2014 Agribusiness CFO Conference

October 28, 2014 ***Terranea Resort, Rancho Palos Verdes, CA***

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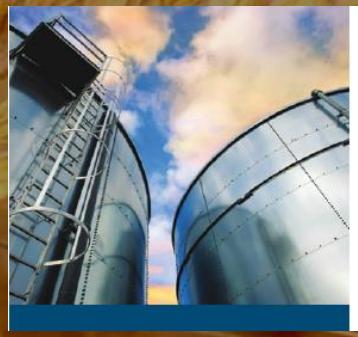
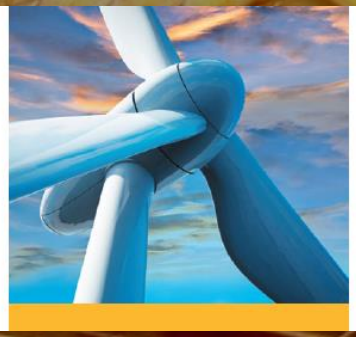

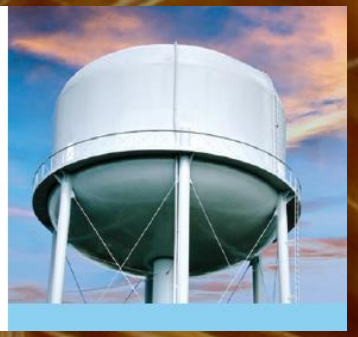

CoBank's 2014 Agribusiness CFO Conference

Will Growing US Agricultural Exports Overtax the US Logistical Capabilities?

John Vickerman

Williamsburg, Virginia

Agriculture is Leading the Way Out of the Recession… But with What Impacts?

"US agriculture was better positioned than most US industries entering the recession, was less affected by the recession than most other US industries, and is well positioned to continue to do well in the years ahead"….

Source: Chris Harris - Editor in Chief 5M Publishing June 4, 2012

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US Agricultural Trade Growth

Source: Dr Dev Kambhampati | FY 2014 US Agricultural Trade Forecasts- USDA

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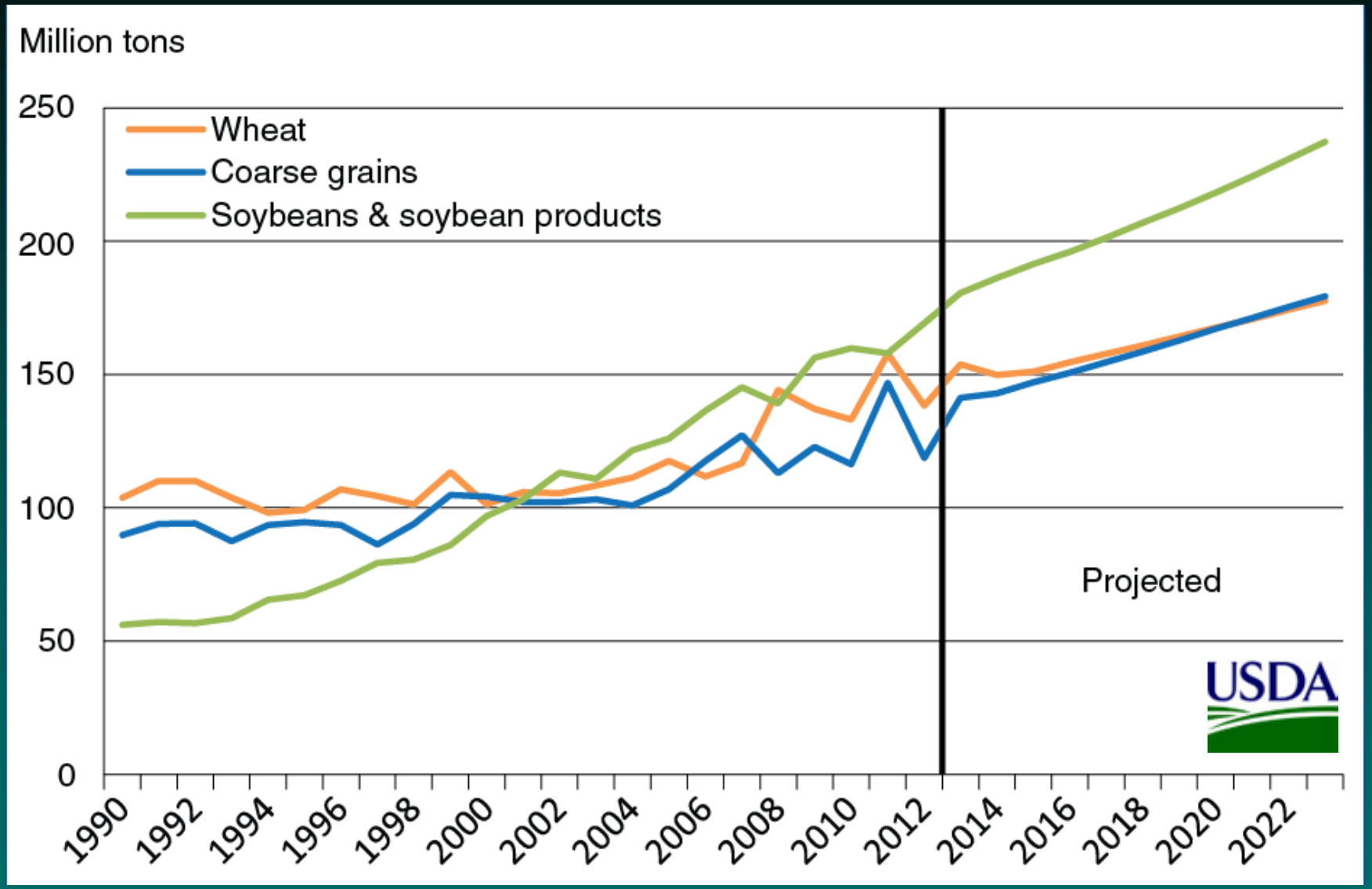
US Agricultural Trade Value Forecast



Source: USDA Economic Research Service - USDA Agricultural Projections to 2023

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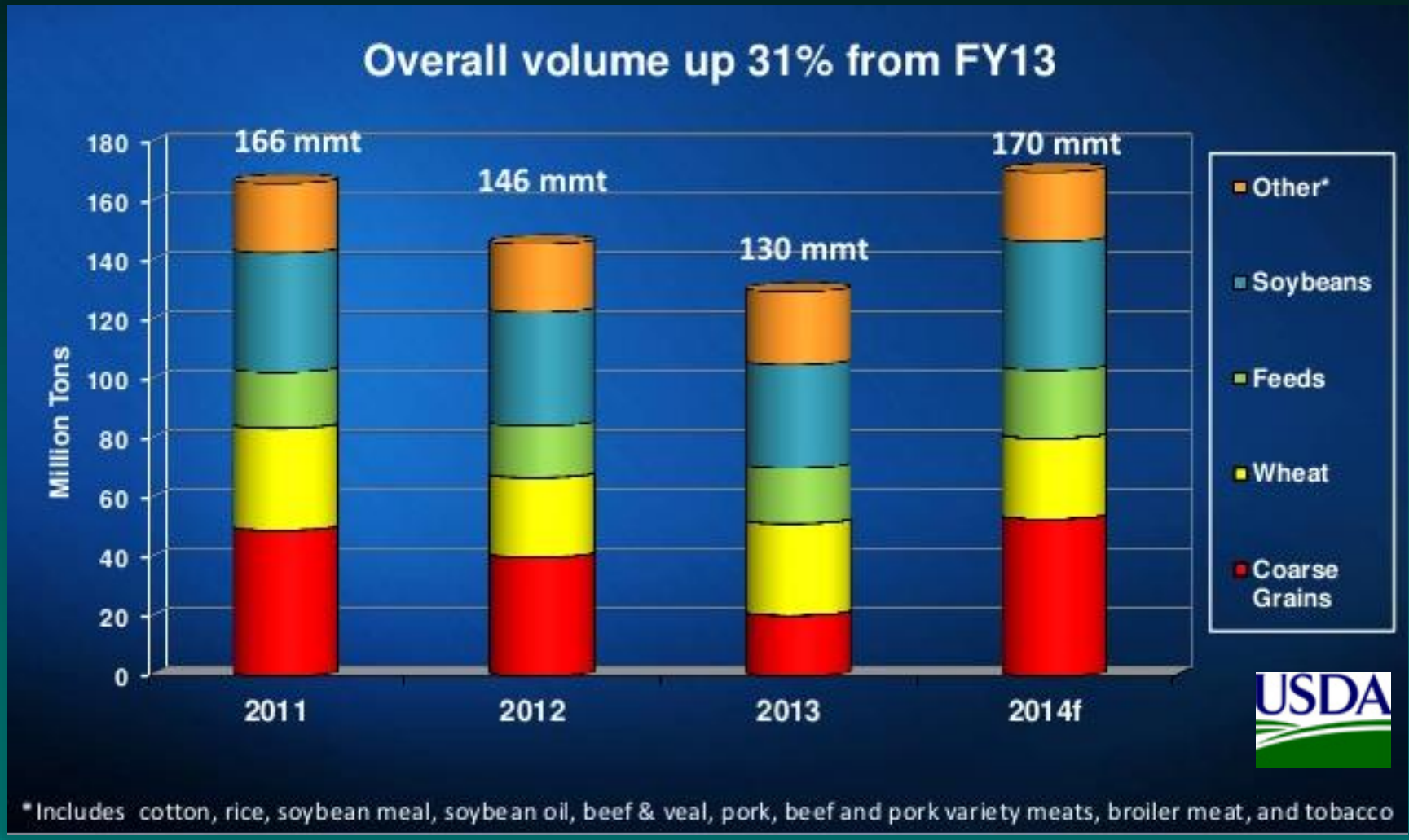
Record Volume For Soybeans & Feeds - Corn Volume Rebounds



Source: Dr Dev Kambhampati | FY 2014 US Agricultural Trade Forecasts- USDA

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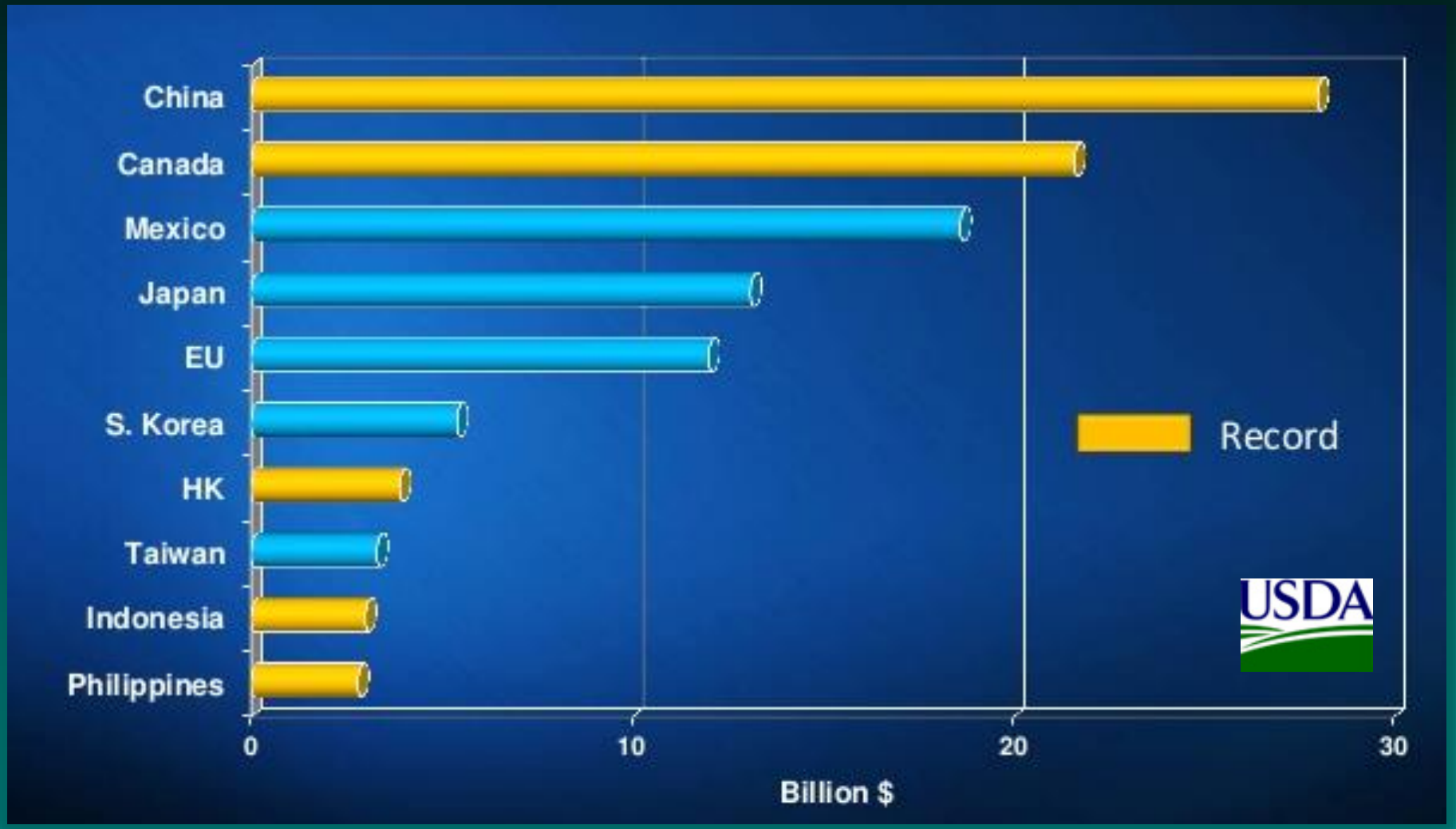
Top 10 US Markets in FY 2014

(Half of the Top Markets are Forecast to hit Records)



Source: Dr Dev Kambhampati | FY 2014 US Agricultural Trade Forecasts- USDA

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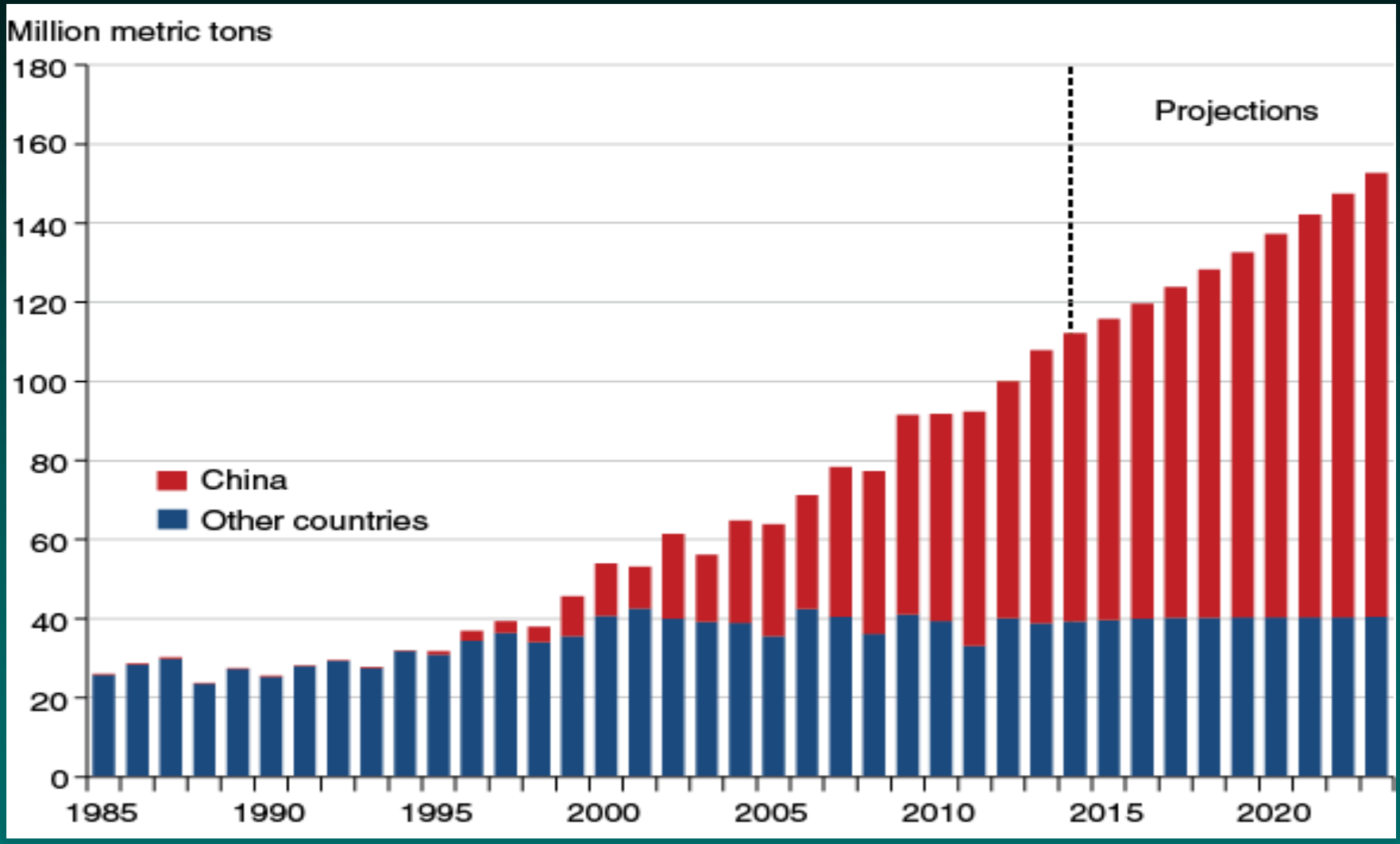
China Will Continue to be the Dominant Global Soybean Importer



Source: USDA Production, Supply and Distribution Database and Projections

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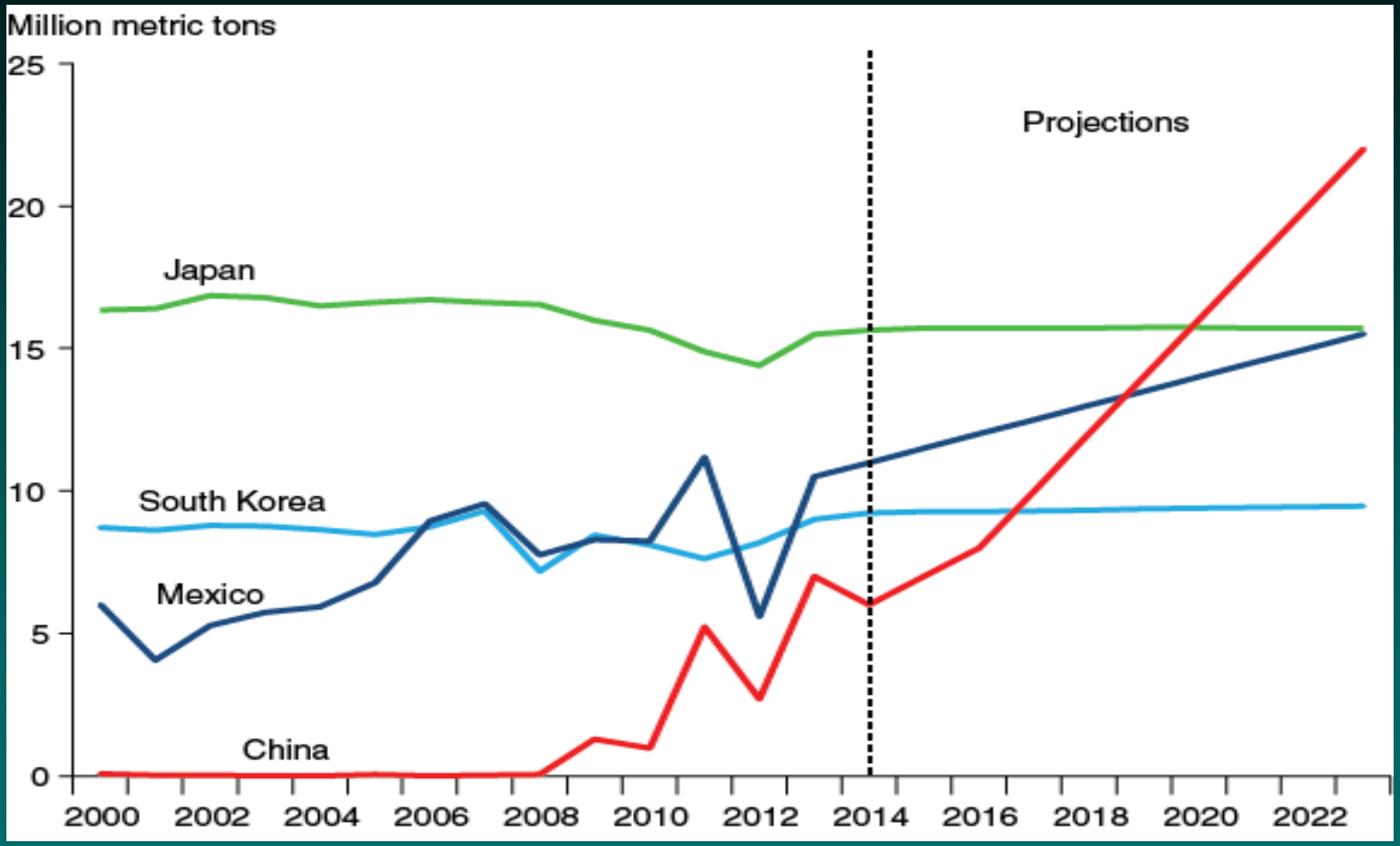
China Expected to Become the Largest Global Corn Importer



Source: USDA Production, Supply and Distribution Database and Projections

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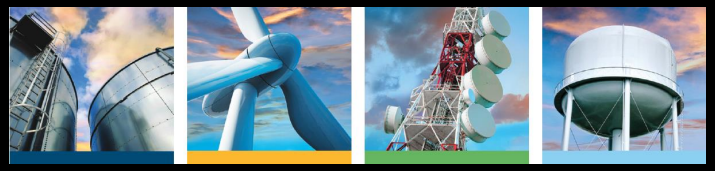

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The Evolution of Today's Global Shipping Lanes

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Vessel Cargo Handling Circa 1955

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Cargo Handling Circa 2010

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US Navy Fast Frigate Circa 2045

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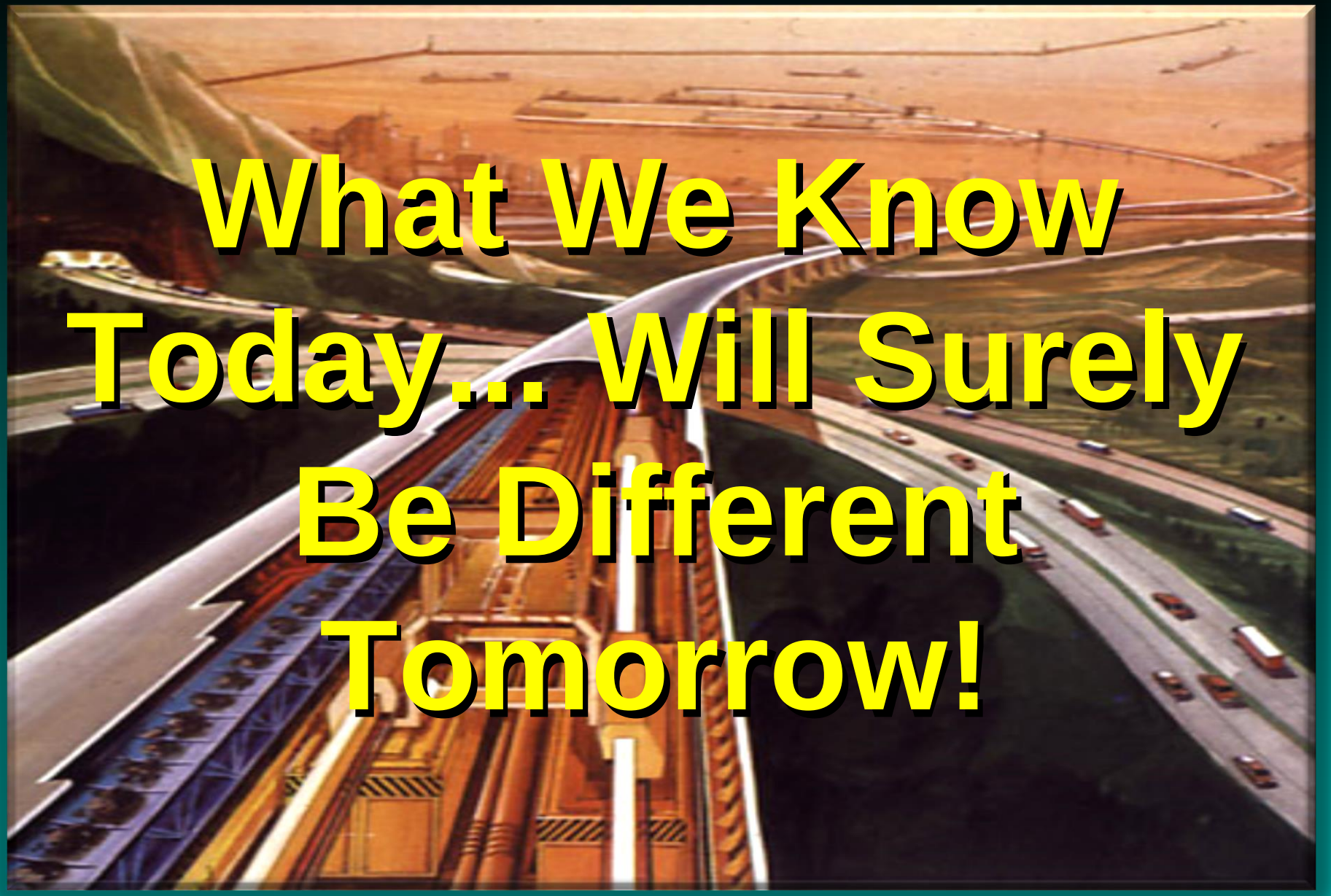

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The World's Primary Shipping Routes

The Marine Silk Road

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Indian Ocean Electric Blue Shipping Lane Trails From the Marine Silk Road

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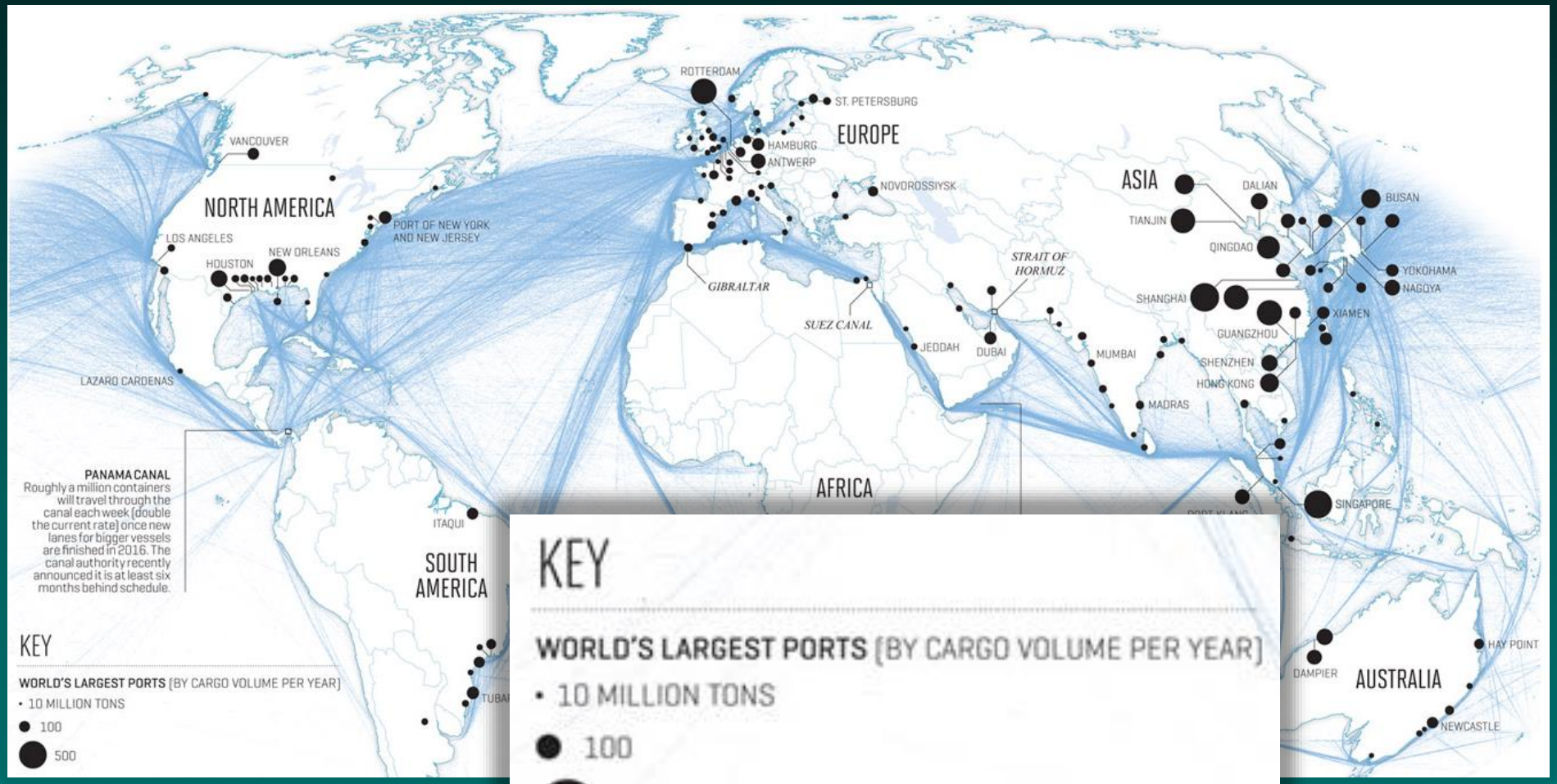
The World's Largest Ports Are Connected Via The Marine Silk Road

Where are the Biggest Ports?



KEY
WORLD'S LARGEST PORTS (BY CARGO VOLUME PER YEAR)
• 10 MILLION TONS
100
500

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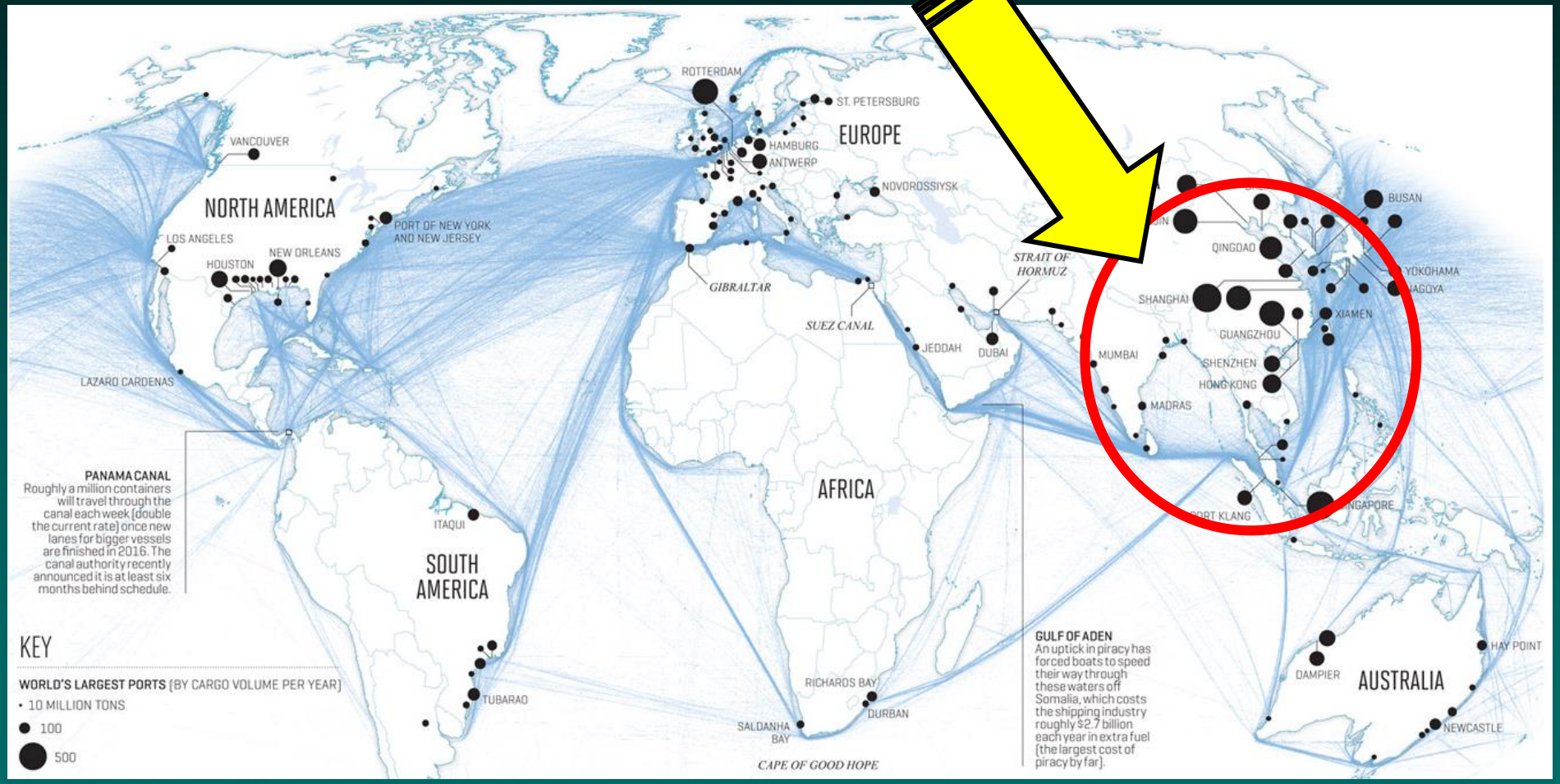
There Are More People Living Inside This Circle Than in the Rest of the World



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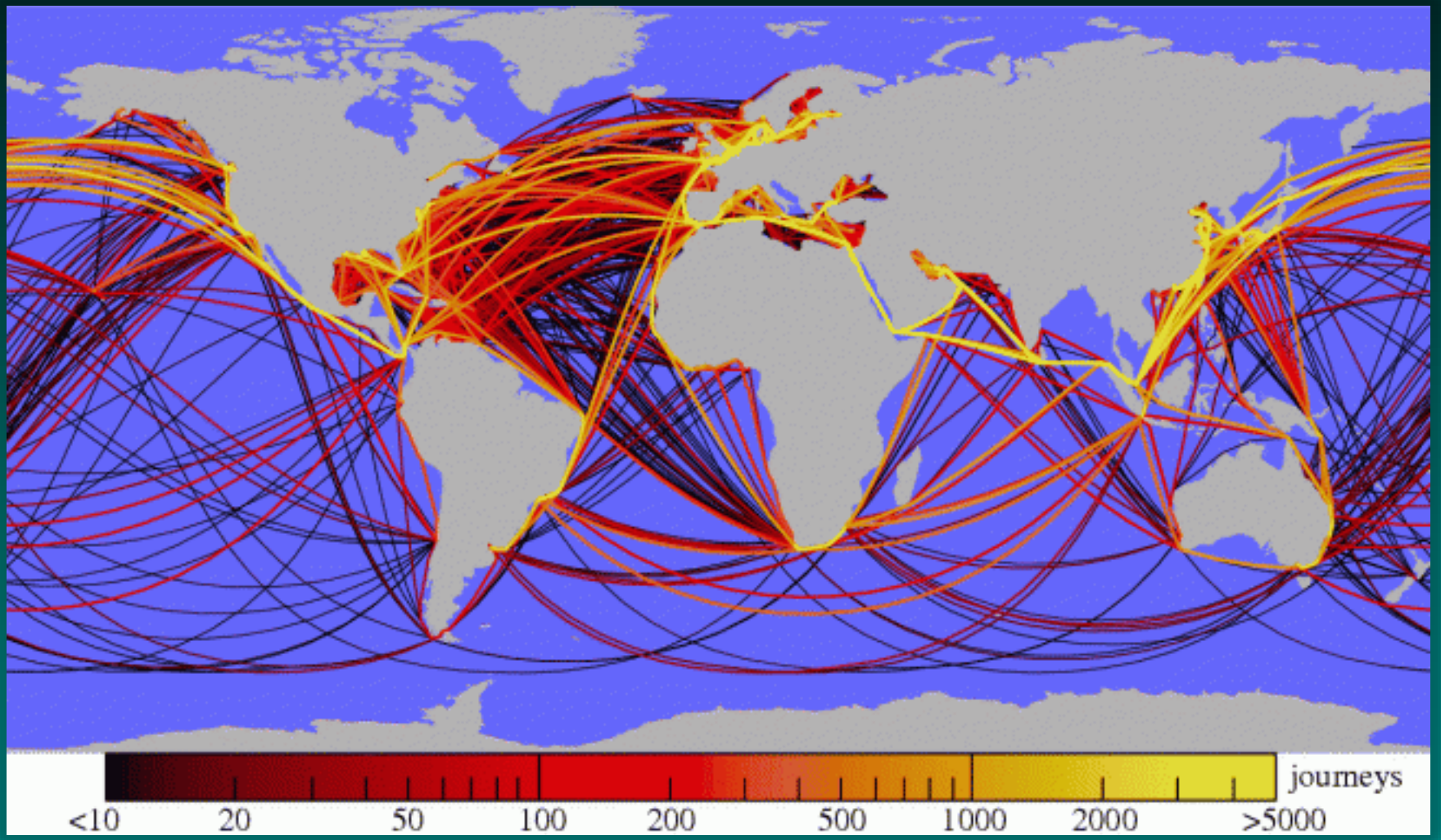
90% of Global Trade is Carried Out by Shipping

The Majority of Today's Ocean Trade is Conducted on the Marine Silk Road

Global Shipping Routes Plotted by AIS GPS

Today's Busiest Shipping Routes:
(1) Panama Canal, (2) Suez Canal, (3) Offshore China



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

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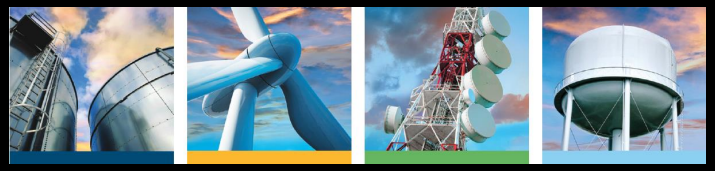

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International External Industry Pressures Driving Today's Logistics

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

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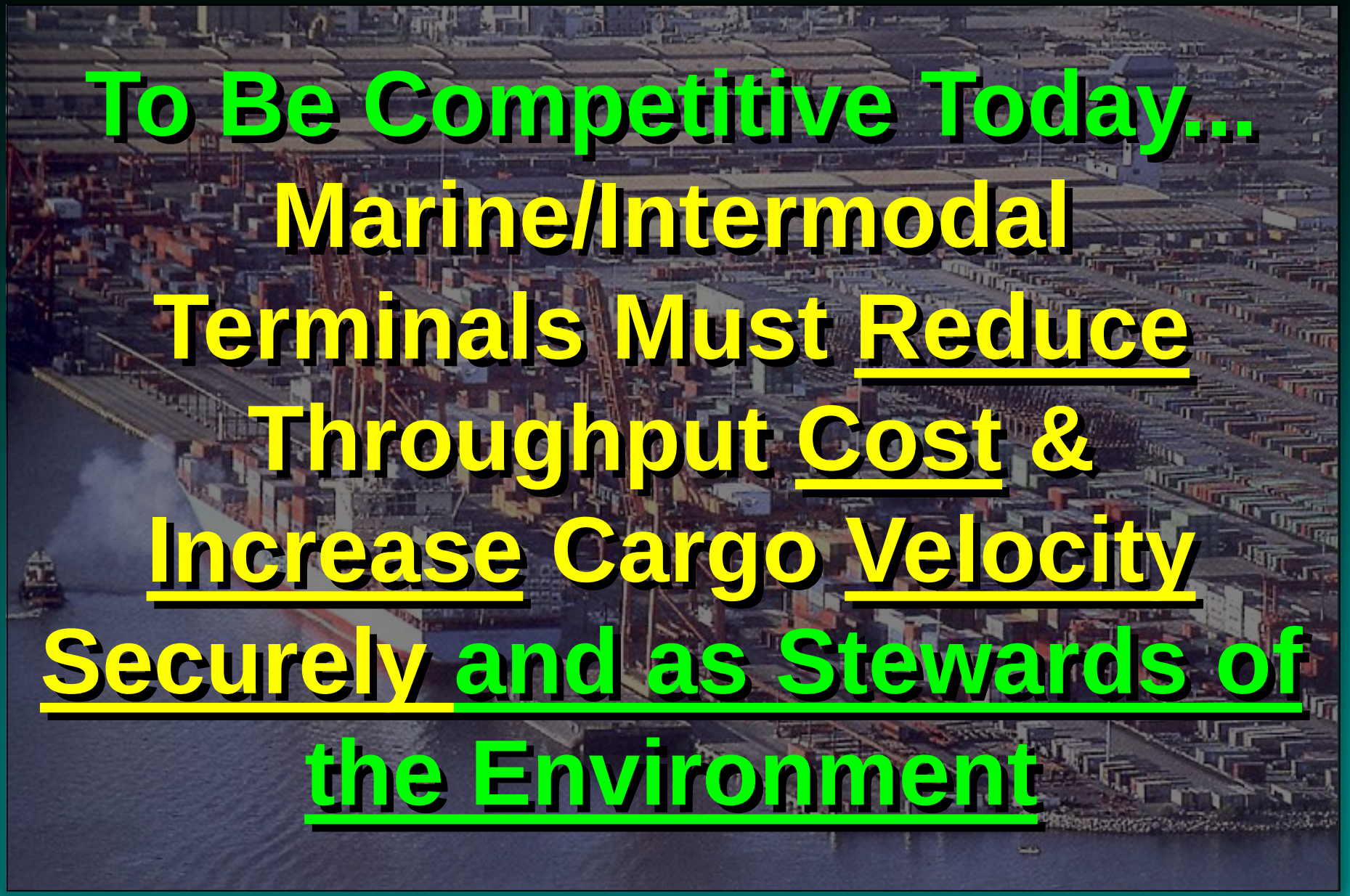

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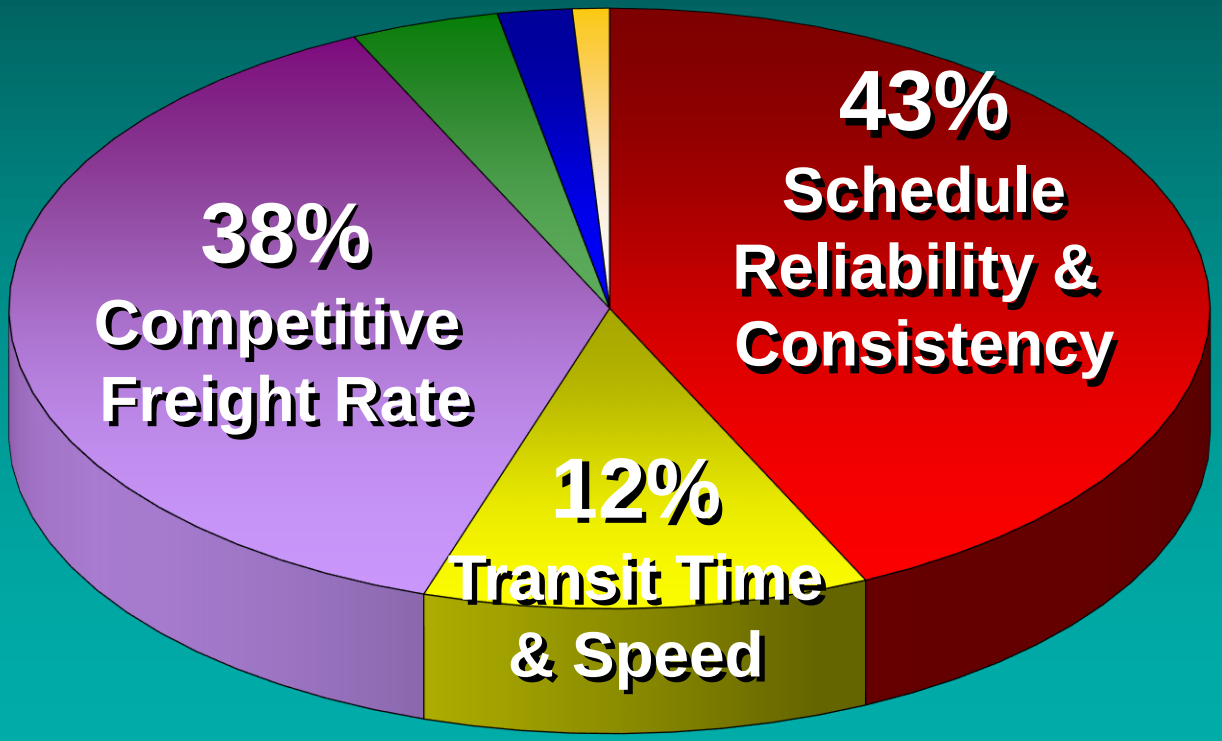
Poll of the Top 1000 "Blue Chip" Multinational Shipper Priorities



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Today's Logistics Truth:

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

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Relationship Between US Trade and US Prosperity – 1930 to 2005

(US Trade & Gross Domestic Product - $ Billions)

Source: USDOT Based on USDOC Data

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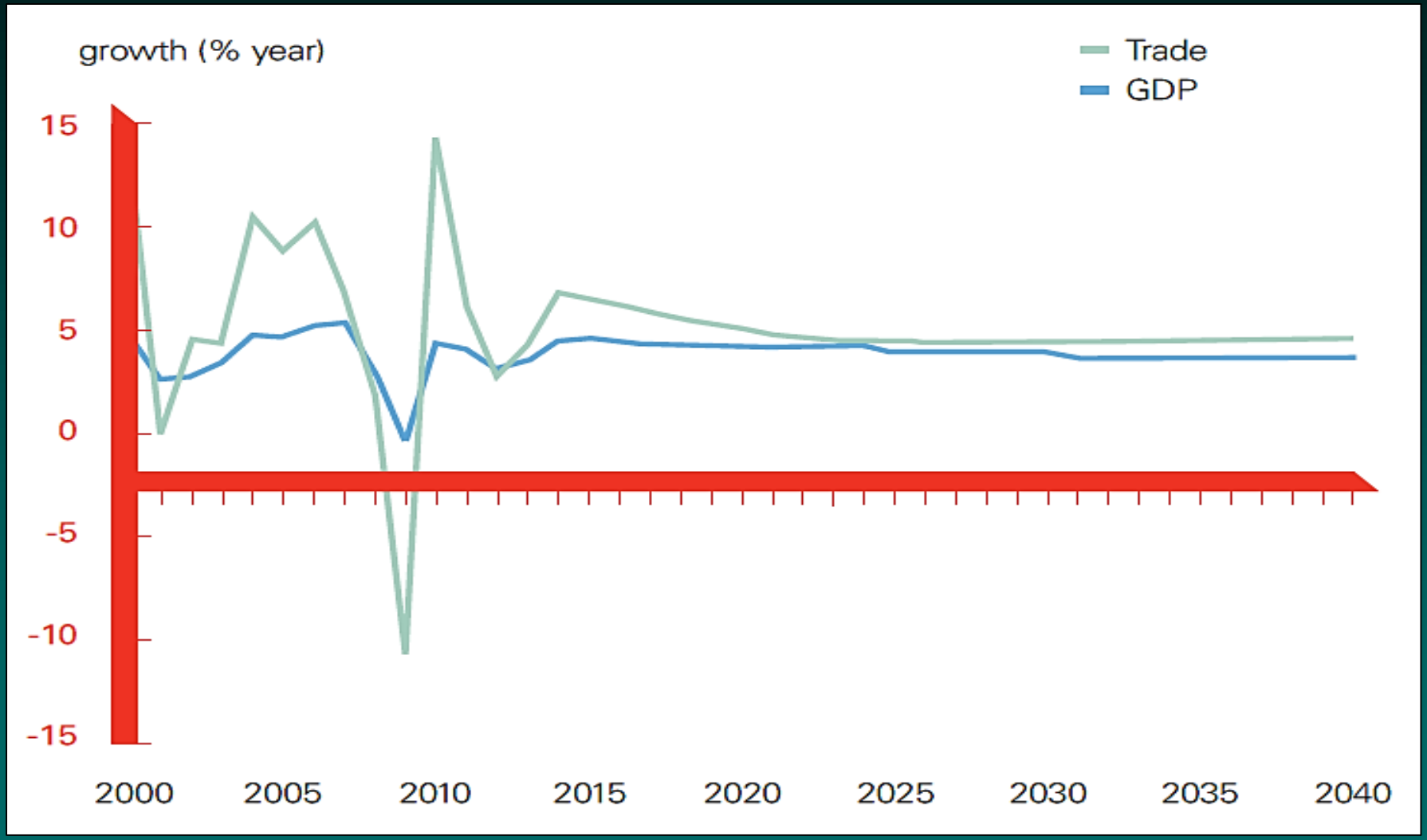
Growth in GDP and World Trade

World trade will grow by 73% in the next 15 years. With merchandise trade volumes in 2025 hitting $43.6 trillion compared to today's $27.2 trillion



Source: Oxford Economics 2013

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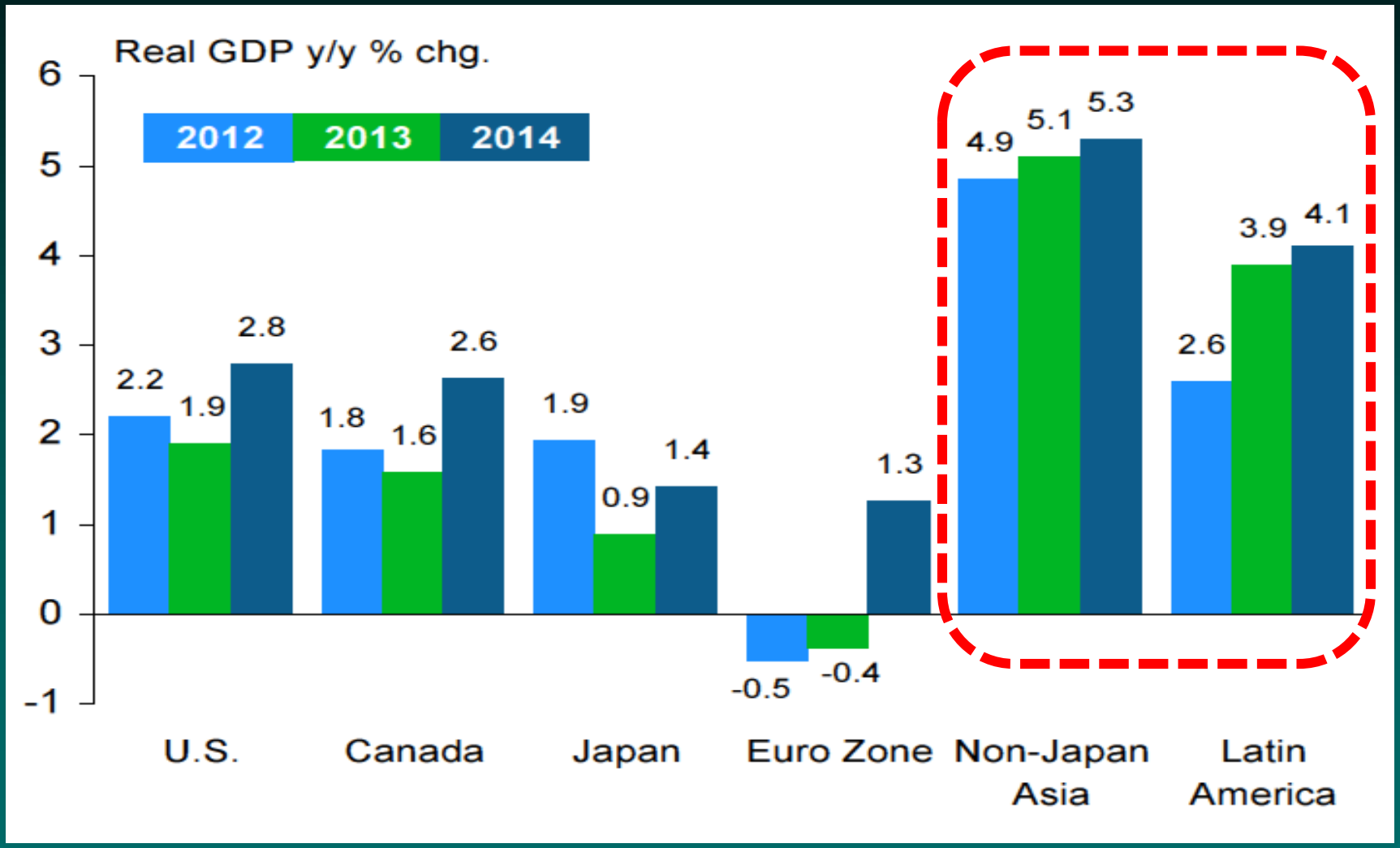
Continuing Economic Global Growth

International trade is set to significantly grow despite current economic uncertainty in the U.S. and elsewhere around the world



Source: TD Economics Forecast as of March 2013

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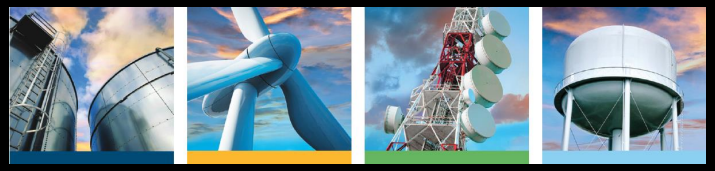

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Who Controls the Route and Flow of Marine Cargo?

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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**.

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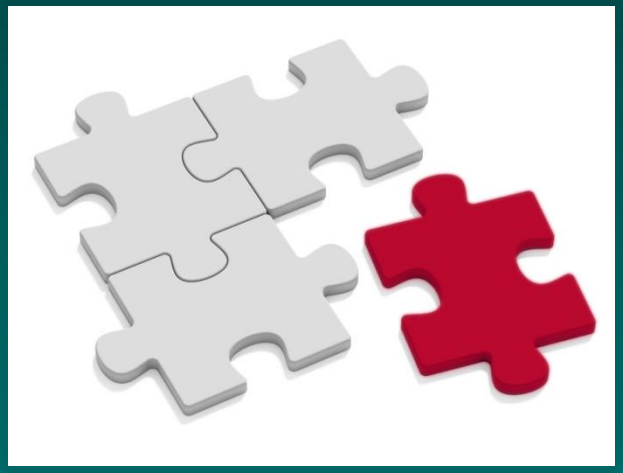
Key Success Factor:

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

(Total Logistics Costs From Origin to Destination)



Above All Be MARKET DRIVEN

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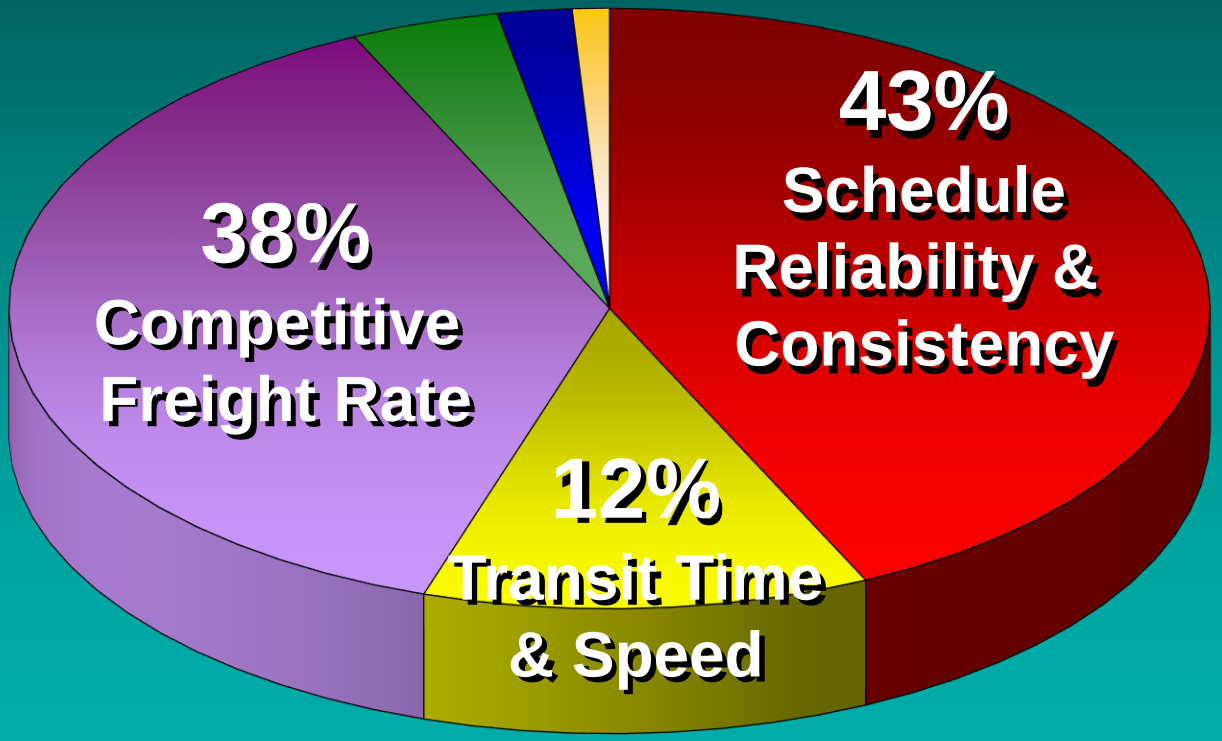
Poll of the Top 1000 "Blue Chip" Multinational Shipper Priorities



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Today's Logistics Truth:

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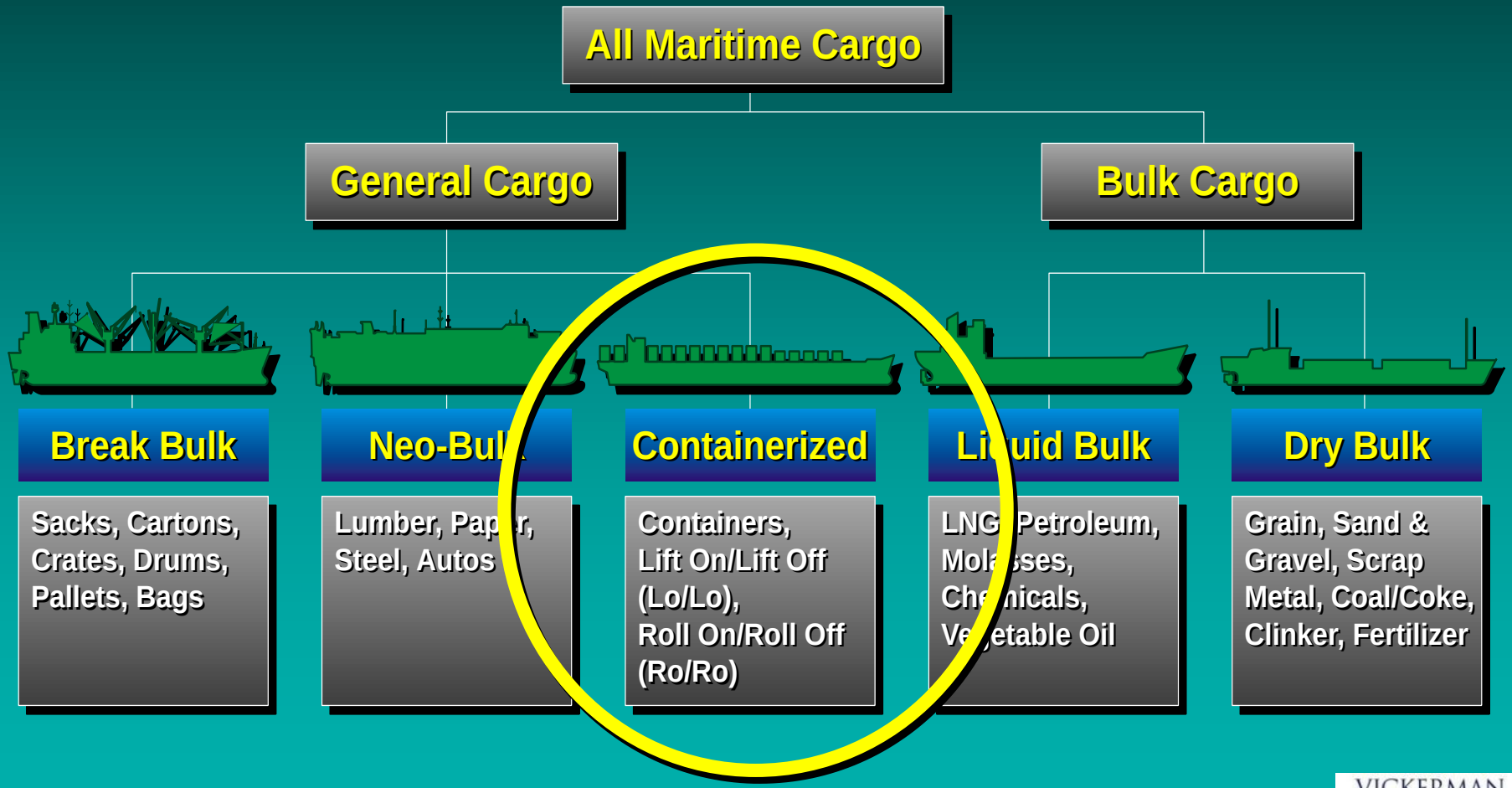
Functional Classification of Global Maritime Cargoes



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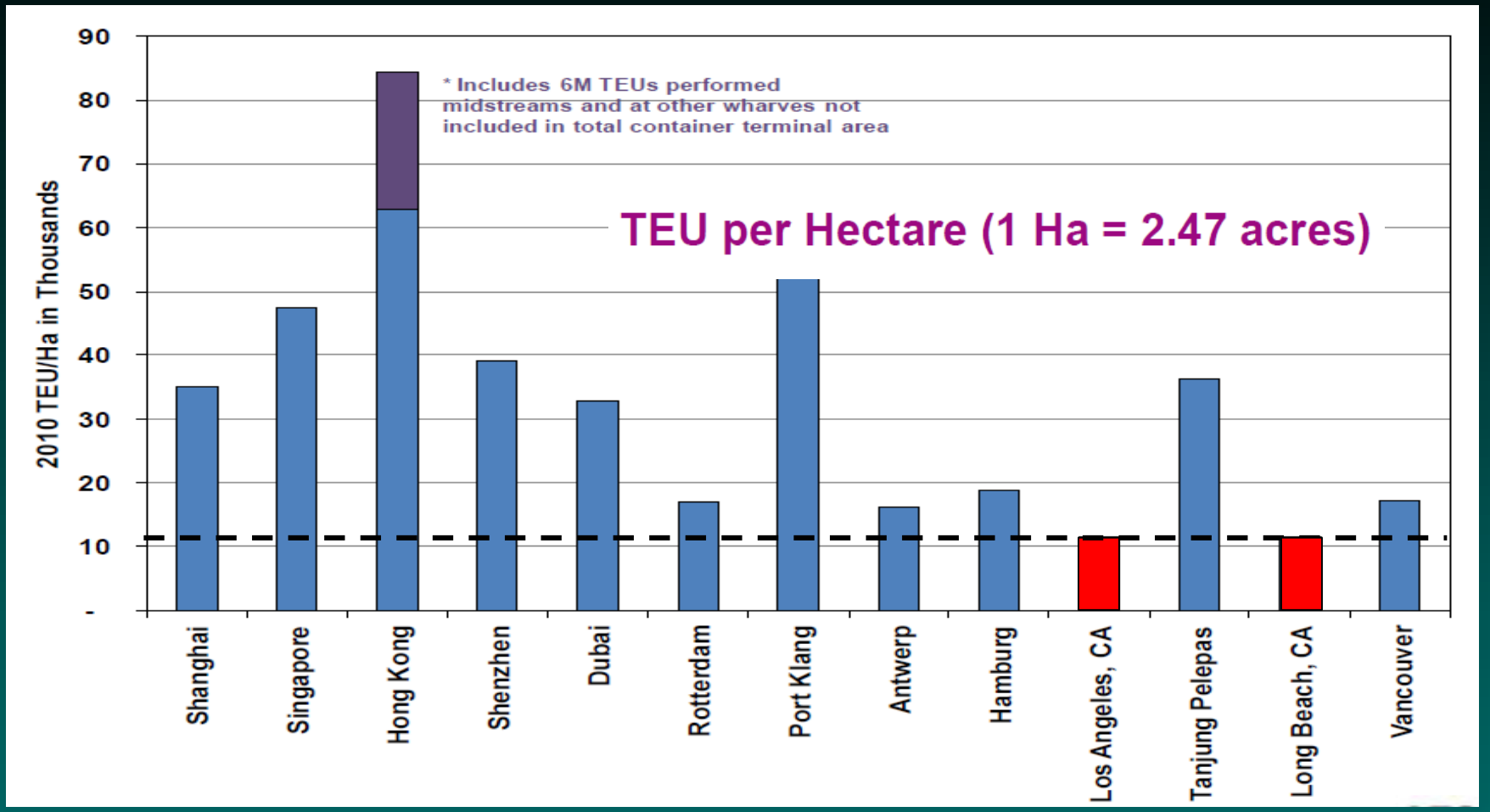
Top Global Container Port Productivity



Global Ocean Carriers & Terminal Operators Do Not Consider North American Ports as a "Best Case Practice"

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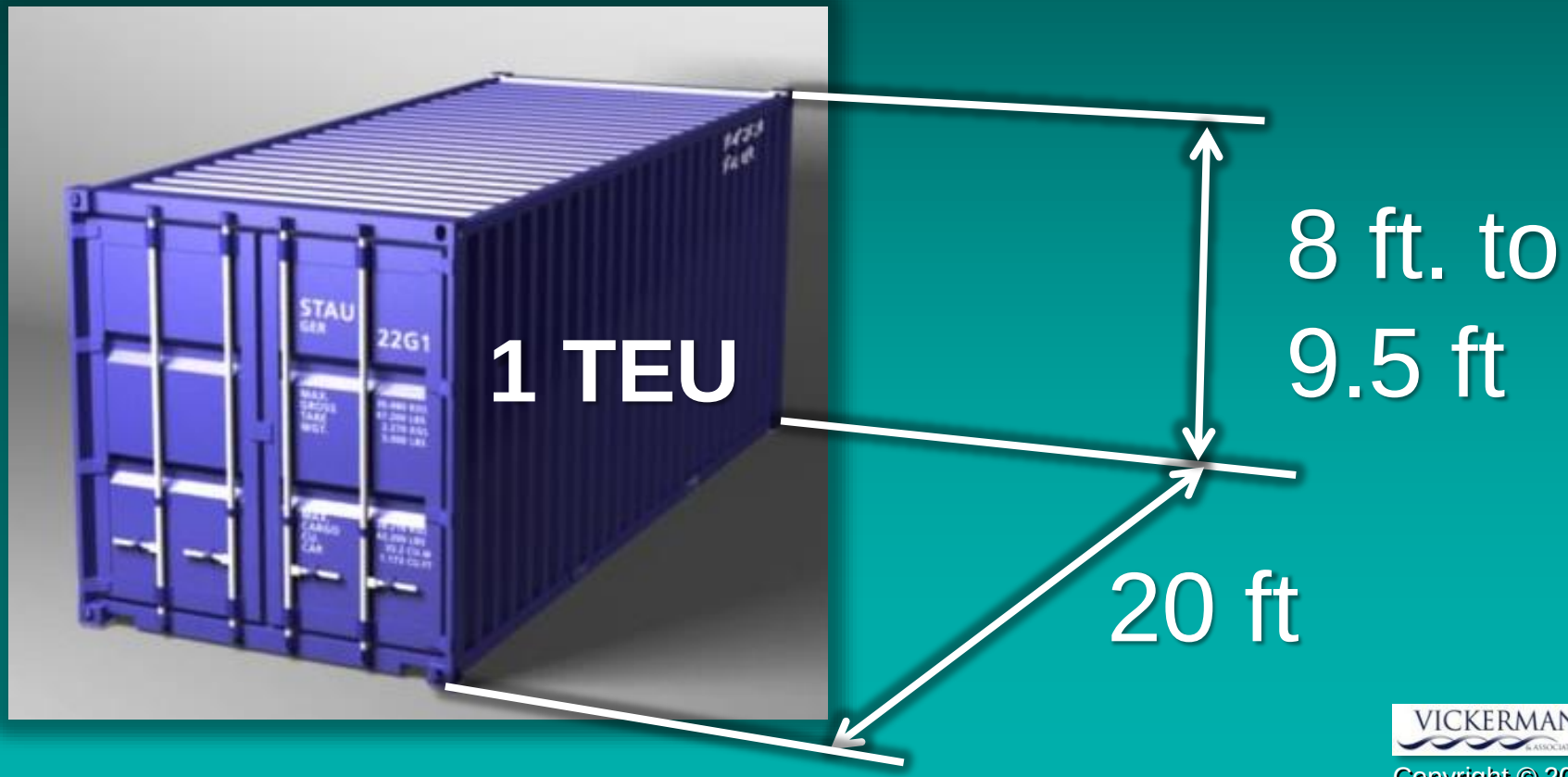
The TEU (Twenty Foot Equivalent Unit)

"*The Container Shipping Unit of Measure*"

1 TEU = One 20 ft. ISO Container

1 FEU = 2 TEUs = One 40 ft. ISO Container



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How Much Can a Single Container Hold?

(Example 40 ft. Container)

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

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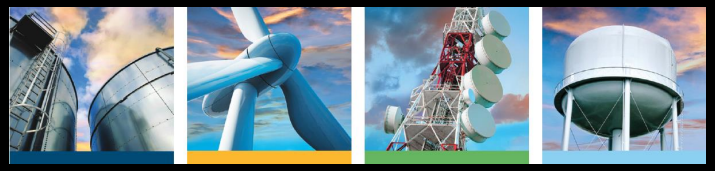

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International Maritime Cargo Demand Trends

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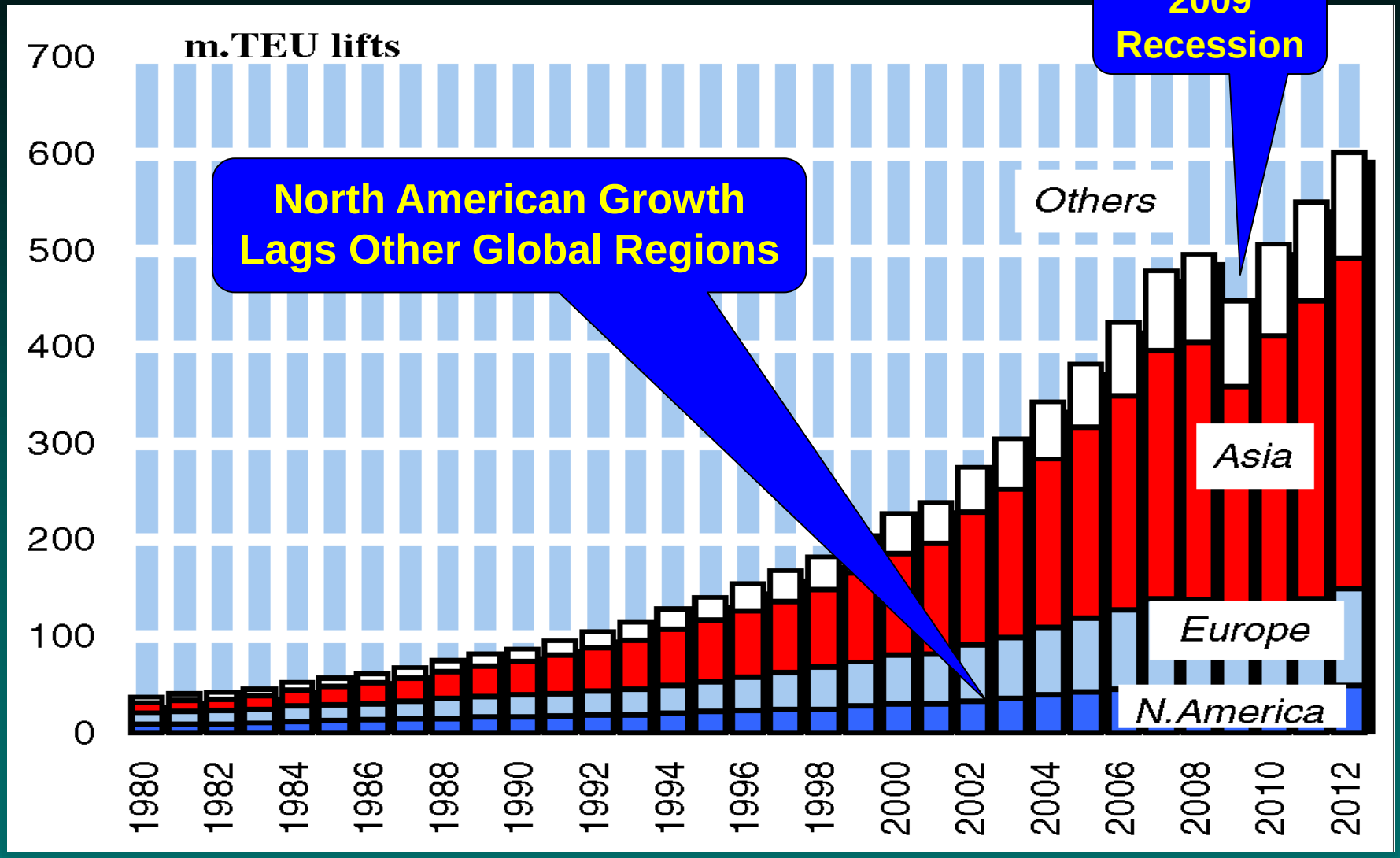
Historical Global Container Market Demand
(Millions of TEUs)



Source: Drewry Shipping Consultants

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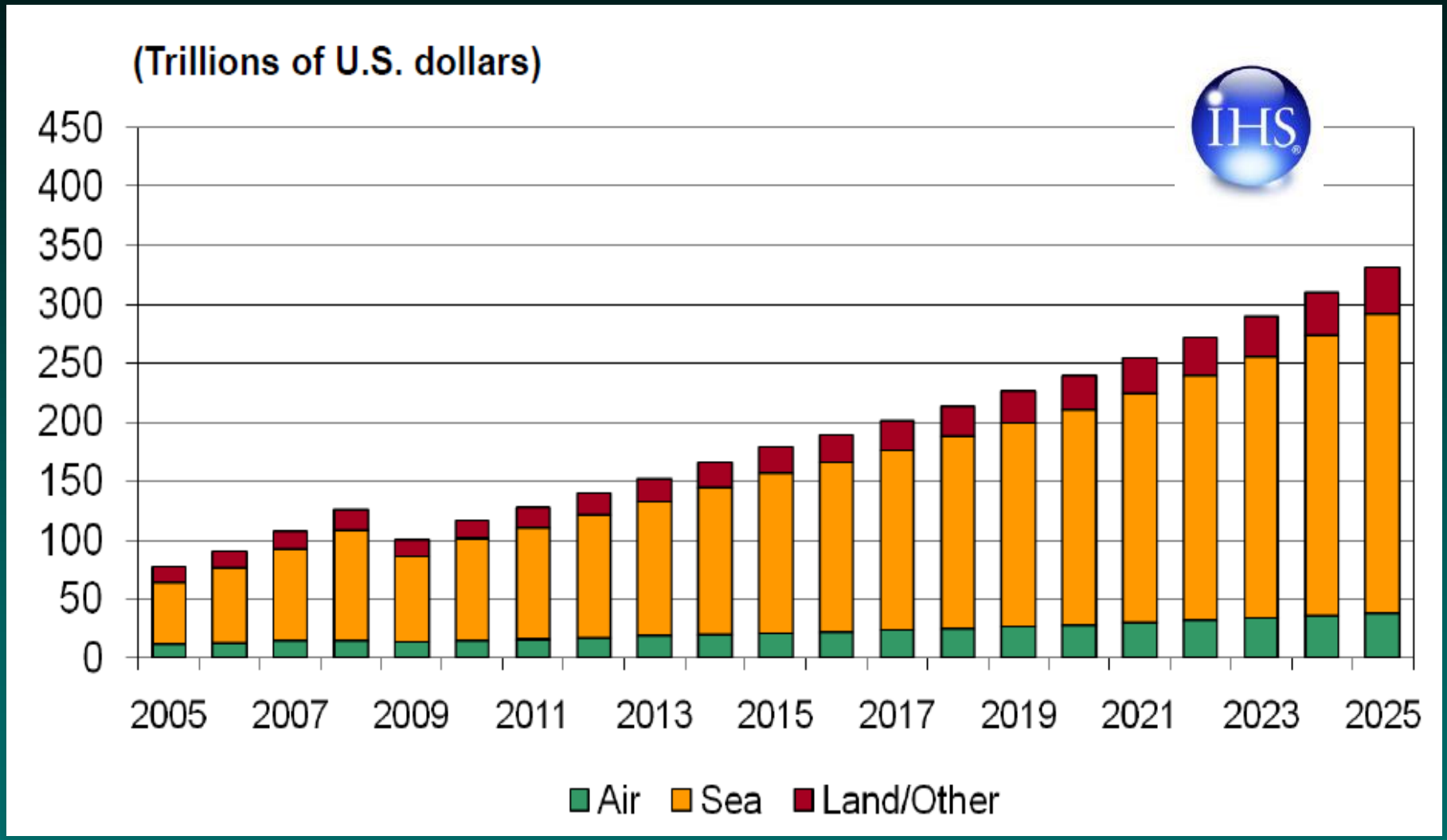
Growth in Global Merchandise Trade

(Intra Europe Trade Excluded)



Source: HIS Global Insight – World Trade Service

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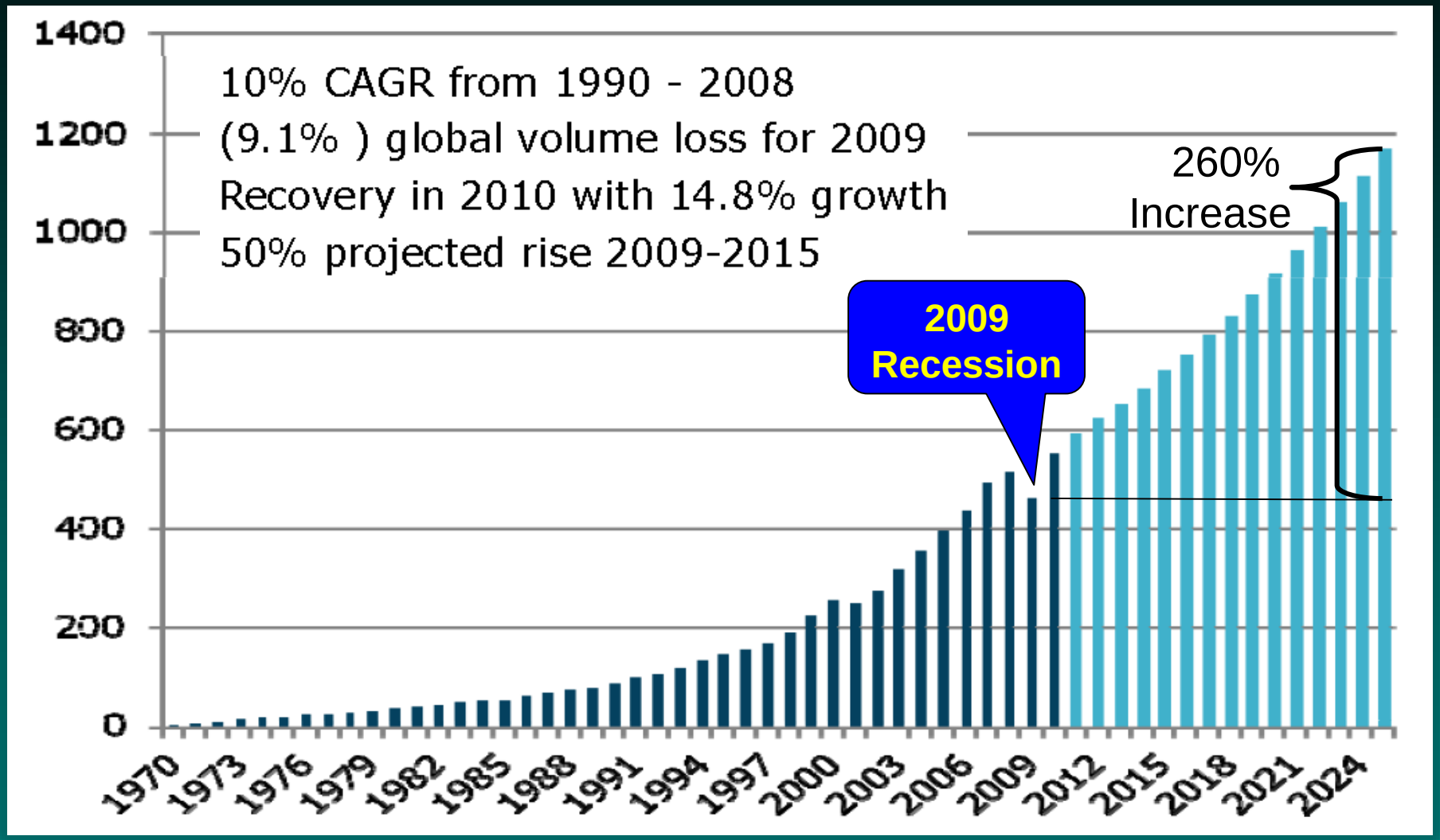
2025 World Container Port Market Demand

(Millions of TEUs)



Source: Drewry Shipping Consultants October 2011

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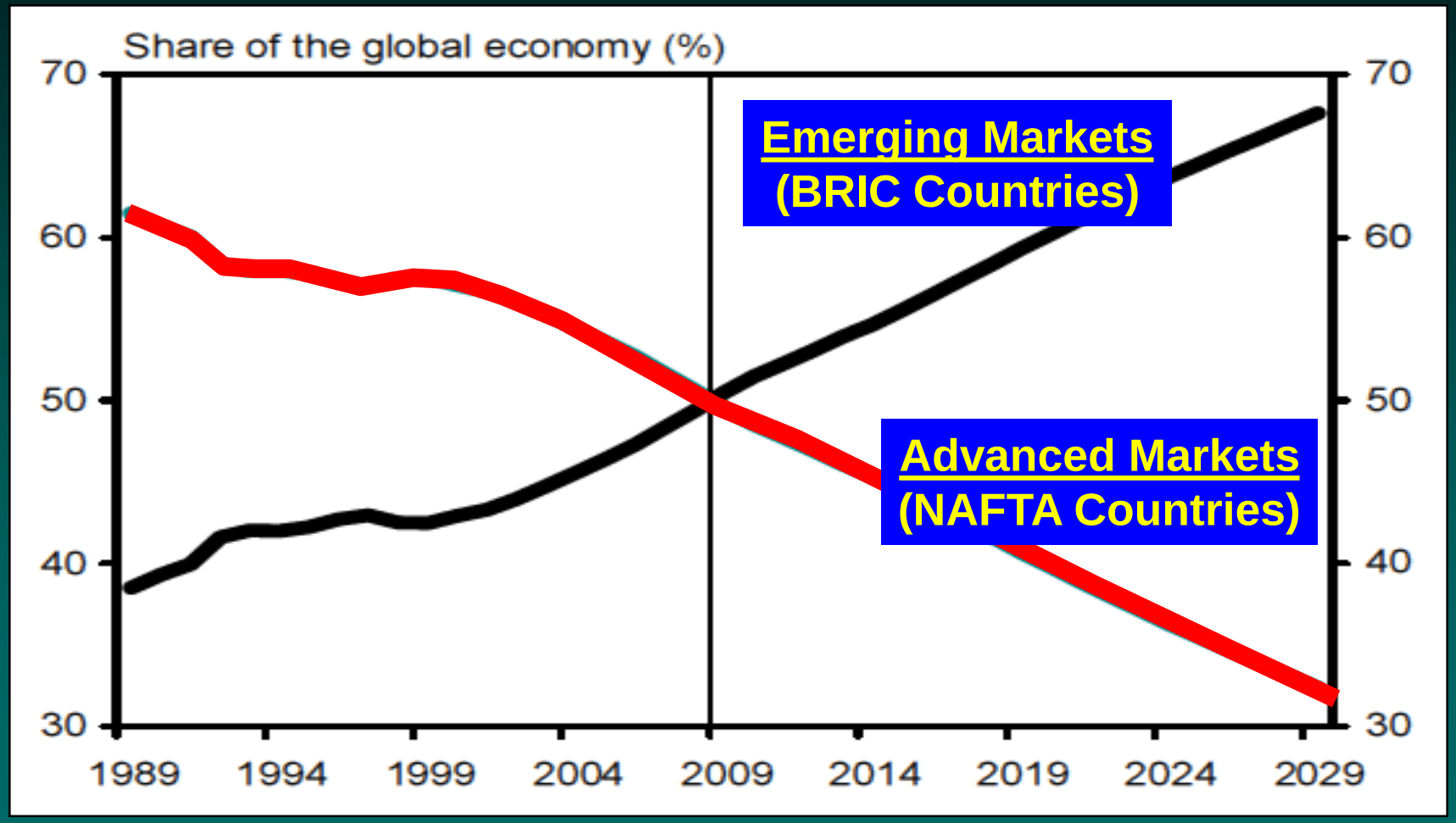
A Turning Point in Global Economic History

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

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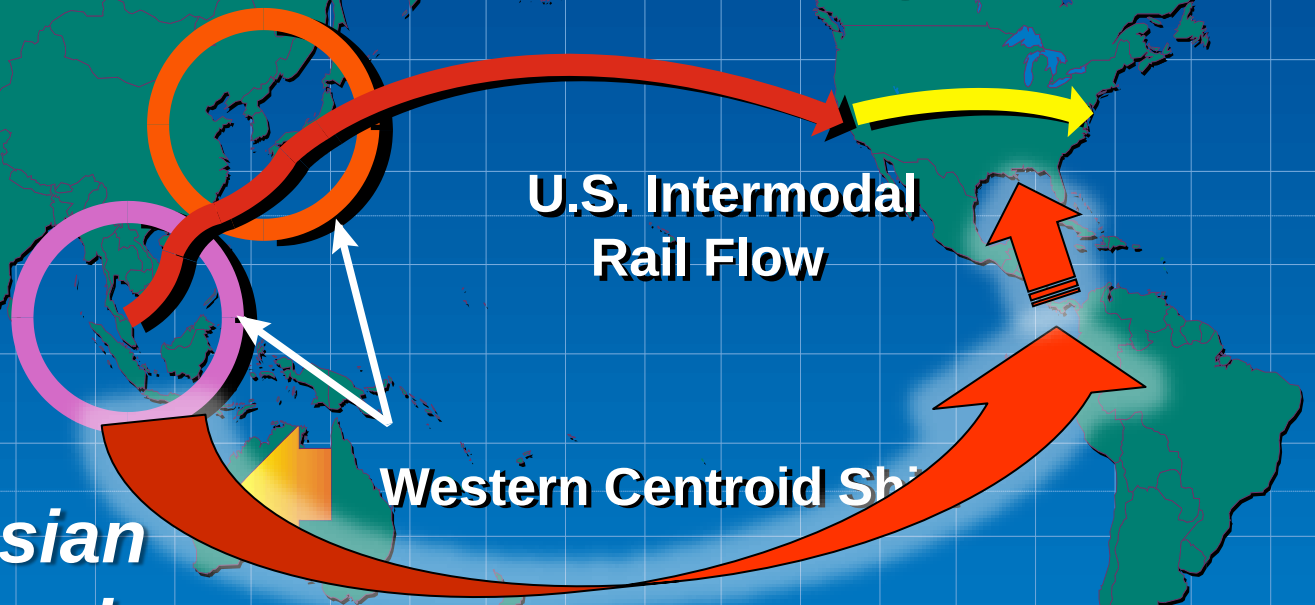
Southeast Asian Manufacturing Centroid Shift

Current Inbound U.S. Cargo Flow



Expanded Asian Panama Canal 2014 Flows

Eastbound: All Water Flow
Eastbound: US Intermodal Rail Flow

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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

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Suez Canal Container Vessel Convoy Traffic

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

2016 Suez Canal Pricing Strategy:

The Suez Canal has an opportunity to competitively alter global shipping patterns by undercutting 2016 Panama Canal new pricing strategy.

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August 5, 2014

The Suez Canal Announces a $4 Billion Expansion of the Canal

New 45-mile-long parallel channel cutting waiting times to transit by 3 hrs. from 11 hrs.

Half of a $8.5 billion project that includes a free trade zone, an industrial park and a regional logistics hub for the Middle East, North Africa and the Mediterranean.

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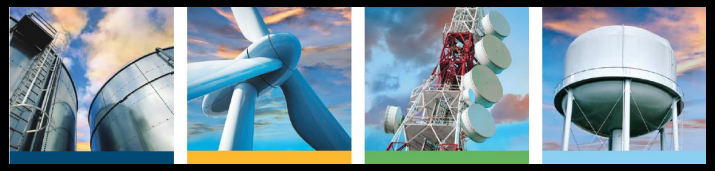

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The Growing Asian Import Trade Challenge

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Container Transhipment World Records

Of the 10 busiest ports in the world, 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

These Two Ports are Larger Than All North American Ports Combined

China-US: Twin Engines of the World

Population:
US: 314 million
China: 1,344 million
(1/5 World)

The number of Chinese children in elementary school is equivalent to the total US population.

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Shanghai International Shipping Center

Yangshan Deep Port & Logistics Park

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Shanghai International Shipping Center

Yangshan Deep Port - 20 Mile Bridge Access

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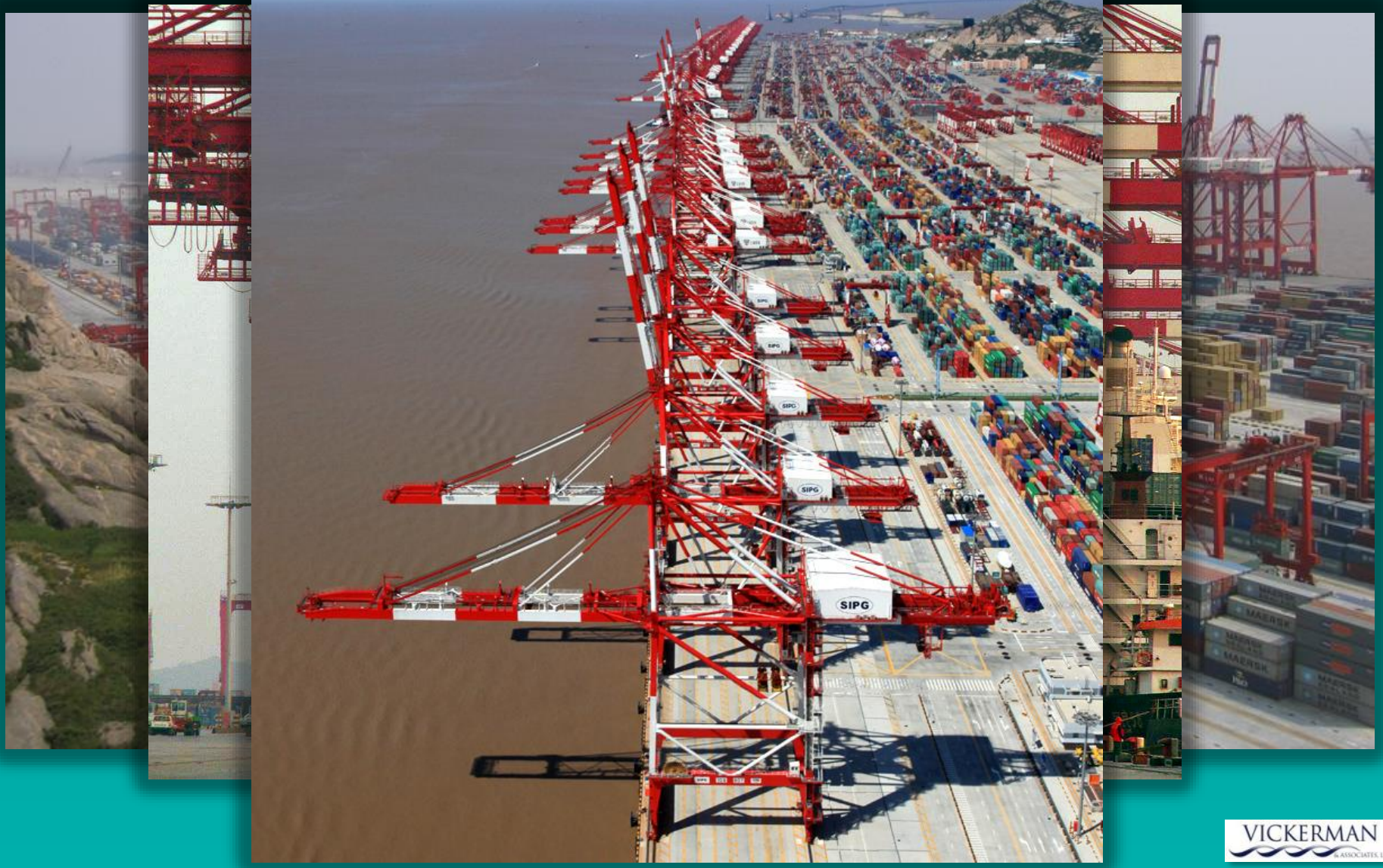
Shanghai Yangshan Deep-Water Harbour

Yangshan Deep Port – 54 Berths East China Sea



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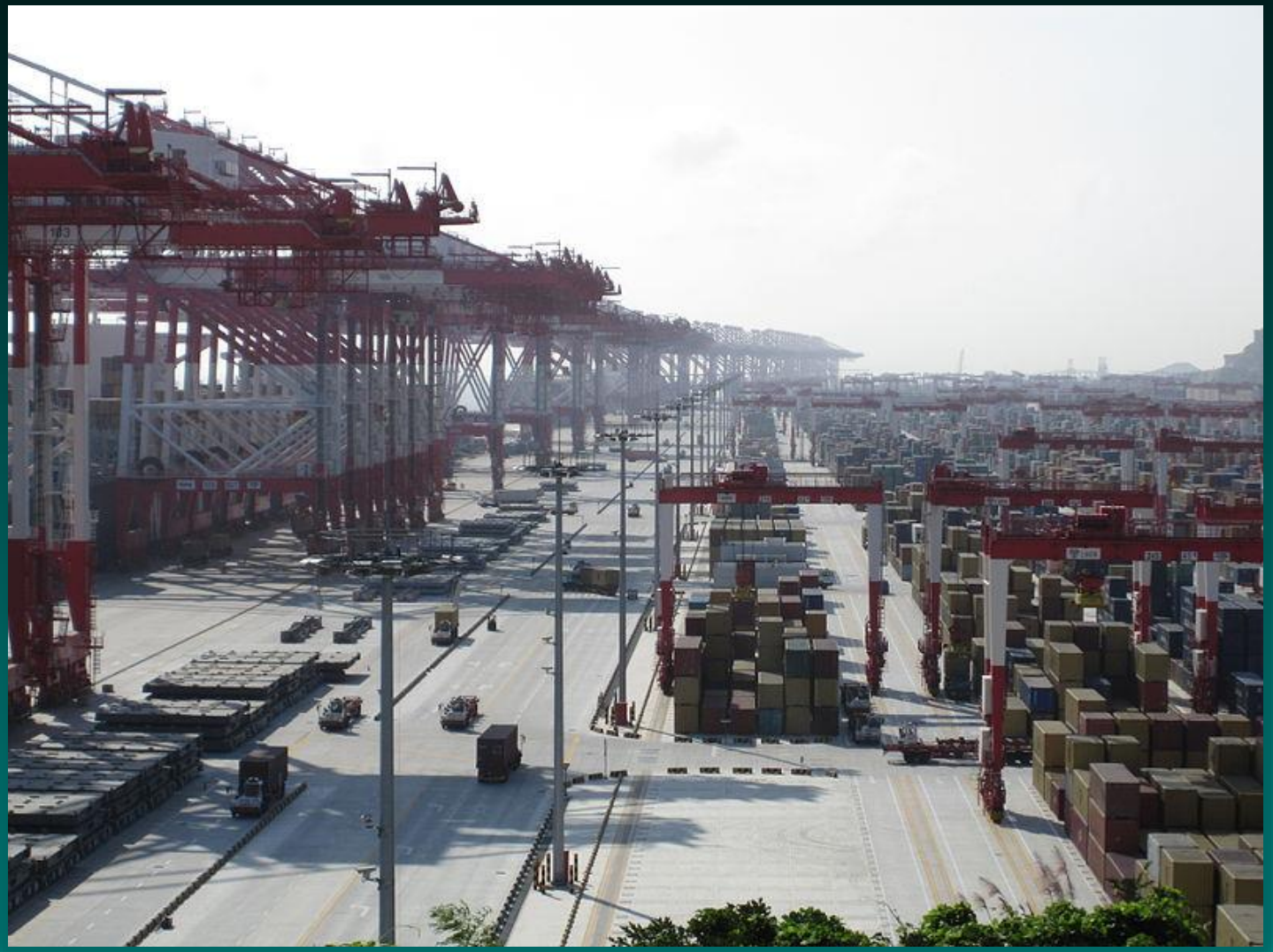
Shanghai International Shipping Center

Yangshan Deep Port & Logistics Park



Shanghai Port Set a 2011 Record by Handling over 30 million TEUs

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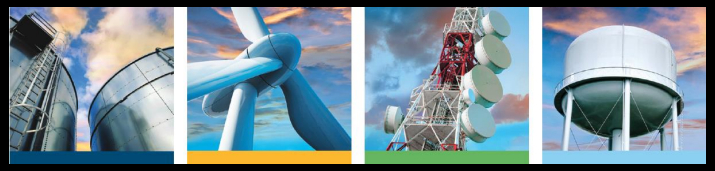

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New Emerging Economic Global Drivers

(~~BRIC~~ → ASEAN 2016)

+ India

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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%

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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

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India's Current & Planned Container Port Developments

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

Source: Alphaliner Volume 2012 Issue 14

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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

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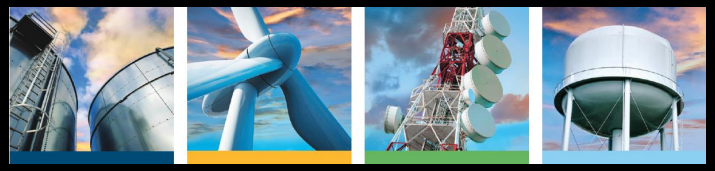

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Maritime Vessel Technology Trends

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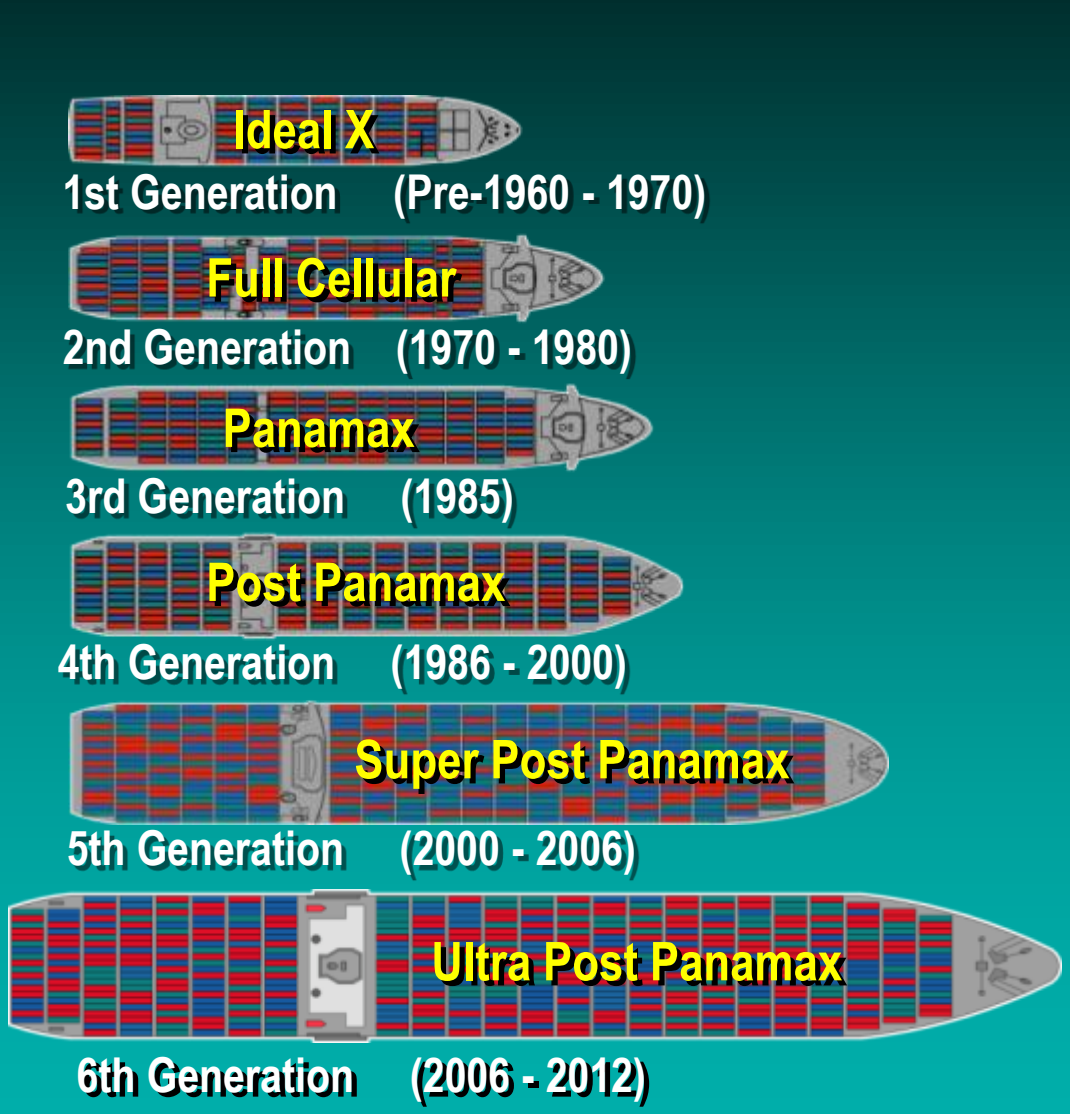
April 26, 1956

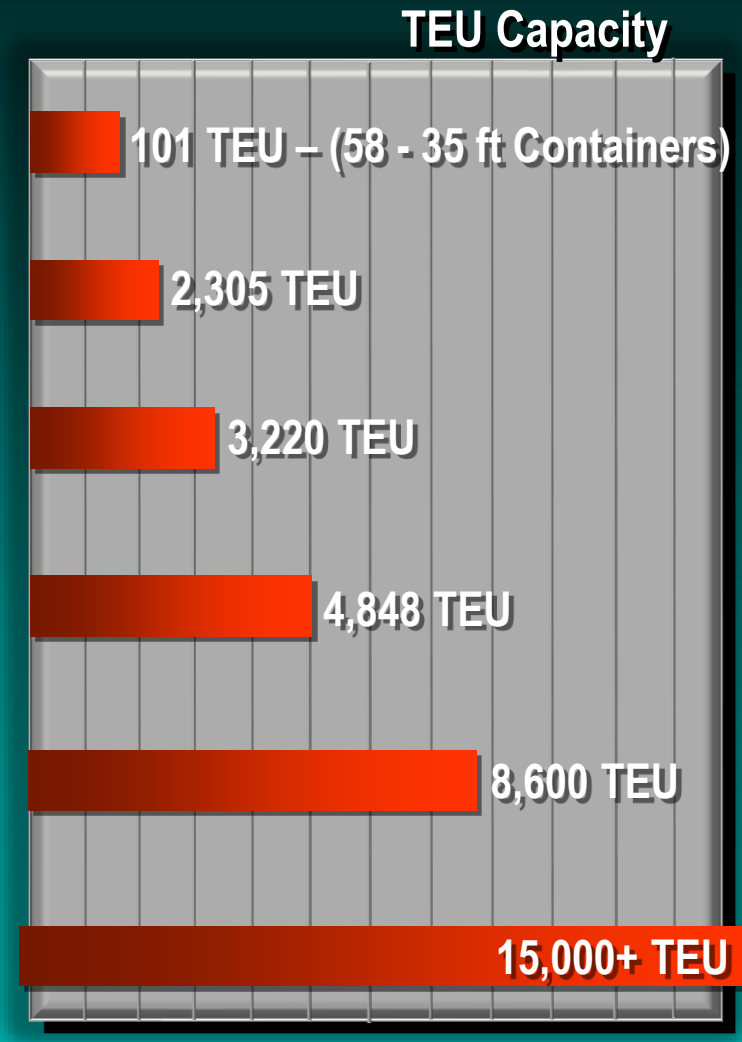
58 Modified 35-foot Truck Containers

April 2006: 50 Year Anniversary of the Container

In 1955 Malcolm McLean, sold McLean Trucking, and secured a bank loan of US$42 million to build the world's first container ship.

World Container Ship Evolution





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World Container Ship Evolution

24% increase** in the average container ship size from **2008 to 2012

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Madison Maersk (3,928 TEUs) in the Panama Canal

(Current Max Panamax Vessel Approx. 4,800 TEUs)

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*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*

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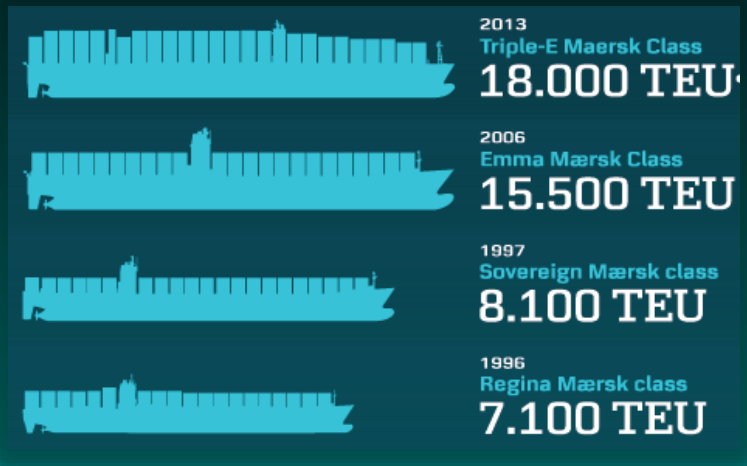
MAERSK LINE, LIMITED

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

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21,000 TEU Ultra Large Twin Engine Container Ship

ALPHALINER

23 Containers Wide

Source: Alphaliner Newsletter Volume 2011 Issue 4

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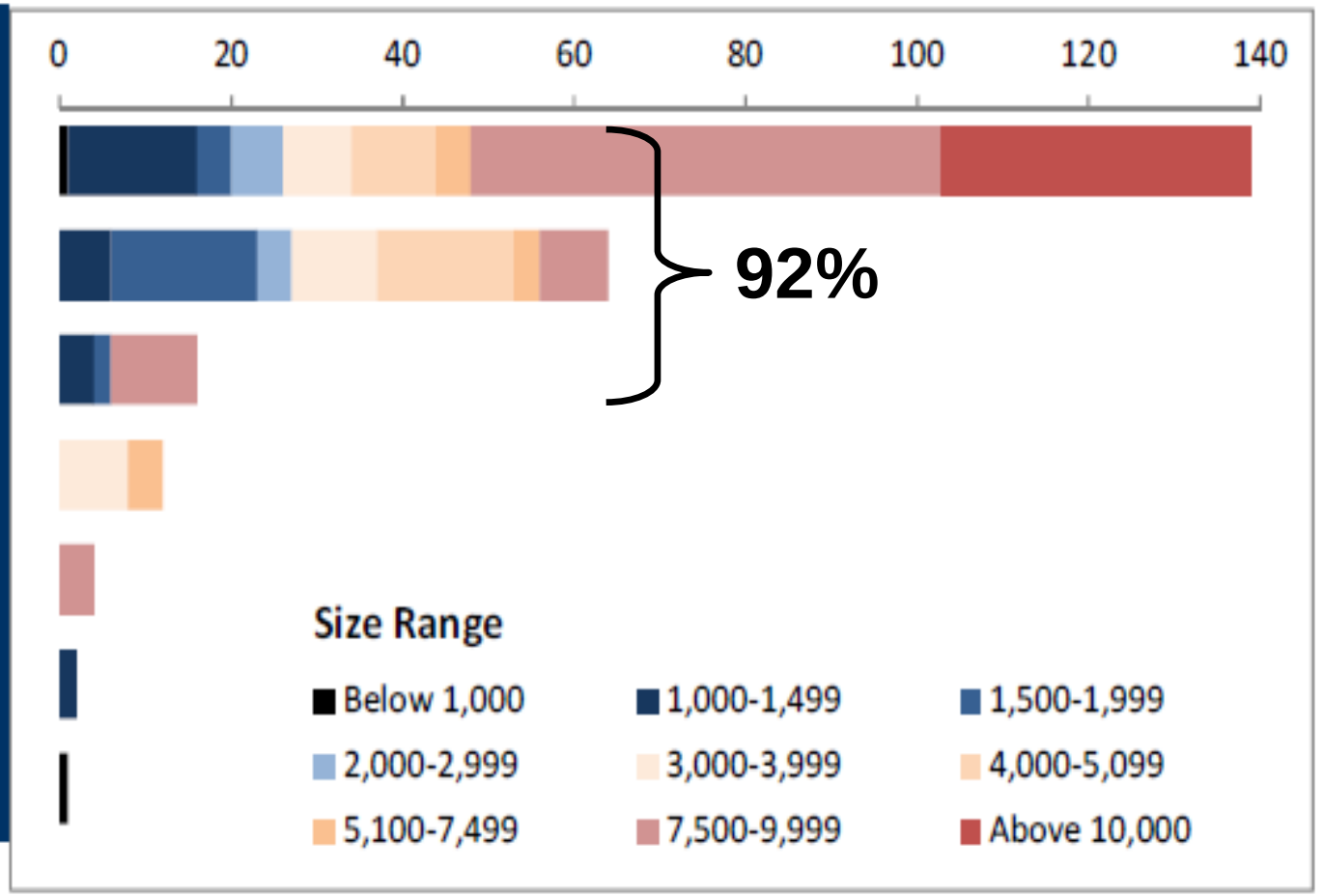
Containership Orders – Country of Build

(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

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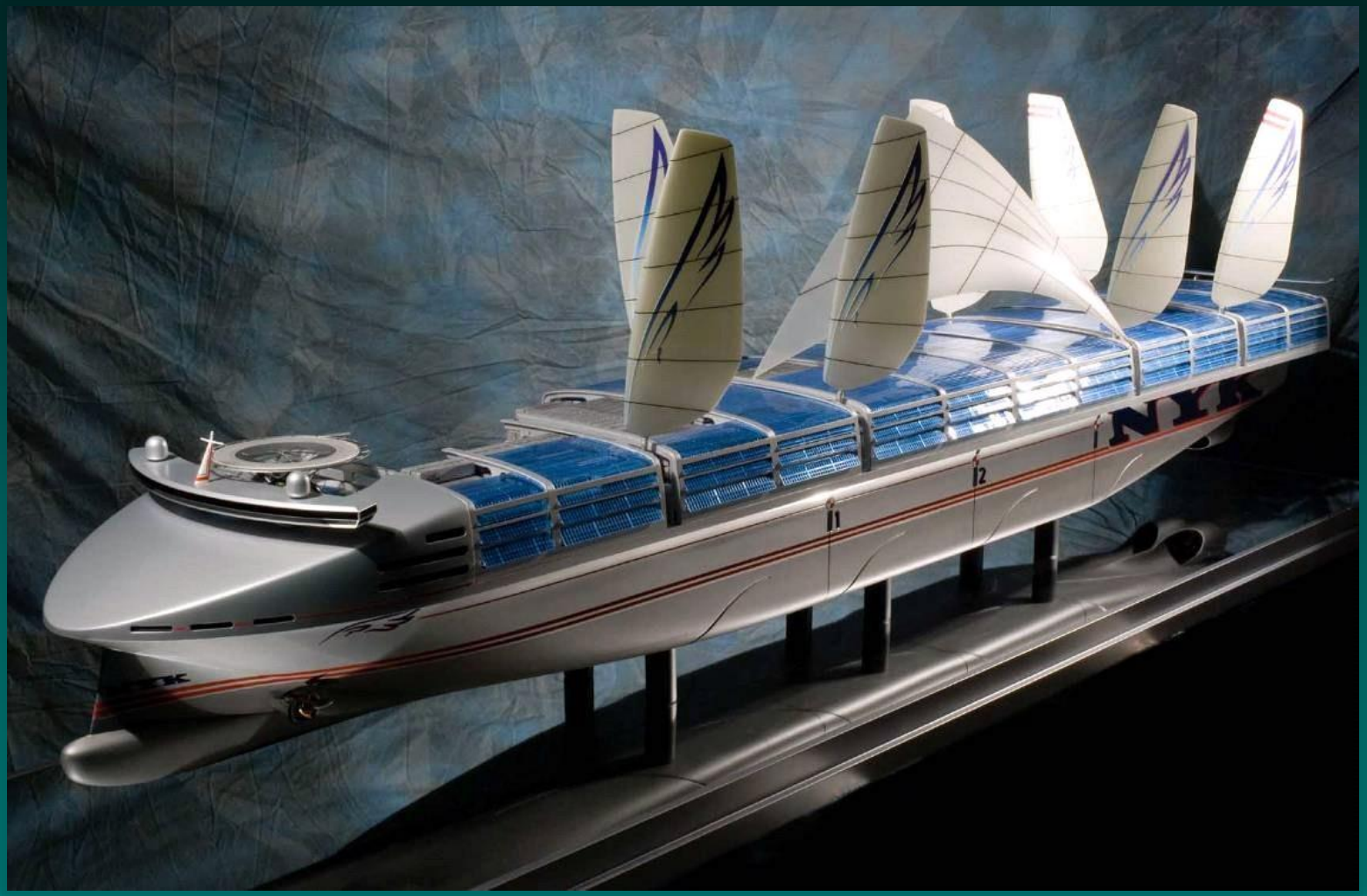
NYK LOGISTICS & MEGACARRIER

Future Container Vessel: NYK Super Eco Ship



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NYK LOGISTICS & MEGACARRIER

Future Container Vessel: NYK Super Eco Ship

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New Era of LNG Vessels is on the Horizon:

Will LNG be the Fuel of the Future for Shipping ?

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TOTE Orders Two New LNG Powered Container Ships & Two RO/RO Conversions: Largest LNG Powered Ships in the World

These ships will be the largest ships in the world powered primarily by Liquefied Natural Gas (LNG).

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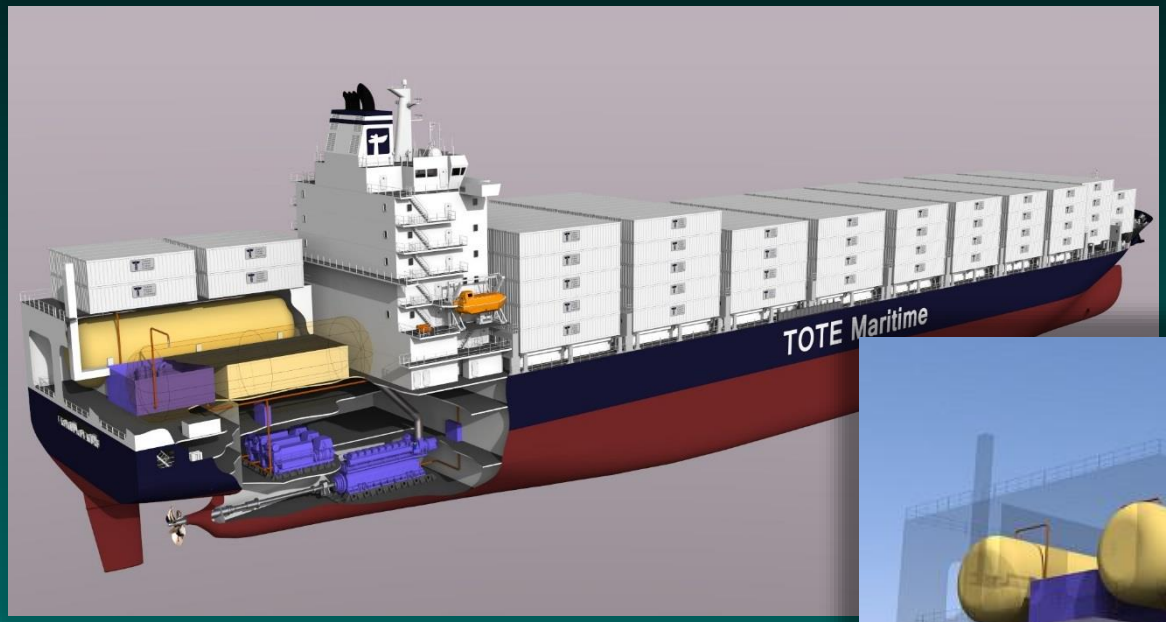
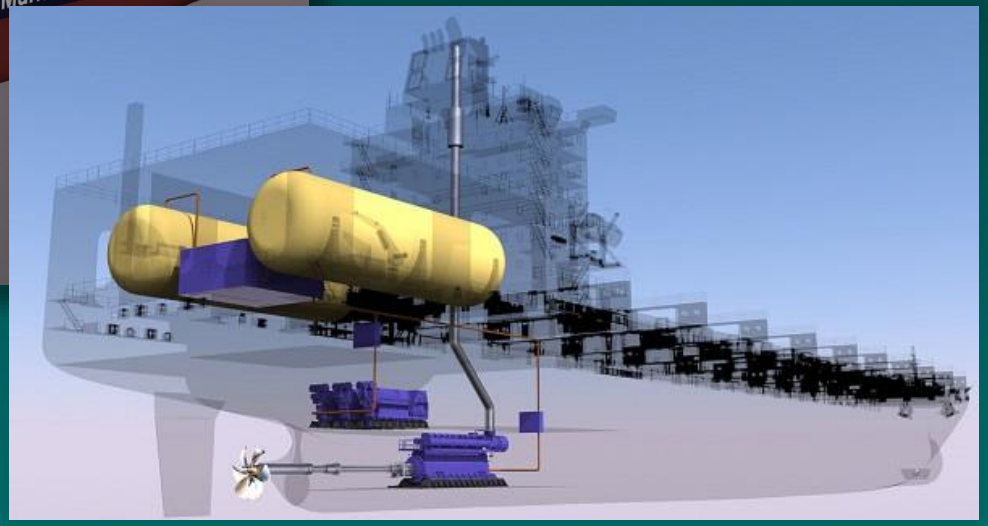
TOTE Orders Two New LNG Powered Container Ships & Two RO/RO Conversions: Largest LNG Powered Ships in the World





Two 839-foot Orca-class vessels to liquefied natural gas-diesel dual fuel operation for Seattle-Alaska service and two 764-foot new-builds for the Florida-Puerto Rico trade

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Kawasaki Heavy Industries 9,000 TEU container ship Fuelled by LNG

A new type of LNG tank that provides more space for container cargo.

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Germanischer Lloyd (GL) & IHI Marine United Inc. (IHIMU)

Concept Study 13,000 TEU Container Vessel Fuelled by LNG

The eFuture 13000C design (©IHIMU)

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LNG Vessel Bunkering: *North American Ports Are Not Prepared…*

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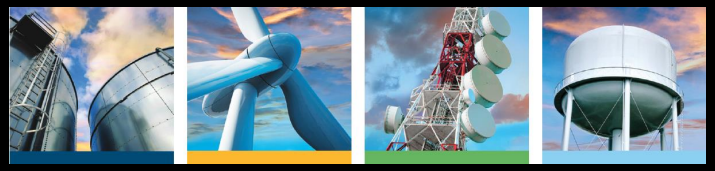

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North American Cargo Demand Trends

(Dé jà vu Experience)

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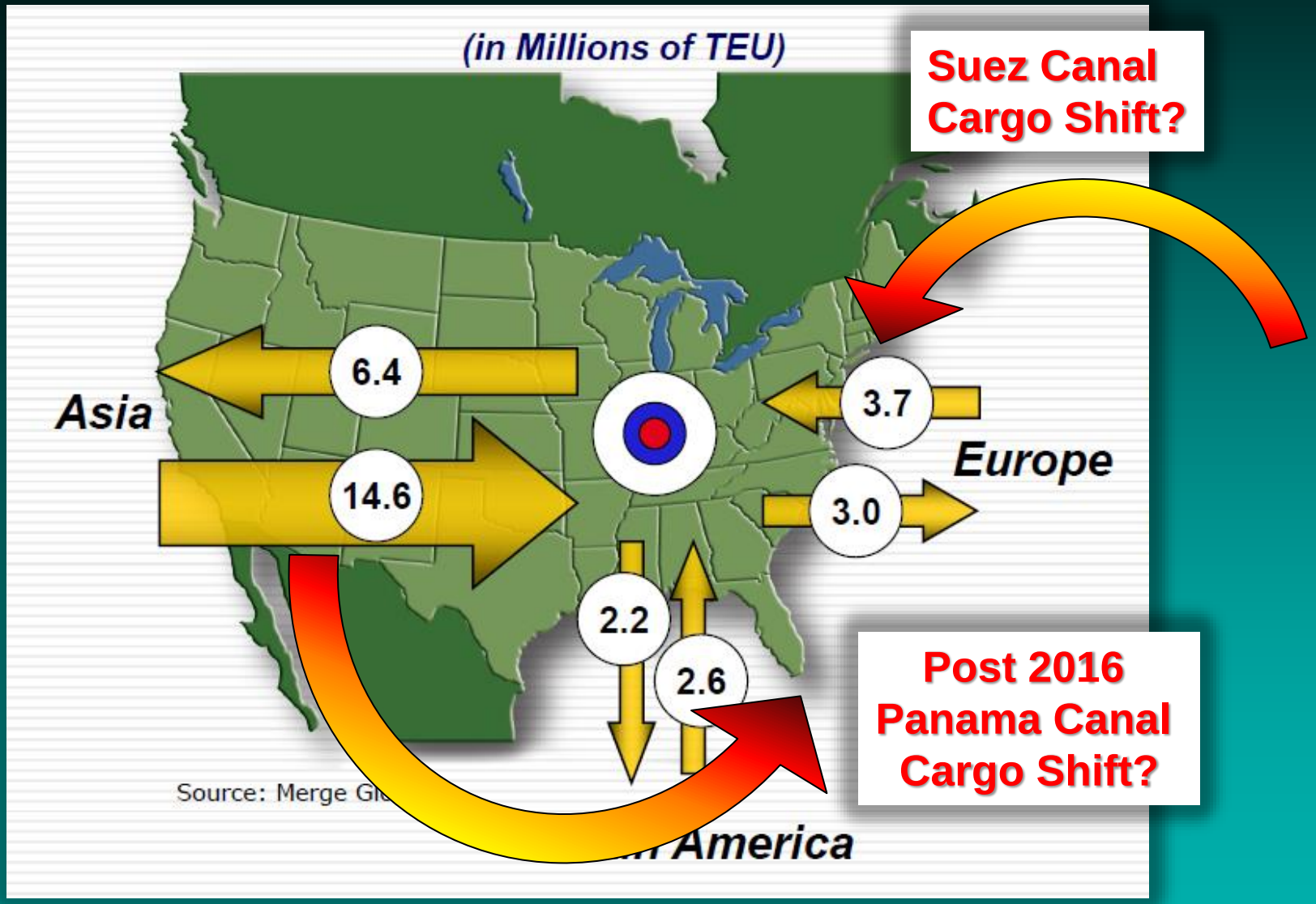
US Containerized Ocean Trade Flows (2007)

(West Coast Ports Handle 63% of Imports)



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

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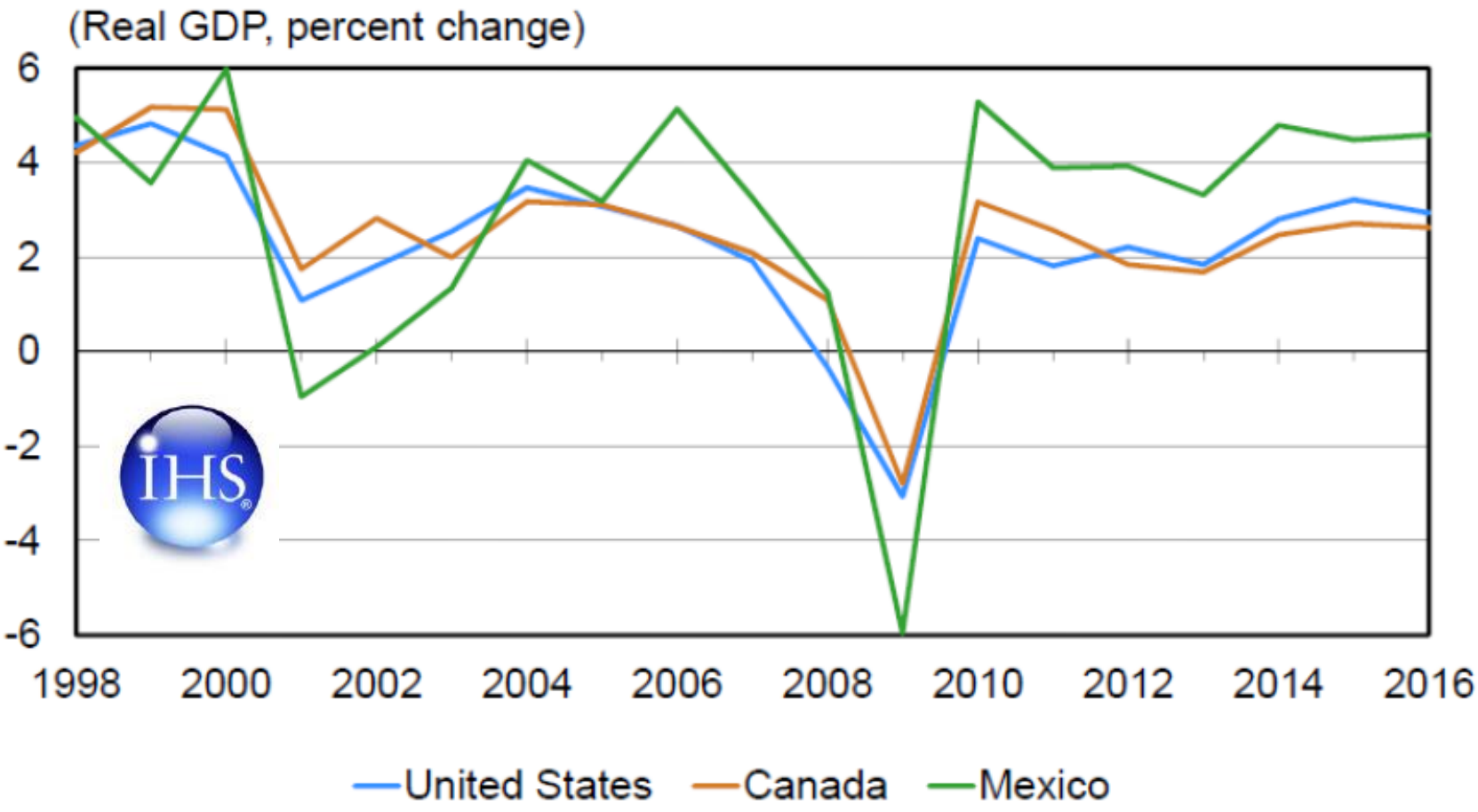
NAFTA Trade Partners Are Growing



Source: IHS Global Insight – World Trade Service

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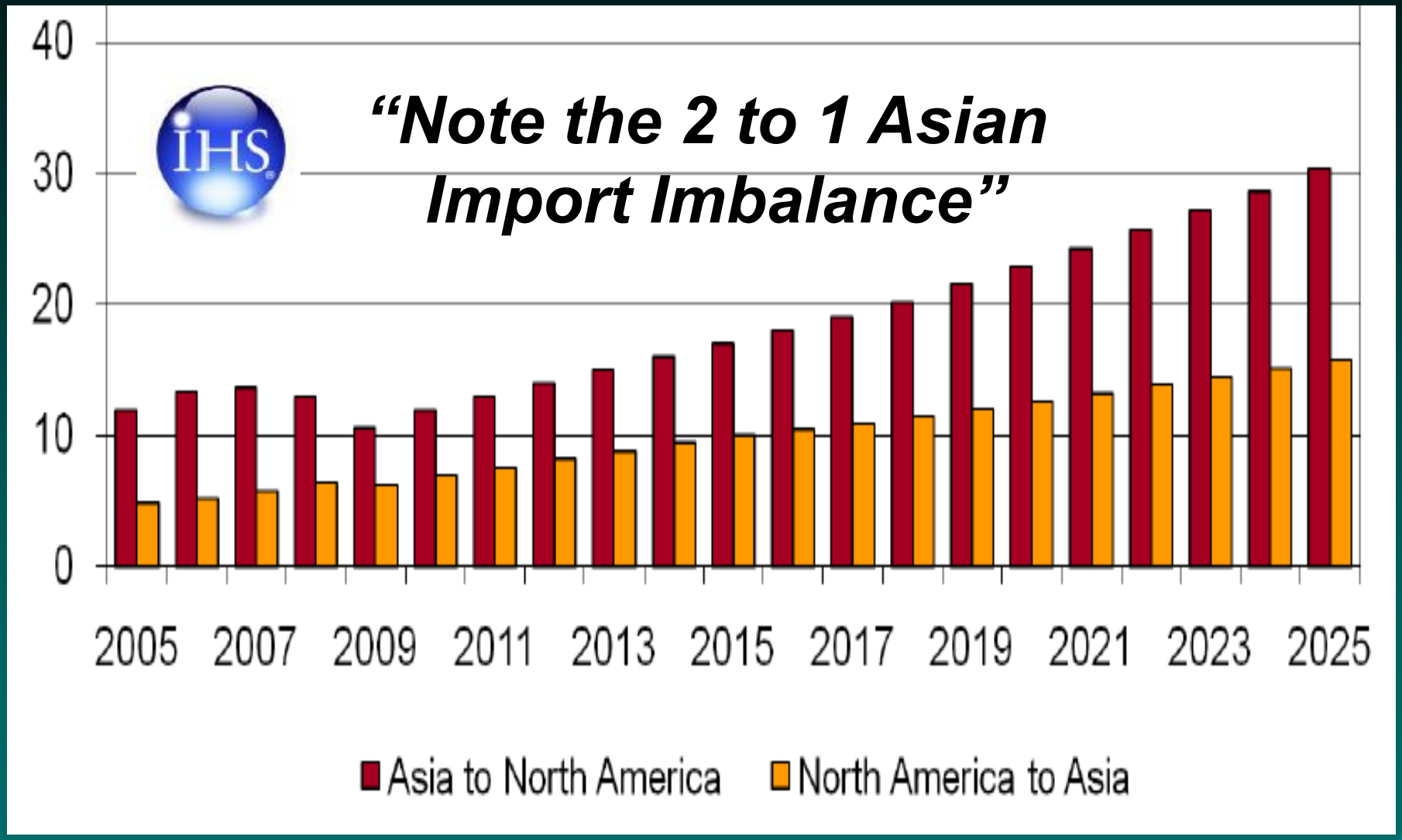
Transpacific Container Trade Recovery

(Millions of TEUs)



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

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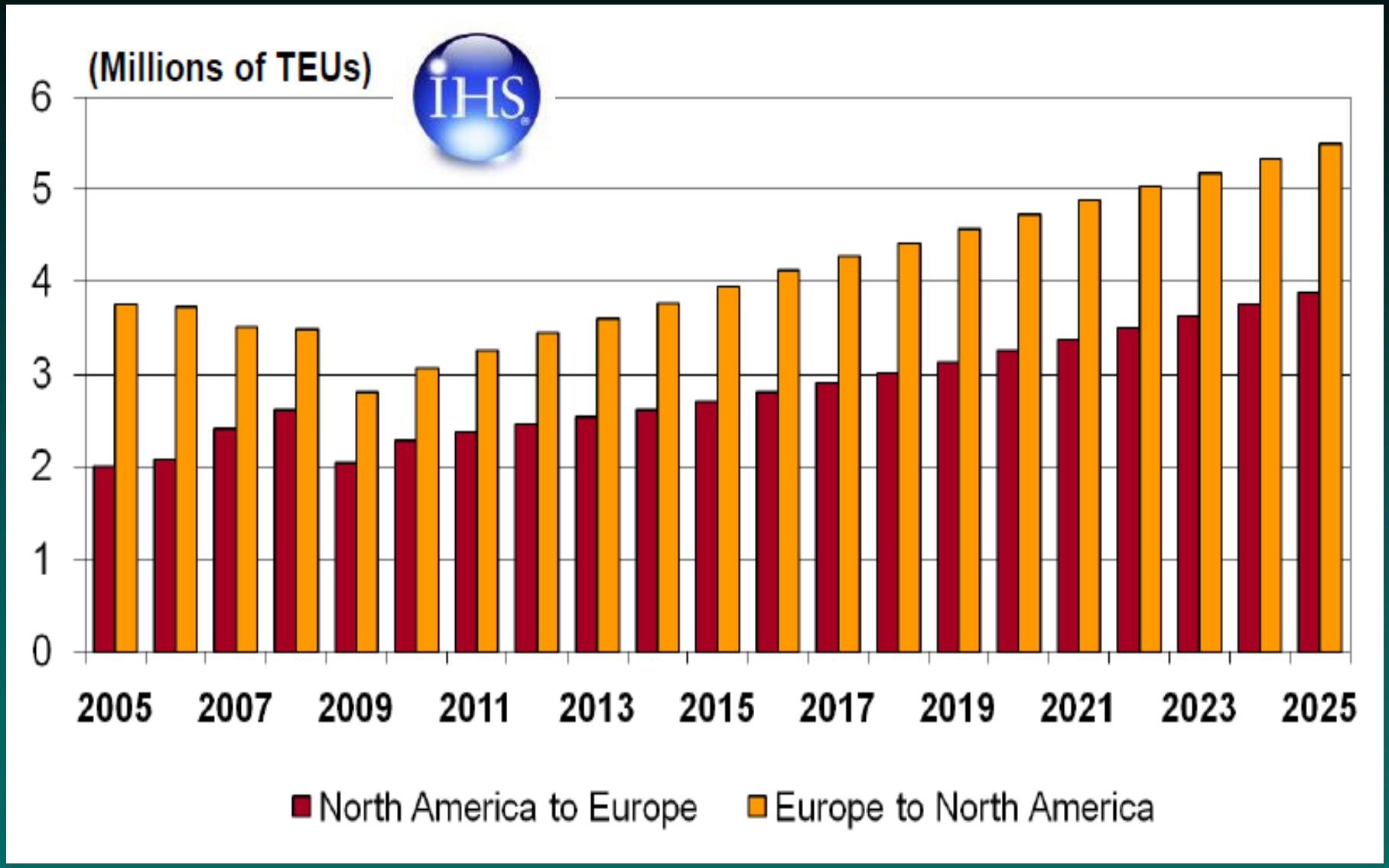
Transatlantic Container Trade Recovery



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

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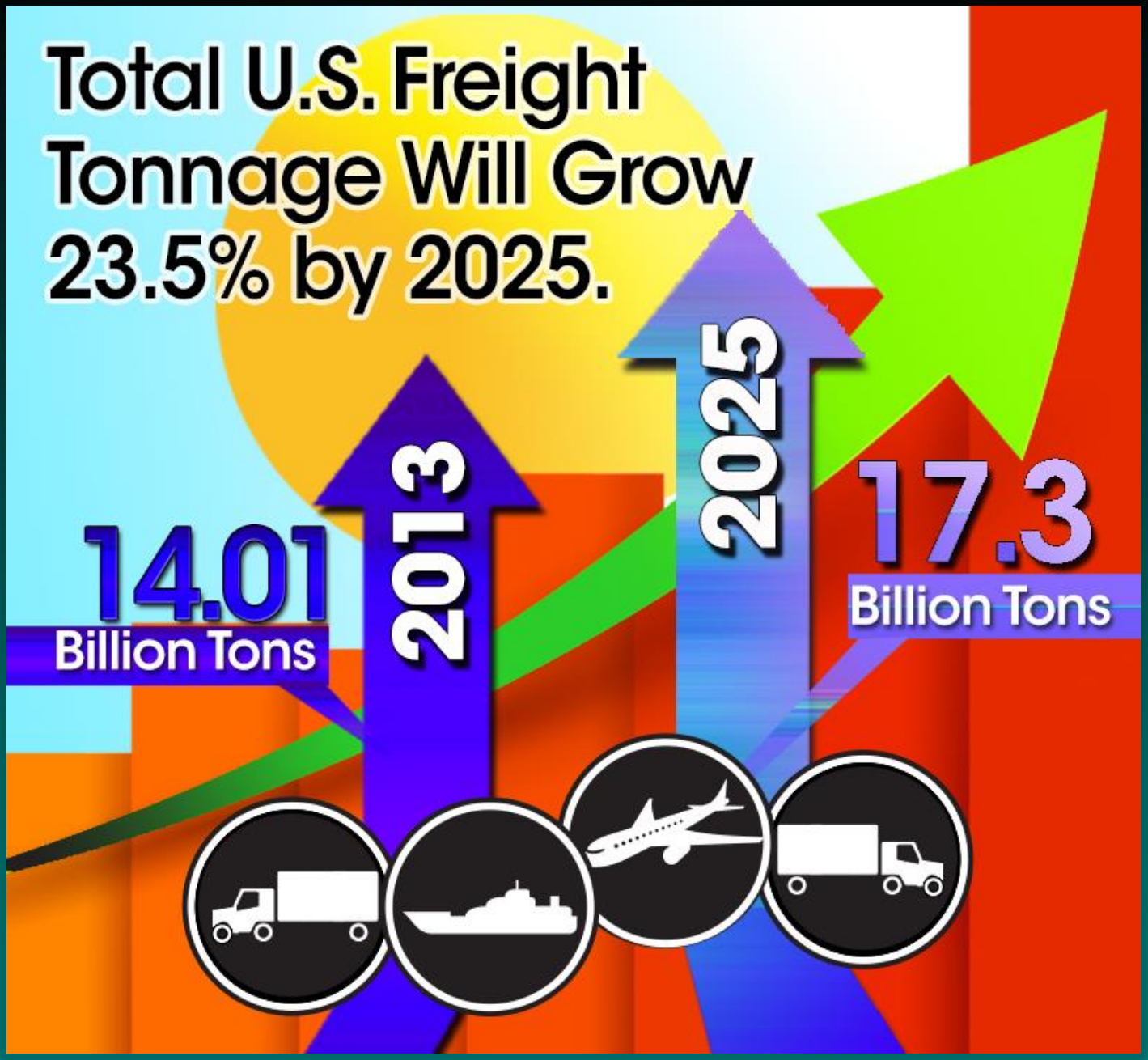

Source: ATA US Freight Transportation 2025 Forecast

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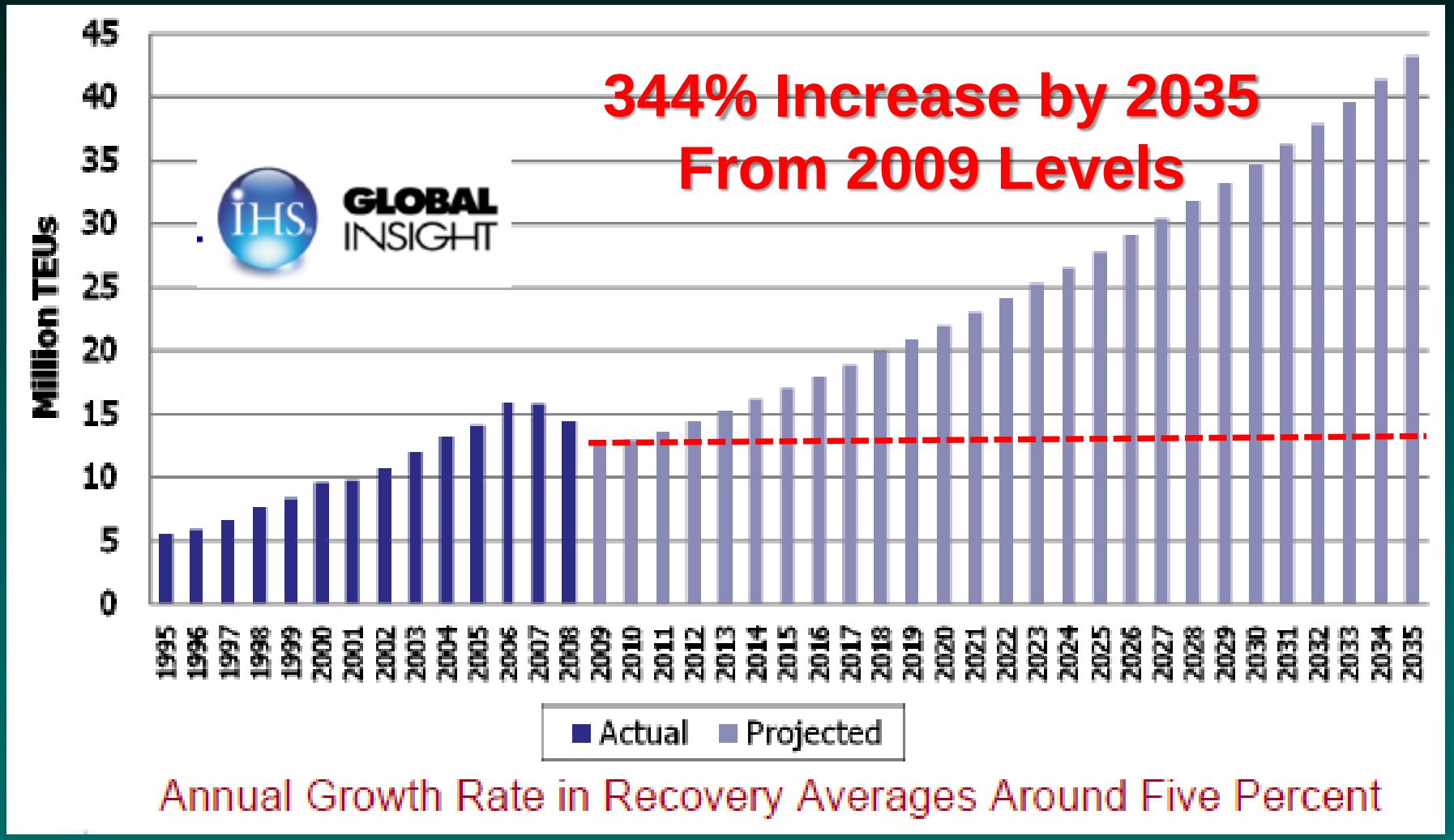
San Pedro Bay (POLA +POLB) Container Volume Forecast



Source: HIS Global Insight 2010 Forecast

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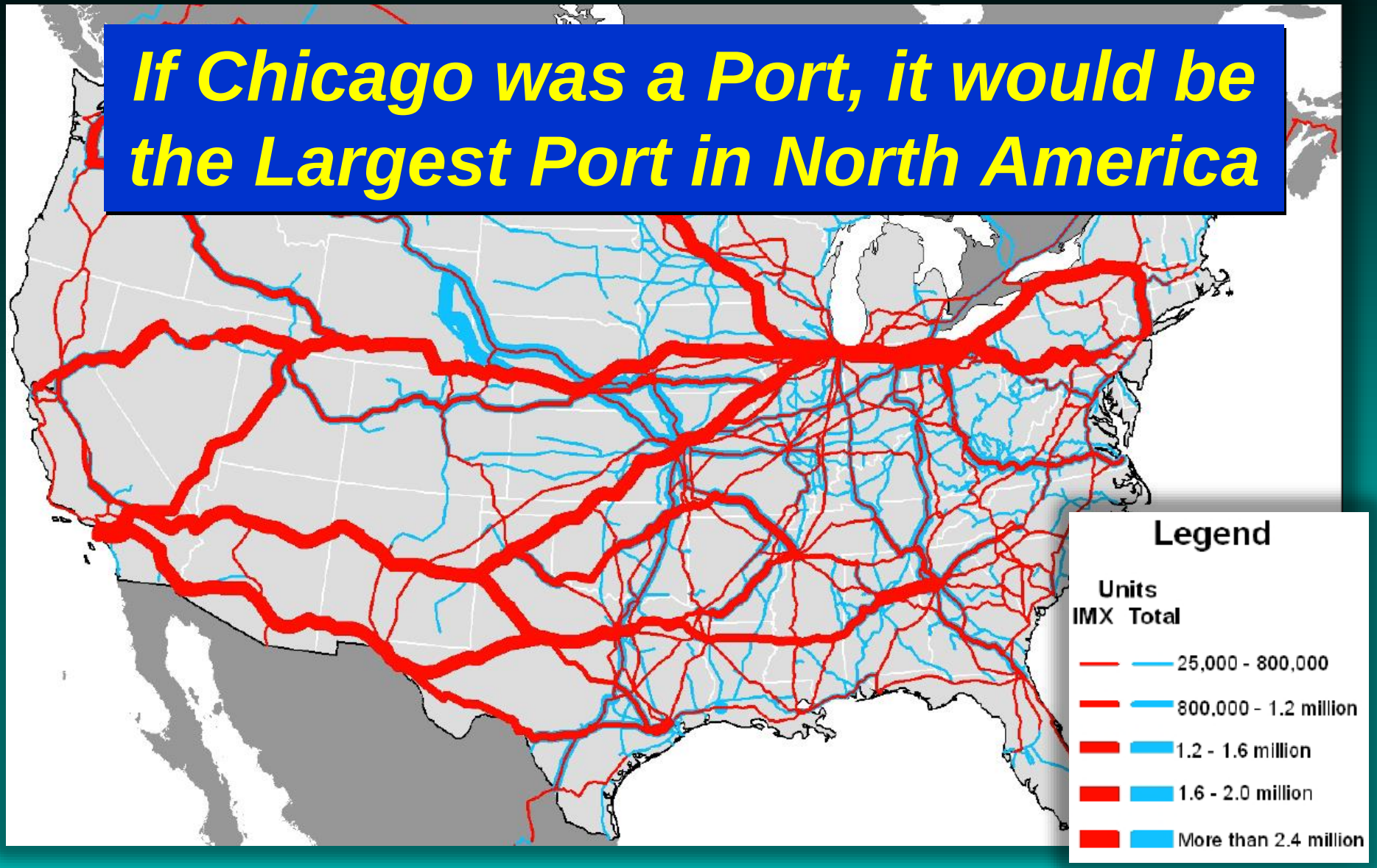
2035 Intermodal Rail Car Volumes



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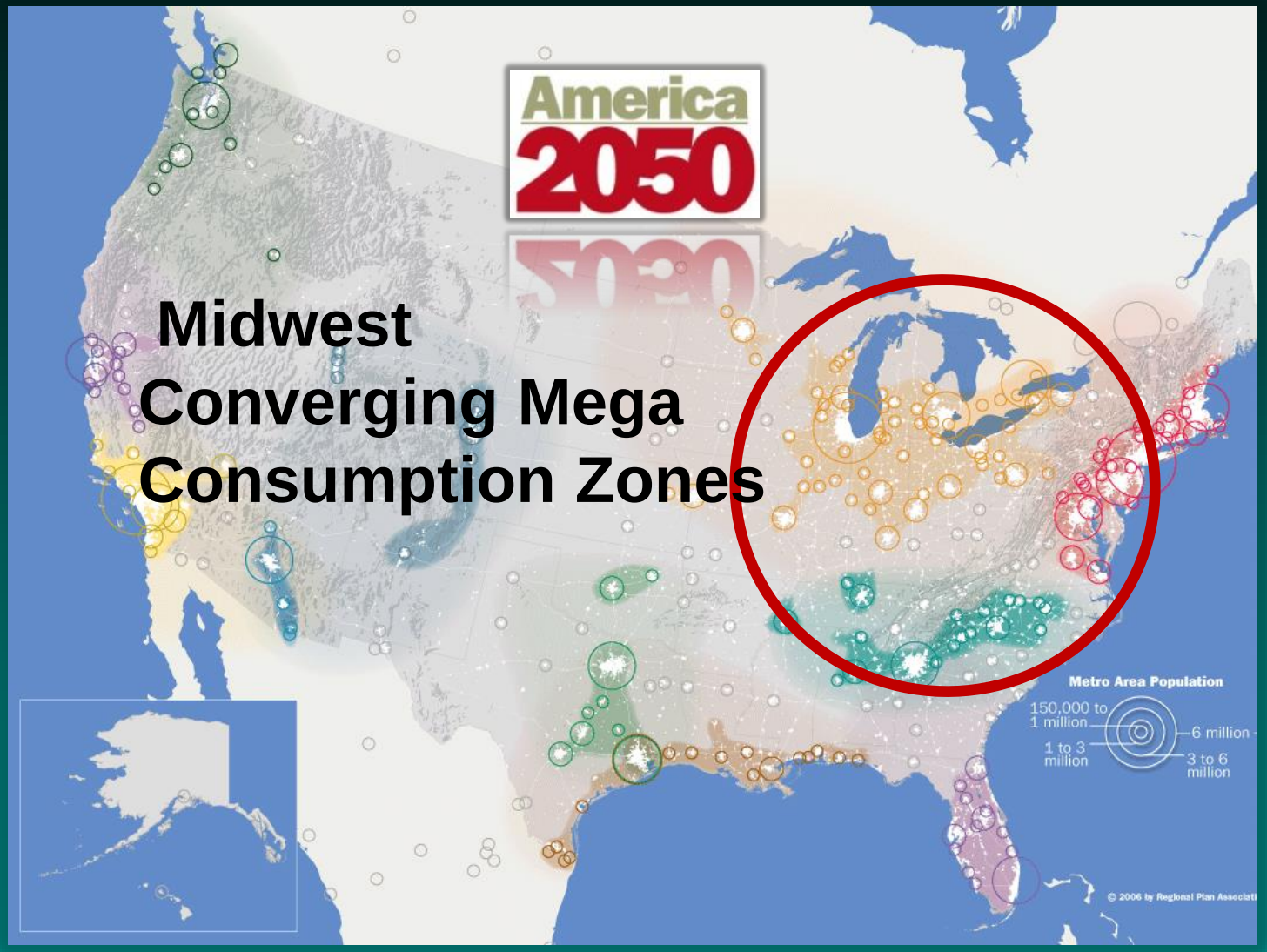
North American Emerging Mega-Regions

Future US Growth Areas



Source: America 2050 Prospects - Regional Plan Association

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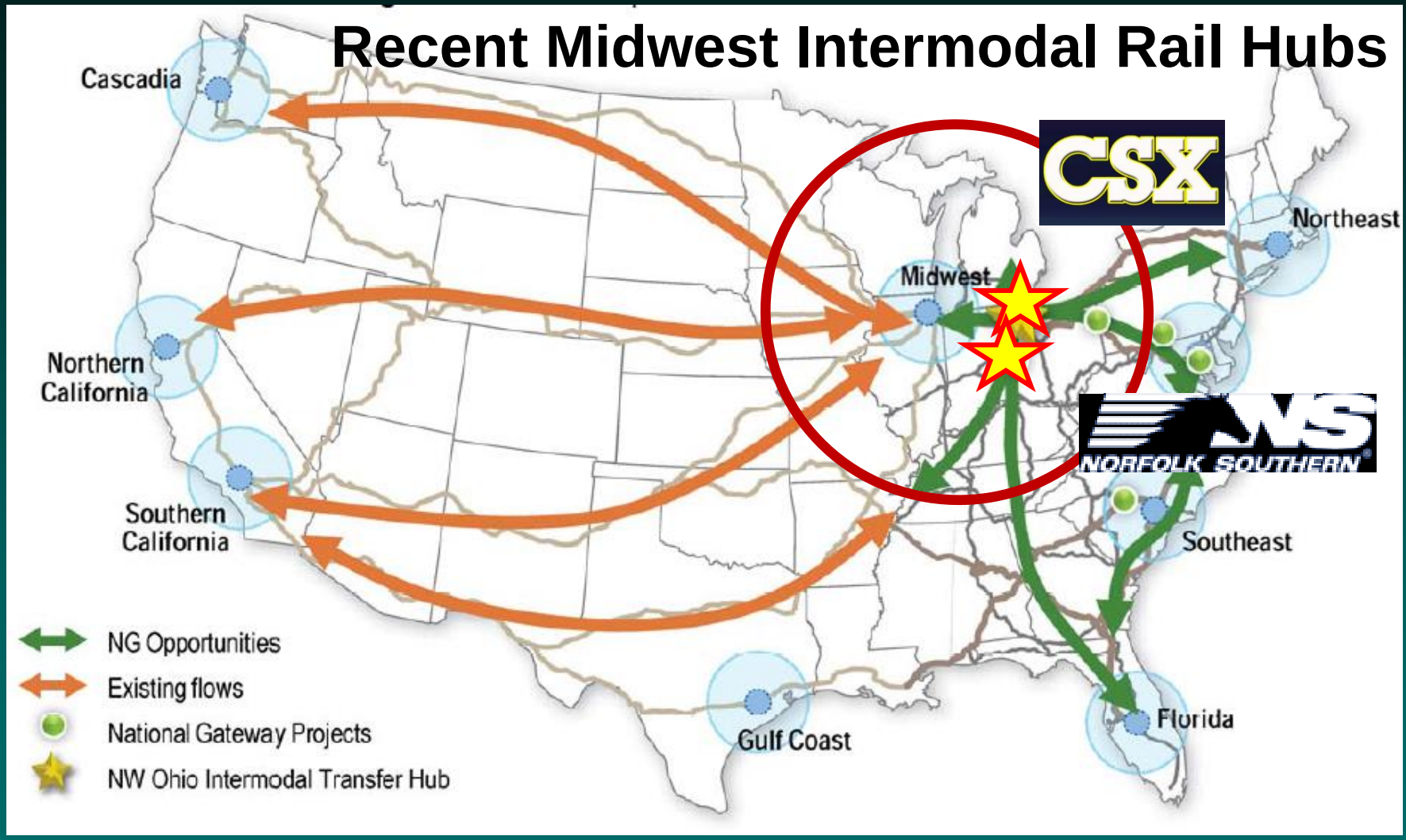
CSX & NS National Expansion of Integrated Intermodal Rail Logistics Centers



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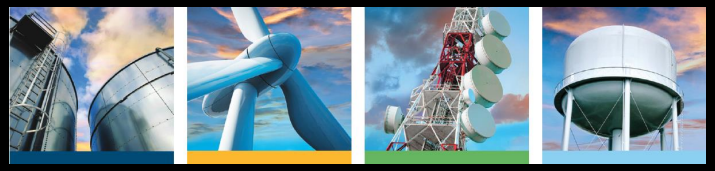

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Panama Canal 2015 Expansion:

Major New Capacity

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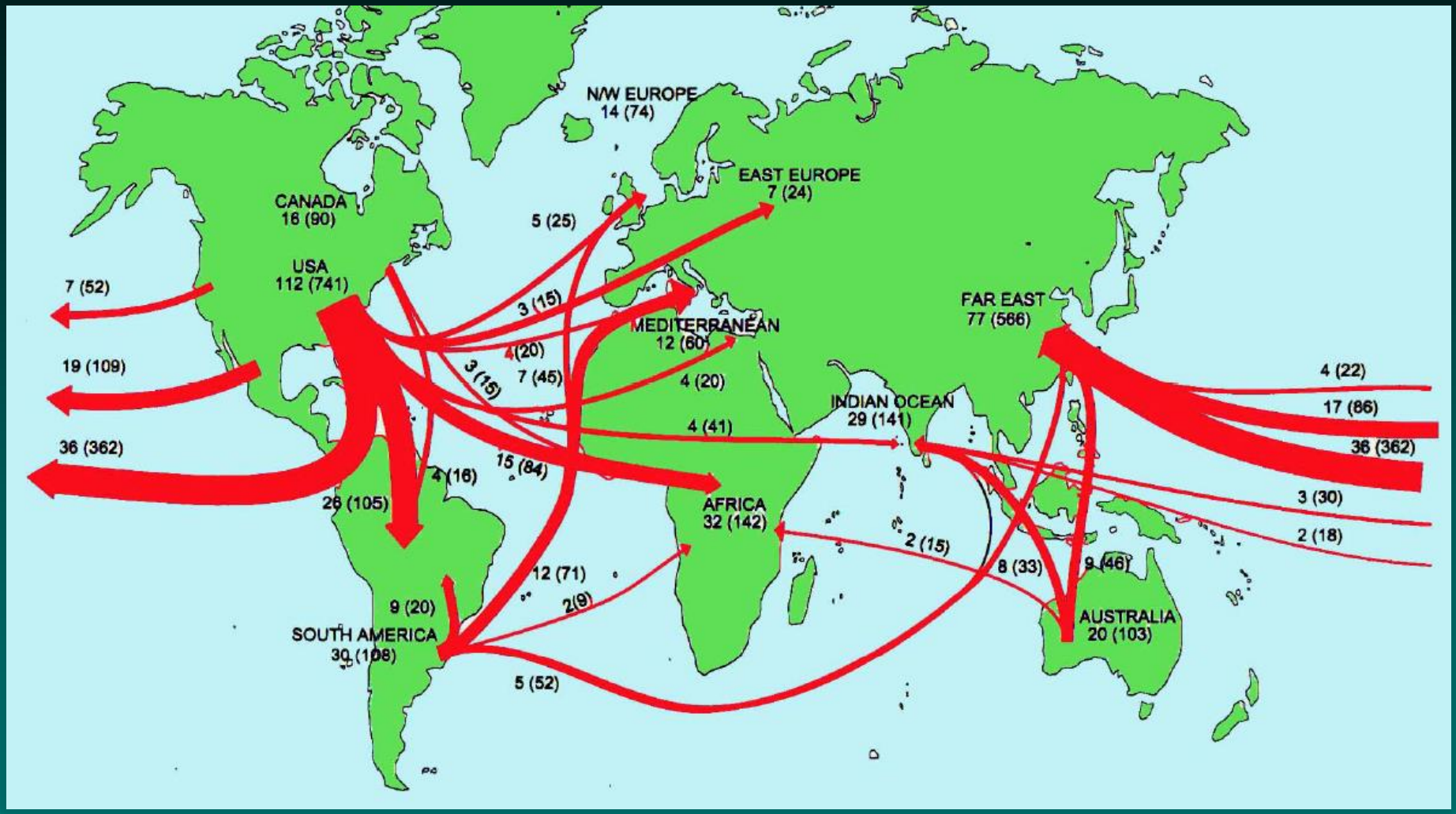
The Panama Canal is a Vital Link for US Grain Exports



Source: Fearnleys Research

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Panama Canal Route

ACP

The Autoridad Del Canal de Panama

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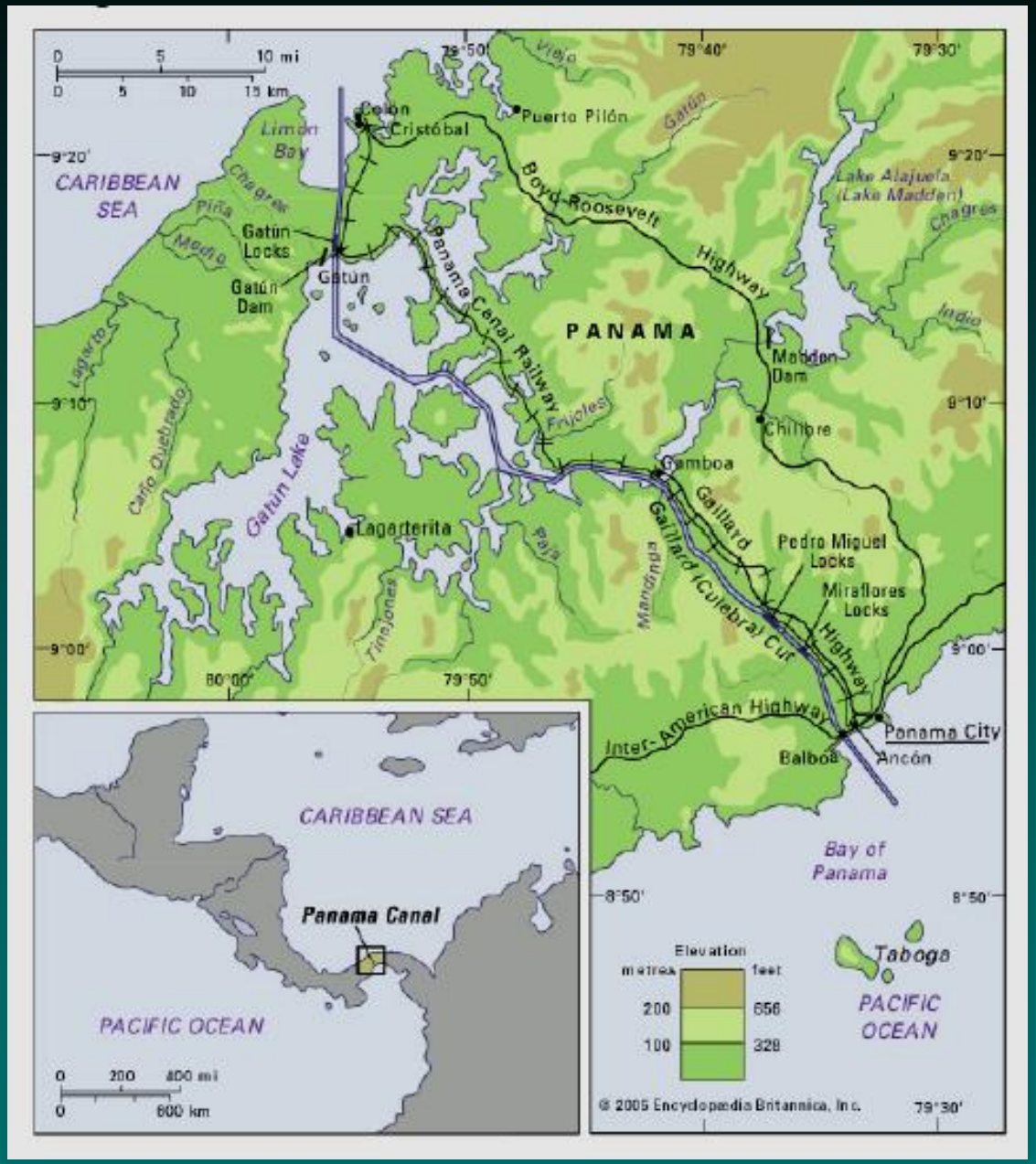
Panama Canal Expansion



The Autoridad Del Canal de Panama

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**

Source: ACP Data

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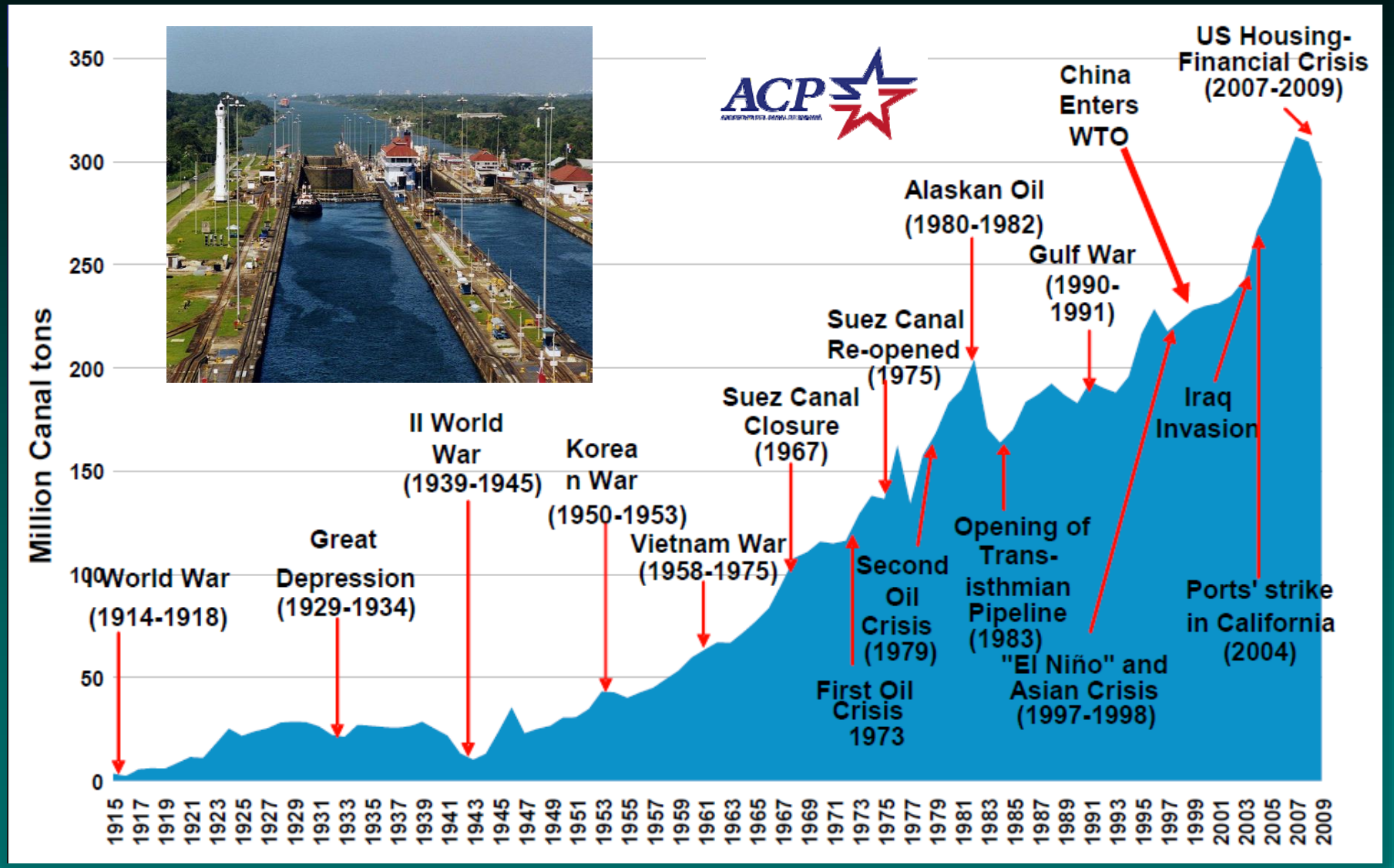
Panama Canal Historical Tonnage Traffic



Source: ACP Data

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The Panama Canal Circa 1914

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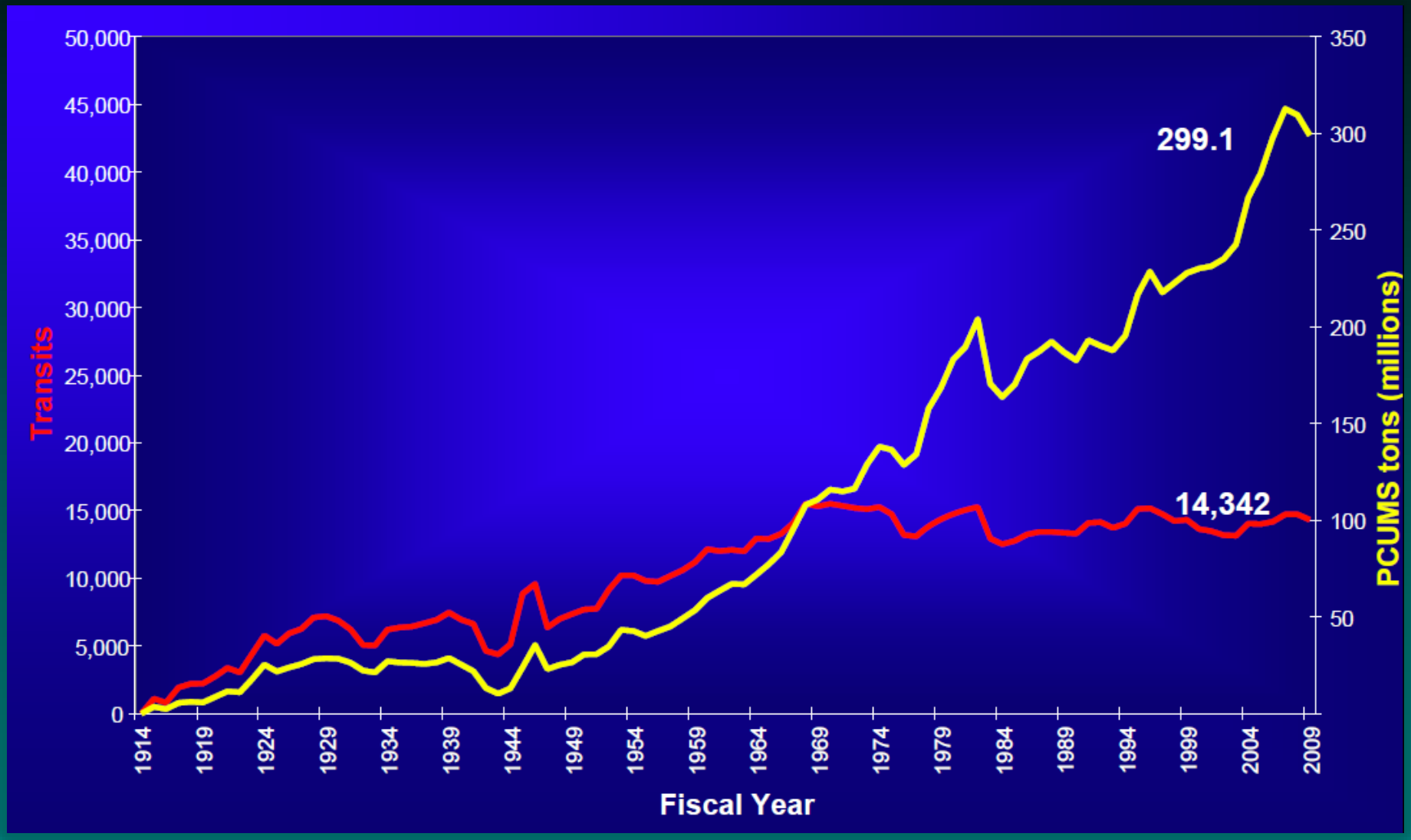
Panama Canal Transit & Tonnage Traffic

(Transits and PCUMS Tonnage 1914 to 2009)



Source: ACP Data

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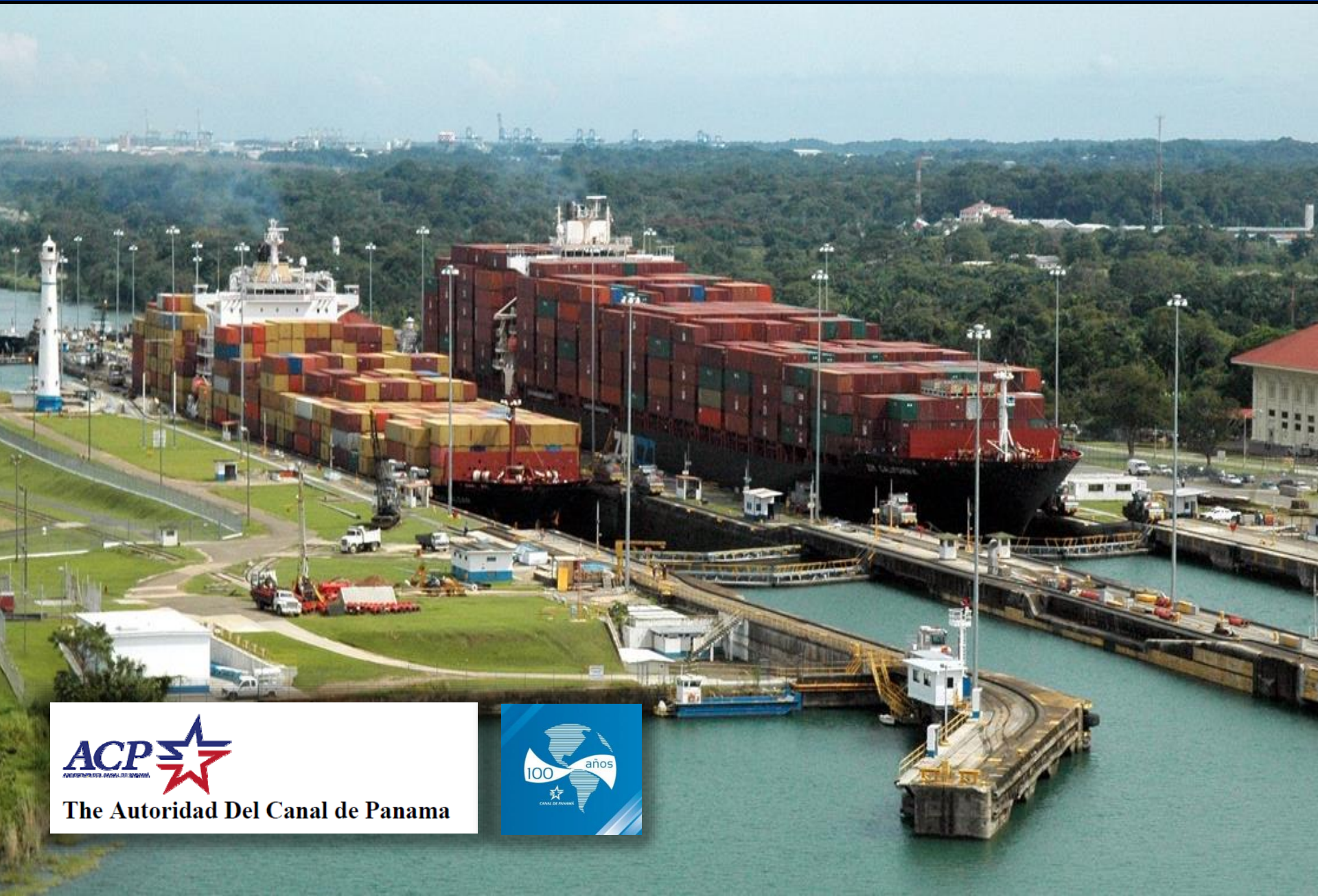
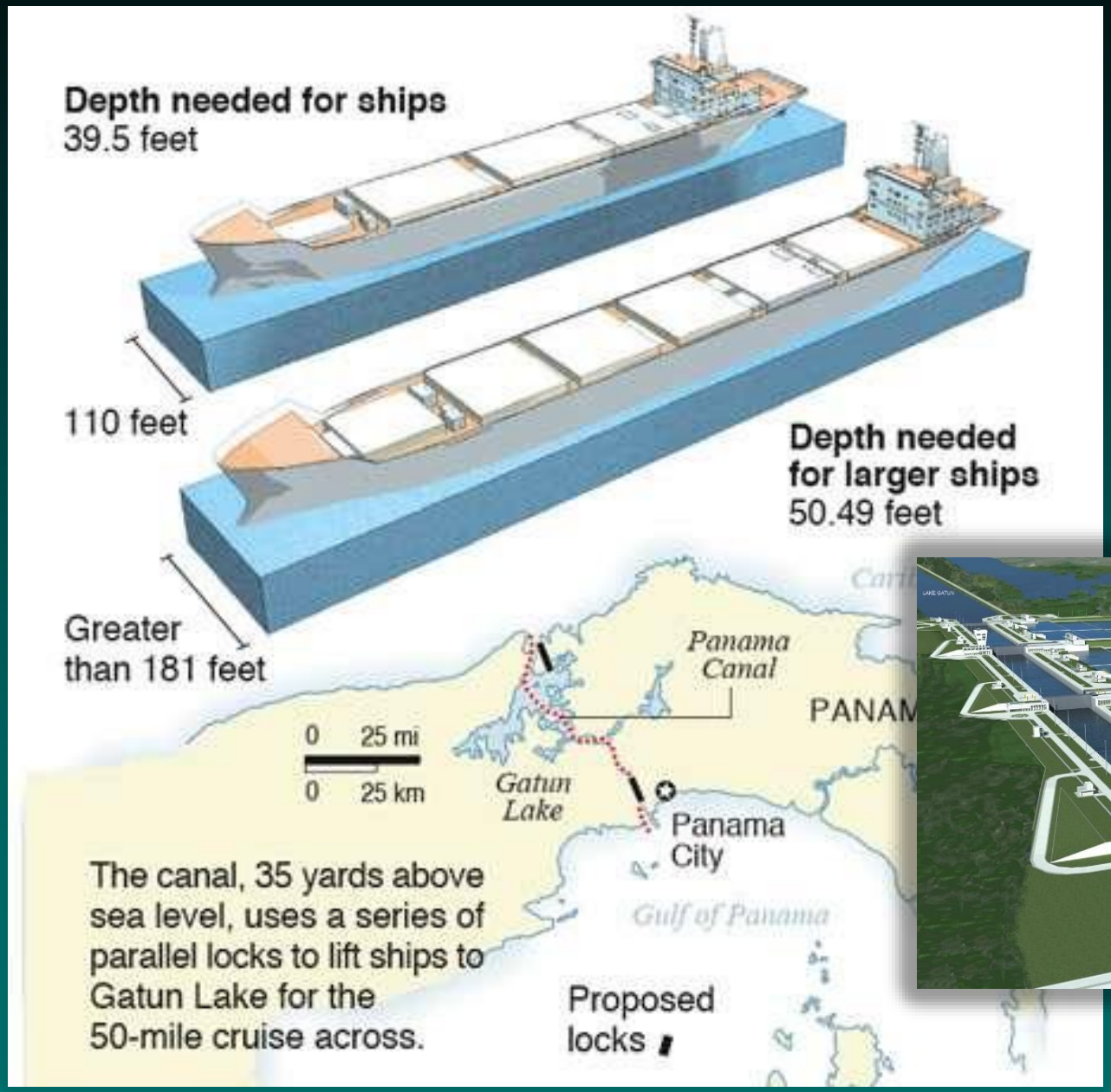
Panama Canal Today



Expansion of the Panama Canal: Circa 2016



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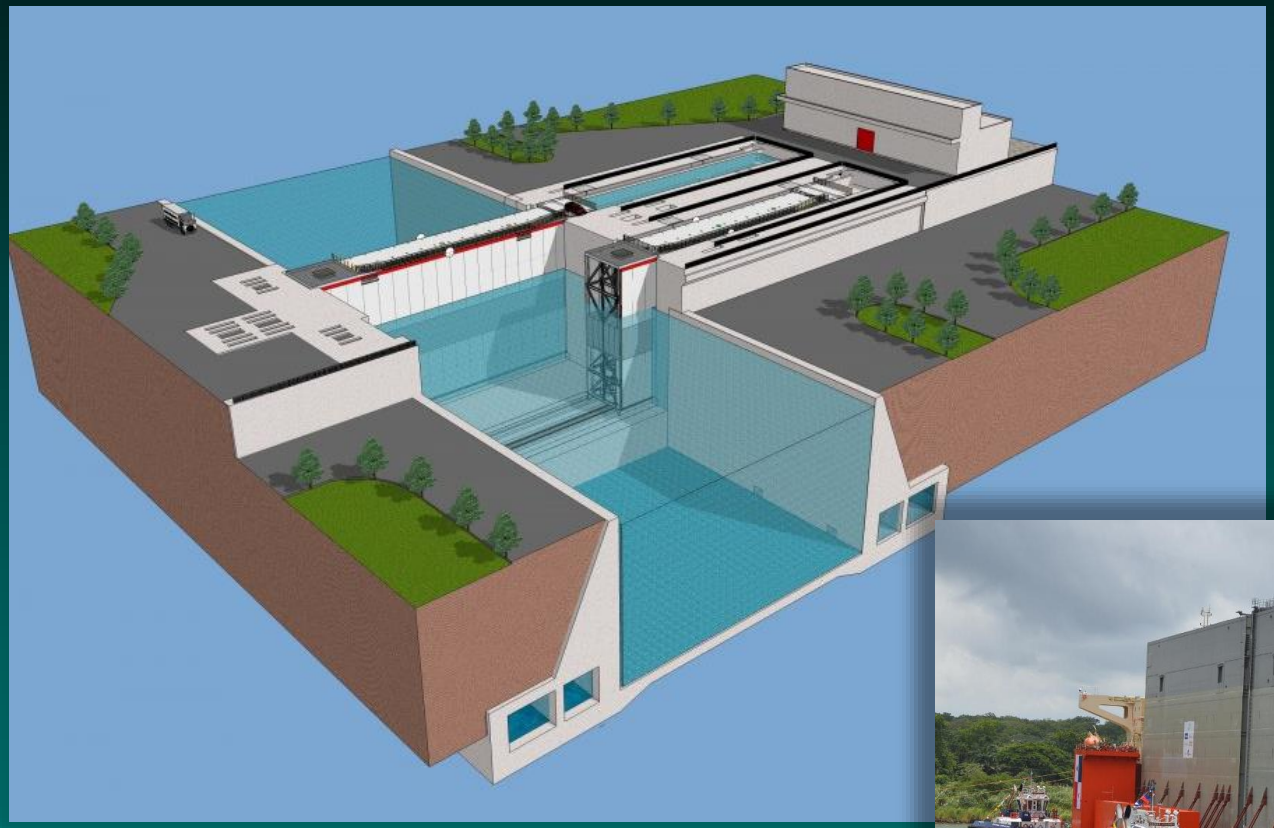
Post 2016 Panama Canal

The Autoridad Del Canal de Panama

Panama Canal Third Lane Expansion
Circa Late 2015 / Early 2016



ACP
The Autoridad Del Canal de Panama

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

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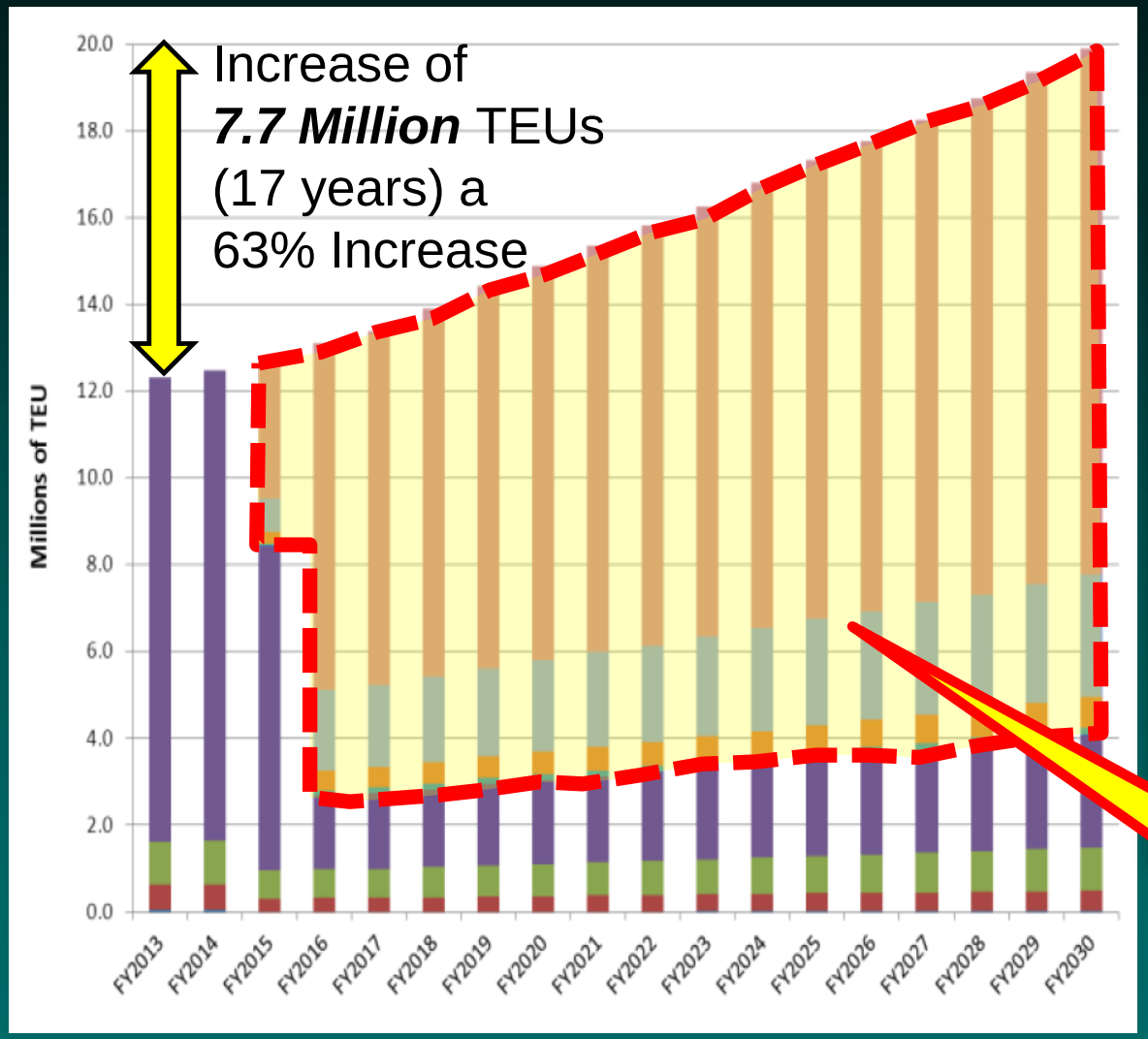
Canal TEU Forecast by Vessel Beam

(FY2013 to FY 2030 – Millions of TEUs)



The Autoridad Del Canal de Panama

- 140' or more
- 120' – 139.99'
- 107' – 119.99'
- 100' – 106.99' (> 39.5' Draft)
- 100' – 106.99' (< 39.5' Draft)
- 91' – 99.99'
- 80' – 90.99'
- Less than 80'

Beyond Current Panamax Width

Source: Container Market Segment and Transhipment Study – Oct 2012 ACP/M&N

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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%

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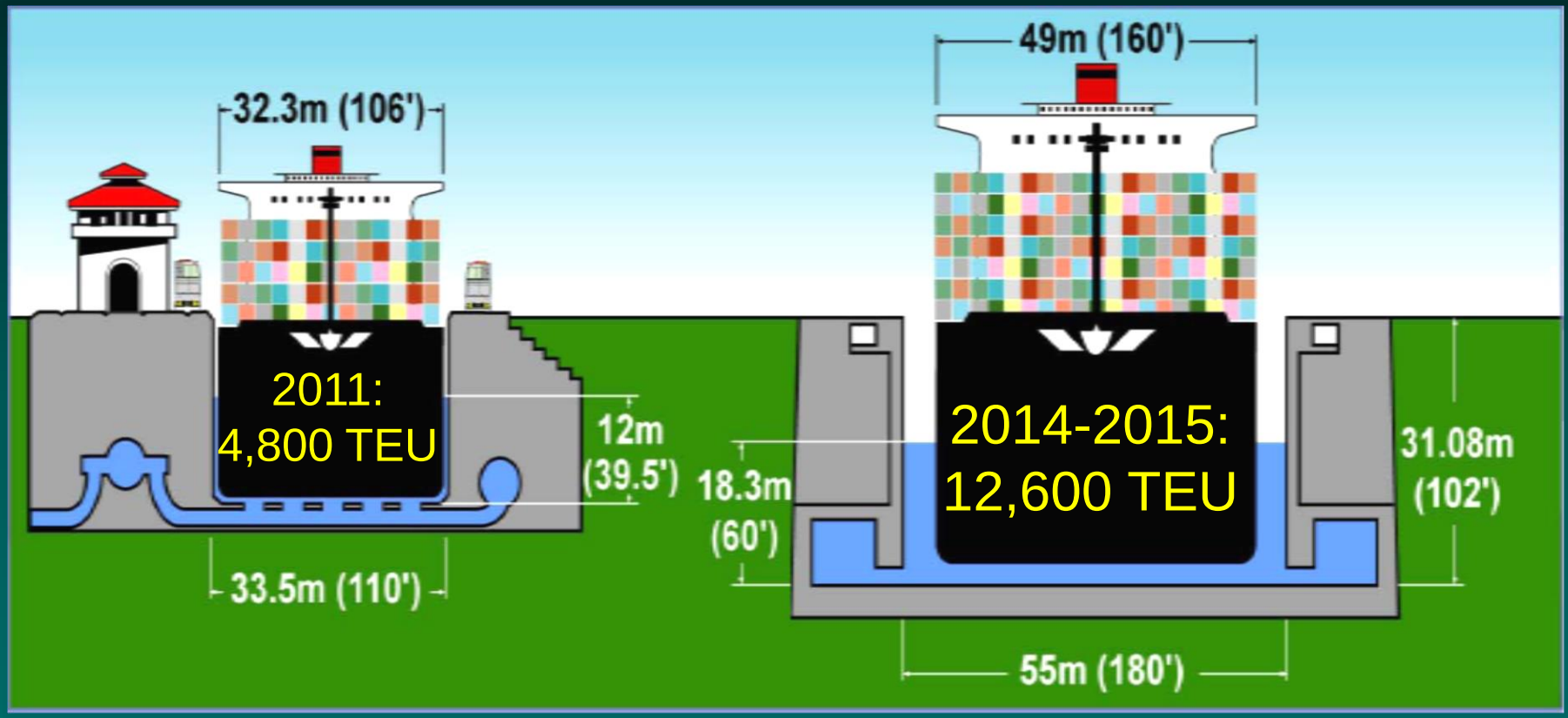
The Autoridad Del Canal de Panama

Panama Canal Third Lane Expansion Capabilities



Source: ACP Expansion Project

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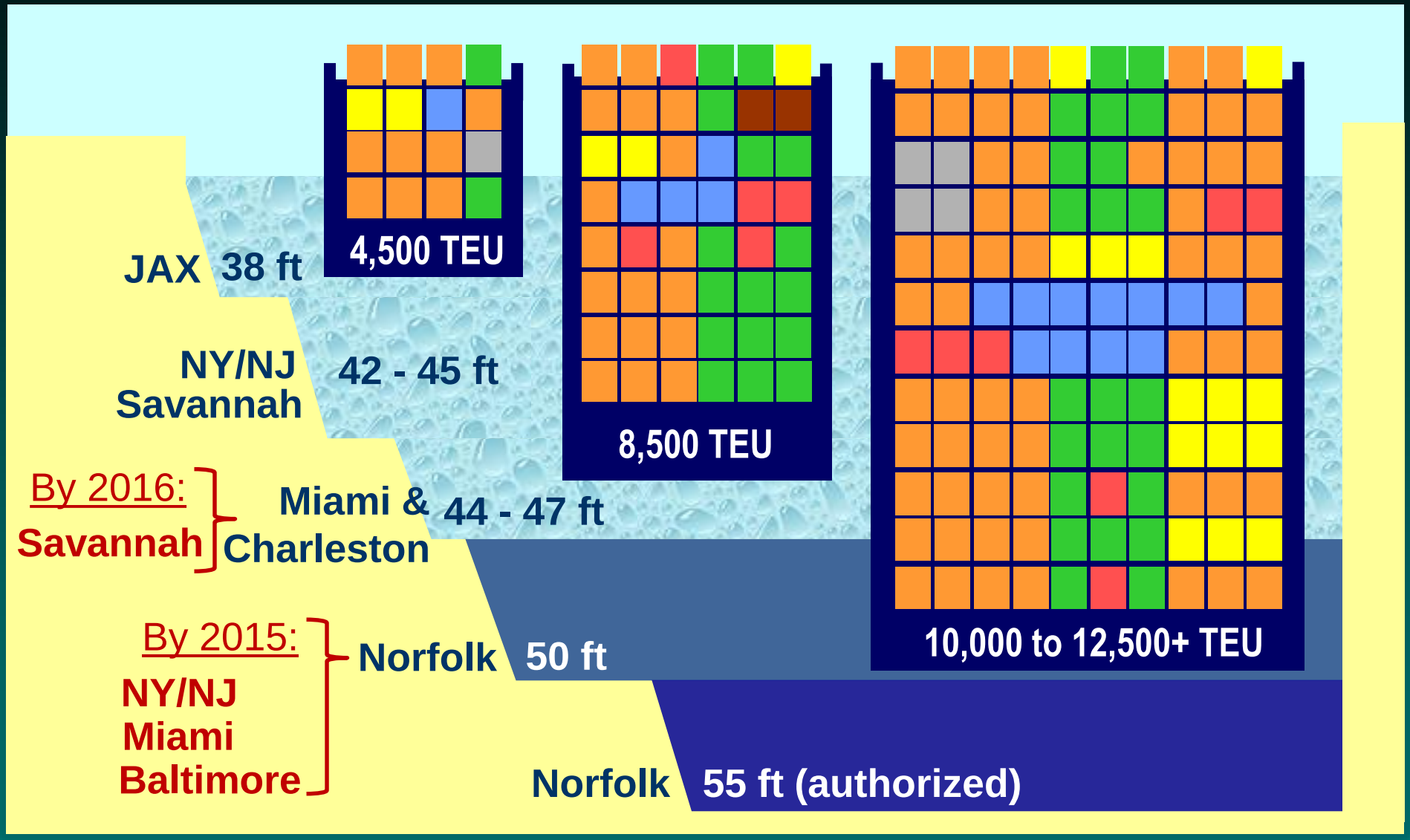
Today Only The Port of Virginia Can Handle The New 2015 Panamax Vessels Fully Loaded



Source: Virginia Port Authority (VPA) October 2011

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Port Authority of New York & New Jersey
Entrance Channel & Harbor Dredging Program
($1.6 Billion Program, Completion December 2014)

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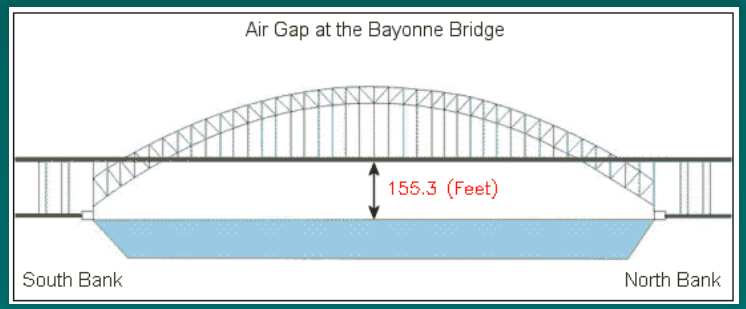
Raising of the Bayonne Bridge

(Estimated at $1 billion)

Future Clearance: 214 ft

Current Clearance: 155.3 ft



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Panama Canal Vessel Deployments Will Determine New US Logistics Patterns

The Distance to New Orleans and Savannah Via the Panama Canal

A Competitive & Robust Landside Access to the Gateway Port's Inland Market will be a Key Success Factor!

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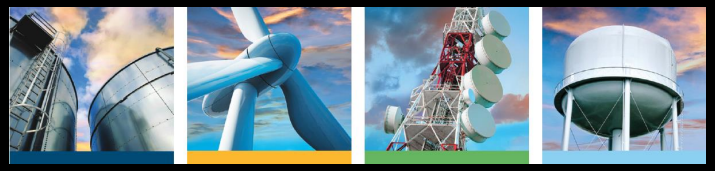

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Emerging New Caribbean Transhipment Center

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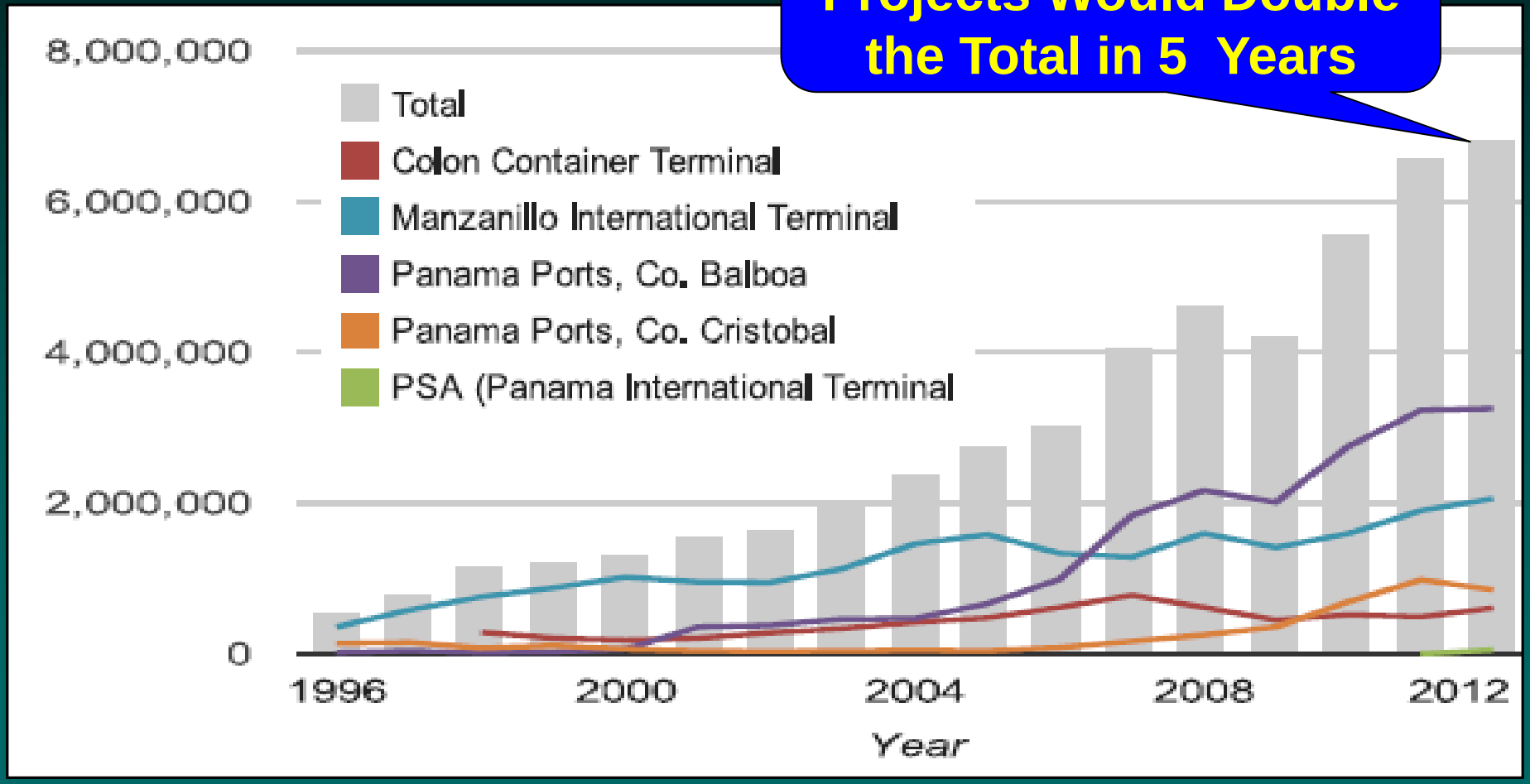
Panama Ports Annual *Transhipment Growth*

"The Singapore of Latin America"

Proposed New Port Projects Would Double the Total in 5 Years



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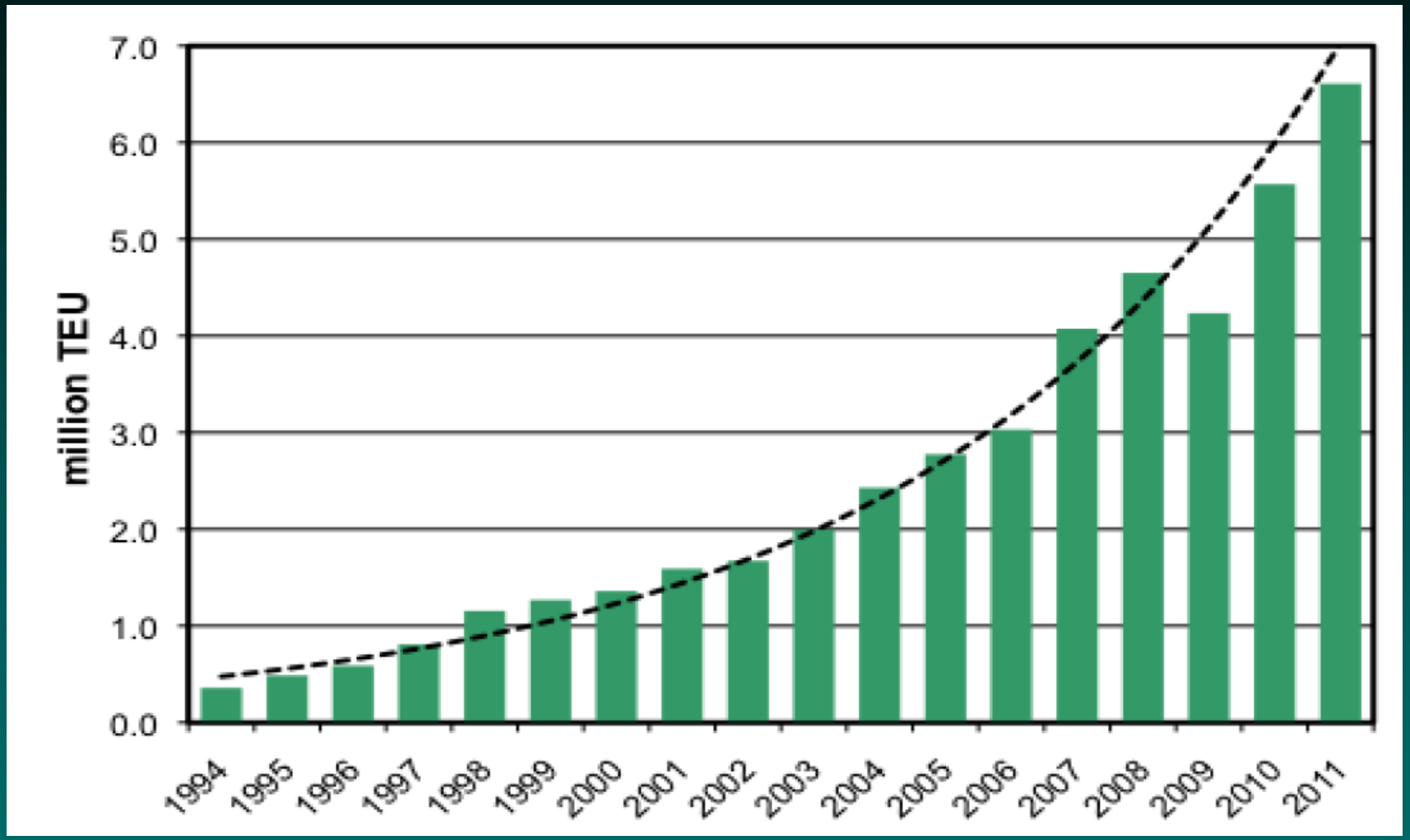
Panama Ports Container *Transhipment Growth*



6.8 Million TEUs – 18.5 % Growth Rate

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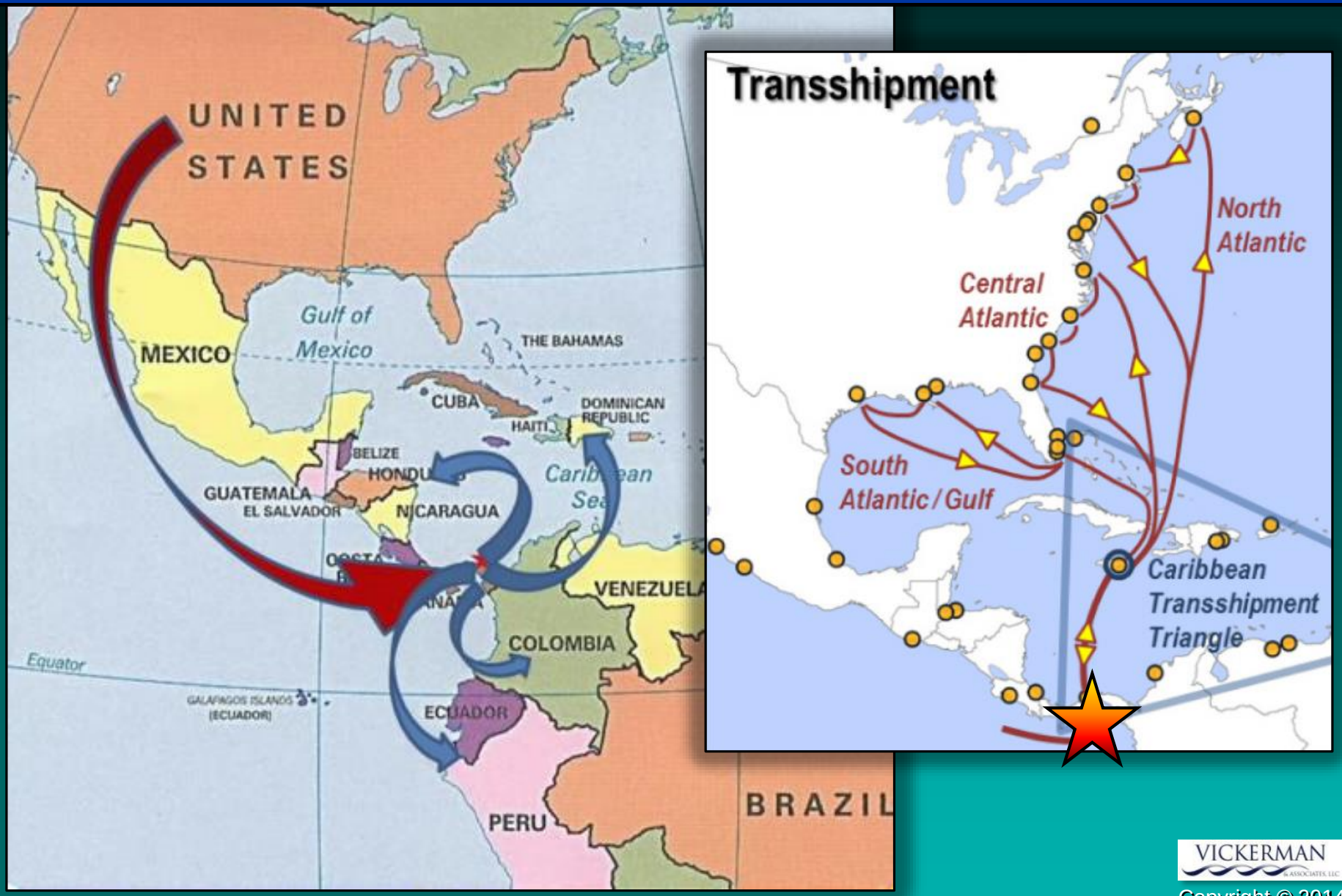
The Panama Canal Expansion Will Move the Caribbean Transhipment Center Point to Panama



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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

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New Panama Canal Pacific Entrance Ports

ACP

The Autoridad Del Canal de Panama

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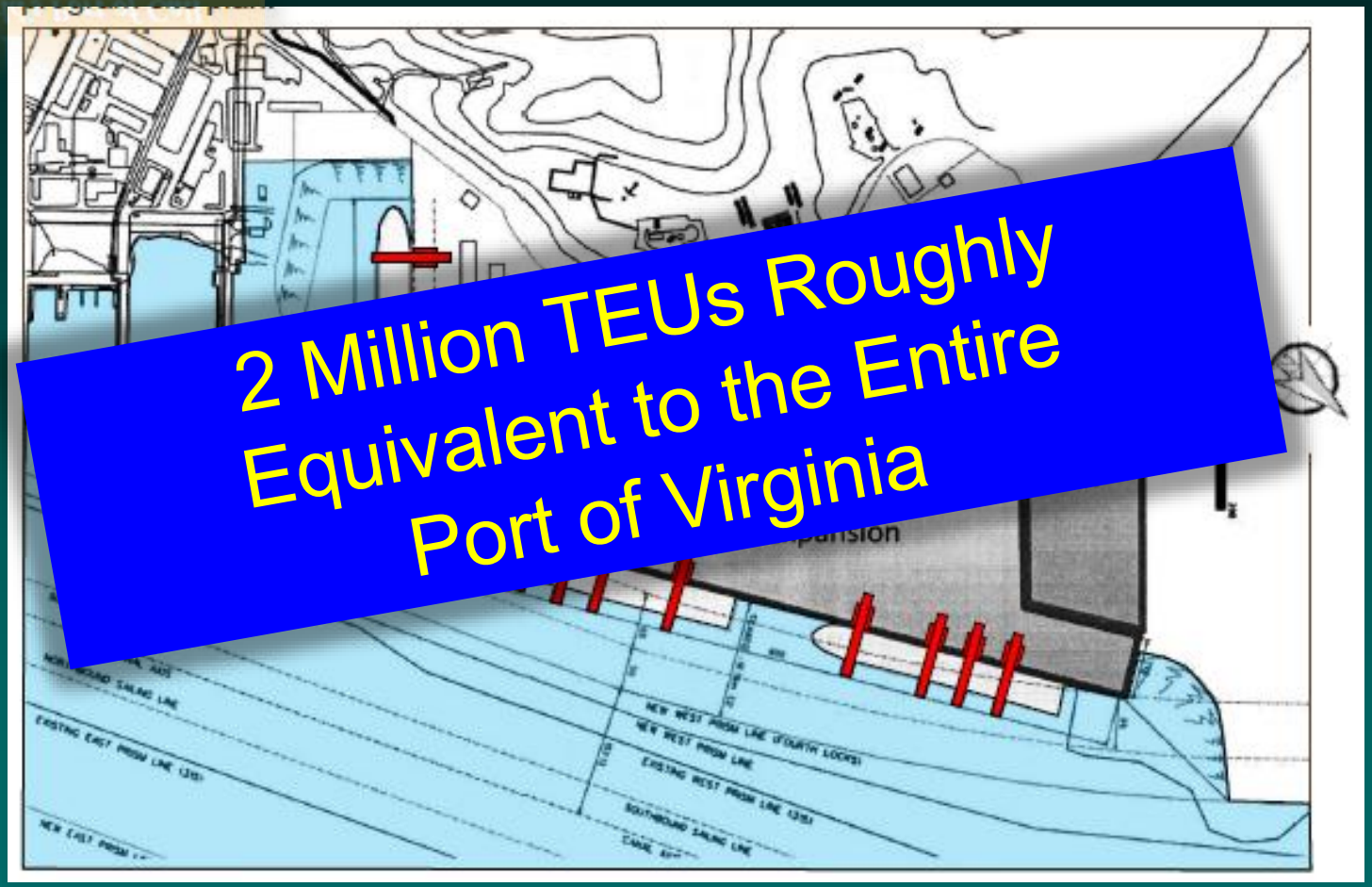
PSA Panama International Terminal (PPIT) Western Entrance Conceptual Site Plan, Phase I +II



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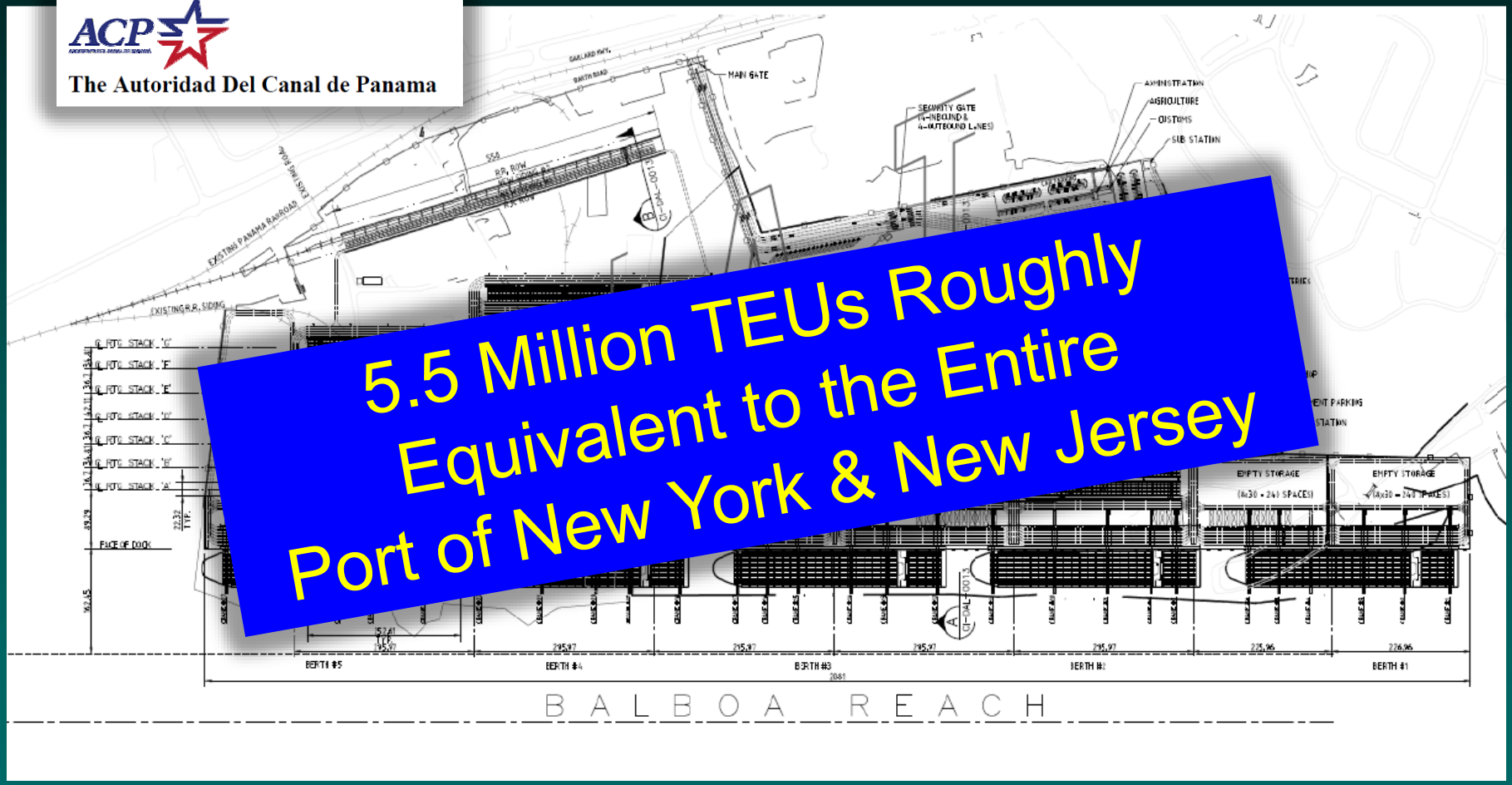
Corozal Oeste Container New Transhipment Terminal Panama Canal Western Entrance - Phase I & II



Source: ACP Expansion Project – Rodolfo Sabonge AAPA January 24, 2013

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Corozal Oeste Container New Transhipment Terminal Panama Canal Pacific Entrance - Phase I & II

Terminal: 116 hectares (286.6 acres)

Source: ACP Expansion Project – Rodolfo Sabonge AAPA January 24, 2013

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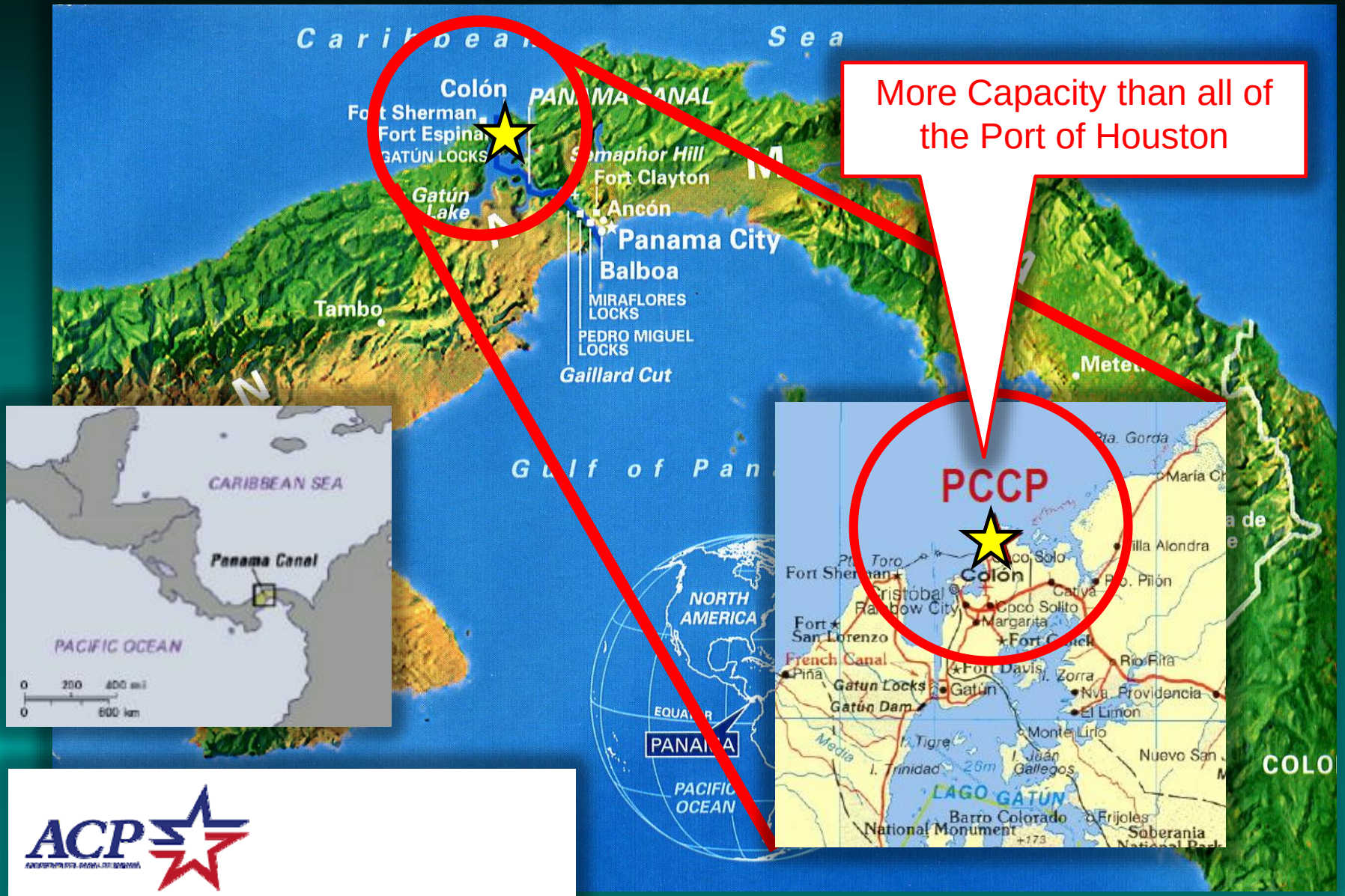
New Panama Canal Atlantic Entrance Port



ACP

The Autoridad Del Canal de Panama

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Panama Colon Container Port

(New $600 Million Container Port Panama Canal Atlantic Entrance)

The terminal, with an initial capacity of two million TEU, will be constructed by a consortium of Asian developers under the name Panama Colon Container Port LLC (PCCP)

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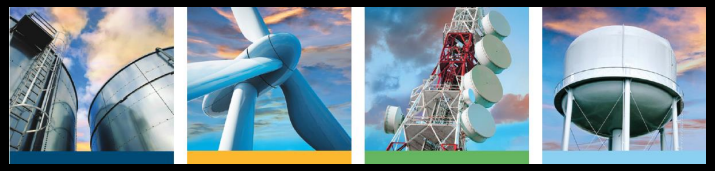

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Panama Canal Large Vessel Market Penetration into the US Midwest

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Nicaragua's $40 Billion Contract with Chinese HKND to Dig a Rival to the Panama Canal

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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.

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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

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The Primary North American Competitor to the Panama Canal is the Class I Rail Intermodal System

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Source: USDOT Maritime Administration (MARAD) 2009

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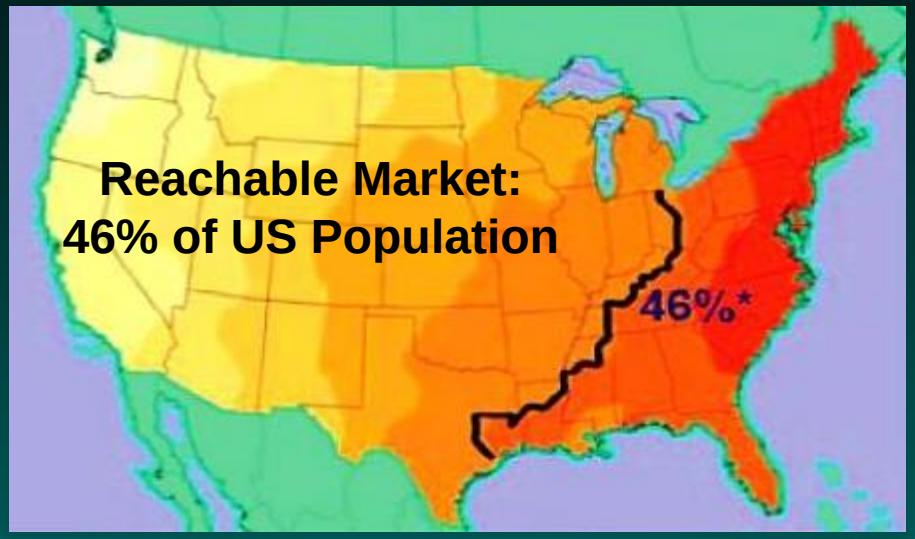
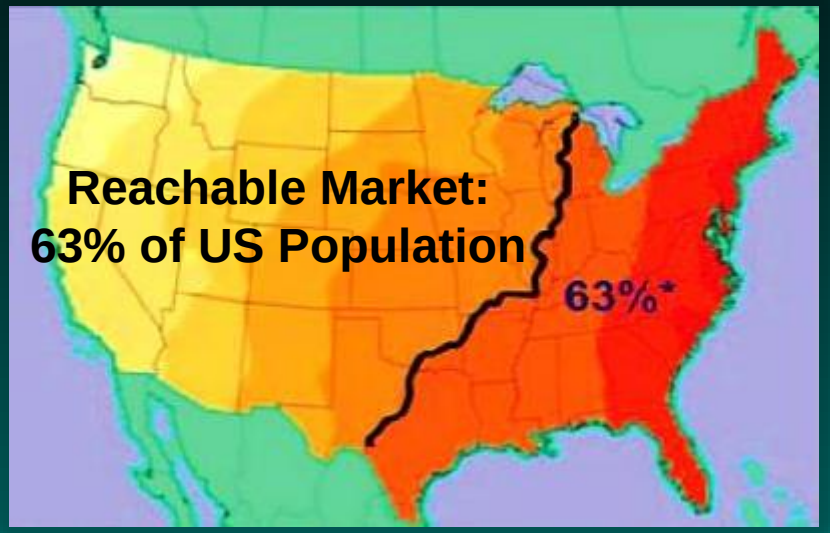
Dramatic US Market Penetration after 2015

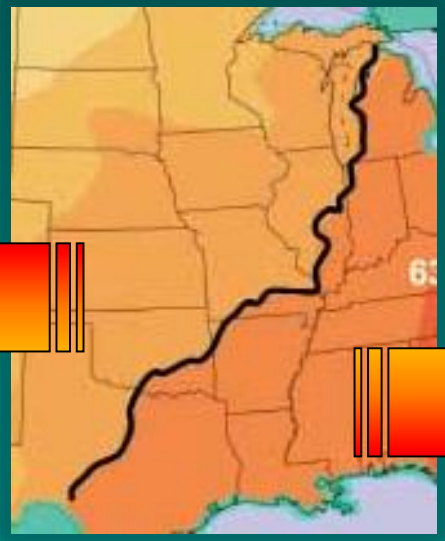
Panama Canal Economies of Scale with permit deeper market penetration into the US





4,000 TEU ship, all-water.

8,000 TEU ship, all-water.



West Coast
Cost Advantage

East Coast
Cost Advantage

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

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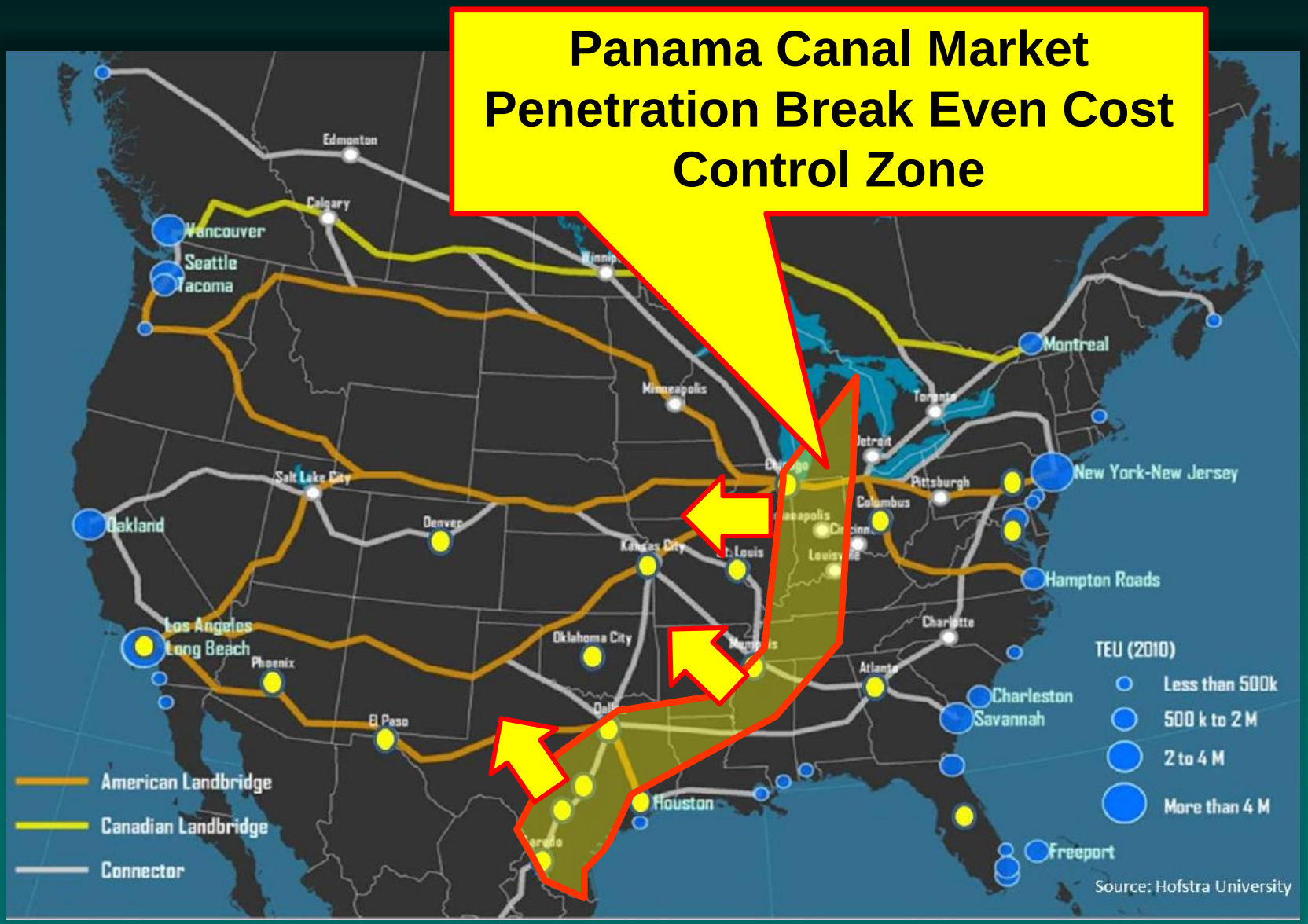
US and Canadian Rail Land Bridges



Source: USDOT PB Panama Canal Expansion Study, June 2012

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Dramatic US Market Penetration after 2015

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

Source: ACP Expansion Project – Rodolfo Sabonge AAPA January 24, 2013

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Dramatic US Market Penetration after 2016

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

The Panama Canal will prove to be a strong contender for Asian trade serving not only the US East Coast, but also most of Texas and the Midwest by 2016.

Source: Potential Effects of the Panama Canal Expansion on the Texas Transportation System, Texas DOT, Cambridge Systematics October 2011

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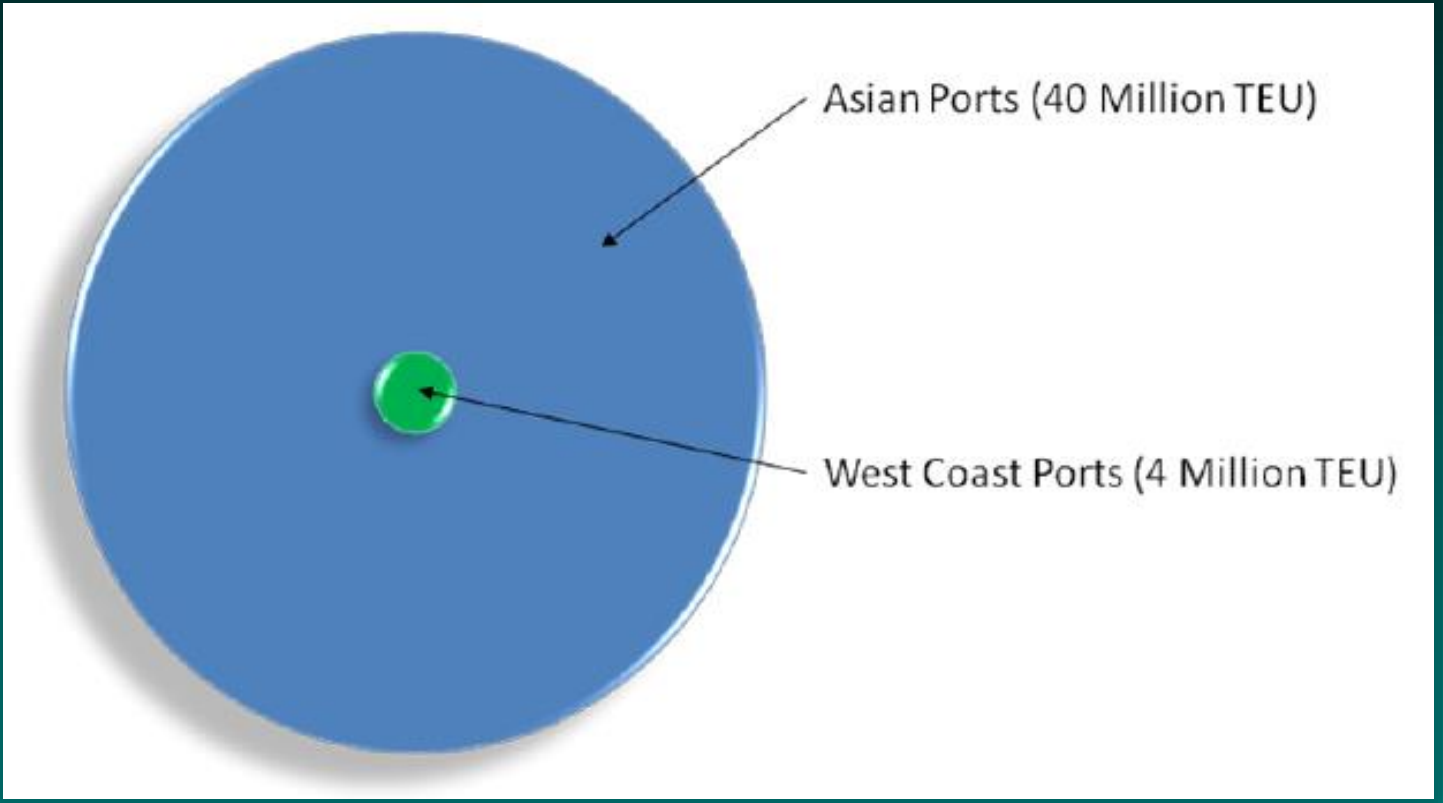
Is This Trade Trend Long Lasting?

Planned Port Container Capacity Expansion in Asia Compared to US West Coast Ports



Source: Potential Effects of the Panama Canal Expansion on the Texas Transportation System, Texas DOT, Cambridge Systematics October 2011

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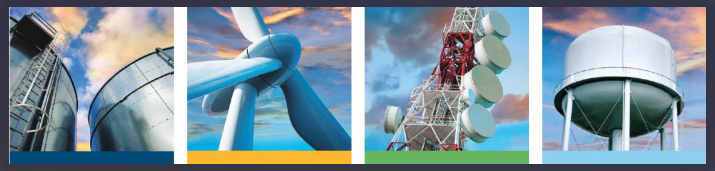

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Thank You

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Williamsburg, Virginia