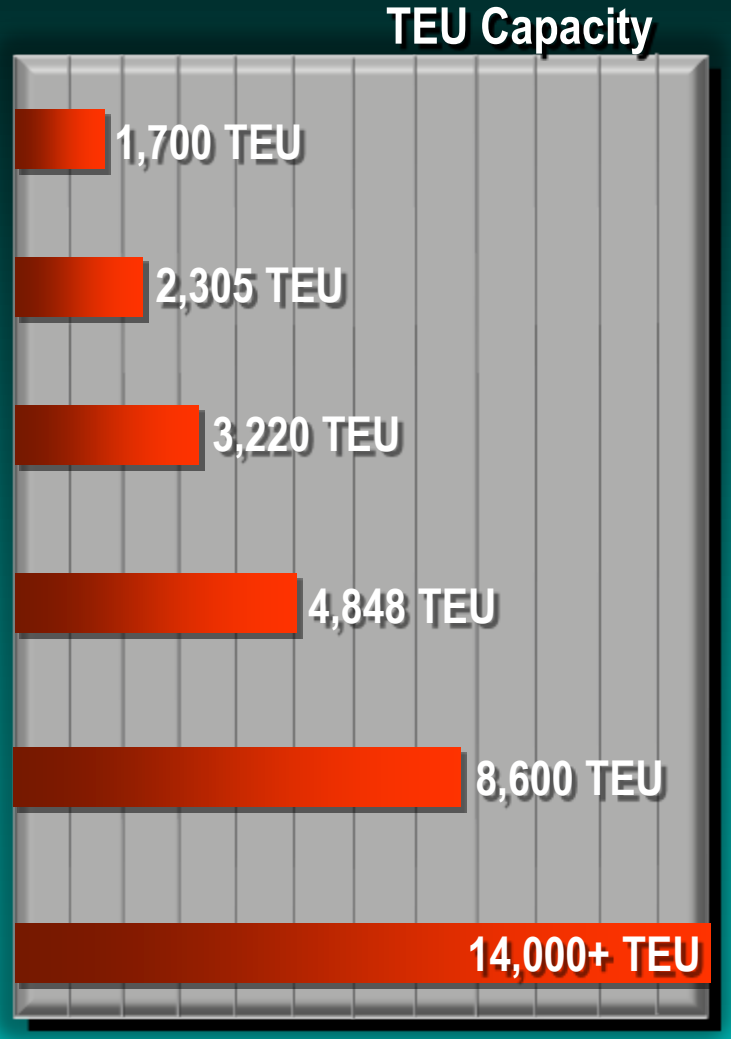
National Expansion of Integrated Intermodal Rail Logistics Centers



Maritime Vessel Technology Trends

World Container Ship Evolution





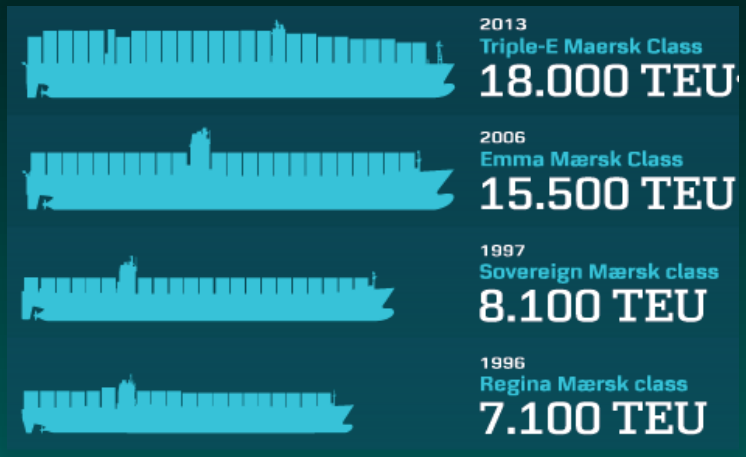
VICKERMAN

*Maersk's New 30 Vessels (ordered) are **4** Times the Current Size of the Panama Canal & **1.5** times the Size of the Expanded Panama Canal*

VICKERMAN

MAERSK LINE, LIMITED

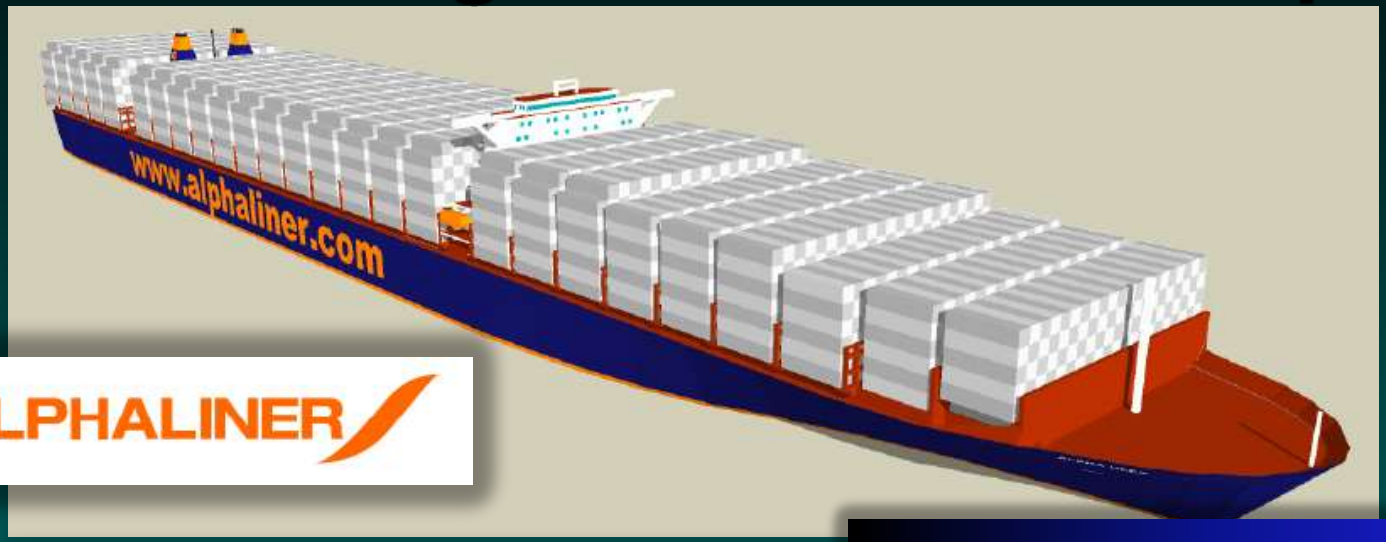
February 2011: A.P. Moller-Maersk Orders 30 – 18,000 TEU Container Vessels "*Largest in the World*"



23 Containers Wide – 9 Tiers Above the Hatch

VICKERMAN

21,000 TEU Ultra Large Twin Engine Container Ship - 2011



ALPHALINER

23 Containers Wide

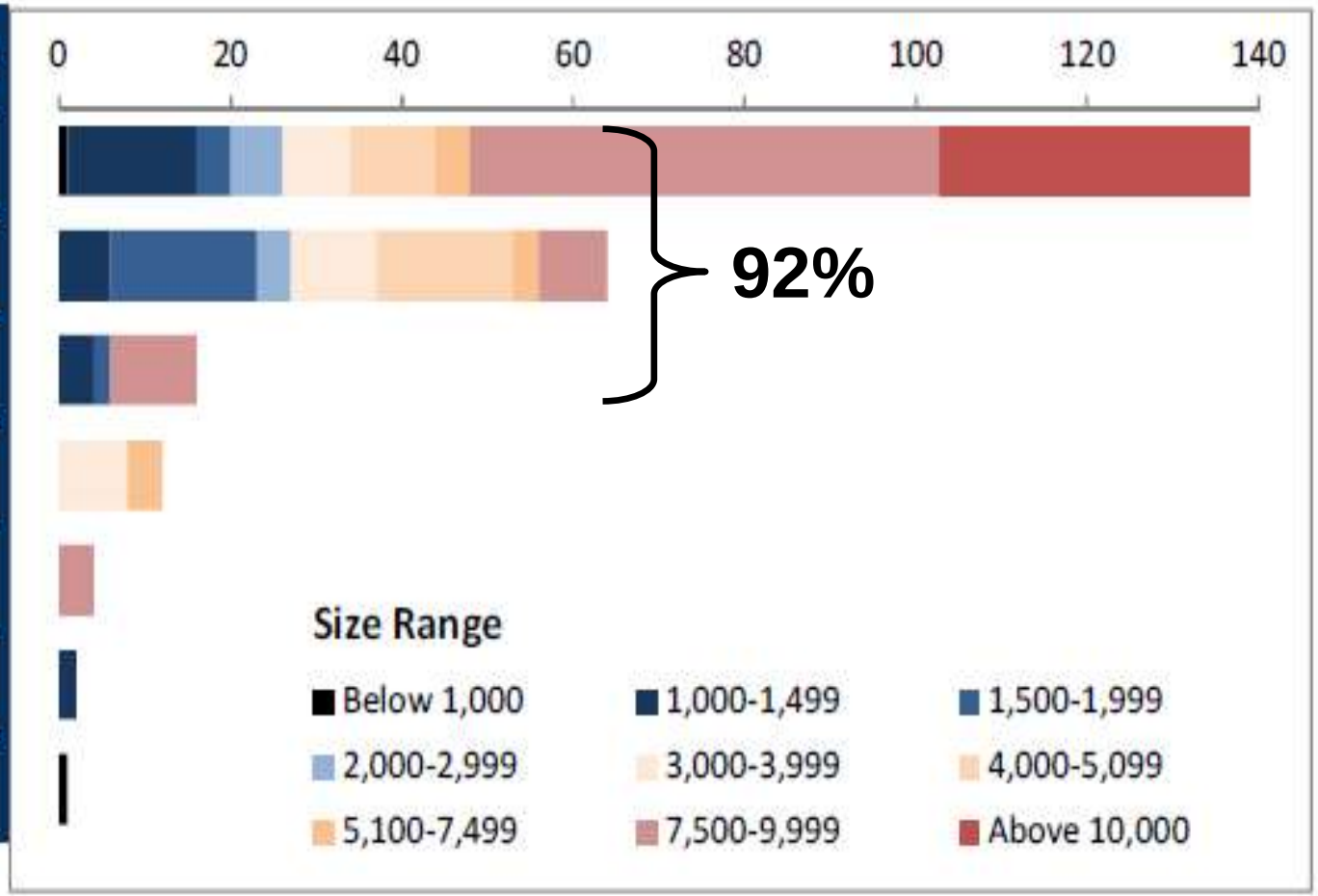
Source: Alphaliner Newsletter Volume 2011 Issue 4

VICKERMAN

Containership Orders – Country of Build

(Orders Since January 2010)

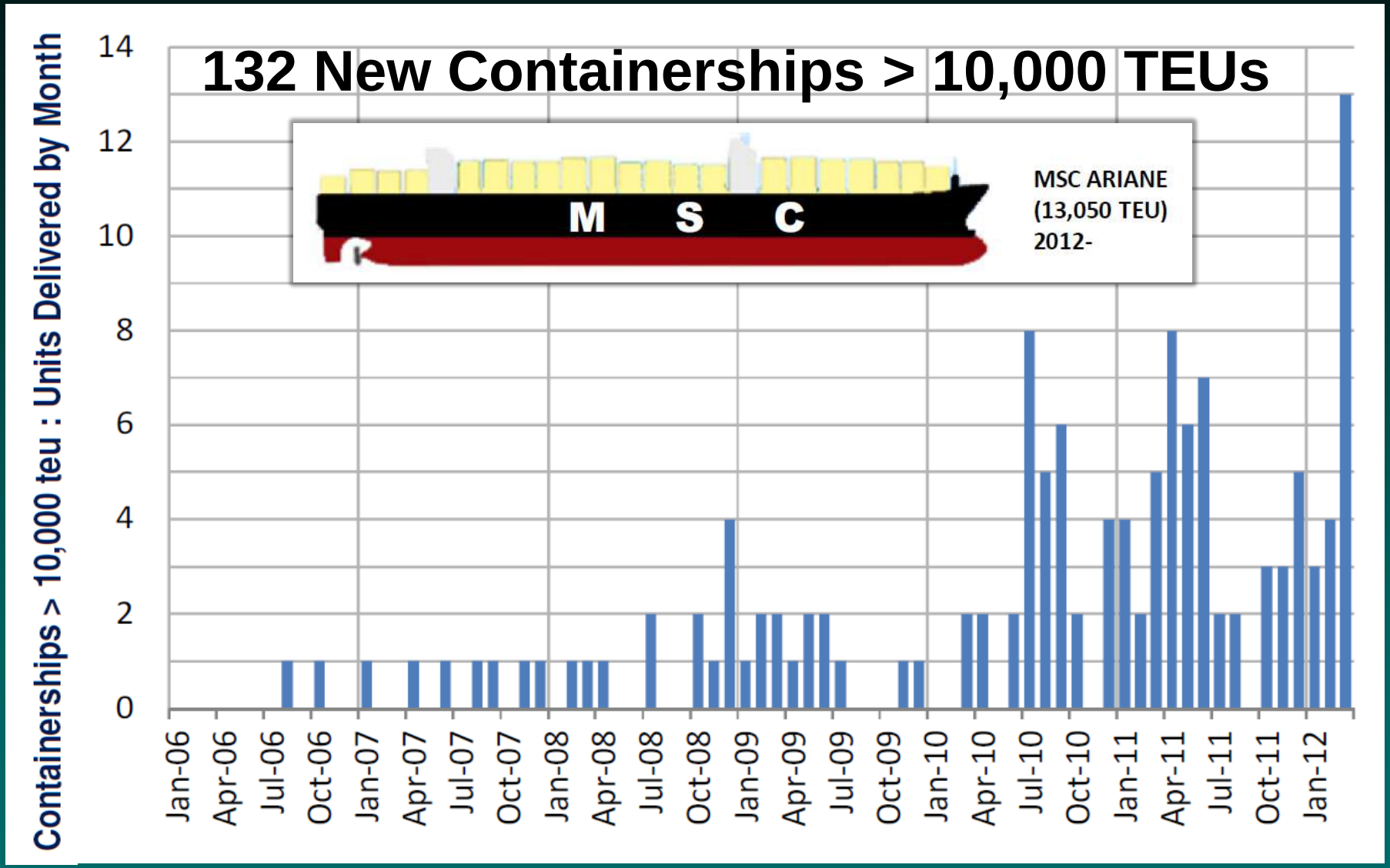
Country	Units
S Korea	139
China	64
Taiwan	16
Philippines	12
Romania	4
Japan	2
Germany	1



Source: Alphaliner Newsletter Volume 2011 Issue 21

Record New Container Ship Delivery > 10,000 TEUs

(11 Vessels now 13,000 to 14,000 TEUs)

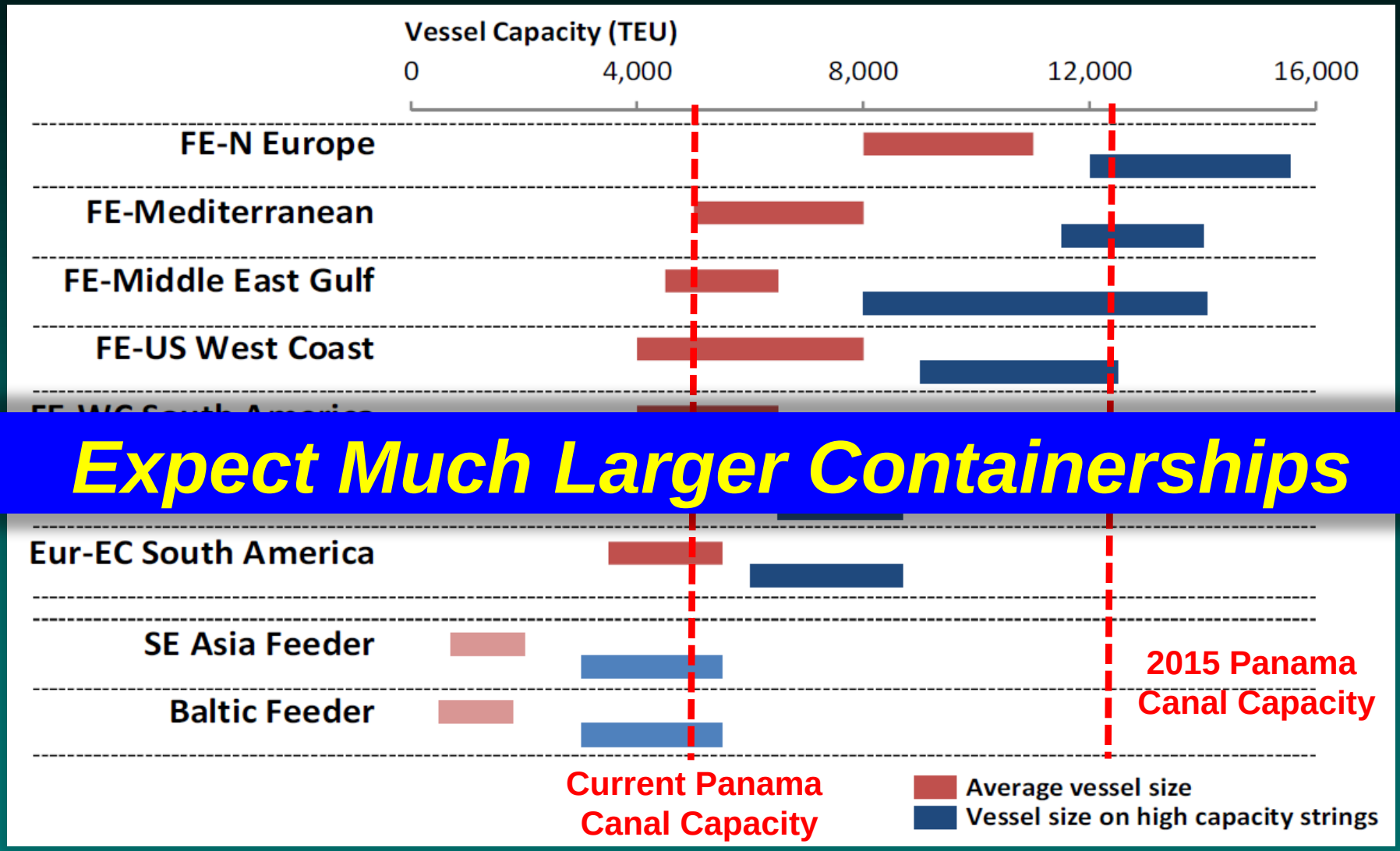


Source: Alphaliner Volume 2012 Issue 14

VICKERMAN

The Size of Container Ships to Come

(Average Containership sixe by Trade Route)



Expect Much Larger Containerships

Source: Alphaliner Volume 2012 Issue 14

Largest Container Vessel to Dock at a North American Port – March 21, 2012

MSC Fabiola (12,562 TEUs) at the Port of Oakland Built in Korea 2010

Length Overall (LOA): 366.08M - 1,201 Ft

Breadth: 48.2M – 158 Ft

Maximum water draft (fully loaded): 15.50M - 50.85 Ft

Deadweight Tonnage: 146,093 metric tons

25% Larger Than Any Other North American Vessel Call

Source: The Maritime Executive, LLC. – March 23, 2012

VICKERMAN

Future Mega Container Vessel Characteristics:

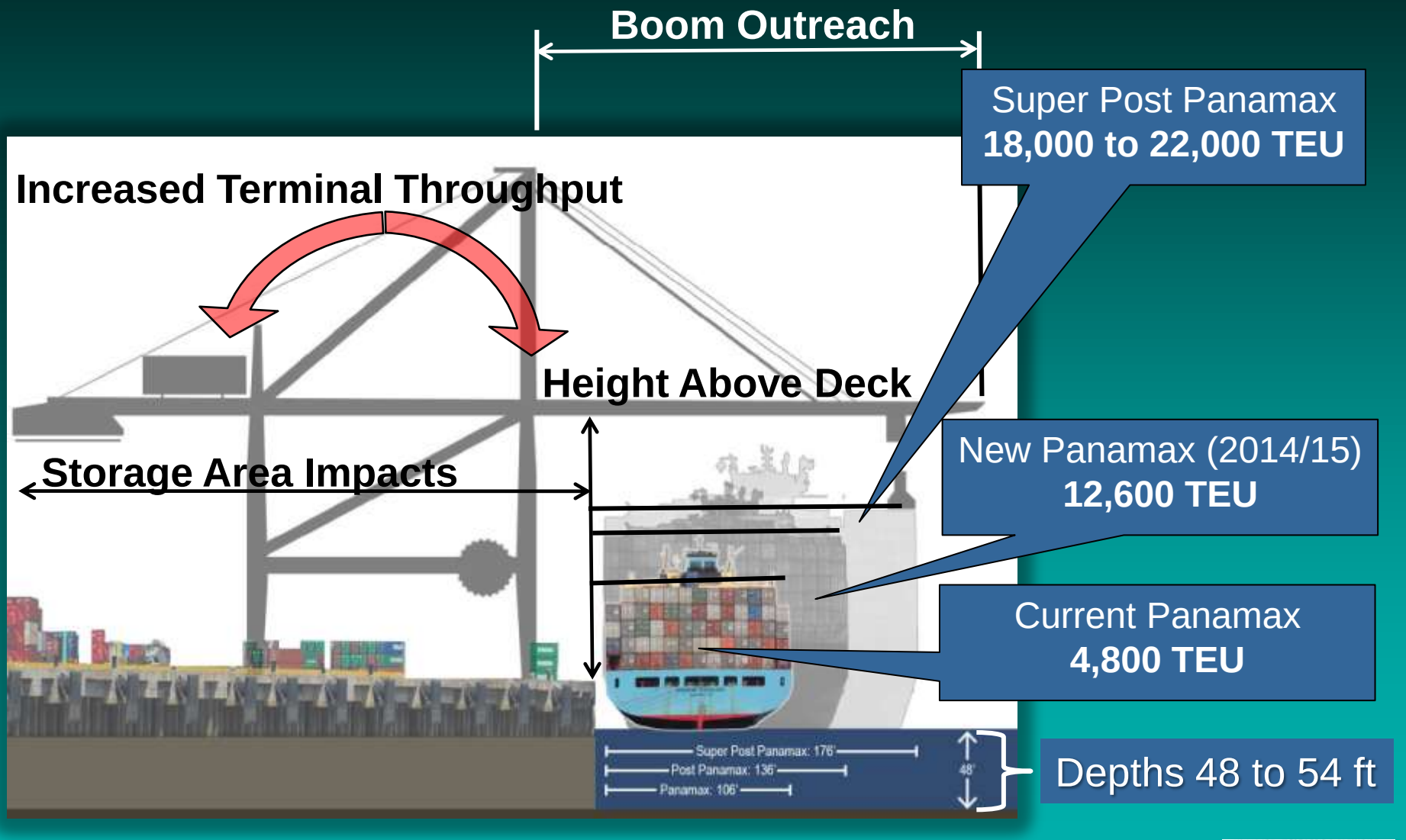
Capacity = up to 22,000 TEUs
Deck Stow: 23 wide & 7- 9 Containers above hatch
Length = up to 1,445 ft (4.5 Football Fields)
Beam = up to 194 ft
Deadweight Tonnage = 220,000 Long Tons
Draft = up to 54 ft

Far Exceeds the 2014/15 Panama Third Lane Capacity

VICKERMAN

Vessel Size Expansion - Terminal Impacts

(Port Terminal Infrastructure & Equipment Geometry Impacts)



Source: Georgia Ports Authority and Vickerman & Associates

VICKERMAN

Ultra Large Container Ships Require A Quantum Leap in Crane Productivity

- ***Five short years ago***, *the number of ships in the world with more than 10,000 TEU capacity was* ***zero***
- ***Today*** *there are* ***132***
- ***By the end of 2012*** *the number will have more than doubled to* ***180***.

new crane concept – Fastnet

VICKERMAN

NYK LOGISTICS & MEGACARRIER

Future Container Vessel: NYK Super Eco Ship

VICKERMAN

NYK LOGISTICS & MEGACARRIER

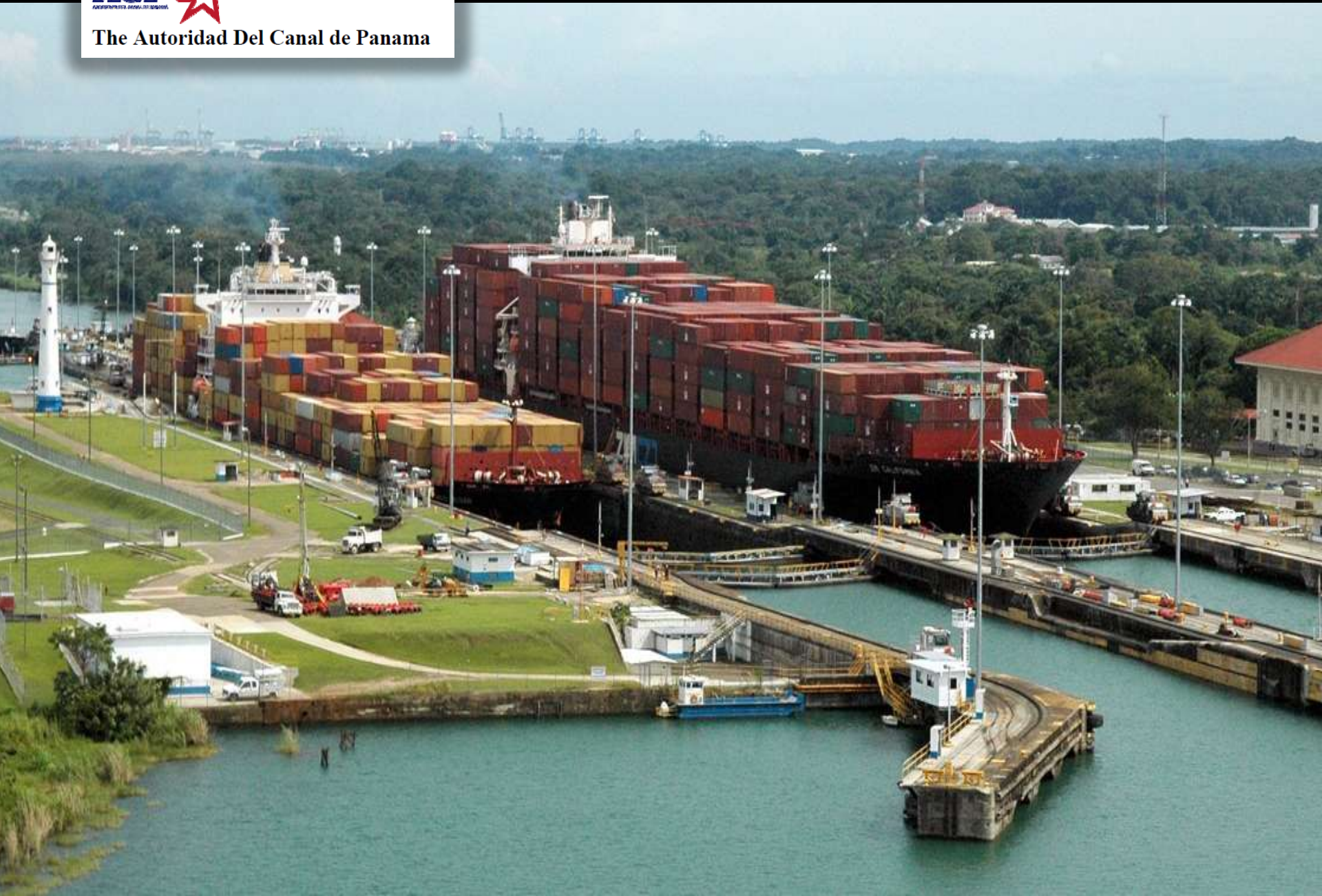
Future Container Vessel: NYK Super Eco Ship

VICKERMAN

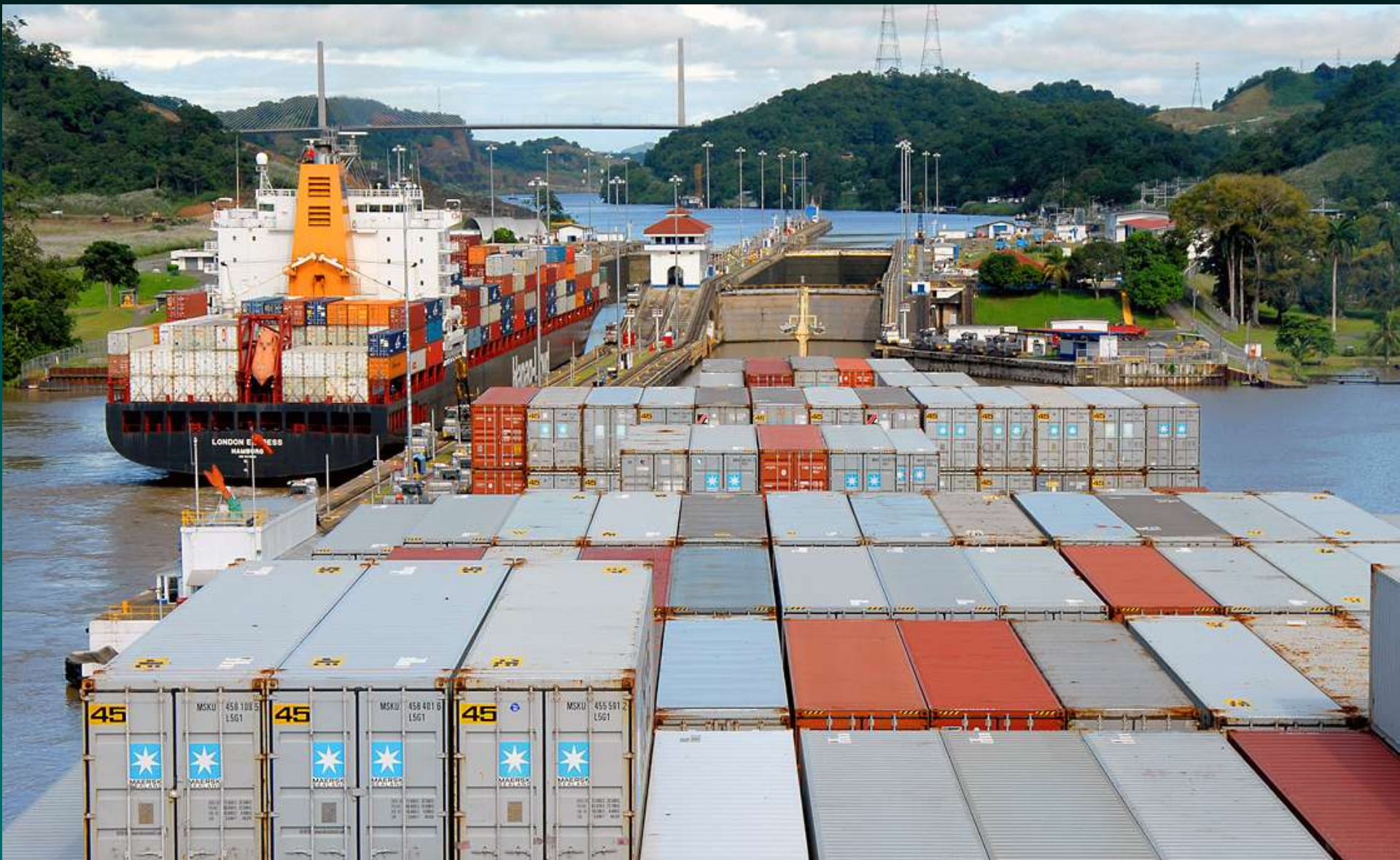
Panama Canal Expansion: New Capacity

Panama Canal Today

The Autoridad Del Canal de Panama



Panama Canal Current Width: 13 Containers Across

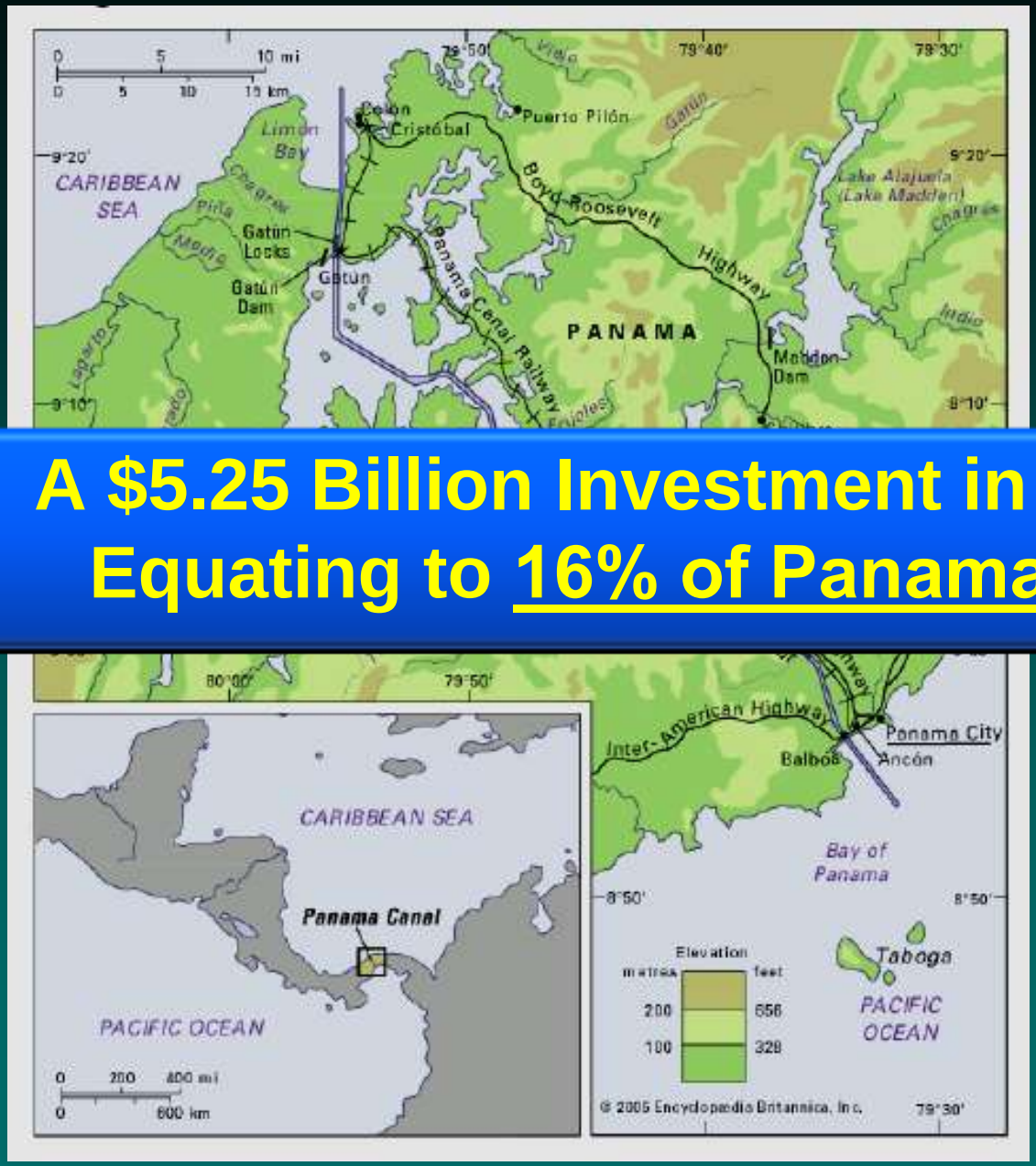


Post 2014 Panama Canal

The Autoridad Del Canal de Panama

Panama Canal Third Lane Expansion
Circa December 2014/January 2015

Panama Canal Expansion



The Autoridad Del Canal de Panama

More than **14,000 ships** a year pass through the **50 mile**

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

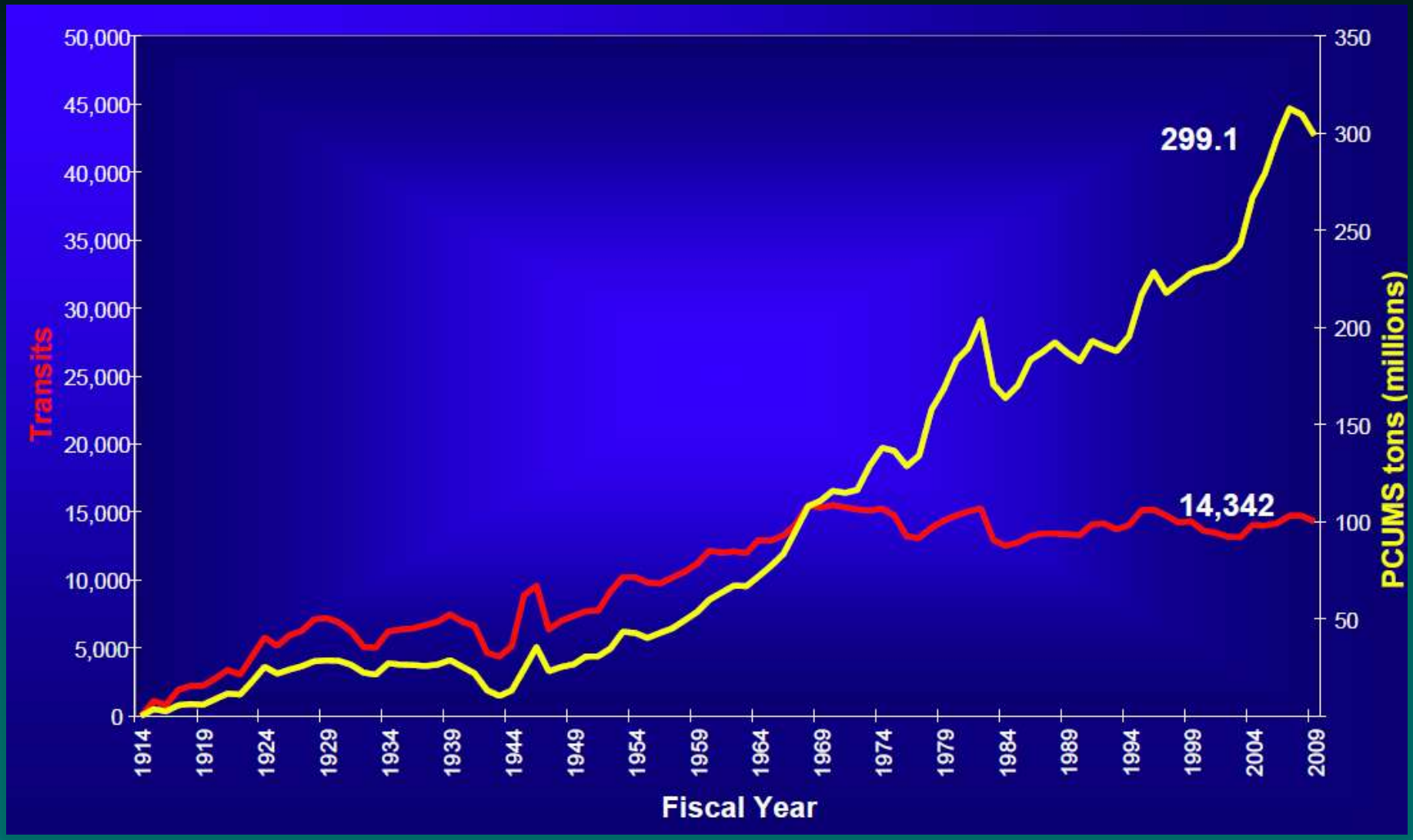
Pacific Ocean & Caribbean Sea carrying **275 million tons of Cargo and $100 billion in container shipping**

Source: ACP Data

VICKERMAN

Panama Canal Transit & Tonnage Traffic

(Transits and PCUMS Tonnage 1914 to 2009)

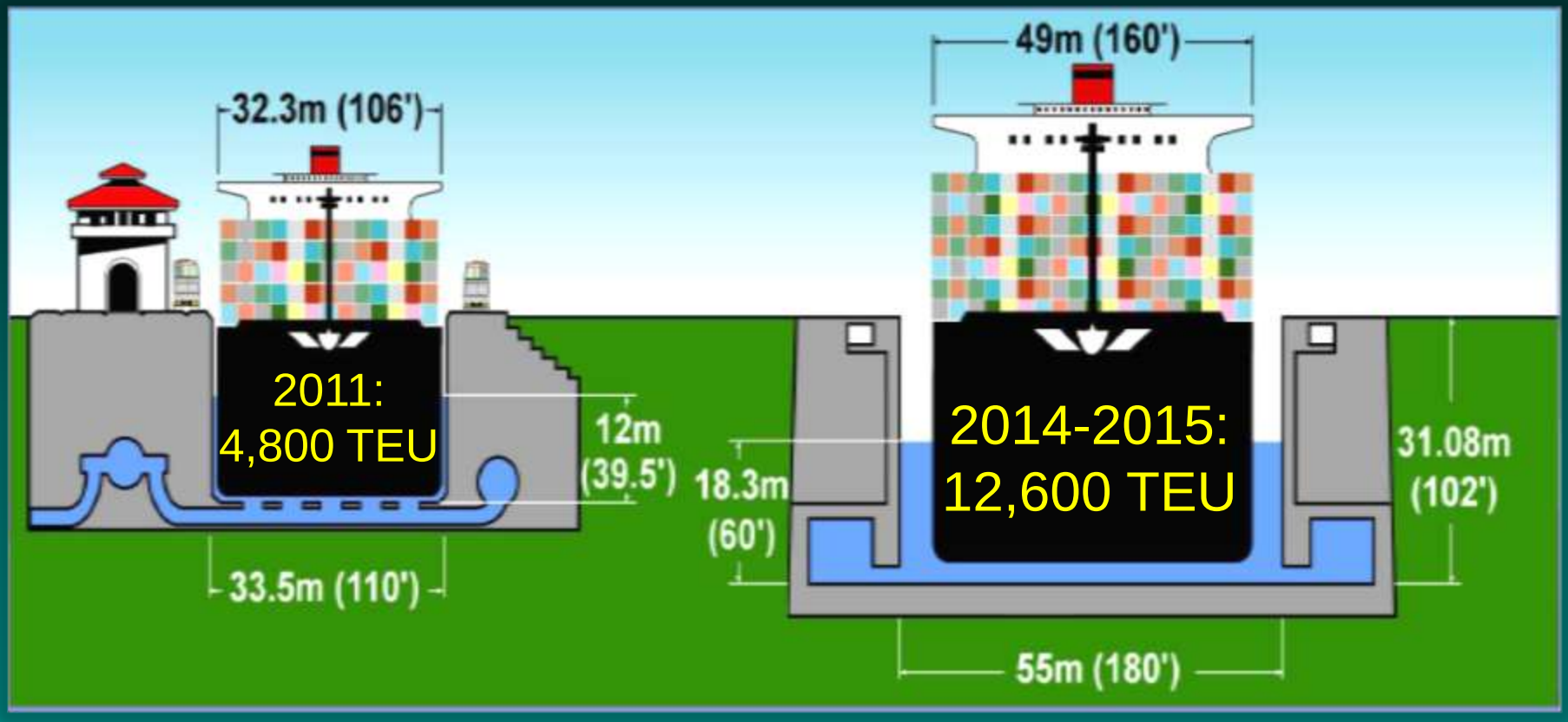


Source: ACP Data

VICKERMAN

The Autoridad Del Canal de Panama

Panama Canal Third Lane Expansion Capabilities



Source: ACP Expansion Project

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

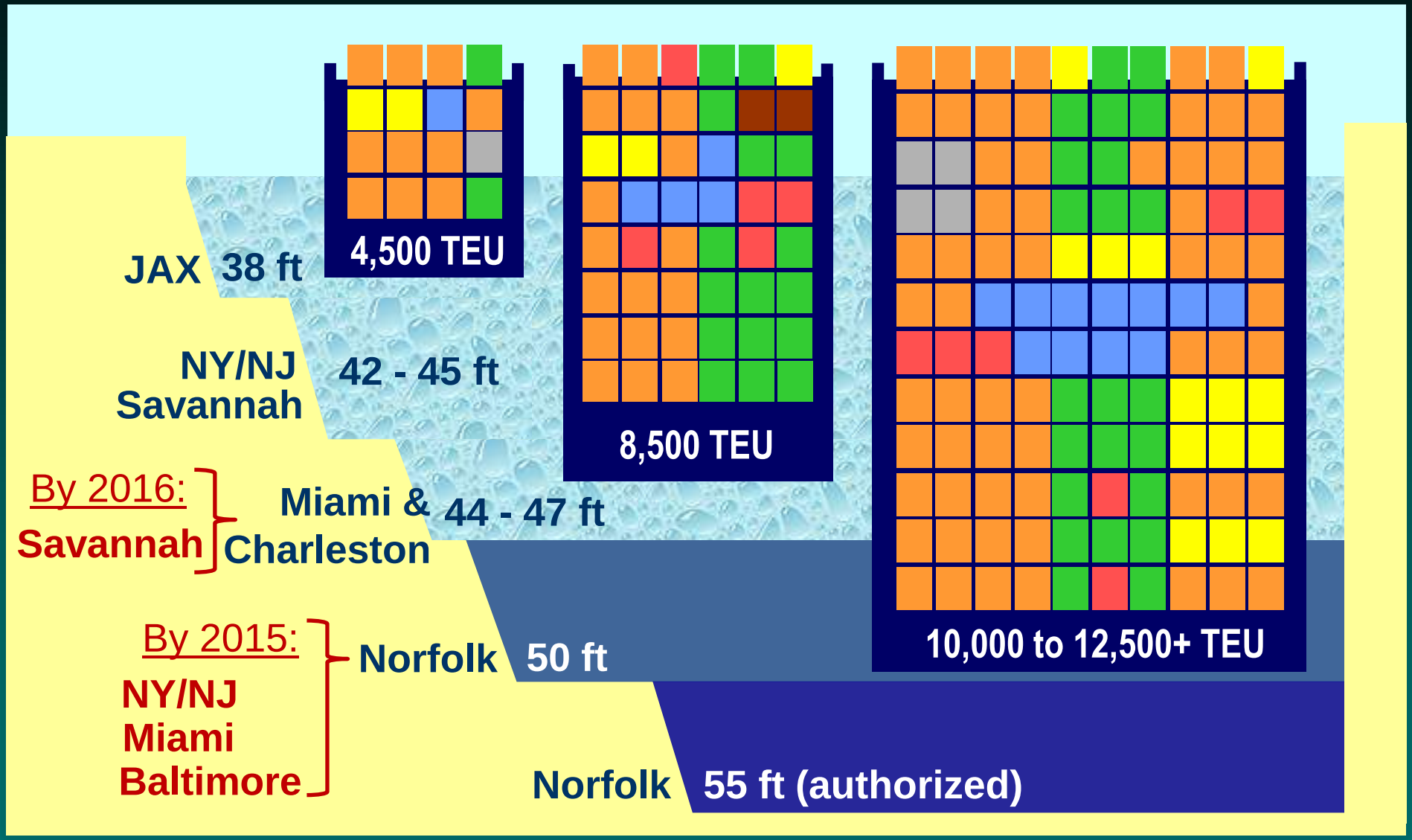
- Vessel Capacity: **9,000 to 10,000 TEUs**
- Vessel Draft: **46 to 50 feet** (tropical fresh water)
- Required Port Channel Depths: **50 to 54 feet**
- LOA: **1,000 to 1,200 feet**
- Beam: **140 to 160 feet**

VICKERMAN

The Container Ship Colombo Express (8750 TEU)

VICKERMAN

Today Only The Port of Virginia Can Handle The New 2015 Panamax Vessels Fully Loaded

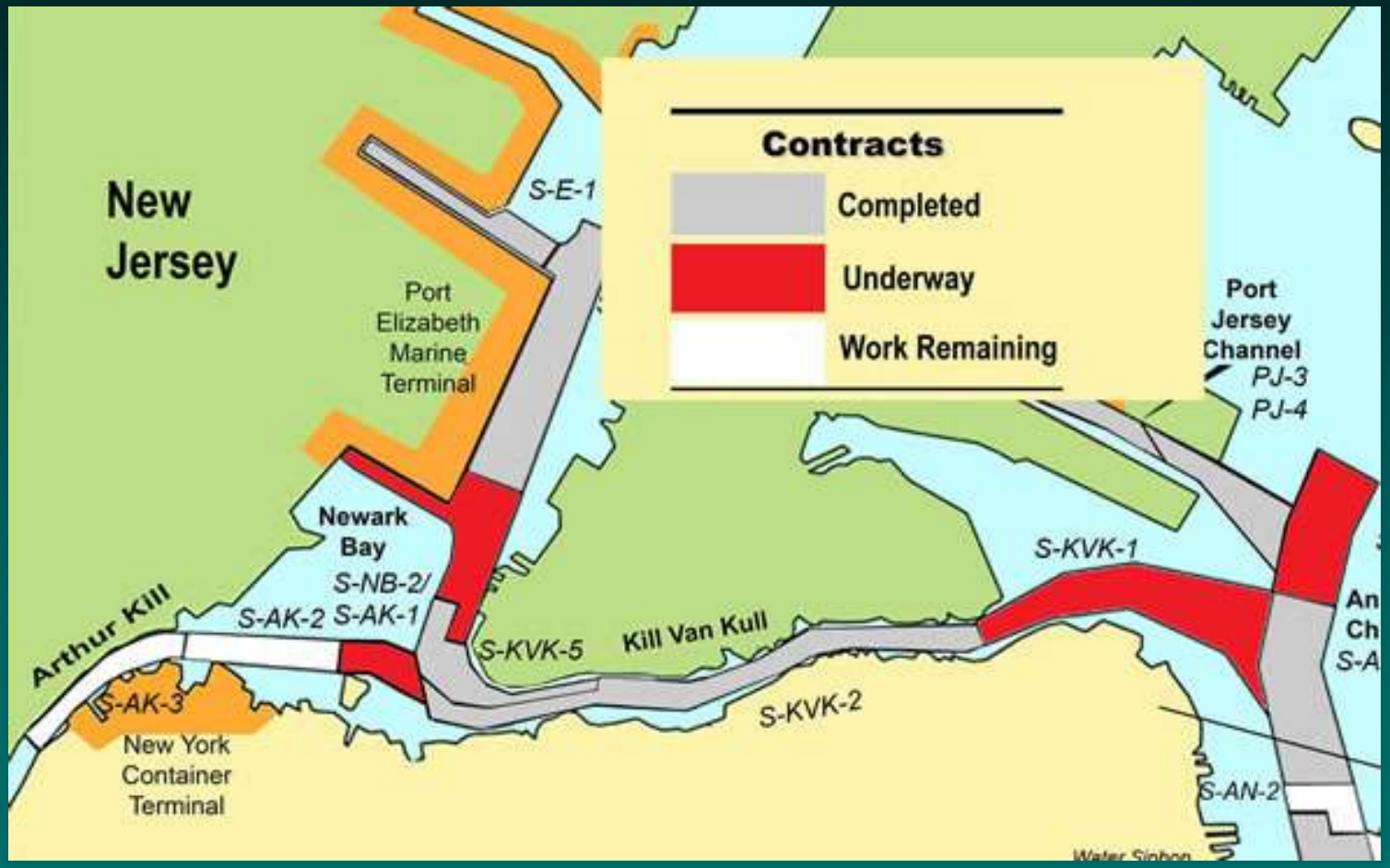


Source: Virginia Port Authority (VPA) October 2011

VICKERMAN

Port Authority of New York & New Jersey Entrance Channel & Harbor Dredging Program

($1.6 Billion Program, Completion December 2014)

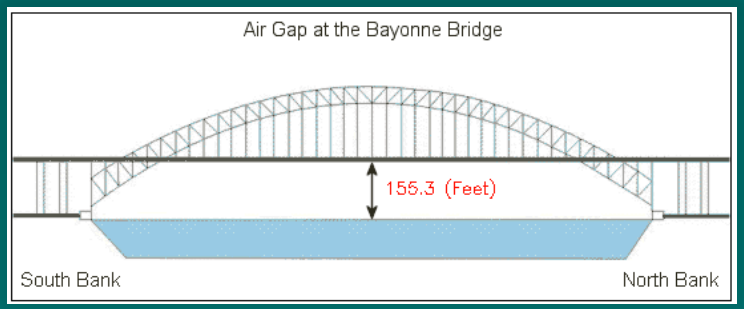


Raising of the Bayonne Bridge

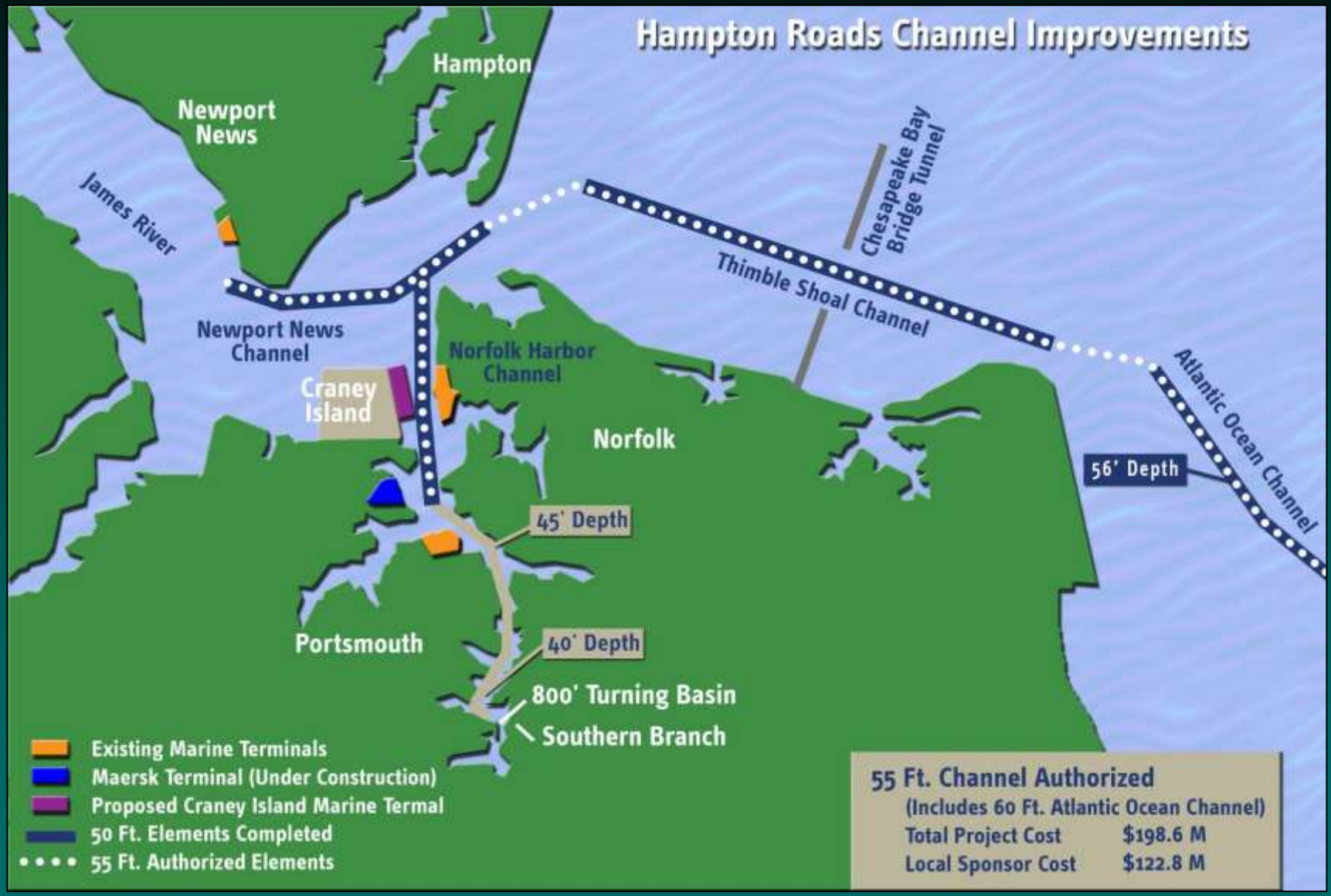
(Estimated at $1 billion)

Future Clearance: 214 ft

Current Clearance: 155.3 ft



Virginia Port Authority: 50’/55’ Channels



VICKERMAN

Panama Canal Future Transit Revenues & Canal Alternatives

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			
Financial Results[1]	**Year 2005**	**Year 2025**	**Annual average growth rate**
PCUMS Tons[2]	279	508	3.0%
Transit Revenue	1,033	6,101	8.9%
Other Revenues	92	125	1.5%
Total Revenues	**1,209**	**6,227**	**8.5%**
Operating Costs	444	1,016	4.2%
Fee per Net Ton[3]	218	668	6.5%
Public Services Fees[3]	2	2	0.0%
Depreciation	61	231	6.8%
Net Income	**704**	**4,310**	**11.6%**

546% Increase

890% Increase

Source: ACP Financial Data

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.

VICKERMAN

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

VICKERMAN

Panama Maritime Authority Becomes A Major Transhipment Center

Source: Panama Maritime Authority


AAPA
Panama Canal
Expansion Impacts:
Prediction Scenarios
VICKERMAN
Copyright © 2012

Panama Canal Vessel Deployments Will Determine New US Logistics Patterns

The Distance to New Orleans and Savannah Via the Panama Canal

A <u>Competitive & Robust</u> Landside Access to the Gateway Port's <u>Inland Market</u> 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

VICKERMAN

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…**

VICKERMAN

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!**

VICKERMAN

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….

Dedicated *Express* Double Stacked Train Service

Florida East Coast RAILWAY

Jacksonville
St. Augustine
Daytona Beach
New Symrna Beach
Aurantia
Titusville
Fort Pierce
West Palm Beach
Lake Harbor
Fort Lauderdale
Miami
Kendall
Key West

Head Haul Rates

Back Haul Rates

Panama Canal Traffic Short Cut

VICKERMAN

A Larger Share of Other Vessels Will be Able to Transit the Canal - Fully Loaded

Crude Oil - 0% to 42%

LNG - 10% to 90%

Dry Bulk - 55% to 80%

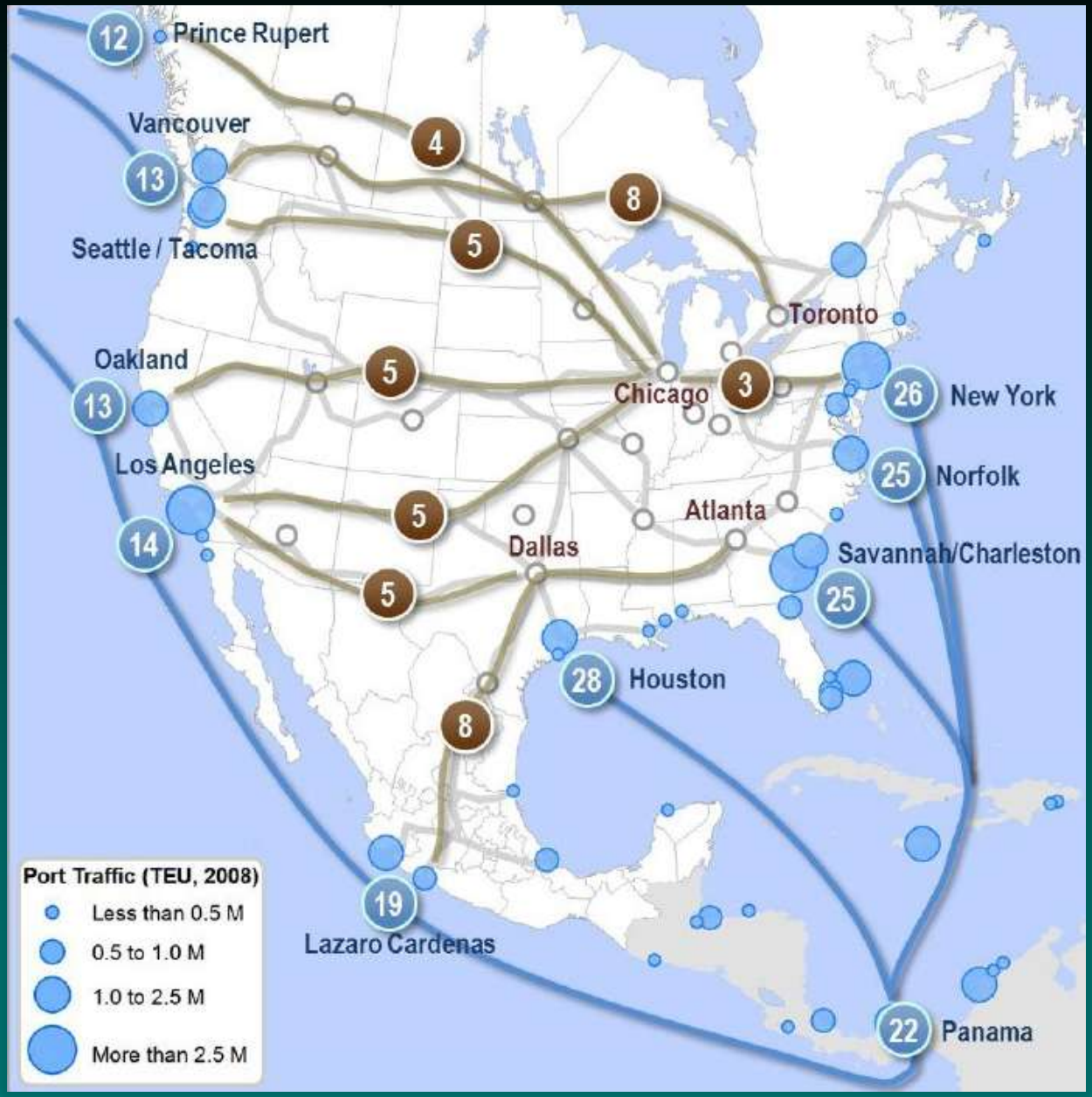
VICKERMAN

Panama Canal Large Vessel Market Penetration into the US Midwest

VICKERMAN & ASSOCIATES LLC

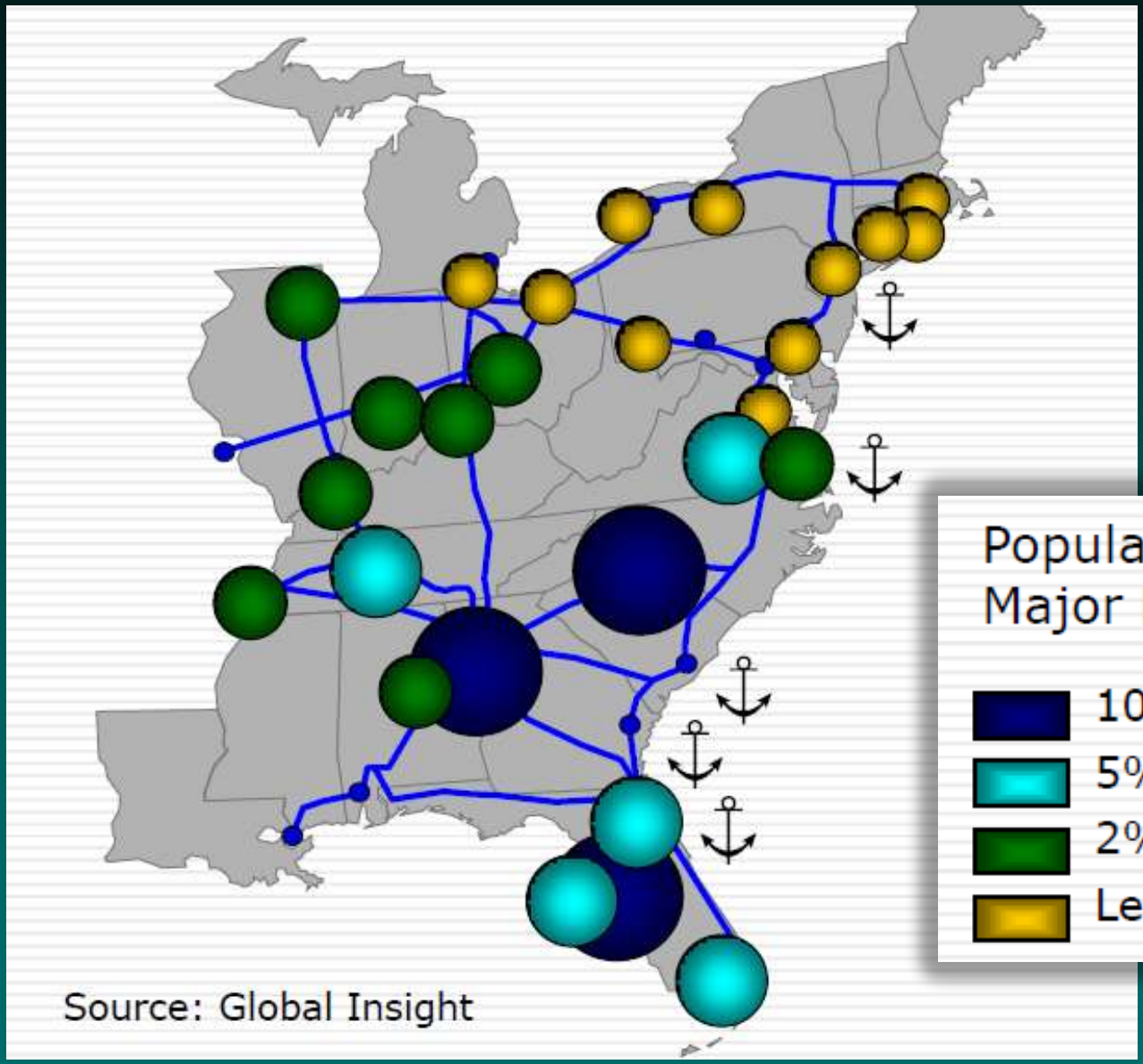
Shanghai to North American Destination Transit Times:

(Ocean Transit and Rail Land-Bridge Routings in Days)



Source: Based on Prologis data

2007 - 2011 Cumulative
US East Coast Population Growth

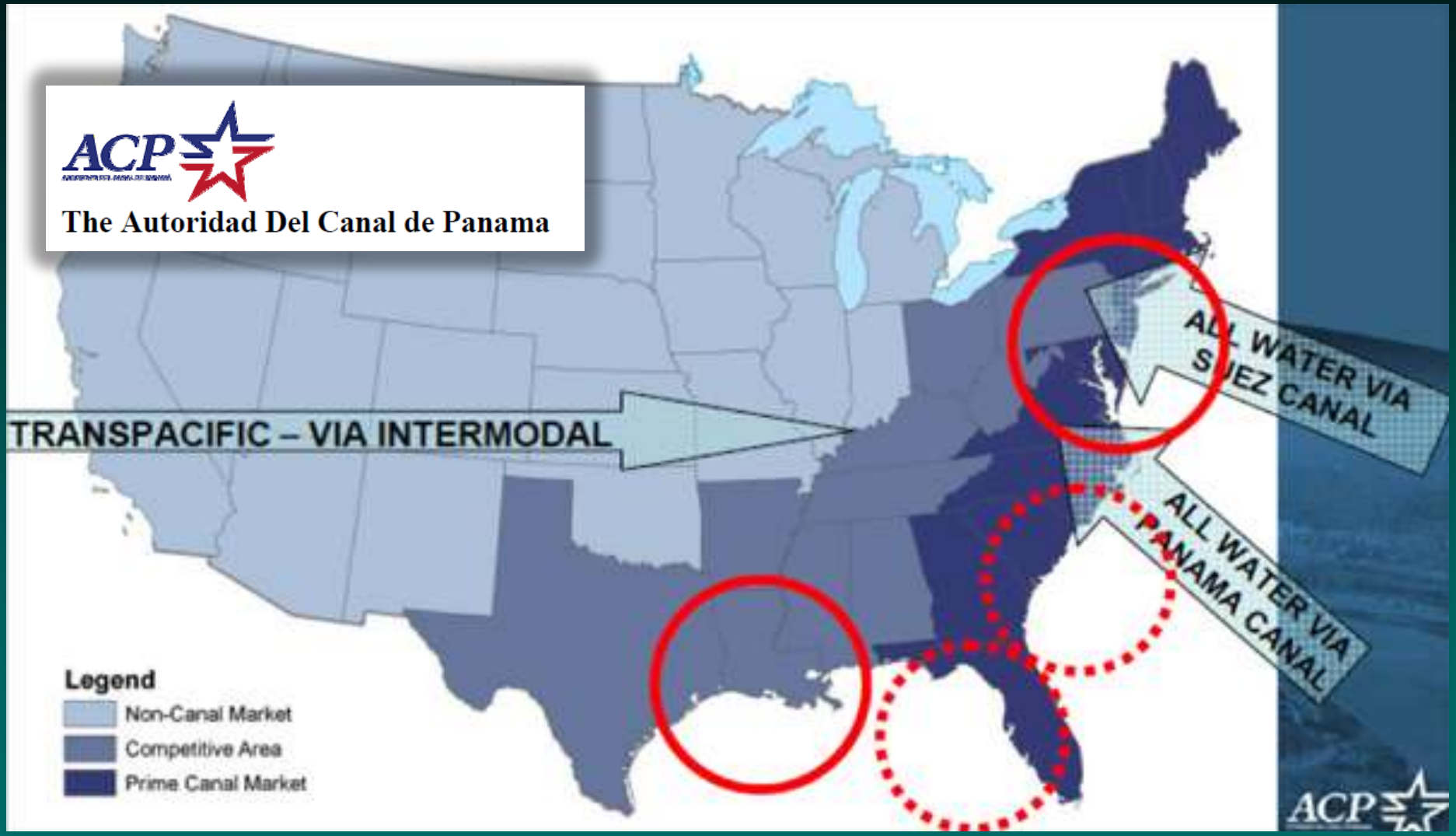


Population Growth in Major Metropolitan Areas

- 10% or greater
- 5% – 9.9%
- 2% - 4.9%
- Less than 2%

VICKERMAN

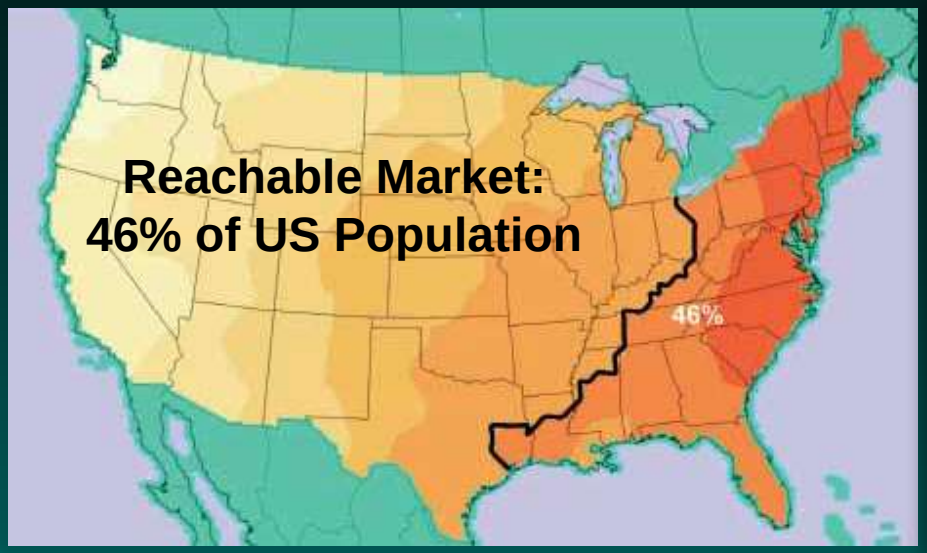
Panama Canal's Designation of "Prime" and "Competitive" Canal Markets Destinations



VICKERMAN

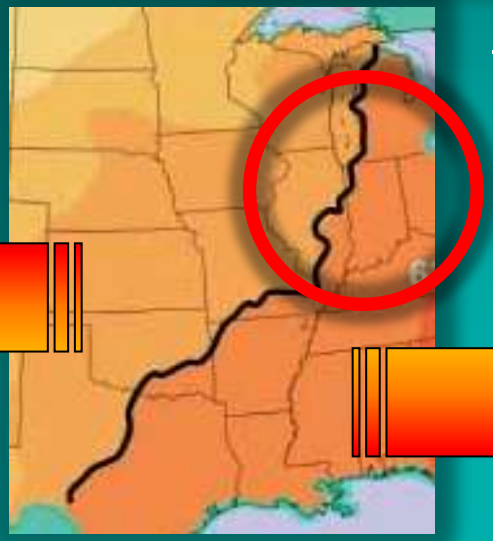
Dramatic Market Penetration in 2015

Panama Canal Economies of Scale with permit deeper market penetration into the US



4,000 TEU ship, all-water.

8,000 TEU ship, all-water.



Indiana at the Epicenter

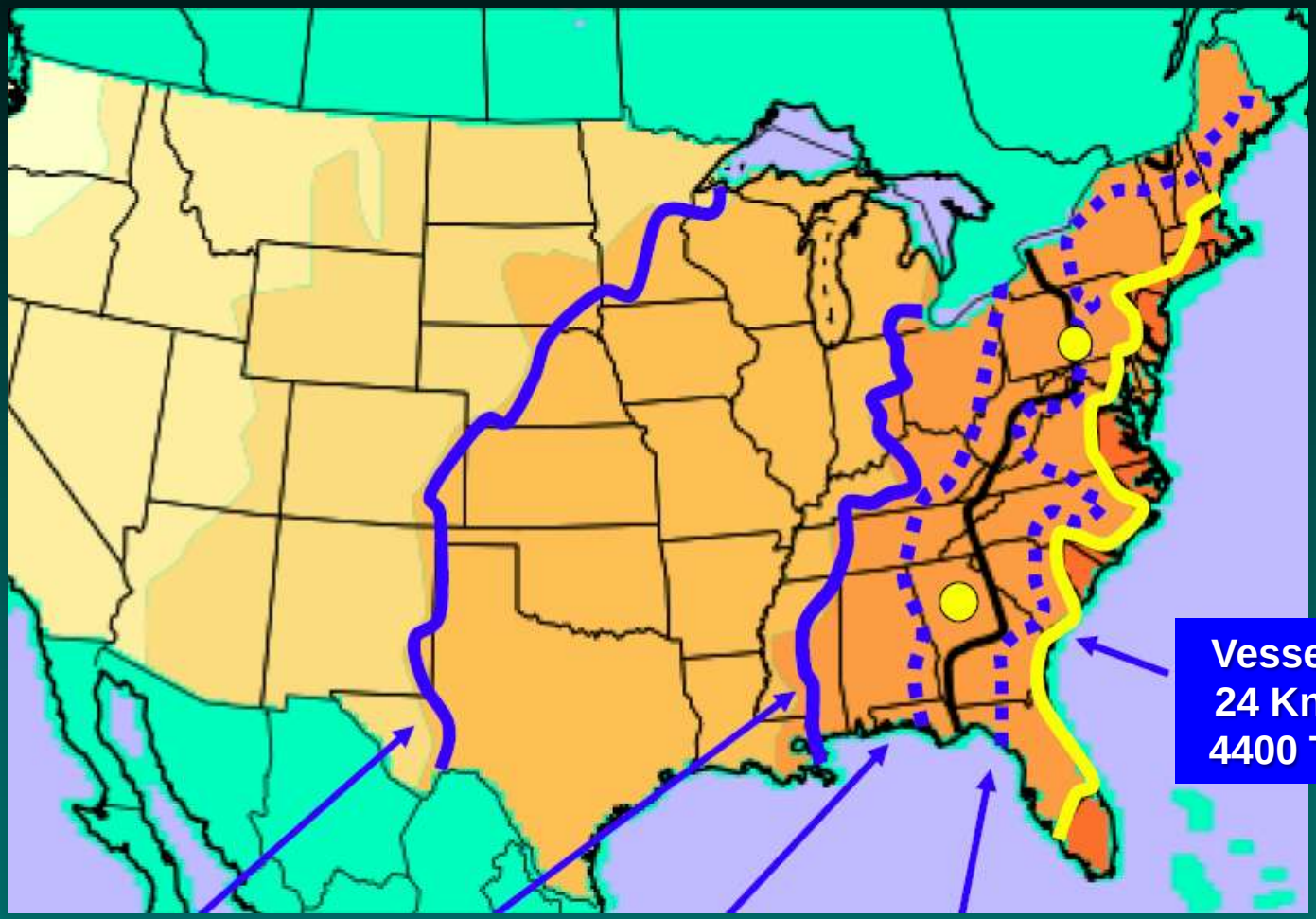
West Coast
Cost Advantage

East Coast
Cost Advantage

VICKERMAN

Market Penetration - High Value Goods

($300,000 Per Container – i.e.: Shoes)



Source: CSX Transportation May 12, 2011 - Director of Strategic Analysis

VICKERMAN

Cargo Will Flow "*Downhill*" to the "*Lowest Cost - Best Service Levels*"

(Total Logistics Costs From Origin to Destination)

More Competitive Regions will End up with the Cargo

VICKERMAN