2017 AAPA Executive Management Conference

Saddlebrook Resort, Tampa, FL *May 1, 2017*

Planning for Future Transportation Realities

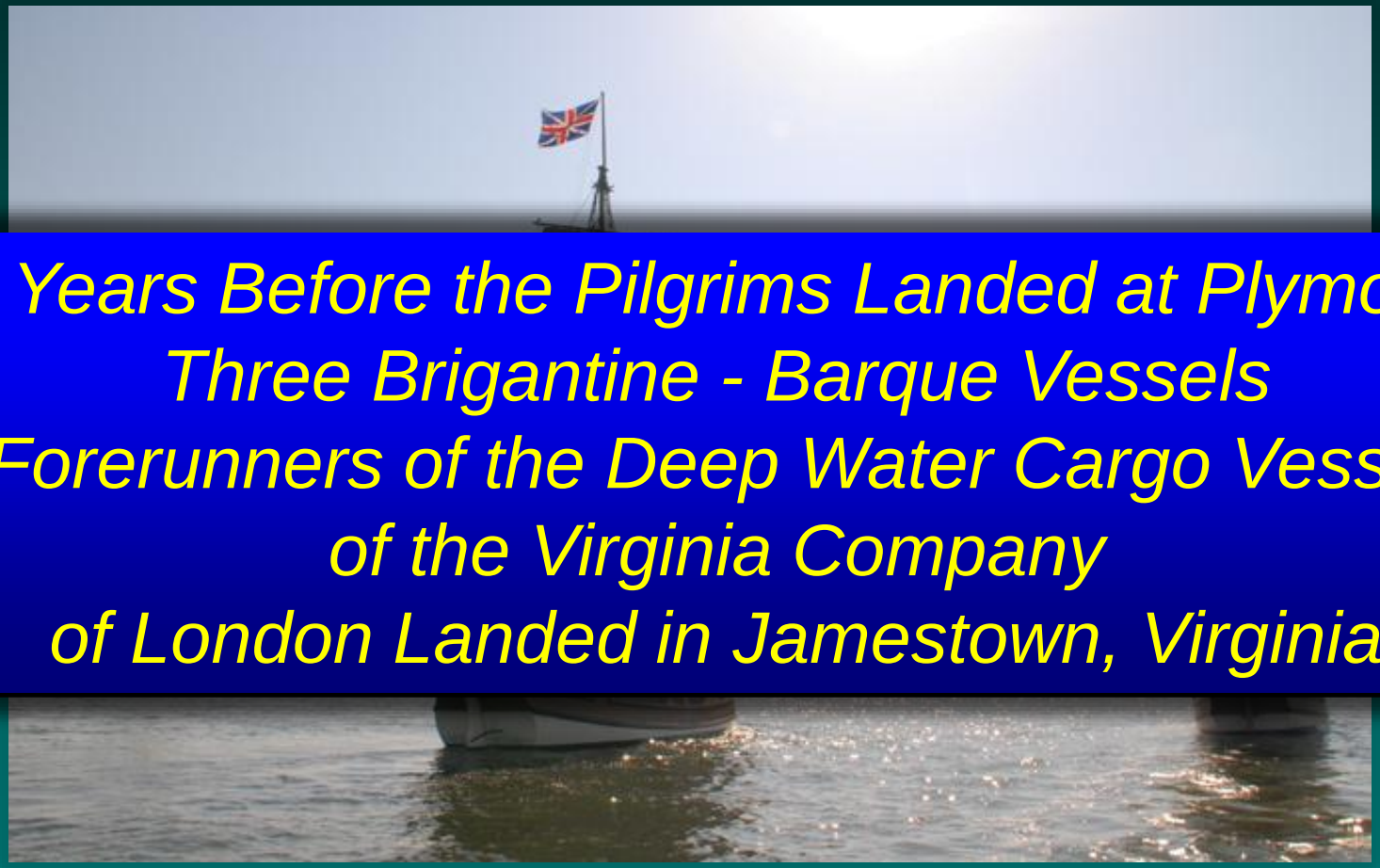
M. John Vickerman

VICKERMAN & ASSOCIATES, LLC

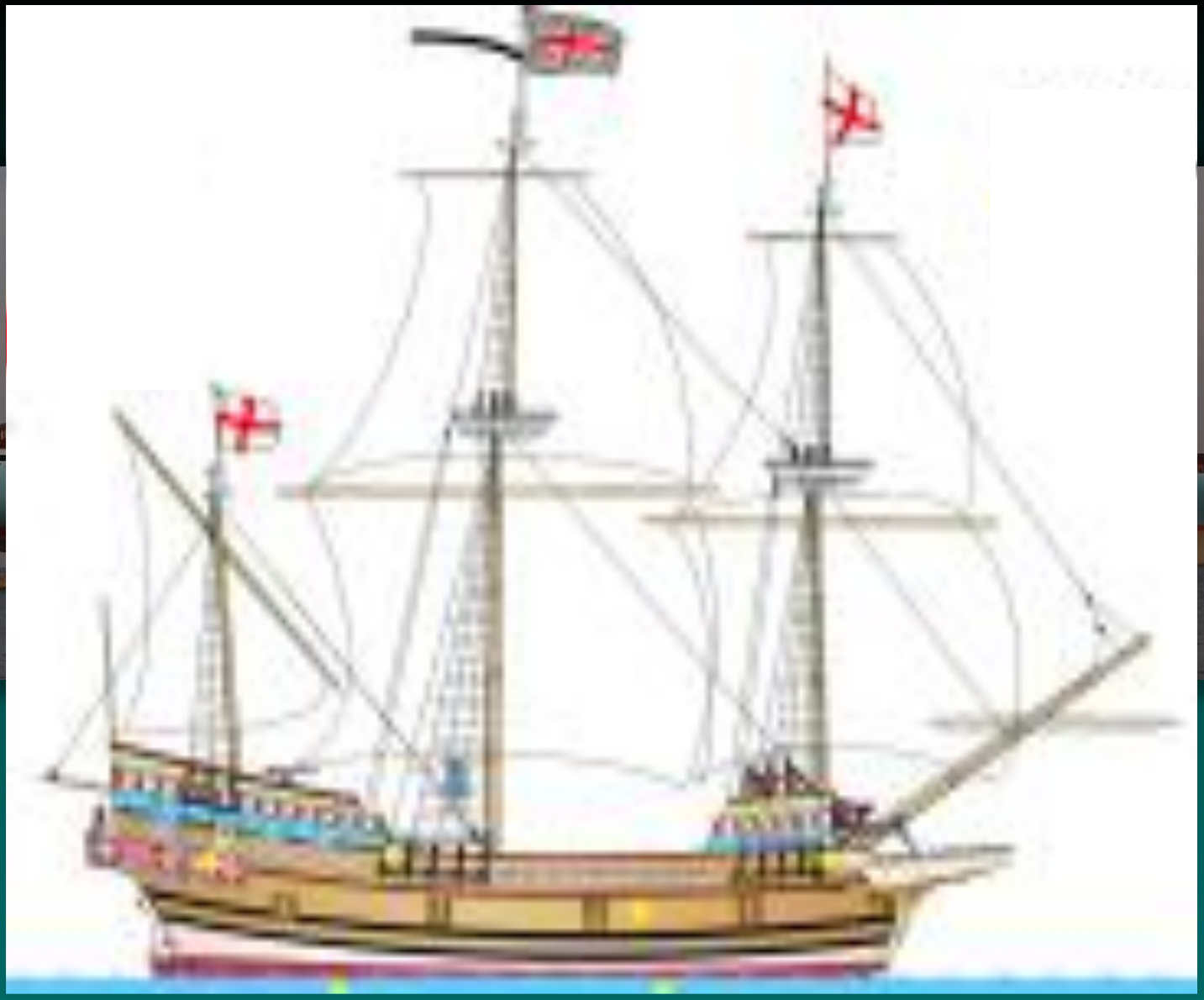
Williamsburg, Virginia

410 Years Ago: 1607

A Voyage of Three Vessels Created the First Permanent English Port in Jamestown, VA



13 Years Before the Pilgrims Landed at Plymouth,
Three Brigantine - Barque Vessels
(Forerunners of the Deep Water Cargo Vessel)
of the Virginia Company
of London Landed in Jamestown, Virginia



Godspeed Brigantine/Barque, Circa 1607
Deadweight Tonnage: 40 tons
LOA: 88 feet; Crew: 13, Passengers: 39

M/S EMMA MÆRSK

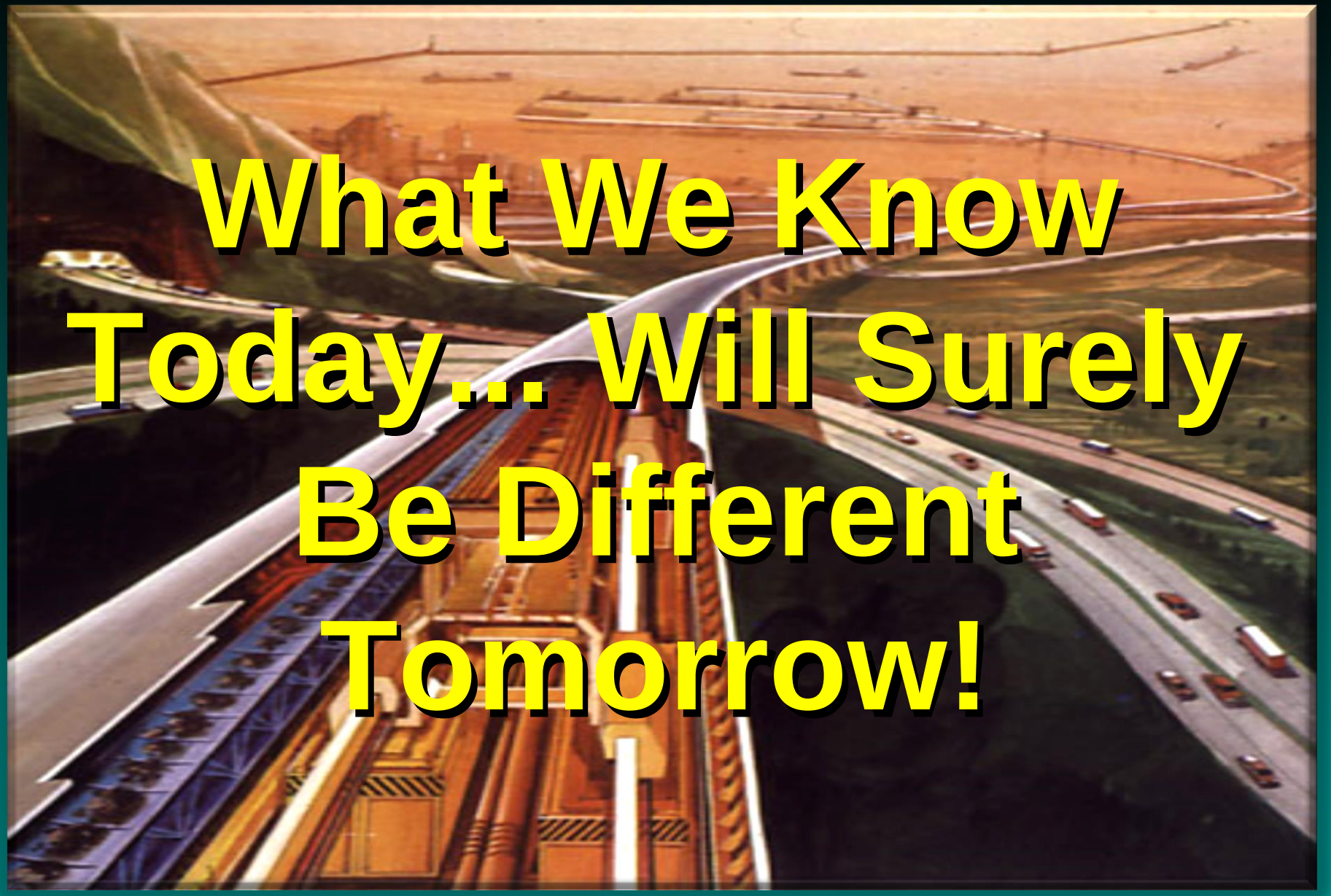
Circa 2013

Godspeed Brigantine/Barque, Circa 1607

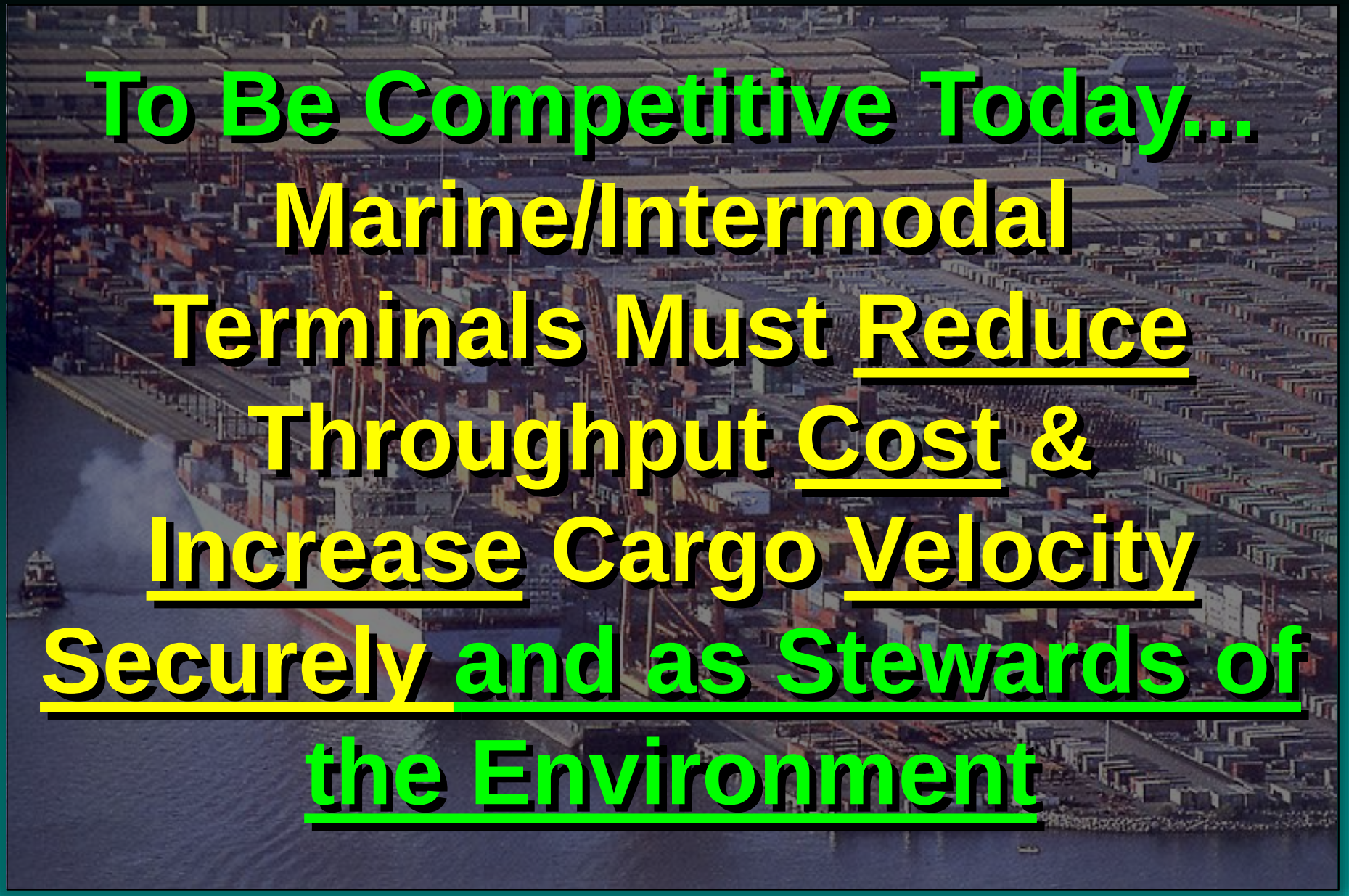
Vessel Cargo Handling Circa 1955

Cargo Handling Circa 2010

US Navy Fast Frigate Circa 2045



VICKERMAN & ASSOCIATES, LLC



VICKERMAN & ASSOCIATES, LLC

2017 AAPA Executive Management Conference

The Evolution of Today's Global Shipping Lanes

VICKERMAN & ASSOCIATES, LLC

The Maritime Silk Road Replaced the Overland Silk Road as the Primary Trading Route Across Eurasia After the Tang Dynasties (618 to 907)

The Marine Silk Road was a Precursor to:

Today's modern supply chain logistics, distribution and shipping transportation networks

90% of Global Trade is Carried Out by Shipping

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

The World's Primary Shipping Route:

The Marine Silk Road

Maersk's Global Trading Routes Today

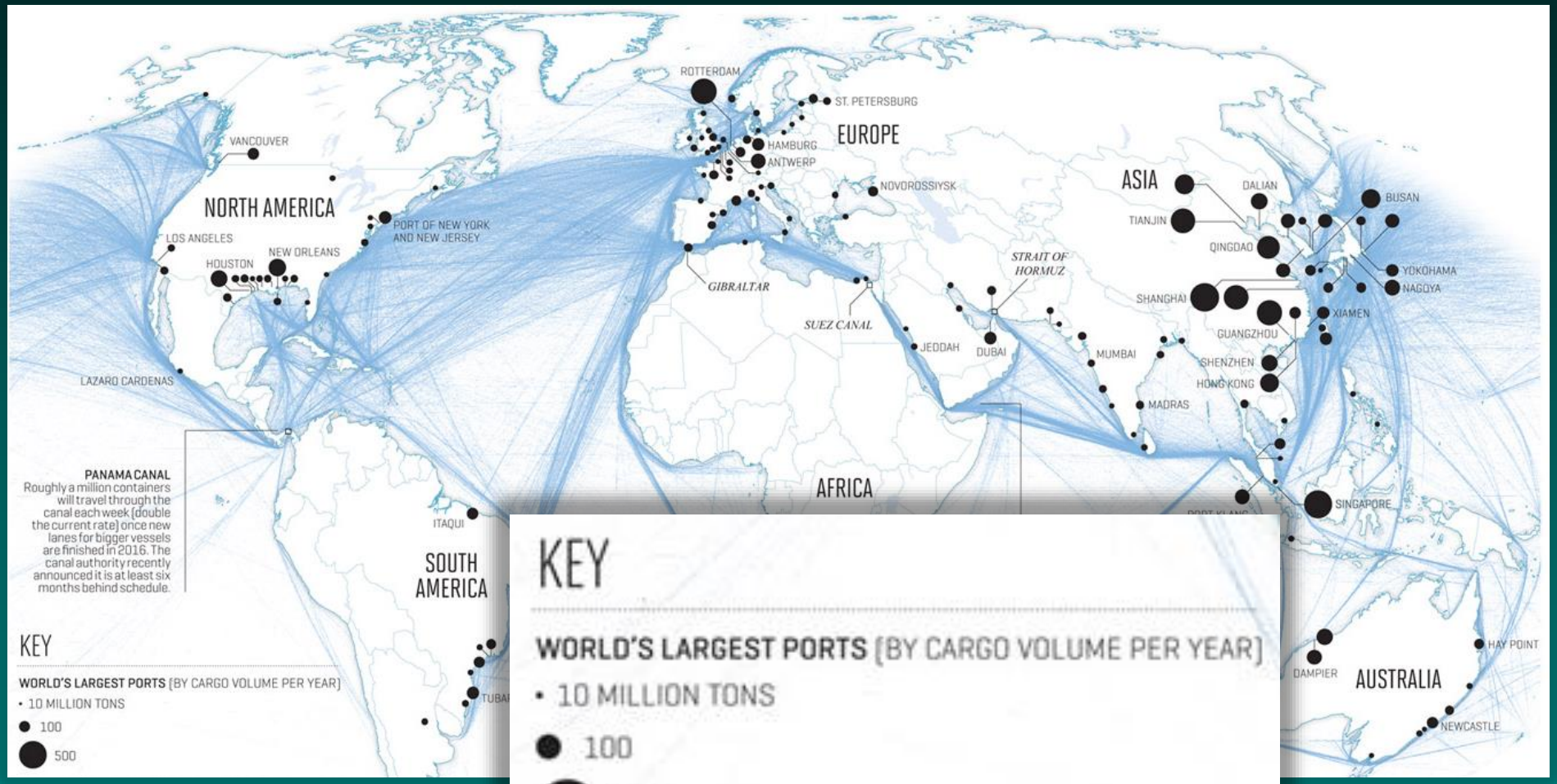
Lifting Global Trade.
APM TERMINALS

MAERSK GROUP

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

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

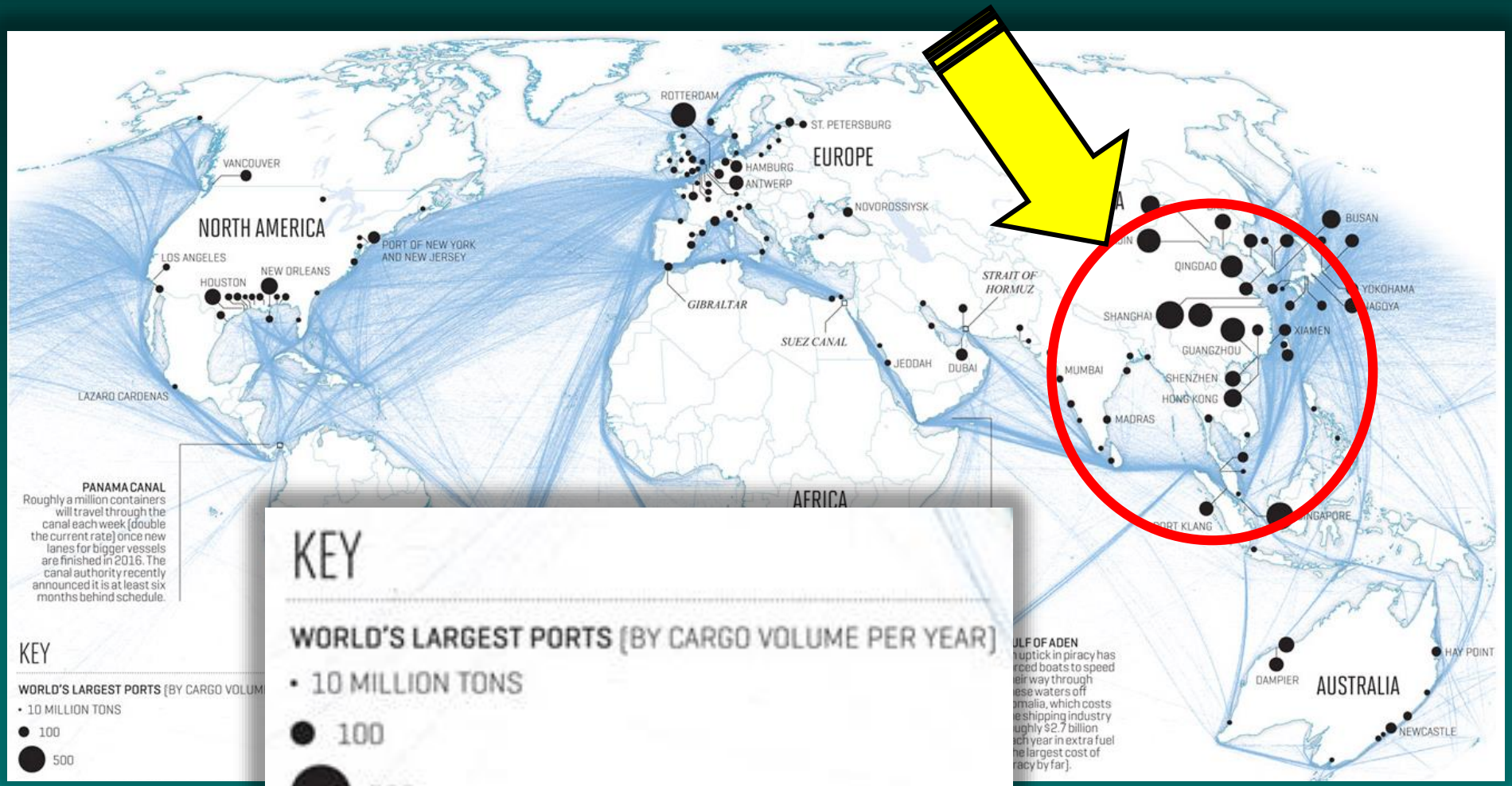
Where are the Biggest Ports?



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

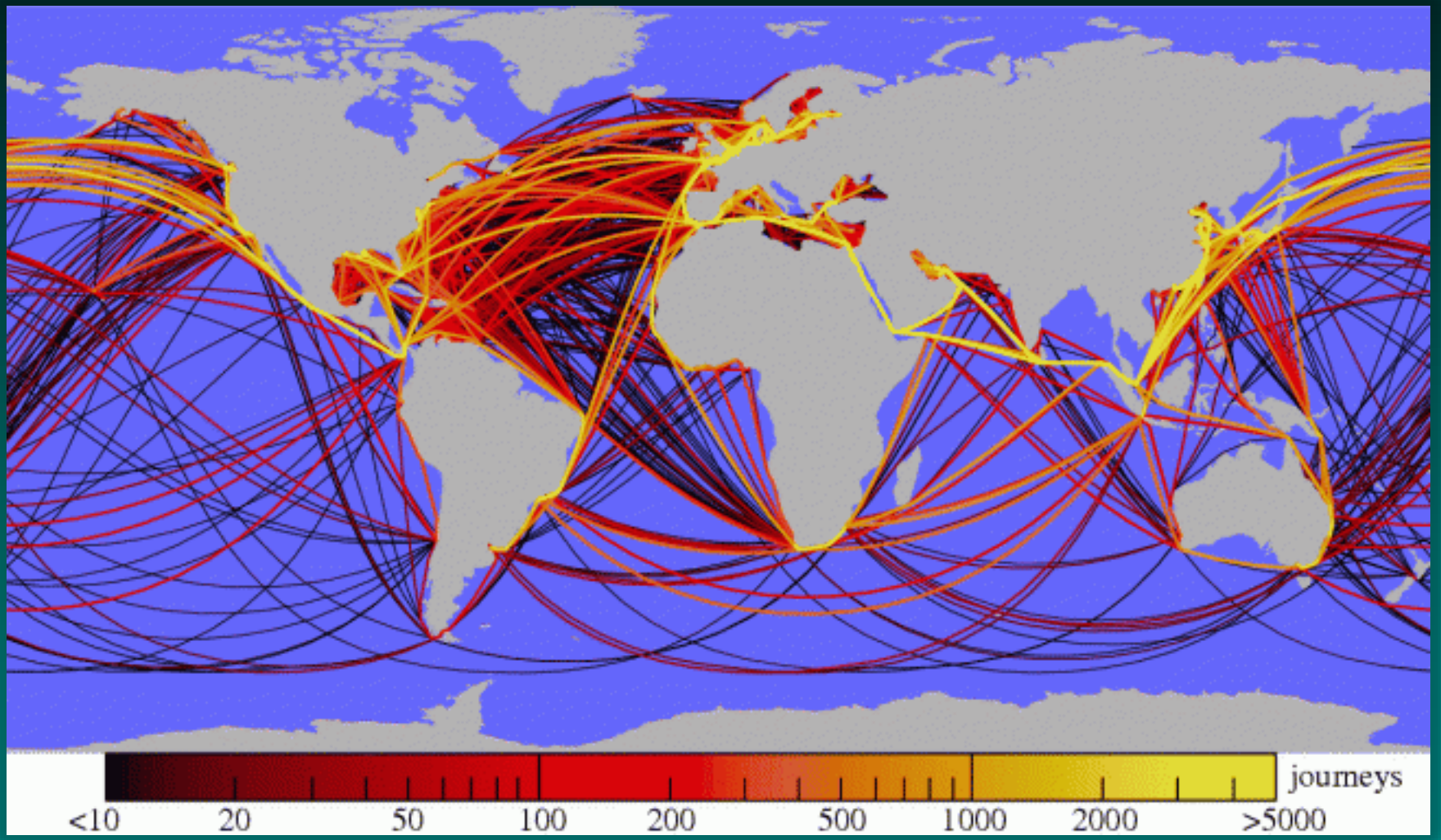
VICKERMAN & ASSOCIATES, LLC

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



Global Shipping Routes Plotted by AIS GPS

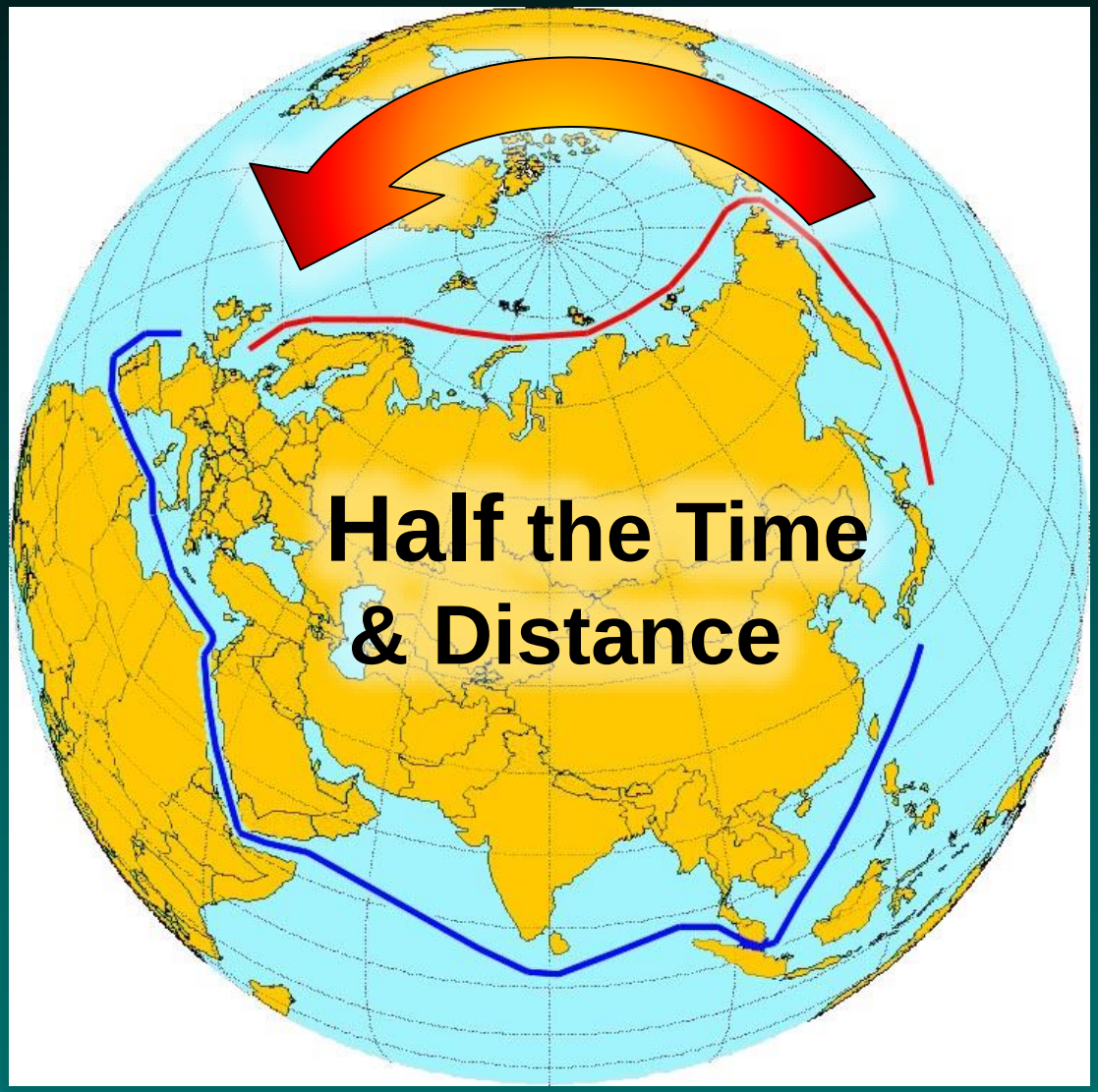
Today's Busiest Shipping Routes:
(1) Panama Canal, (2) Suez Canal, (3) Offshore China

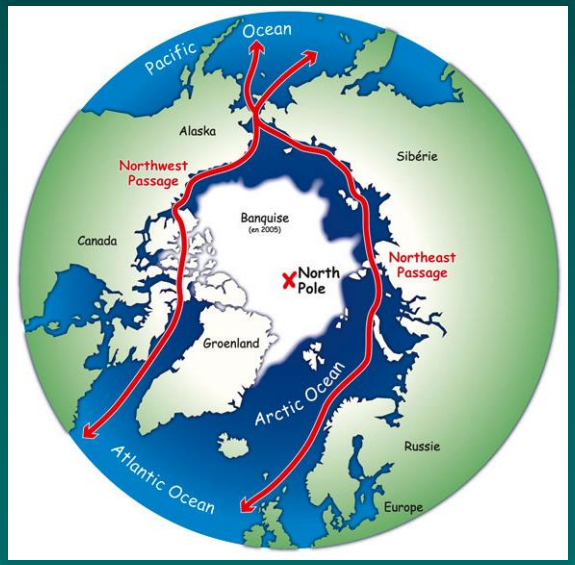


Source: Wired Science January 2010 Journal of the Royal Society: Interface

Shorter – Faster Arctic Ocean Route

2+ Months A Year Using Convoys





2017 AAPA Executive Management Conference

International External Industry Pressures Driving Today's Logistics

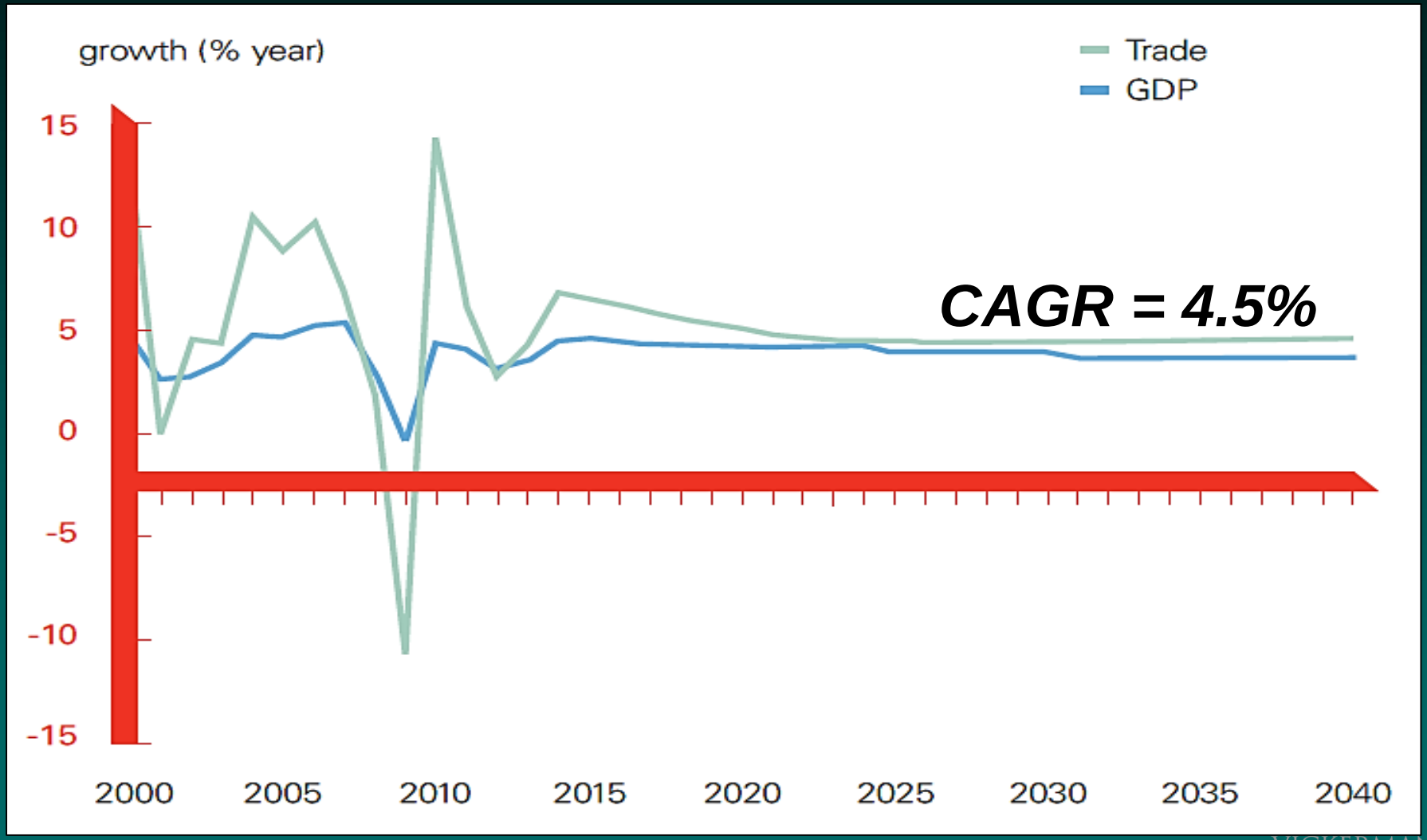
VICKERMAN & ASSOCIATES, LLC

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 & ASSOCIATES, LLC

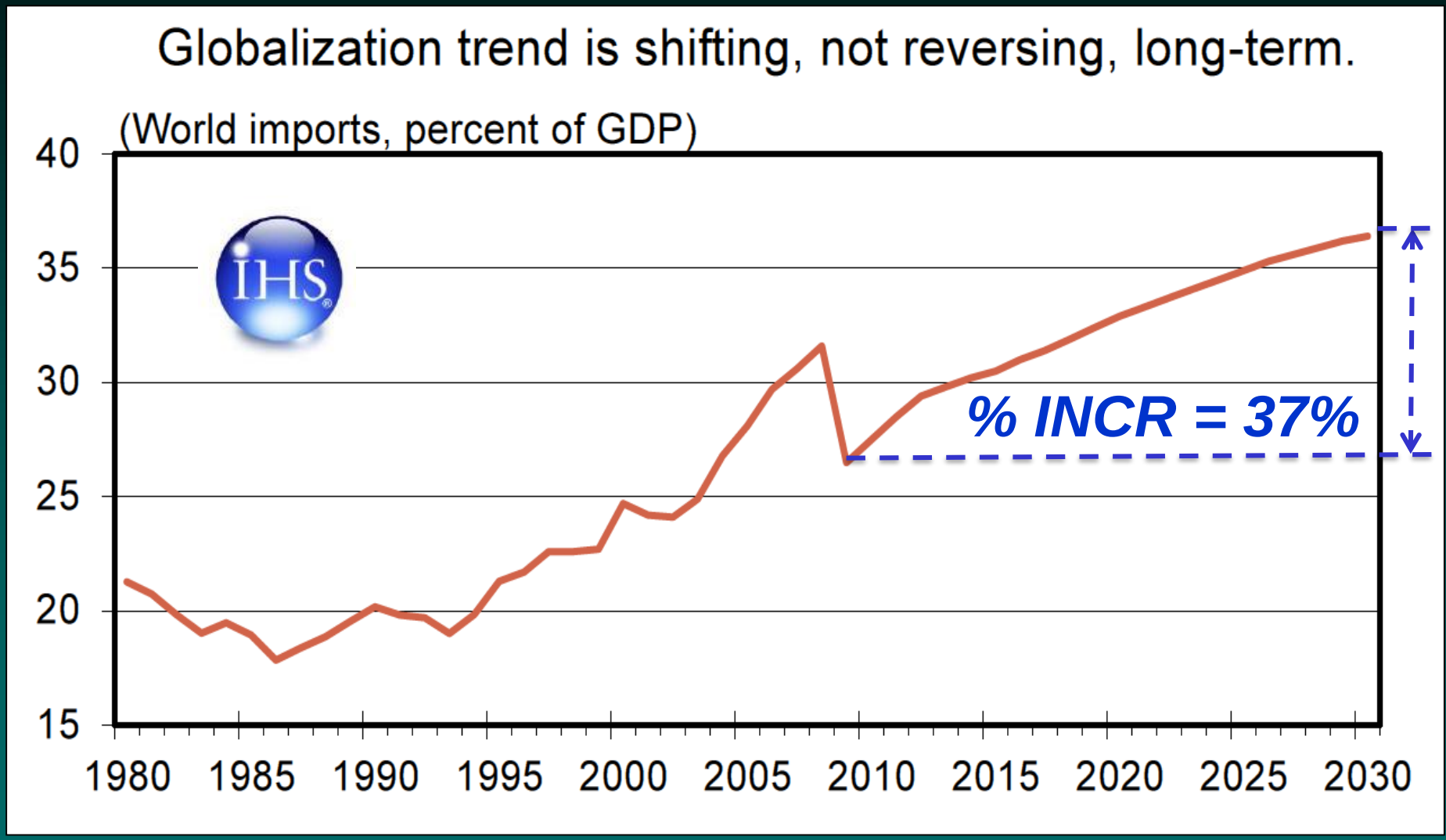
Growth in GDP and World Trade

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



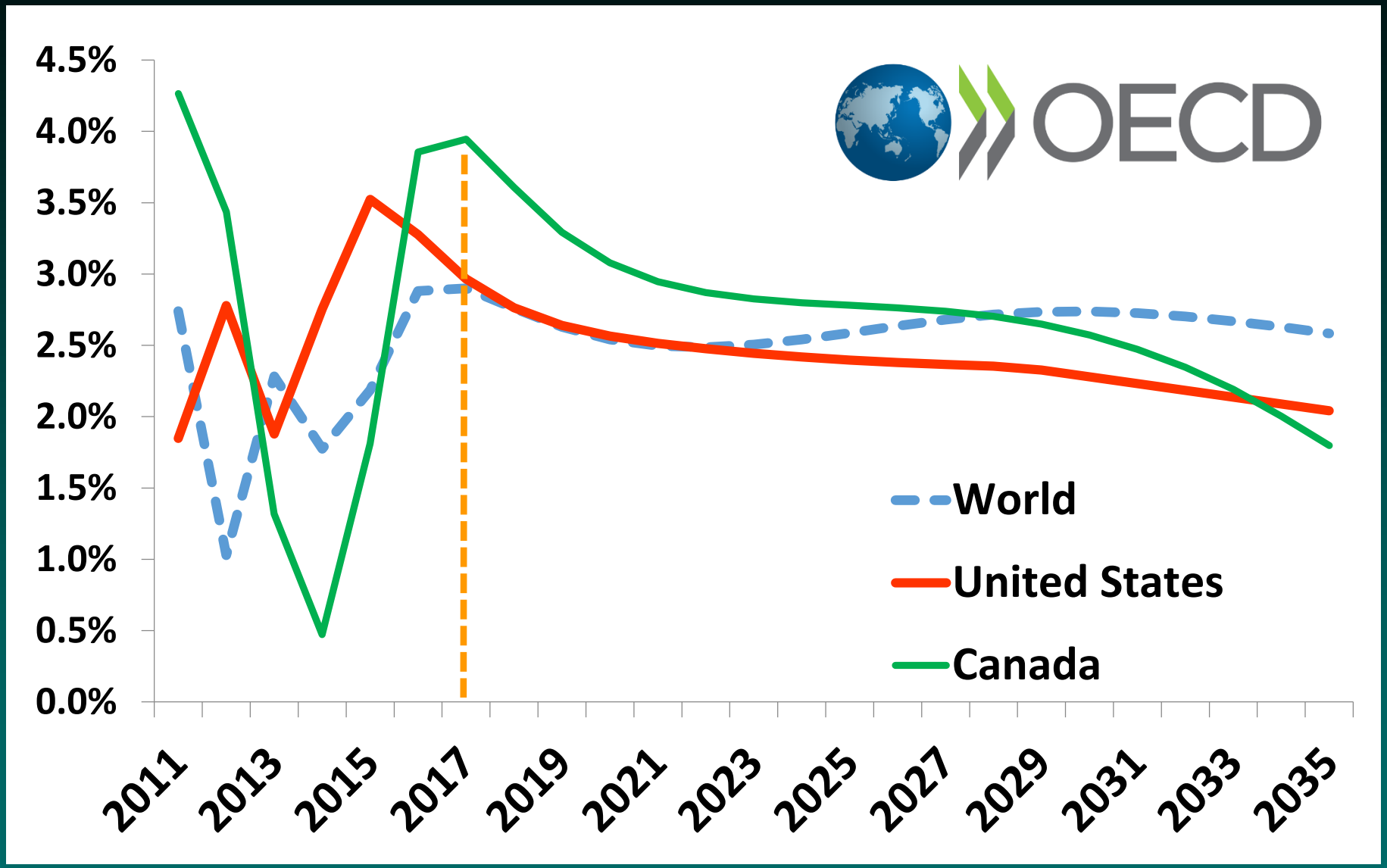
Source: Oxford Economics 2013

World Trade's Share of the Economy Grows Again



Source: IHS Global Insight – World Trade Service

Long Term GDP Annual Growth Rates



Source: OECD Economic Forecast May 2014

2017 AAPA Executive Management Conference

What/Who Determines Today's Logistics Trade Flows?

VICKERMAN & ASSOCIATES, LLC

Who Owns & Controls Today's Cargo?

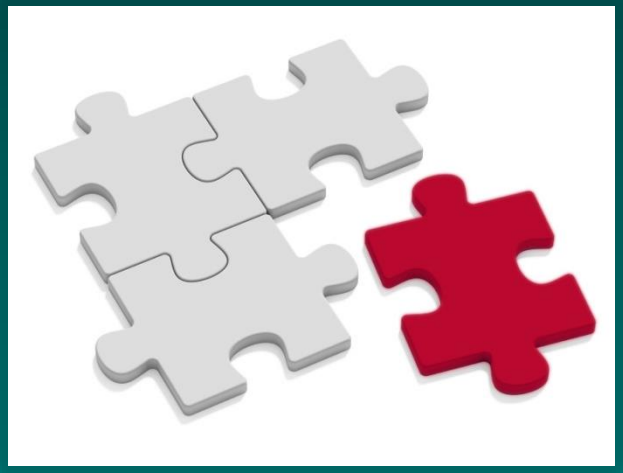
- The "***Shipper***" or "***Beneficial Cargo Owner***" ***(BCO)***
- **BCO** = **Importer of record**, the entity that physically takes possession of cargo at destination and **does not act as a third party** in the movement of such goods
- The person or company who is usually the **supplier or owner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

Key Success Factor:

Cargo Will Flow "*Downhill*" to the

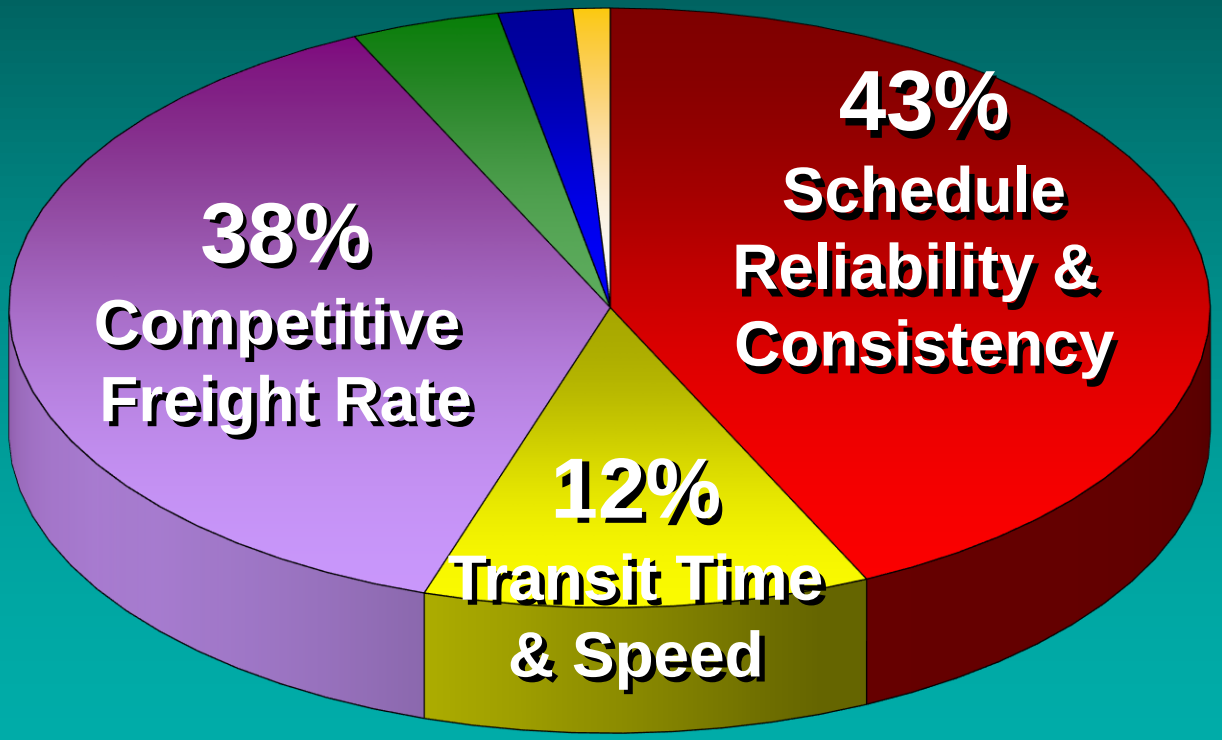
"*Lowest Cost - Best Service Levels*"

(Total Logistics Costs From Origin to Destination)



Above All Be MARKET DRIVEN

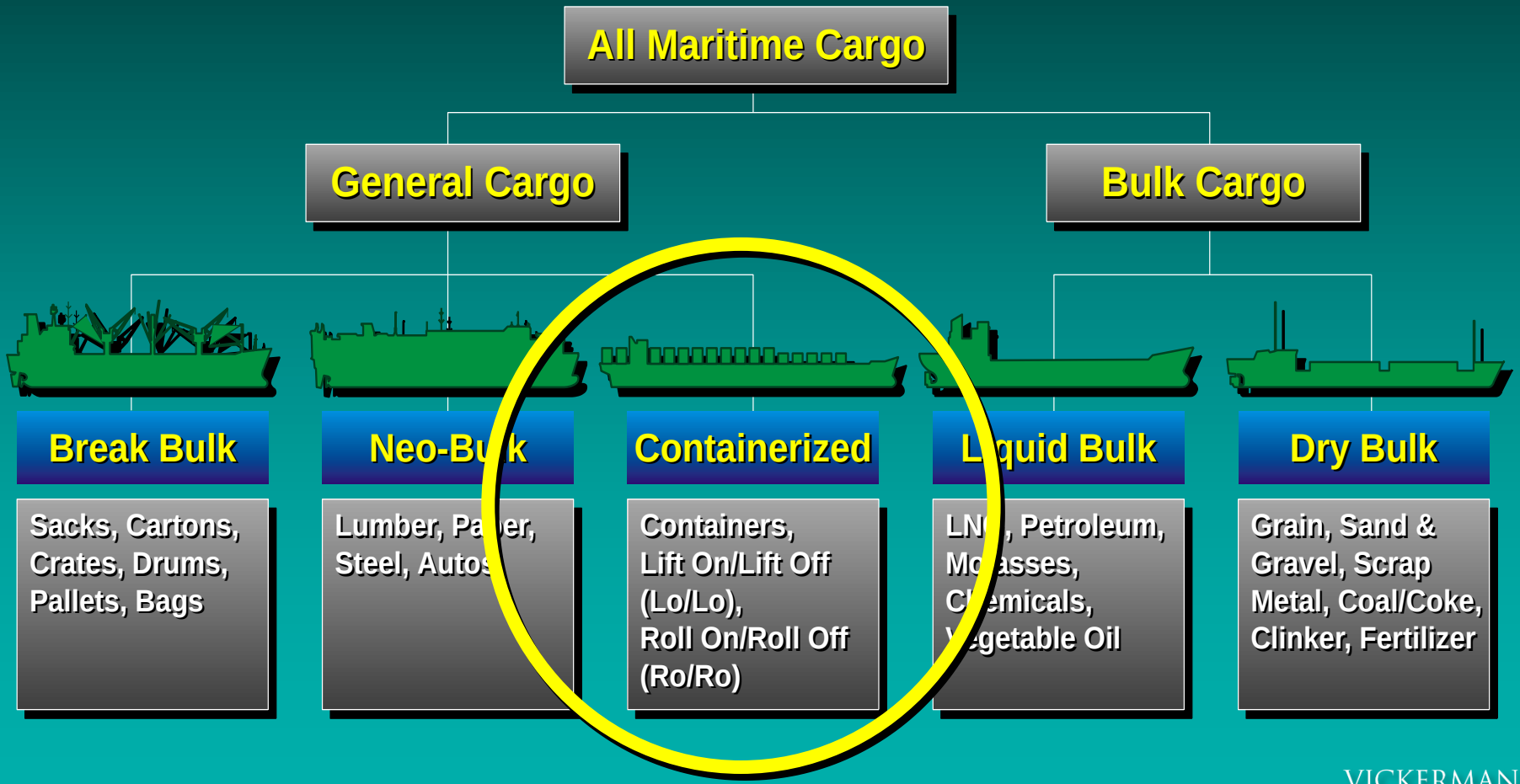
Poll of the Top 1000 "Blue Chip" Multinational Shipper Priorities



Today's Logistics Truth:

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

Functional Classification of Global Maritime Cargoes

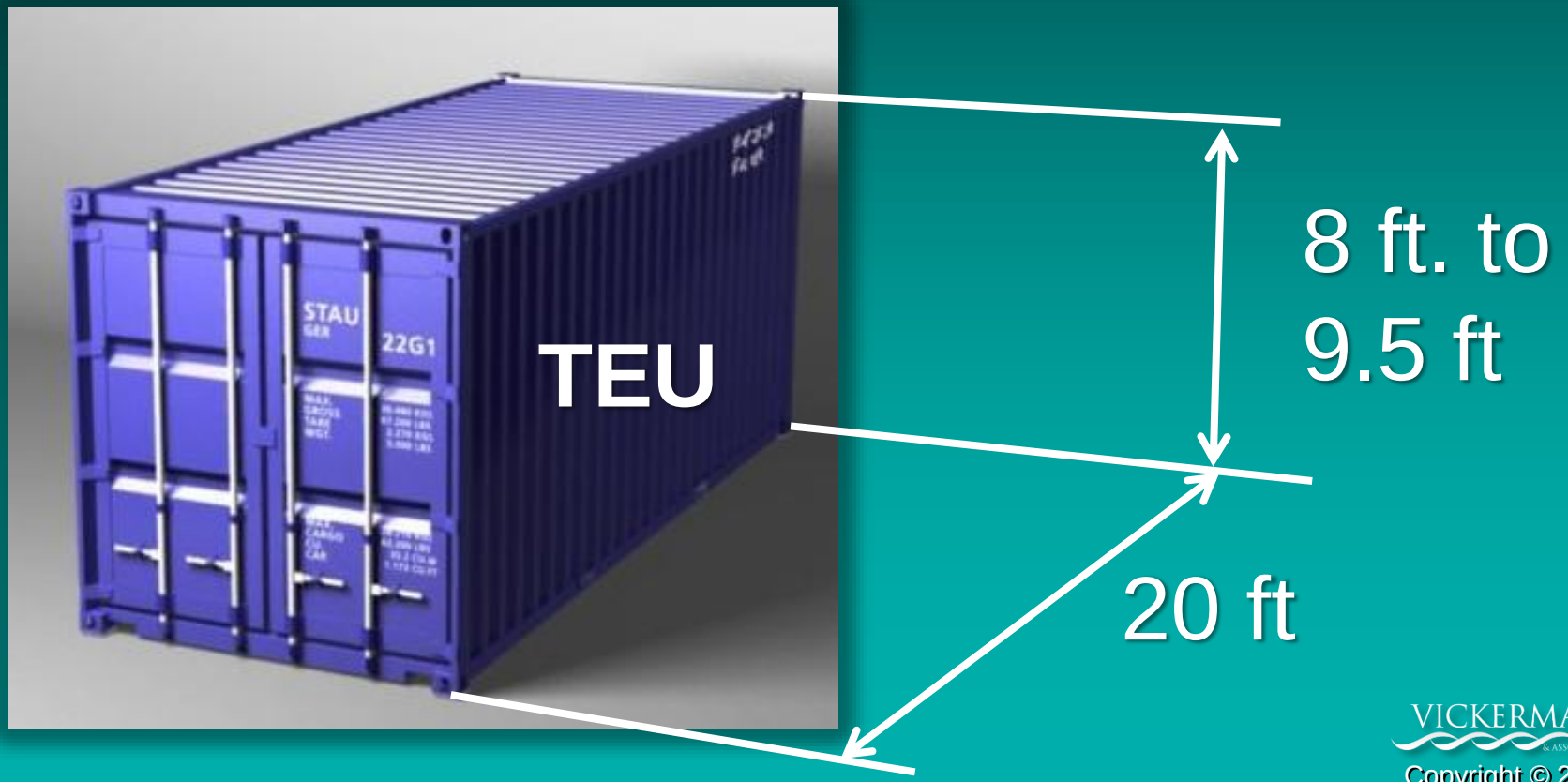


The TEU (Twenty Foot Equivalent Unit)

"The Port & Container Shipping Unit of Measure"

1 TEU = One 20 ft. ISO Container

1 FEU = 2 TEUs = One 40 ft. Container



VICKERMAN & ASSOCIATES, LLC

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

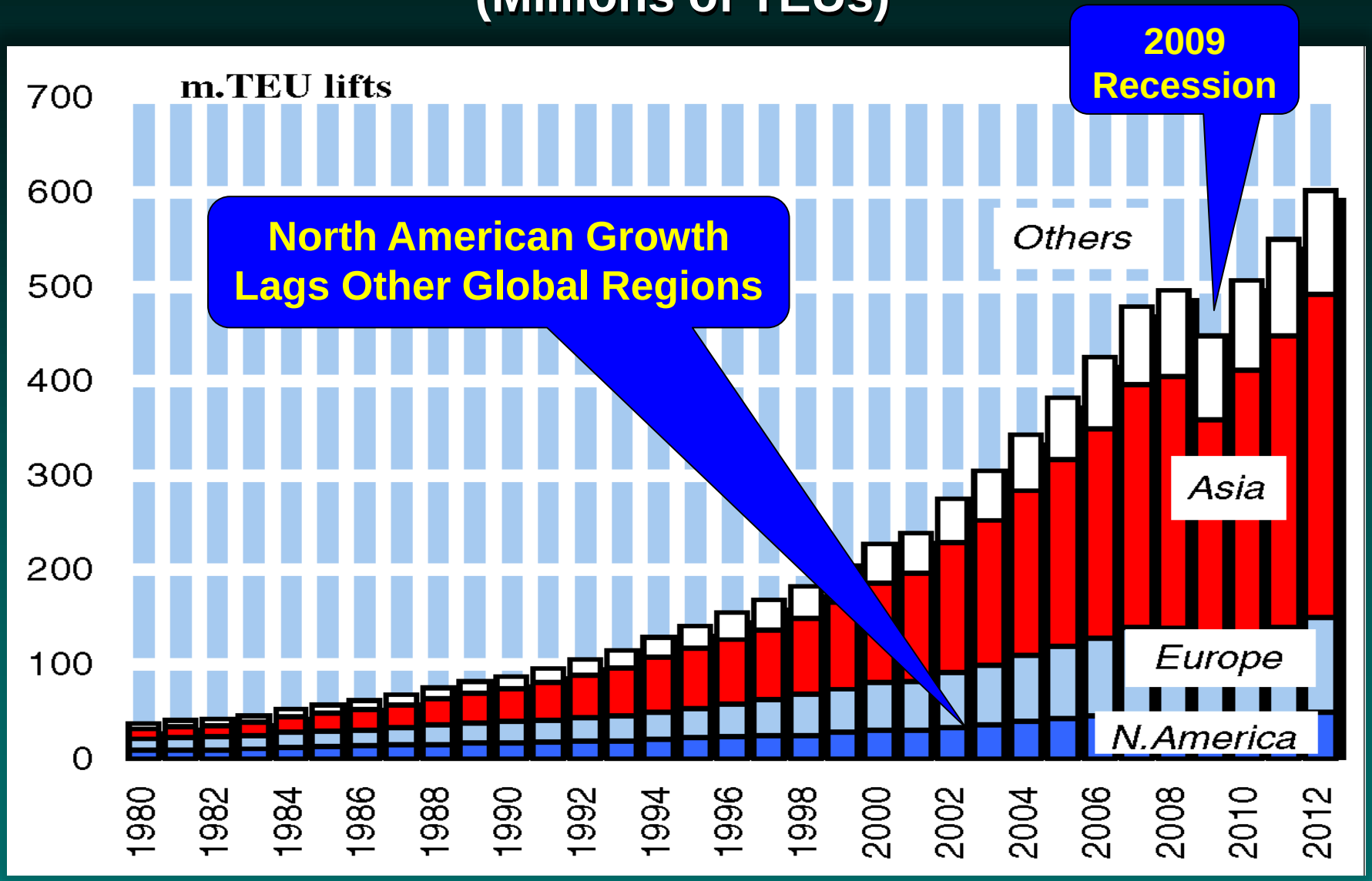
2017 AAPA Executive Management Conference

International Maritime Cargo Demand & Logistics Trends

VICKERMAN & ASSOCIATES, LLC

Historical Global Container Market Demand

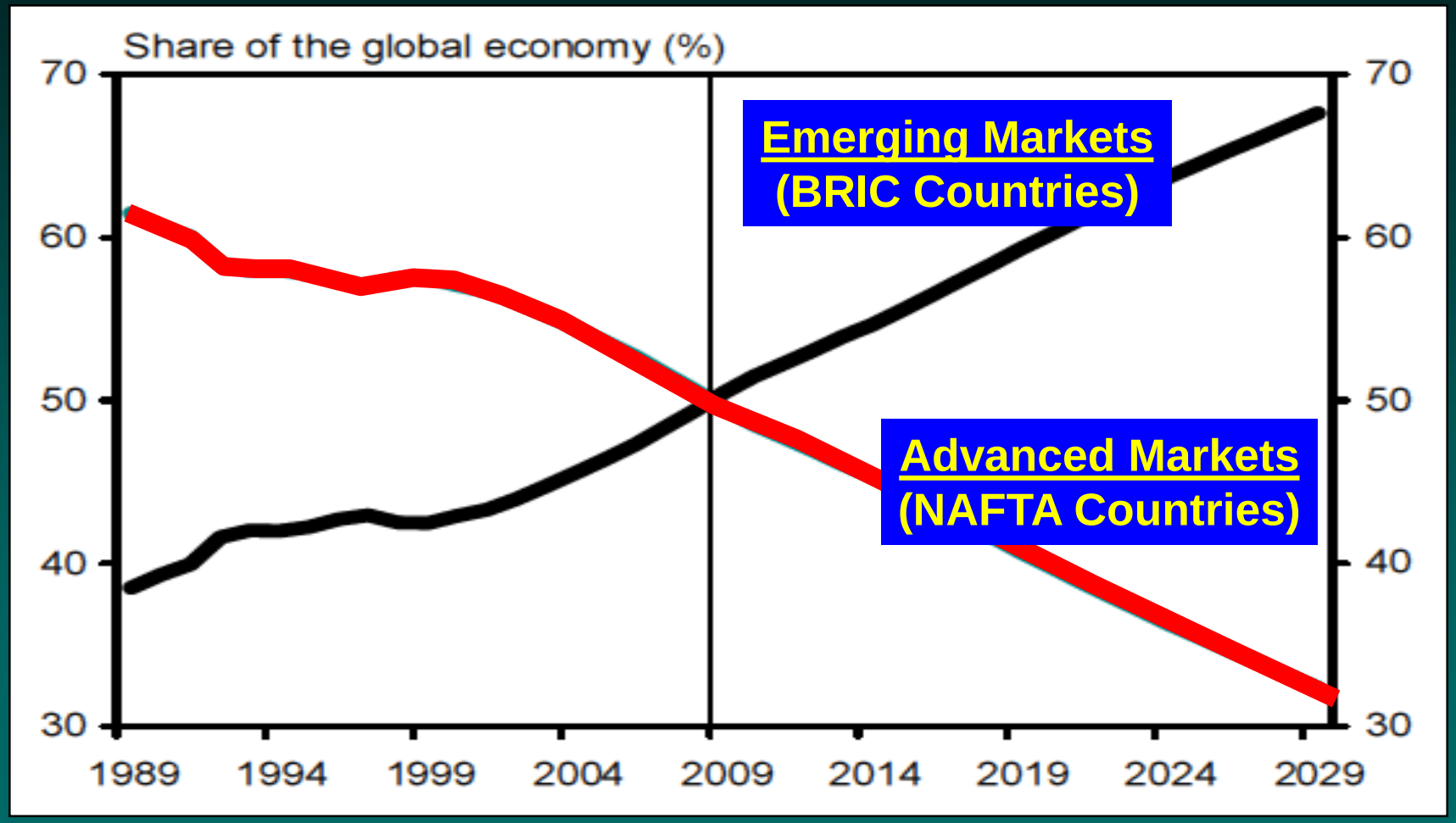
(Millions of TEUs)



Source: Drewry Shipping Consultants

A Turning Point in Global Economic History

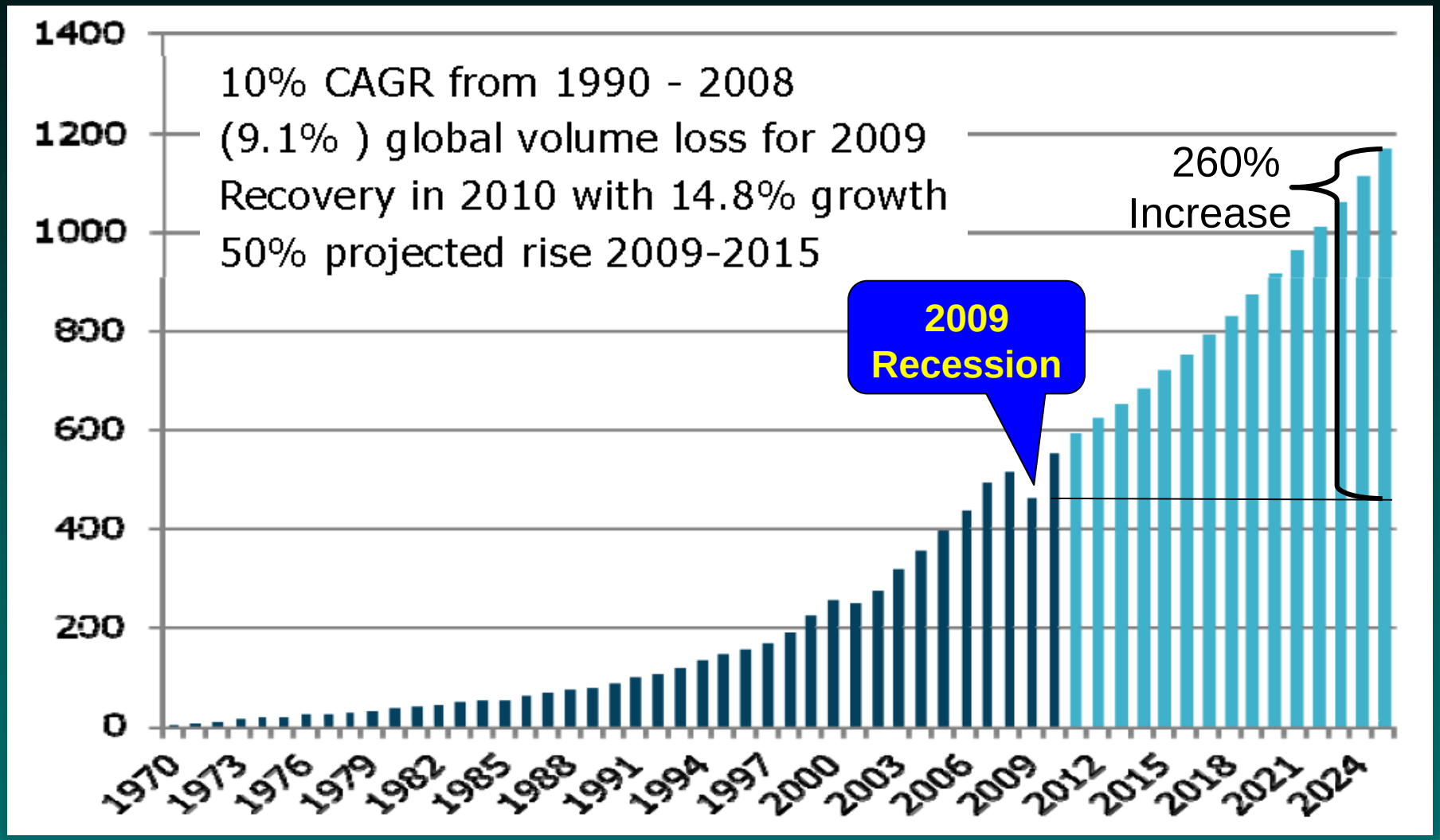
The Advanced Economies Will Decline From 2/3 share of the Global Economy to a 1/3 Global Share. The Global Economy Will See Higher Average Pace of Growth in the Future…



Source: IMF - Forecast by TD Economics, December 2009

2025 World Container Port Market Demand

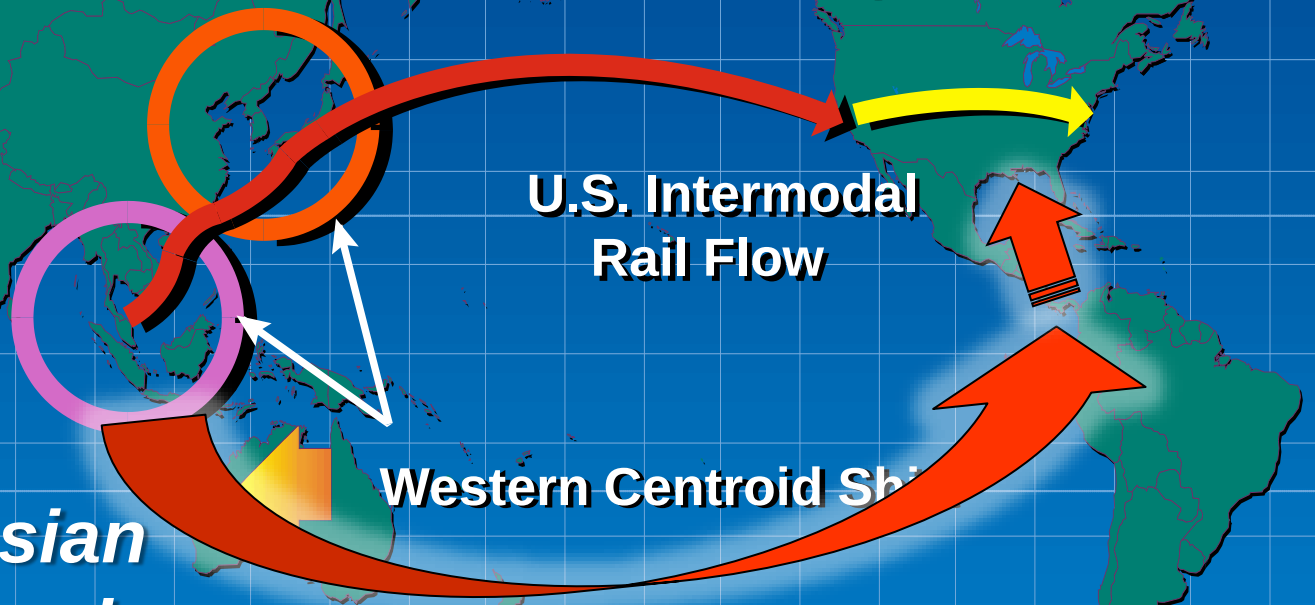
(Millions of TEUs)



Source: Drewry Shipping Consultants October 2011

Southeast Asian Manufacturing Centroid Shift

Current Inbound US Cargo Flow



Expanded Asian Panama Canal Post 2016 Flows

Eastbound: All Water Flow
Eastbound: US Intermodal Rail Flow

VICKERMAN & ASSOCIATES, LLC

Southeast Asian Manufacturing Centroid Shift

C Flow

U.S. Ir
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

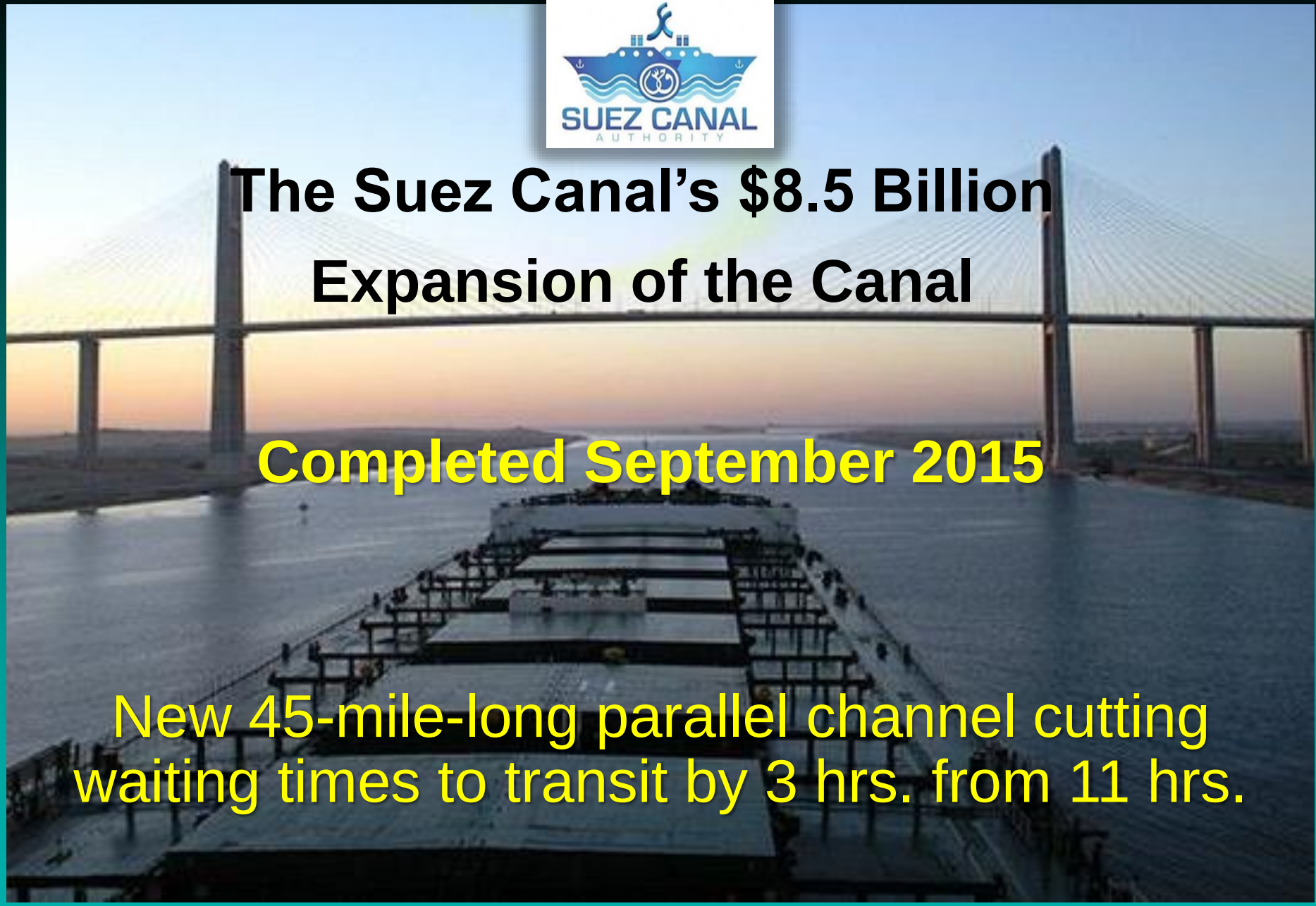
Suez Canal's $8.5 Billion Expansion Plan

(A New $4 Billion 45-mile-long parallel channel and Global Logistics Park)

3 Daily Convoys:

2 Northern Convoys
1 Southern Convoy

VICKERMAN & ASSOCIATES, LLC



The Suez Canal's $8.5 Billion Expansion of the Canal

Completed September 2015

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

VICKERMAN & ASSOCIATES, LLC

Dredging 180 Million Cubic Meters (35-kilometers-long and 24-meters-deep) Shipping Route in Less than One Year

VICKERMAN
& ASSOCIATES, LLC

Egyptian Jet Fighter Escort Selfie

(Taken with the New Expanded Suez Canal in the Background)

Source: Photo Courtesy of MIRASCO, August 2015

The Number of Ships Able to Navigate the Suez Canal Simultaneously Has Increased from 23 to 97, Thus Doubling the Suez Canal Capacity by 2023

2017 AAPA Executive Management Conference

The Continuing Asian Import Trade Challenge

VICKERMAN & ASSOCIATES, LLC

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

2015 Population:
US: 325 million
China: 1,400 million
(1/5 World – 19%)

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

VICKERMAN & ASSOCIATES, LLC

Shanghai International Shipping Center

Yangshan Deep Port & Logistics Park

New Logistics Park

20 Mile New Port Access Bridge Constructed in 3 yrs

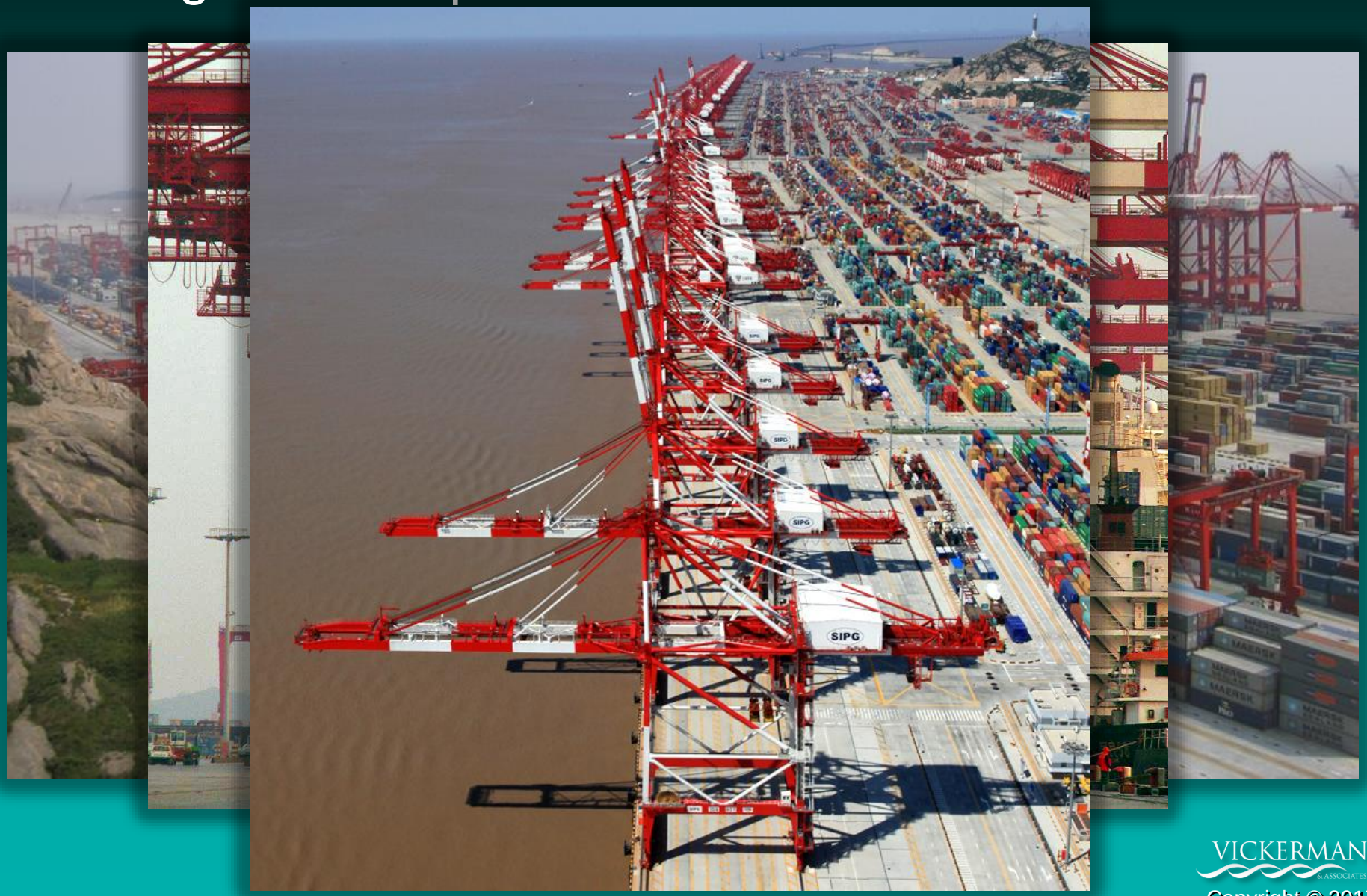
VICKERMAN & ASSOCIATES, LLC

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 & ASSOCIATES, LLC

Shanghai International Shipping Center

Yangshan Deep Port & Logistics Park

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

VICKERMAN & ASSOCIATES, LLC

2017 AAPA Executive Management Conference

Emerging New Economic Global Drivers

(~~BRIC~~ → ASEAN 2017) + India

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 & ASSOCIATES, LLC

Asian Hourly Wage Rates in US Dollars

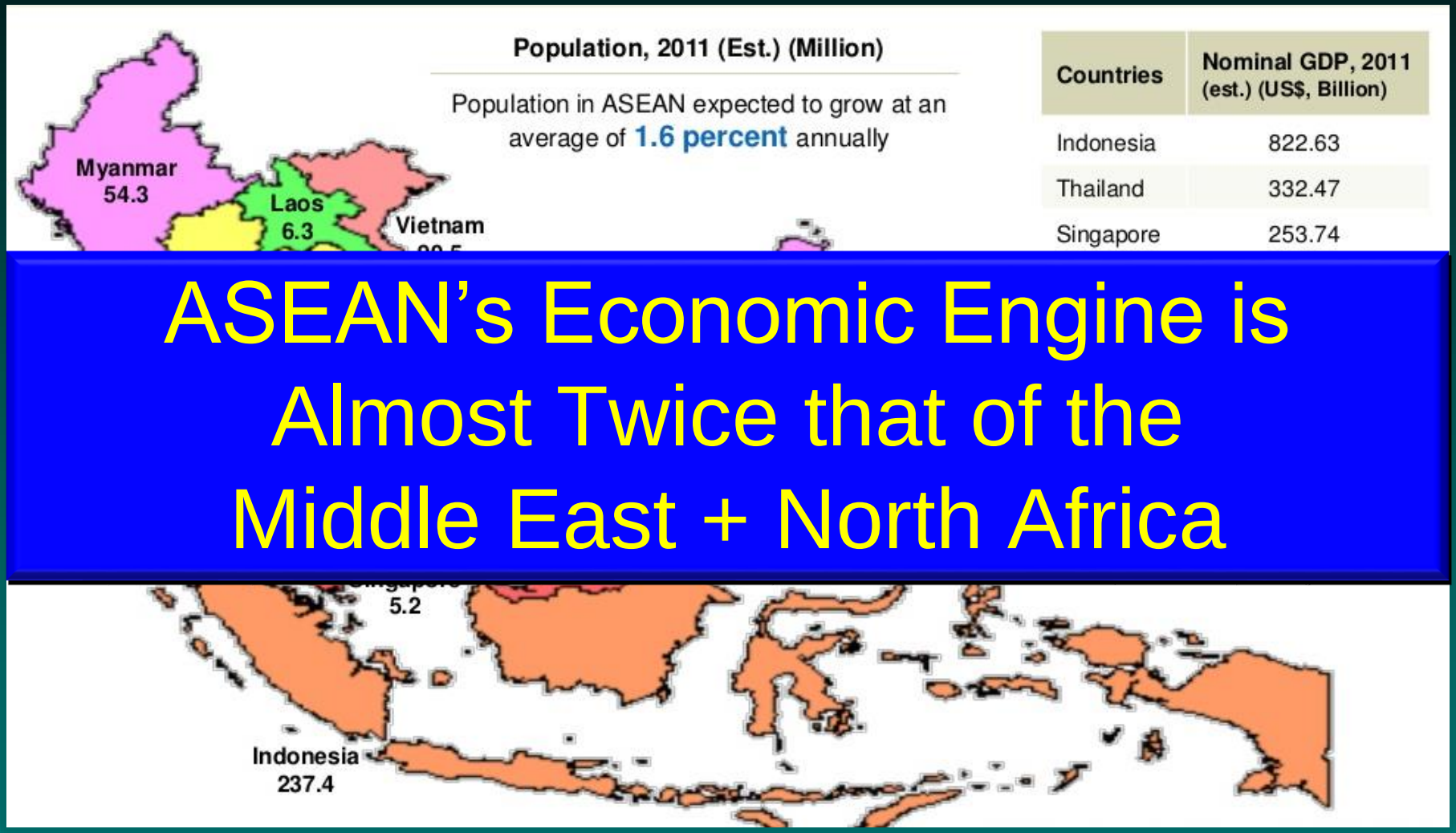
	2008	2009	2010*	2011*	2012*	2013*	2014*	2015*
CHINA	1.56	1.63	1.83	2.16	2.51	2.90	3.2[illegible]	3.66
HONG KONG	7.24	7.27	7.42	7.64	7.95	8.27	8.68	9.11
INDIA	0.50	0.49	0.53	0.57	0.61	0.66	0.7[illegible]	0.78
INDONESIA	0.51	0.51	0.59	0.67	0.77	0.88	0.98	1.08
JAPAN	24.30	26.23	22.59	21.70	20.41	19.81	19.51	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

Association of Southeast Asia Nations (ASEAN)
2015 ASEAN CONNECTIVITY

47 New Seaports Will Be Built Across ASEAN

ASEAN Has a Population of 600 million People and a GDP of over US $2.1 Trillion

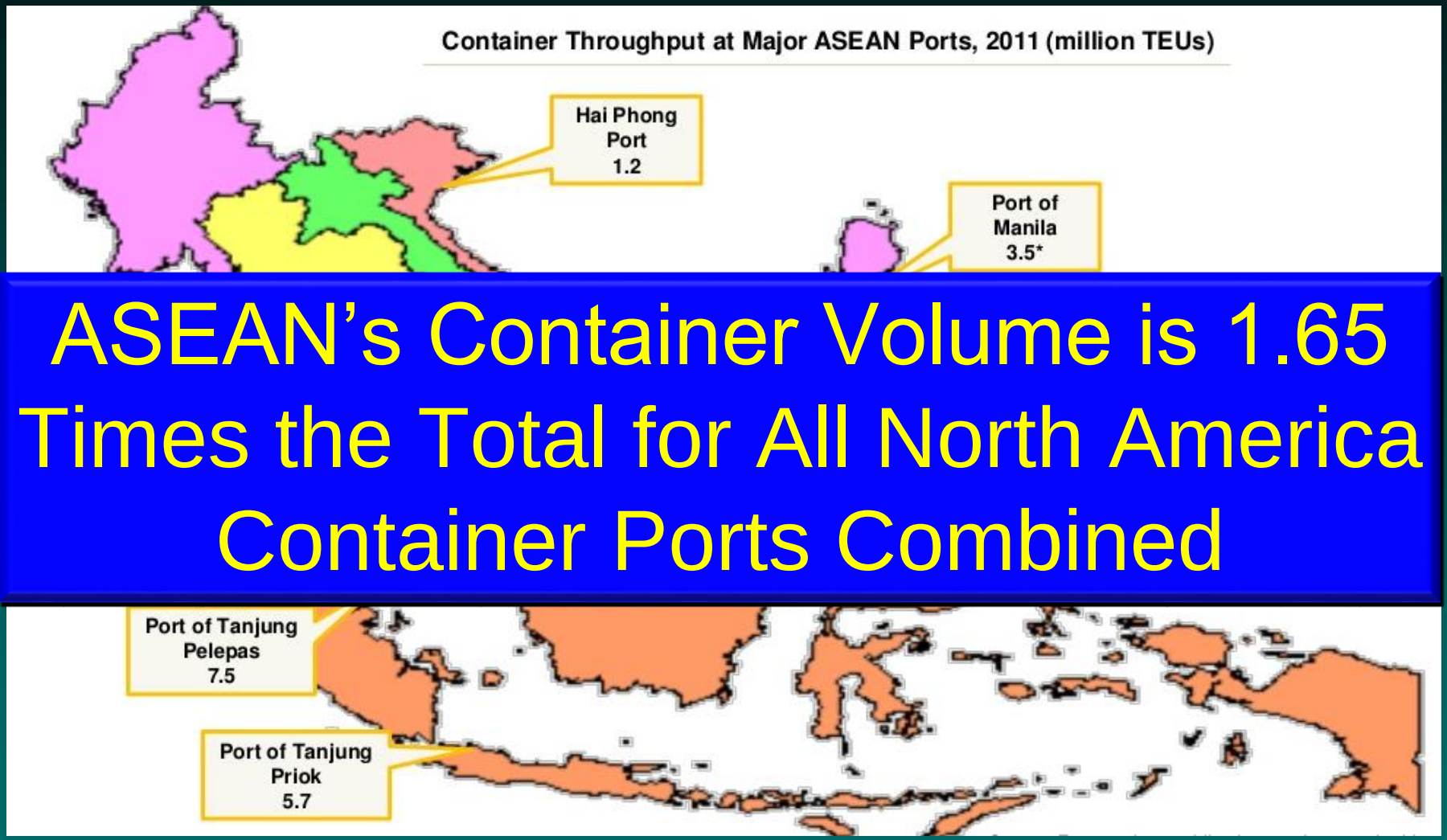


Countries	Nominal GDP, 2011 (est.) (US$, Billion)
Indonesia	822.63
Thailand	332.47
Singapore	253.74

ASEAN's Economic Engine is Almost Twice that of the Middle East + North Africa

Source: ASEAN.org, International Monetary Fund, World Bank, Frost & Sullivan

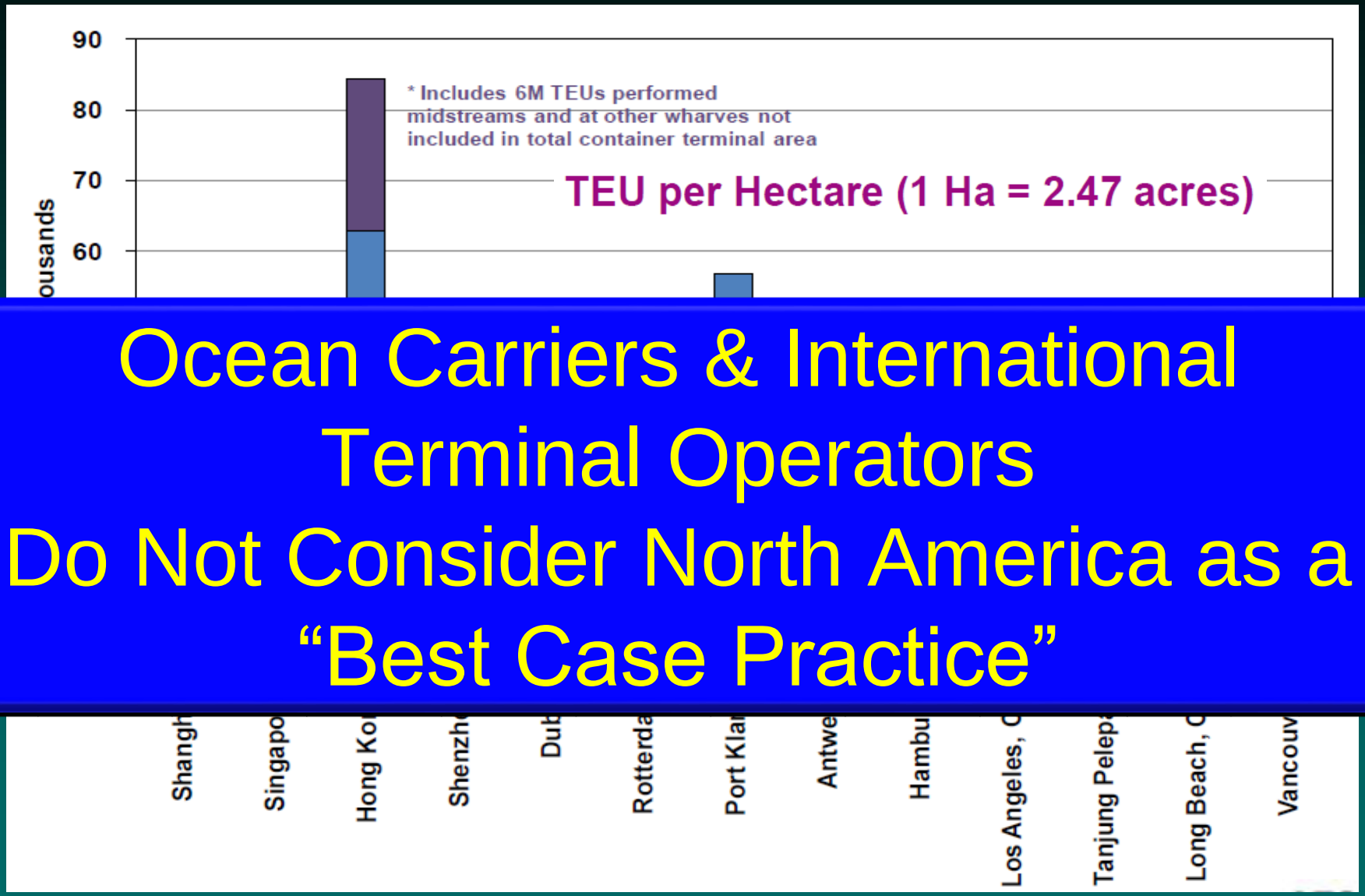
Nine ASEAN Ports Handled More Than 66.3 million TEUS in 2011 (80% of all ASEAN Cargo)



ASEAN's Container Volume is 1.65 Times the Total for All North America Container Ports Combined

Source: ASEAN.org, Frost & Sullivan

Top Global Container Port Productivity



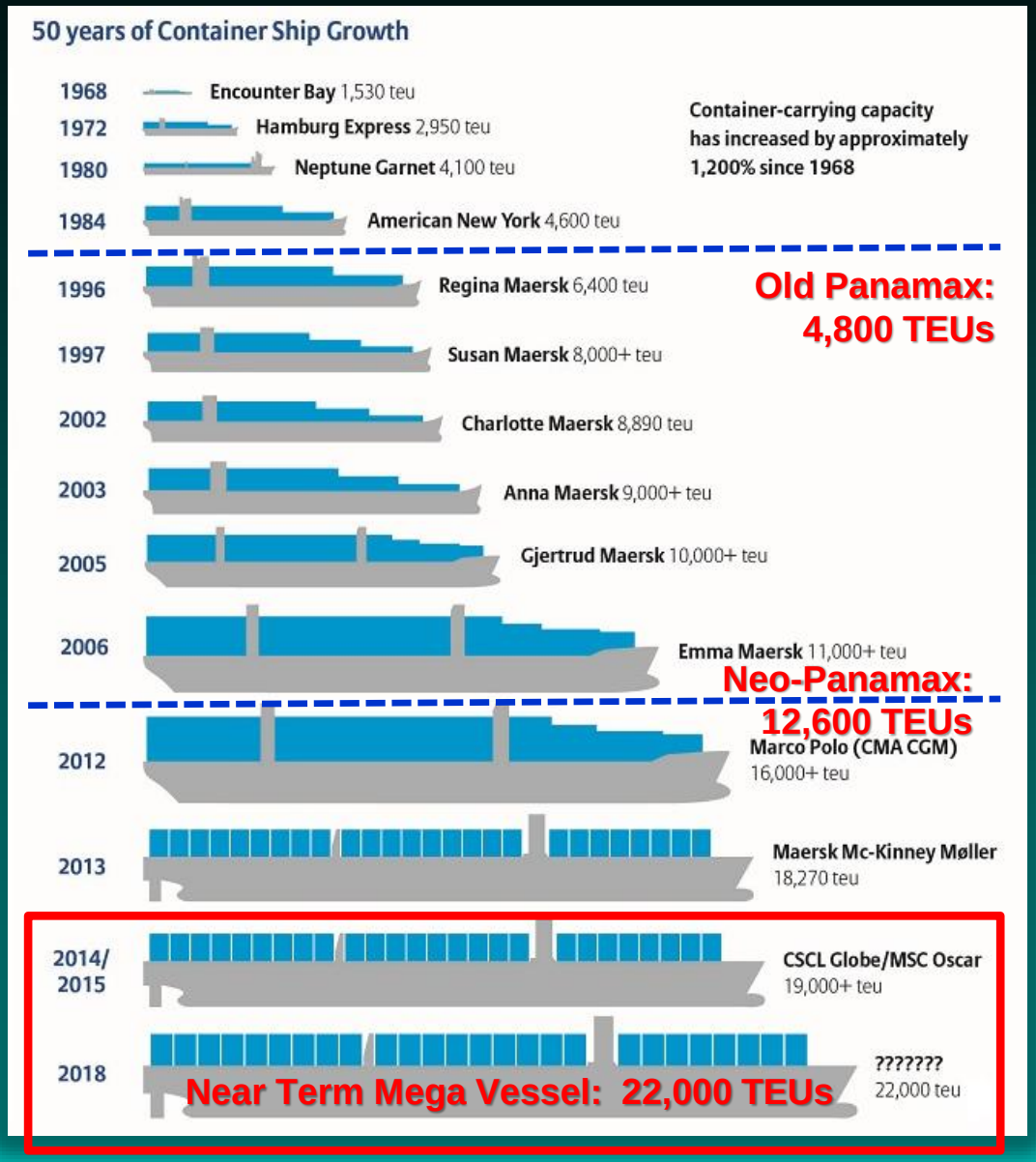
Ocean Carriers & International Terminal Operators Do Not Consider North America as a "Best Case Practice"

2017 AAPA Executive Management Conference

Maritime Vessel Technology Trends: *Emergence of the Neo-Panamax Vessel*

VICKERMAN & ASSOCIATES, LLC

50 Years of Container Vessel Evolutionary Growth



Source: Allianz Global Corporate & Specialty - Data: Container-Transportation.com

VICKERMAN & ASSOCIATES, LLC

World Container Ship Evolution

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

The Stage is set to Jump again to 25,000 TEU Mega Container Vessels

Largest Container Vessel to Call in North America:

(December 26, 2015 APMT POLA - CMA CGM Benjamin Franklin
1,300 ft. LOA and 177 ft. beam, 18,000 TEUs)

***1.5** times the Size of the Expanded Panama Canal*

The massive Benjamin Franklin was turned in 56 hours of operations, averaging 29.1 lifts per crane, per hour, averaging total 200 container moves against the vessel each hour, for a total of 11,200 lifts. The APM Terminal in Los Angeles worked as many as nine ship-to-shore cranes simultaneously against the Benjamin Franklin during its three and one-half day call.

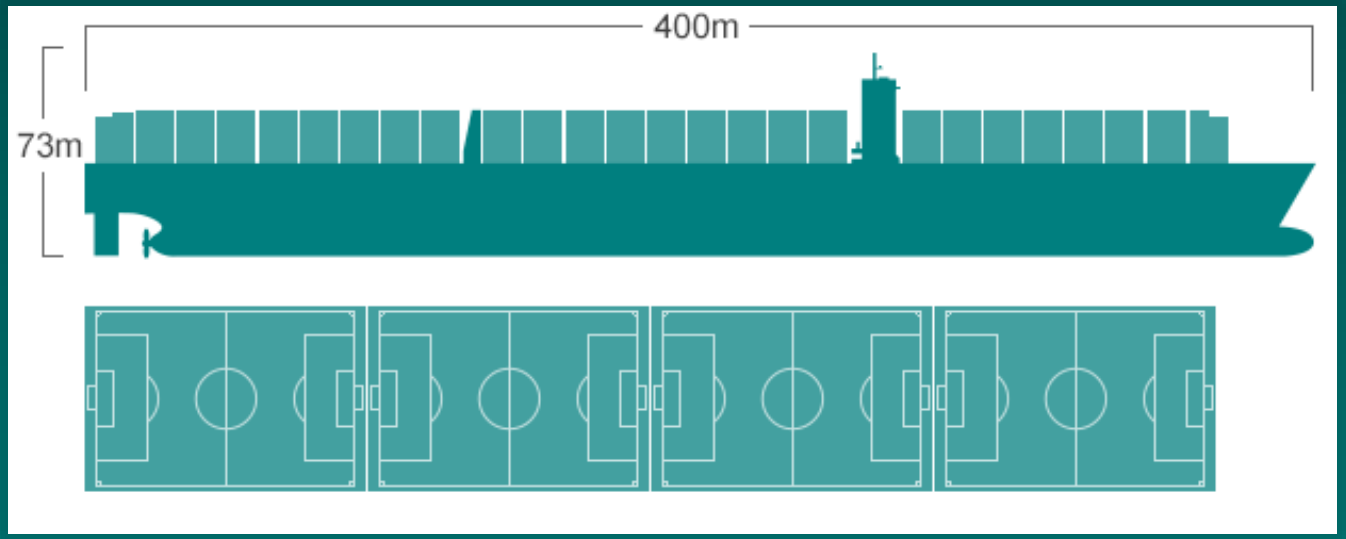
VICKERMAN & ASSOCIATES, LLC

The World's Largest ContainerShip:

(China Shipping Container Lines (CSCL) "CSCL GLOBE"

中国海运(集团)总公司

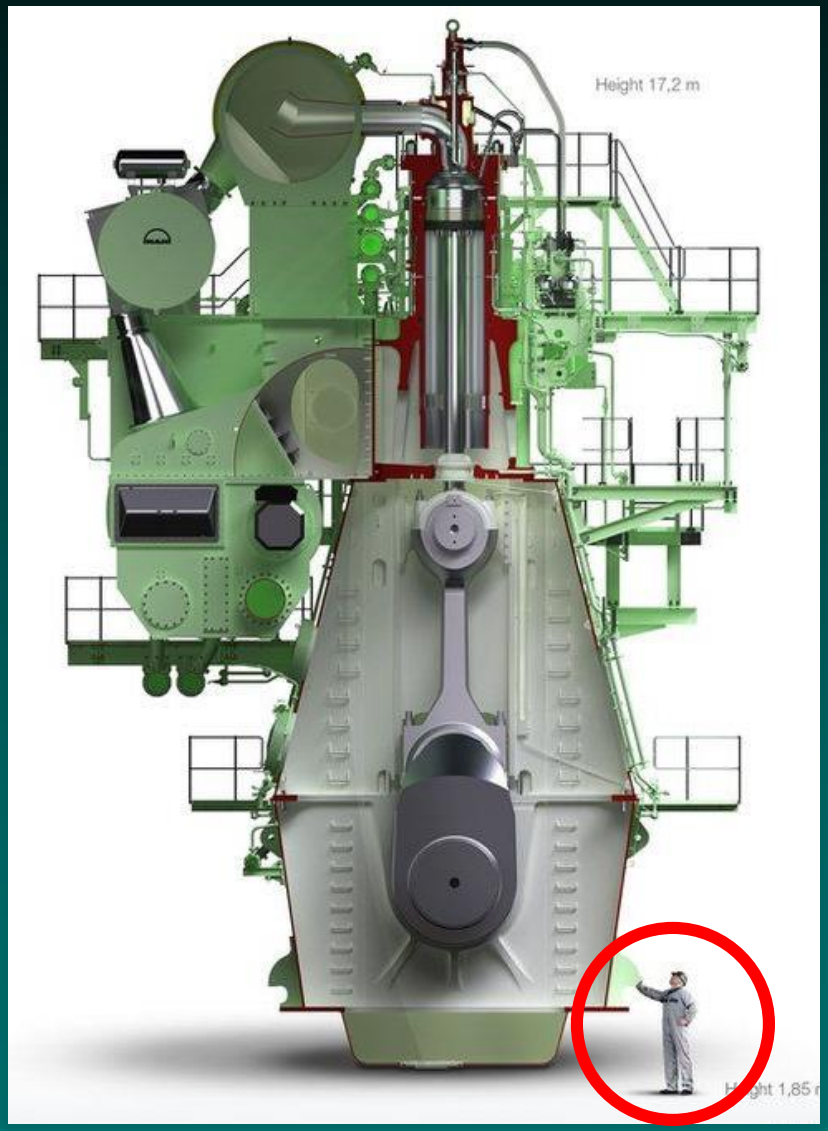
China Shipping Container Lines has invested $700m (£463m) in building the five Globes.



BBC Source: BBC News Magazine, January 2015

The World's Largest Containership:

(China Shipping Container Lines (CSCL) "CSCL GLOBE"



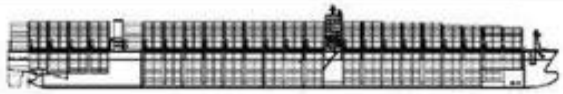
CSCL Globe: The two-stroke engine, built in South Korea, operates at 56.8 megawatts.

It's estimated that the Globe's engine, which automatically adjusts fuel consumption based on the ship's speed and sea conditions, uses one fifth less per container than a vessel carrying 10,000 containers.

Globe's crew is only 23 people work on board during voyages.

BBC Source: BBC News Magazine, January 2015

What are CURRENT DRAFTS AND BEAMS of New Container Vessels – Why are US Ports Dredging to 50 feet?

		TEU tdw = tonn. portata lorda	LUNGHEZZA m	LARGHEZZA m	PESCAGGIO m	File containers
Jiangnan Changxing Hull H6002 **CMA CGM TBN** 2015 Sep		17,859 TEU ~185,000 tdw	399.0	54.0	16.0	21
Hyundai Samho Hull S746 **UASC TBN** 2015 Apr		18,800 TEU ~195,000 tdw	400.0	58.6	16.0	23
DSME Hull 4277 **MSC TBN** 2015 Jan		18,400 TEU ~195,000 tdw	395.4	59.0	16.0	23
Hyundai H.I. Hull 2696 **CSCL GLOBE** 2014 Nov		19,000 TEU ~195,000 tdw	400.0	58.6	16.0	23
DSME Hull 4250 **MAERSK McKINNEY MOLLER** 2013 Jun		18,270 TEU 194,153 tdw	399.0	59.0	16.0	23
DSME Hull 4161 **CMA CGM MARCO POLO** 2012 Nov		16,020 TEU 187,625 tdw	396.0	53.6	16.0	21
Odense Hull 203 **EMMA MAERSK** 2006 Aug		15,550 TEU 156,907 tdw	397.7	56.4	16.0	22

come pubblicizzato

ALPHALINER

Answer:

Length:	up to	400.0 m	1312.34 ft
Breadth	up to	59.0 m	193.57 ft
Load Draft	up to	16.0 m	52.49 ft

TEU Capacity up to 19,000 TEUS and 23 container wide

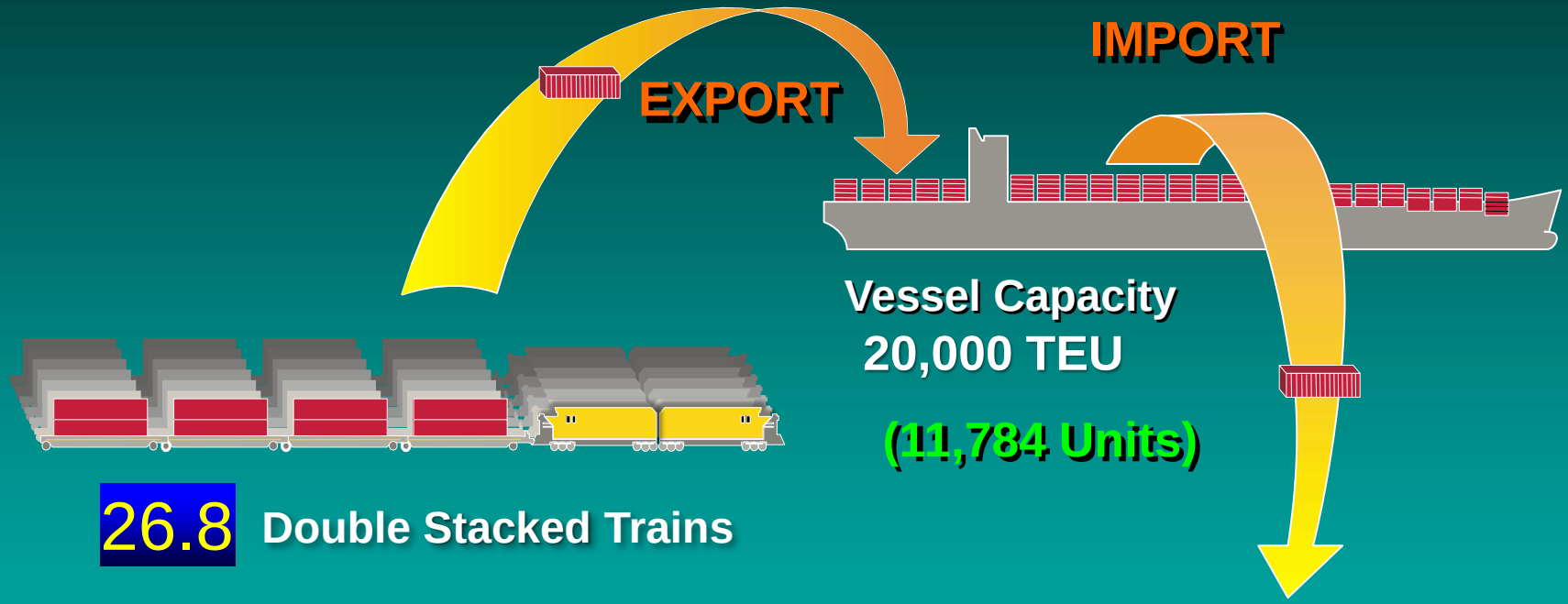
VICKERMAN & ASSOCIATES, LLC

2018: Ultra-Large 20.000 TEUs Container Ships

2015: Maersk Planning Orders up to
10 New 20,000 TEU Ships ($1.5 Billion Order),
Evergreen, Seaspan and United Arab Shipping Company (UASC)
are also looking at 20,000 TEUs

VICKERMAN & ASSOCIATES, LLC

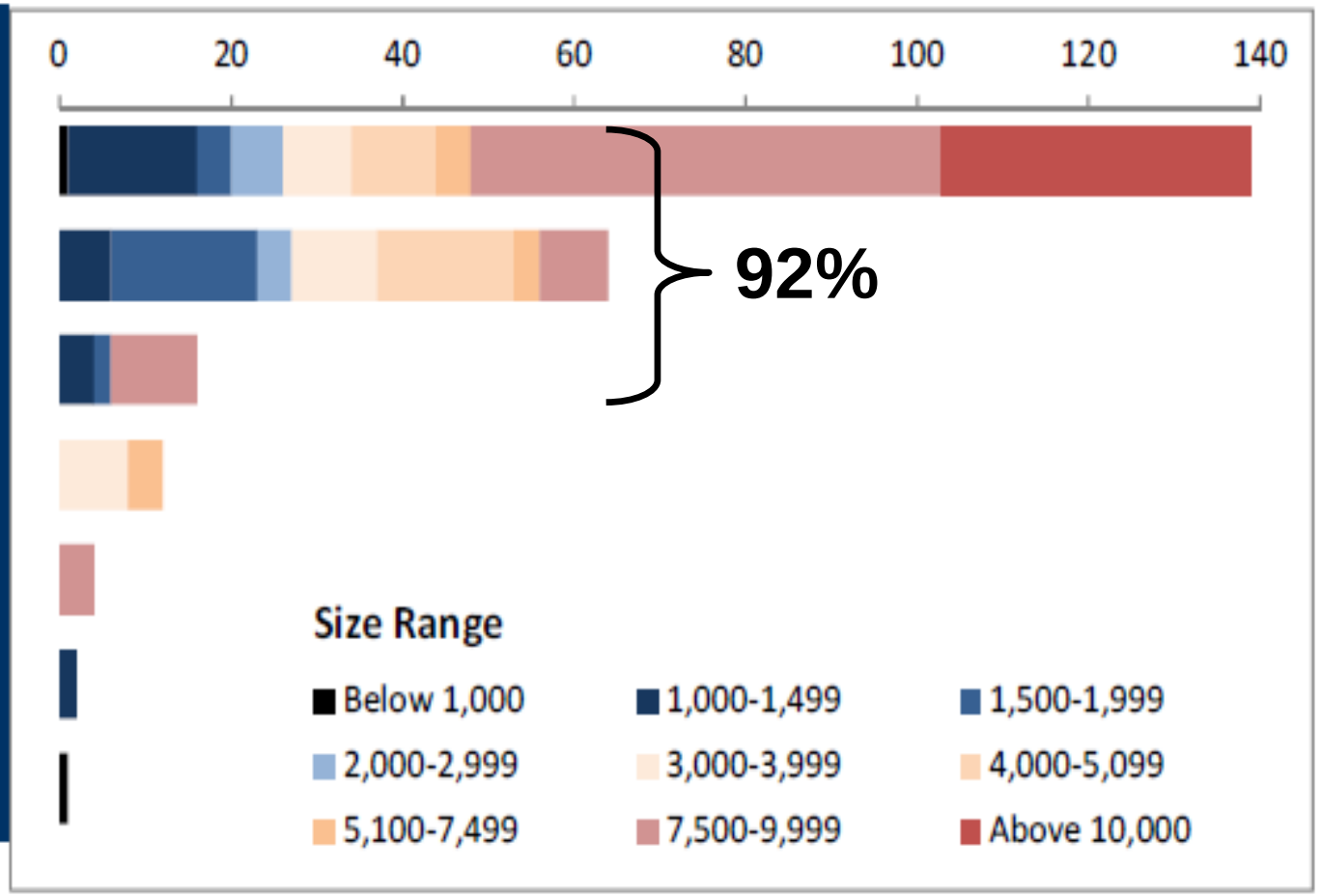
A 20,000 TEU Mega-Container Vessel Can Produce High Intermodal Rail Volumes For One Weekly Vessel Call)



Containership Orders – Country of Build

(Orders Since January 2010)

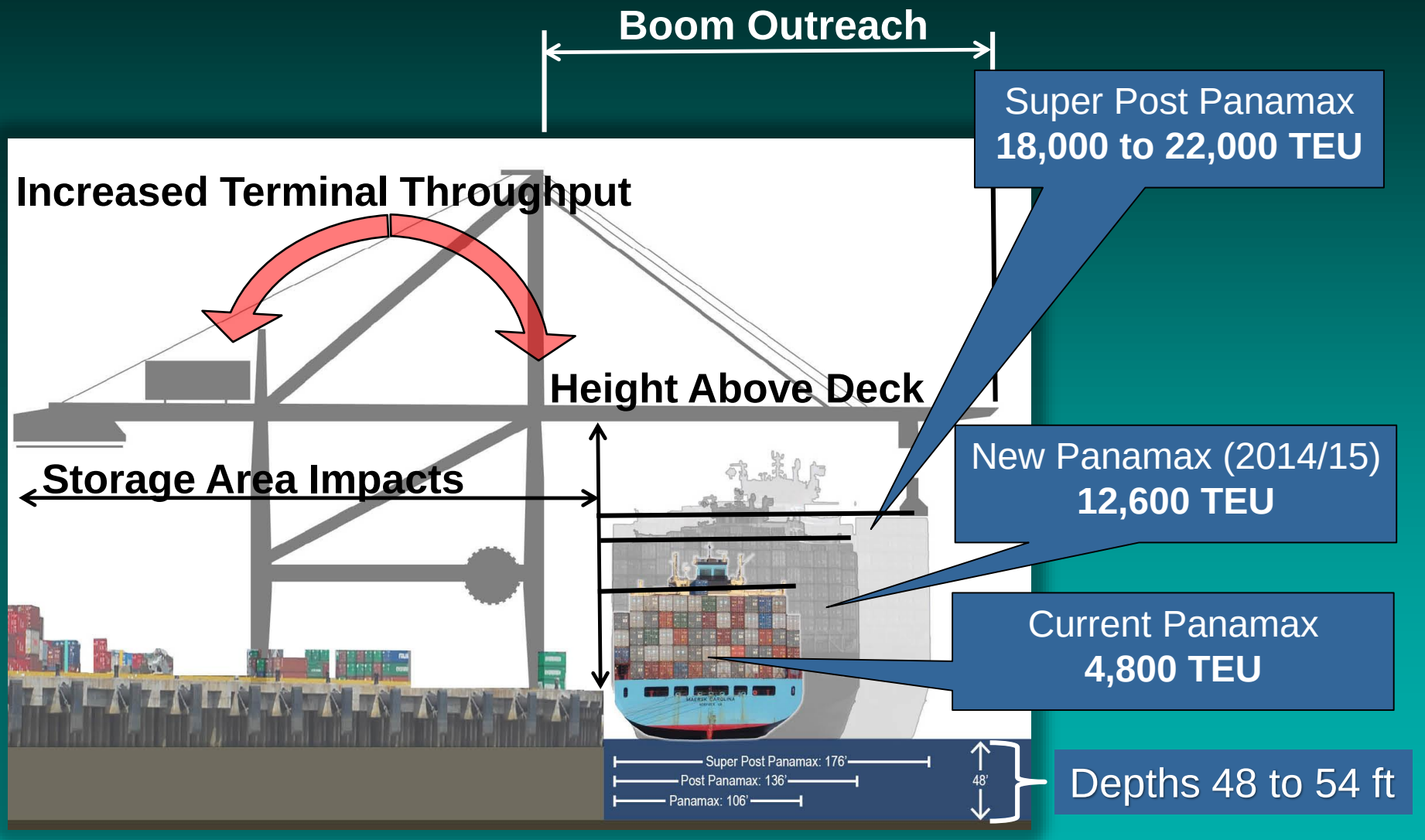
Country	Units
S Korea	139
China	64
Taiwan	16
Philippines	12
Romania	4
Japan	2
Germany	1



Source: Alphaliner Newsletter Volume 2011 Issue 21

Vessel Size Expansion - Terminal Impacts

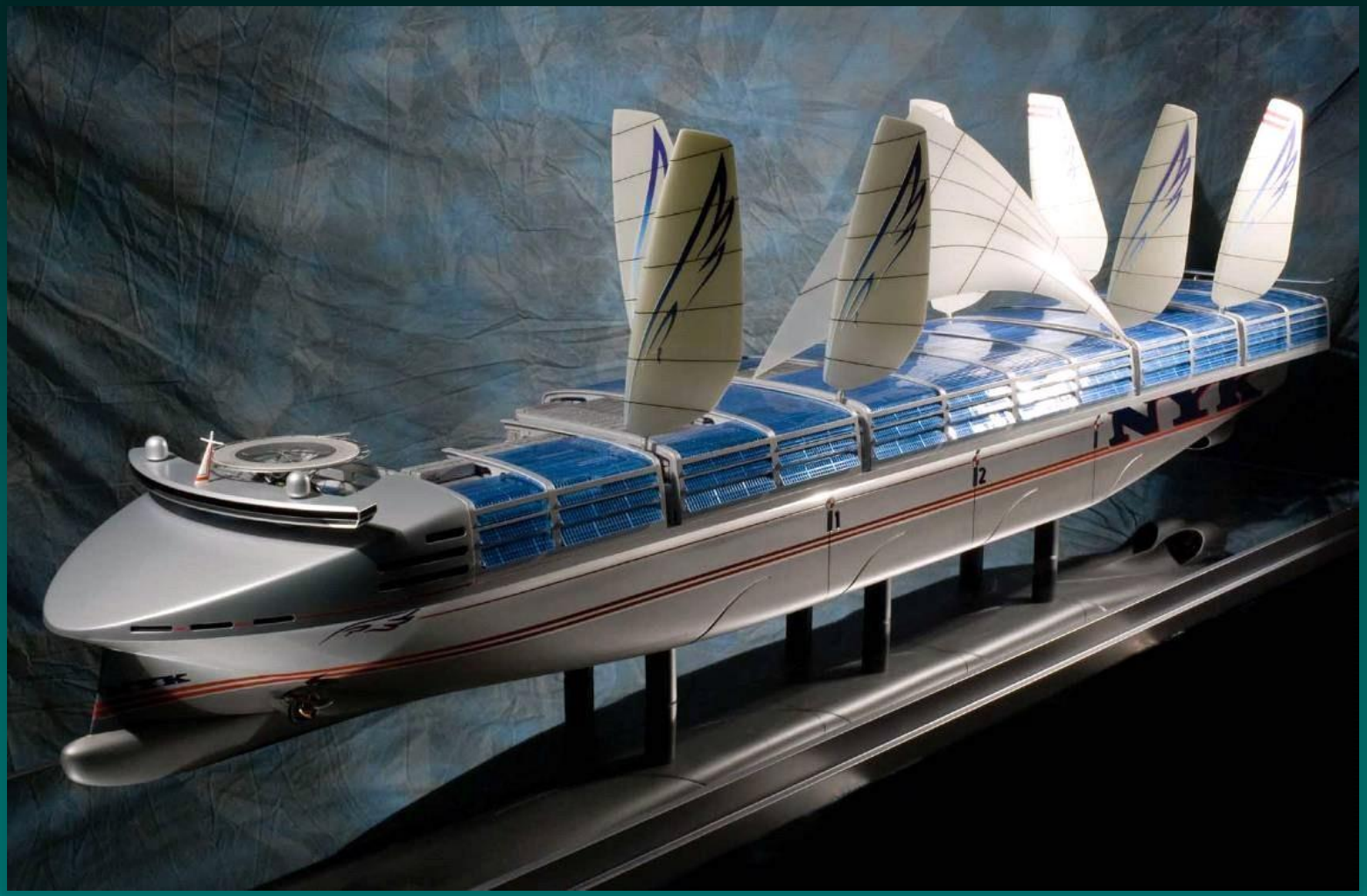
(Port Terminal Infrastructure & Equipment Geometry Impacts)



Source: Georgia Ports Authority and Vickerman & Associates

NYK LOGISTICS & MEGACARRIER

Future Container Vessel: NYK Super Eco Ship



NYK LOGISTICS & MEGACARRIER

Future Container Vessel: NYK Super Eco Ship

VICKERMAN & ASSOCIATES, LLC

2017 AAPA Executive Management Conference

North American Inland Waterway Vessel Evolution

Focus Container On Barge (COB)

VICKERMAN & ASSOCIATES, LLC

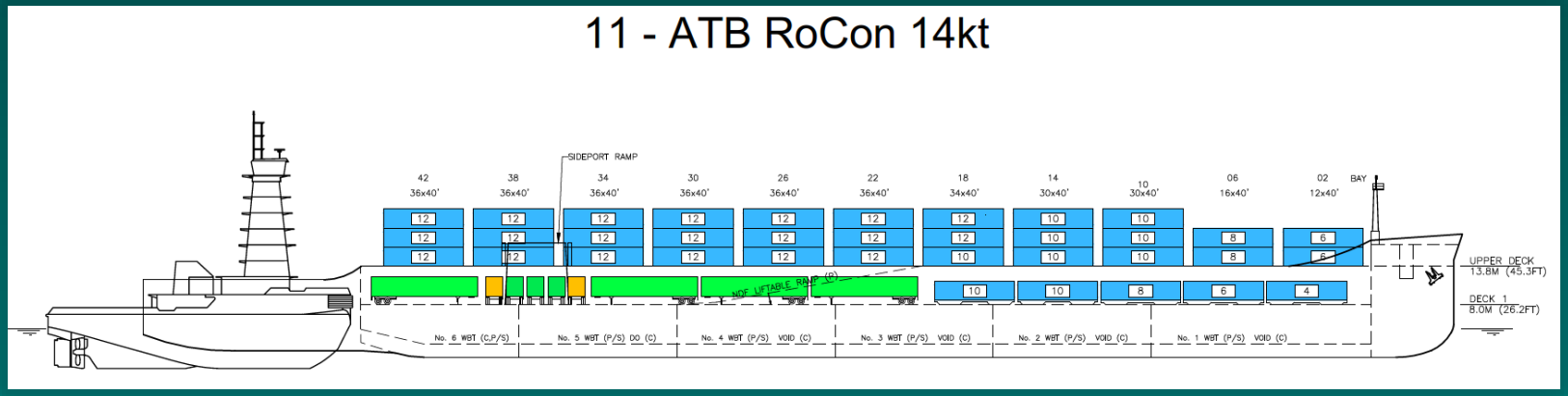
“Deck” Barge Loaded with Containers

“Hopper” Barge Loaded with Containers

Source: USDOT Maritime Administration MARAD

Proposed Domestic AMH/Short Sea Container Services

Proposed New England Marine Highway Project's articulated tug barge short sea container service connecting New York City and Portland, Maine - 900 TEUs



Proposed MARAD ATB Ro/Con – HEC Design - 886 TEUs, Design Draft 14.1 ft. – 14 Knots

VICKERMAN & ASSOCIATES, LLC

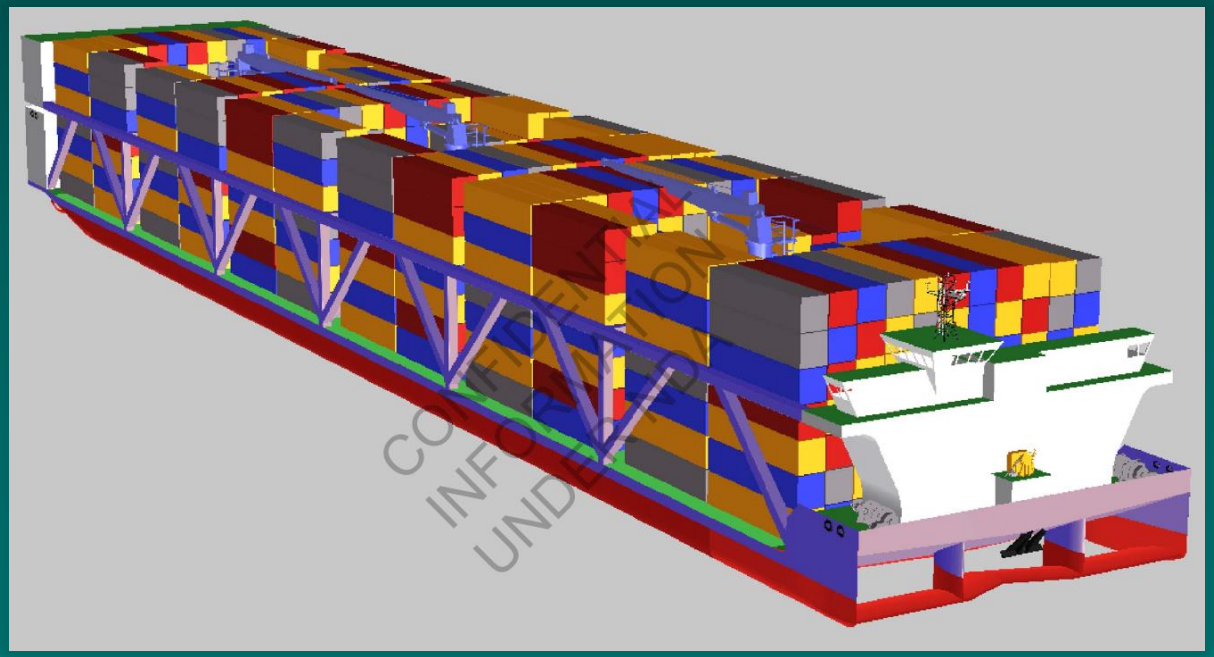
American Patriot Holdings, LLC (APH)
Prototype Container Vessel

A "*State of the Art*" Hull Design to Ensure Optimal Speed in All River Conditions Utilizing LNG as Main Propulsion Fuel

VICKERMAN & ASSOCIATES, LLC

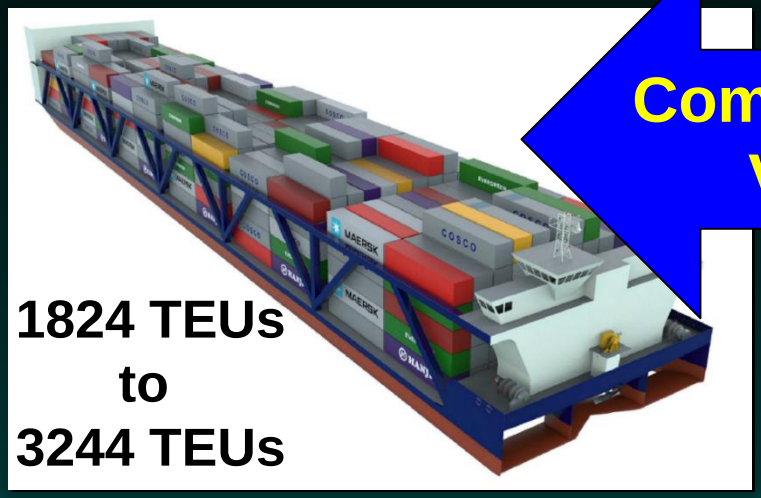
American Patriot Container Transport, LLC. (APCT)Vessel Fleet Characteristics

LOA Feet	Beam Feet	TEU Capacity	Vessel Drafts
592	100	1824	9.0 ft. 9.6 ft., & 10.0 ft.
772	100	2392	9.0 ft. 9.6 ft., & 10.0 ft.
952	100	2960	9.0 ft. 9.6 ft., & 10.0 ft.
1042	100	3244	9.0 ft. 9.6 ft., & 10.0 ft.



VICKERMAN & ASSOCIATES, LLC

Inland Waterway Vessel Transfer to Ocean Container Transport



1824 TEUs
to
3244 TEUs

Commercially Viable

200 - 900 TEUs

Are the Cargo & Quantity Viable?

2017 AAPA Executive Management Conference

New Era of LNG Vessels is on the Horizon:

Will LNG be the Fuel of the Future for Shipping ?

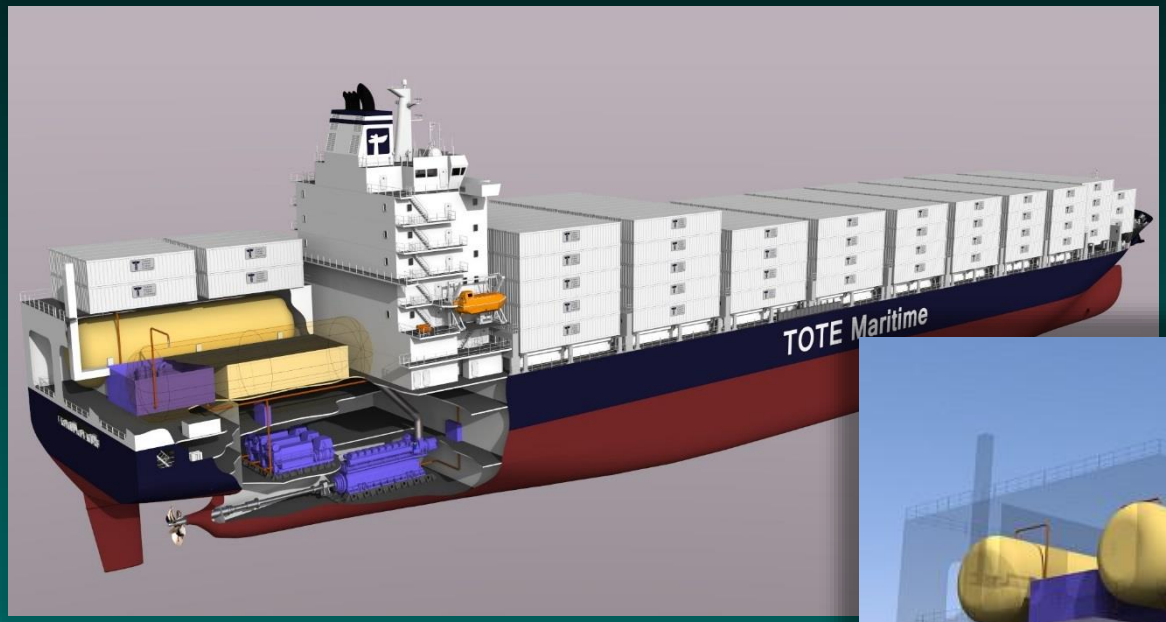
VICKERMAN & ASSOCIATES, LLC

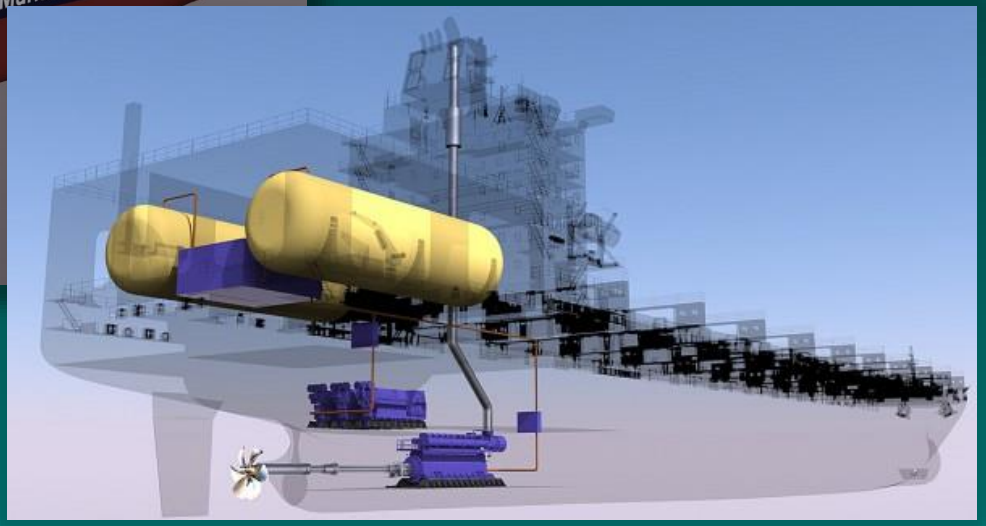
TODAY: Viking Energy, an LNG-powered offshore supply boat – Courtesy of Eidesvik

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).

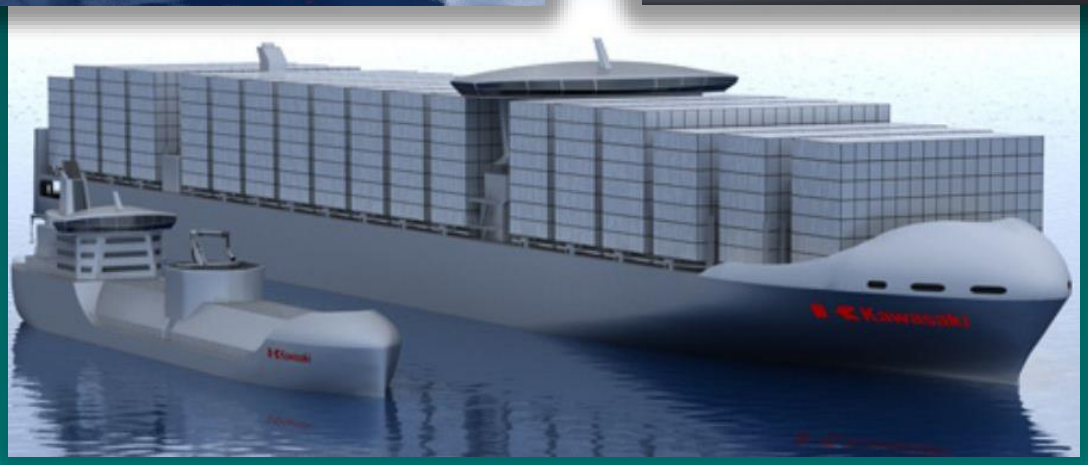
TOTE Orders Two New LNG Powered Container Ships & Two RO/RO Conversions: Largest LNG Powered Ships in the World





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

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



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

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

Concept Study 13,000 TEU Container Vessel Fuelled by LNG

The eFuture 13000C design (©IHIMU)

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

VICKERMAN & ASSOCIATES, LLC

2017 AAPA Executive Management Conference

Panama Canal Expansion: New Capacity

VICKERMAN & ASSOCIATES, LLC

Panama Canal Expansion Project Inauguration - June 26, 2016.

The first ceremony began on the Atlantic side at the new Agura Clara Locks, followed by the new Cocoli Locks on the Pacific side

VICKERMAN & ASSOCIATES, LLC

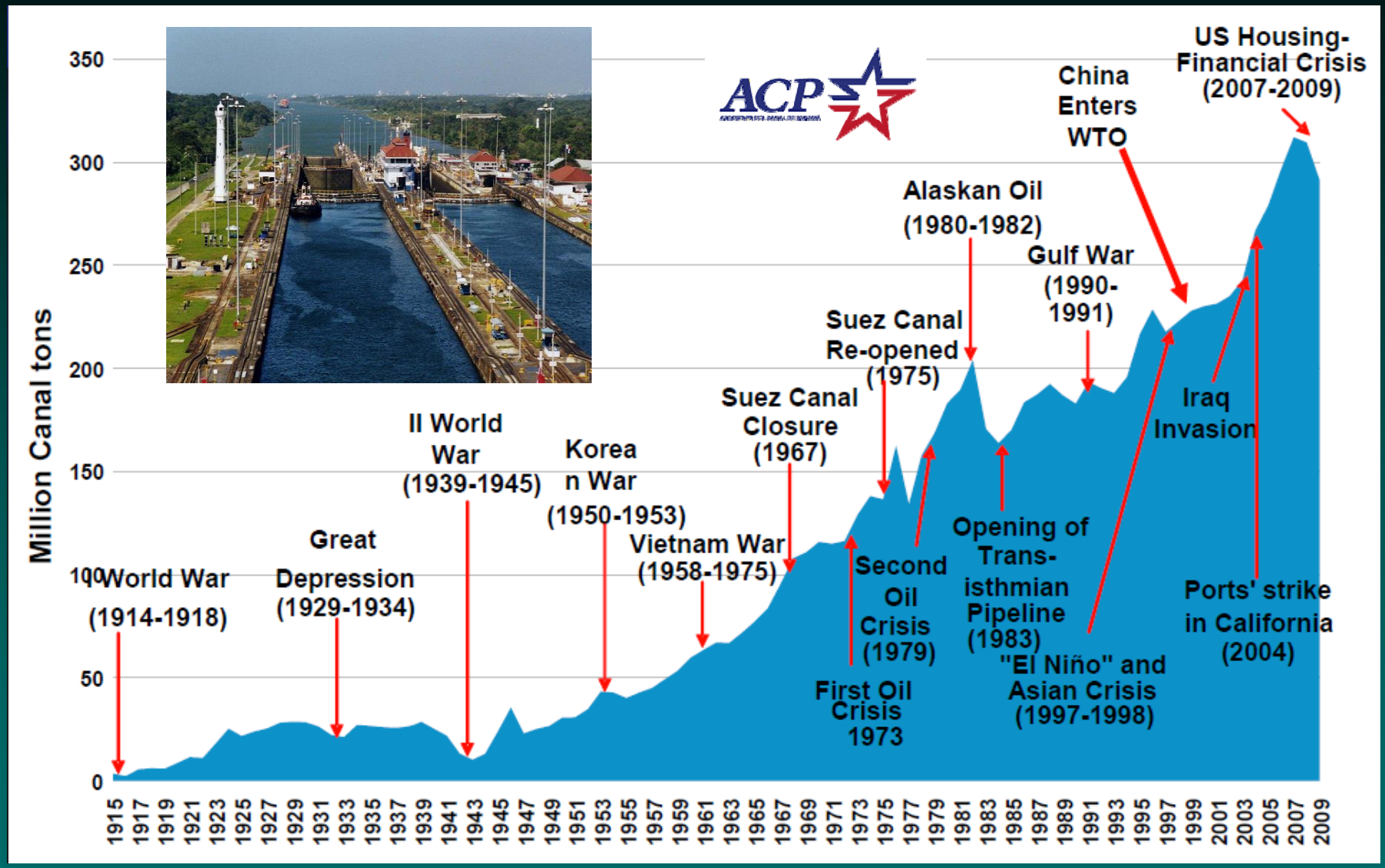
Panama Canal Route

ACP

The Autoridad Del Canal de Panama

VICKERMAN & ASSOCIATES, LLC

Panama Canal Historical Tonnage Traffic



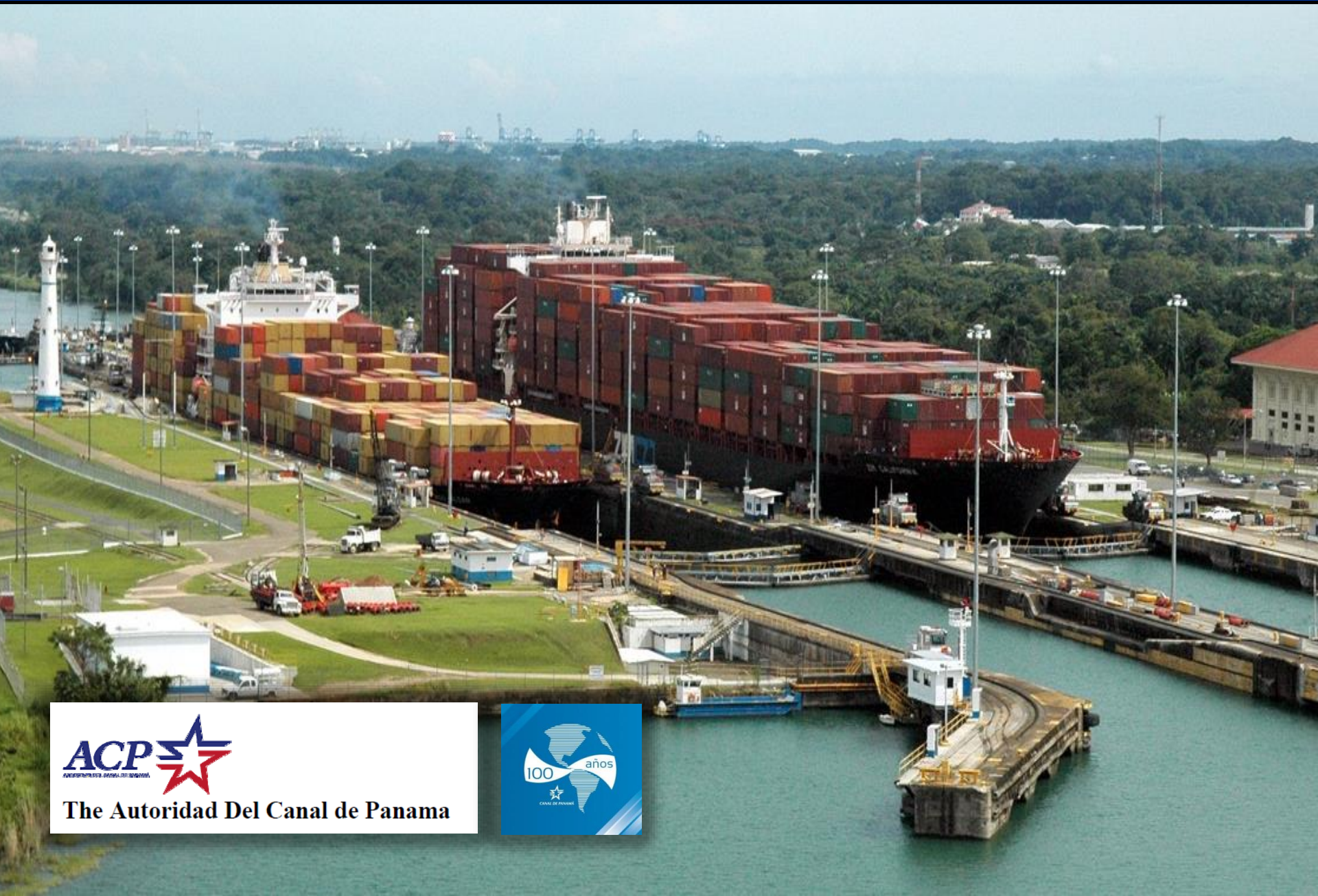
Source: ACP Data

The United States Took Over the Original Canal Construction Project from the French in 1904 and completed it in 1914.

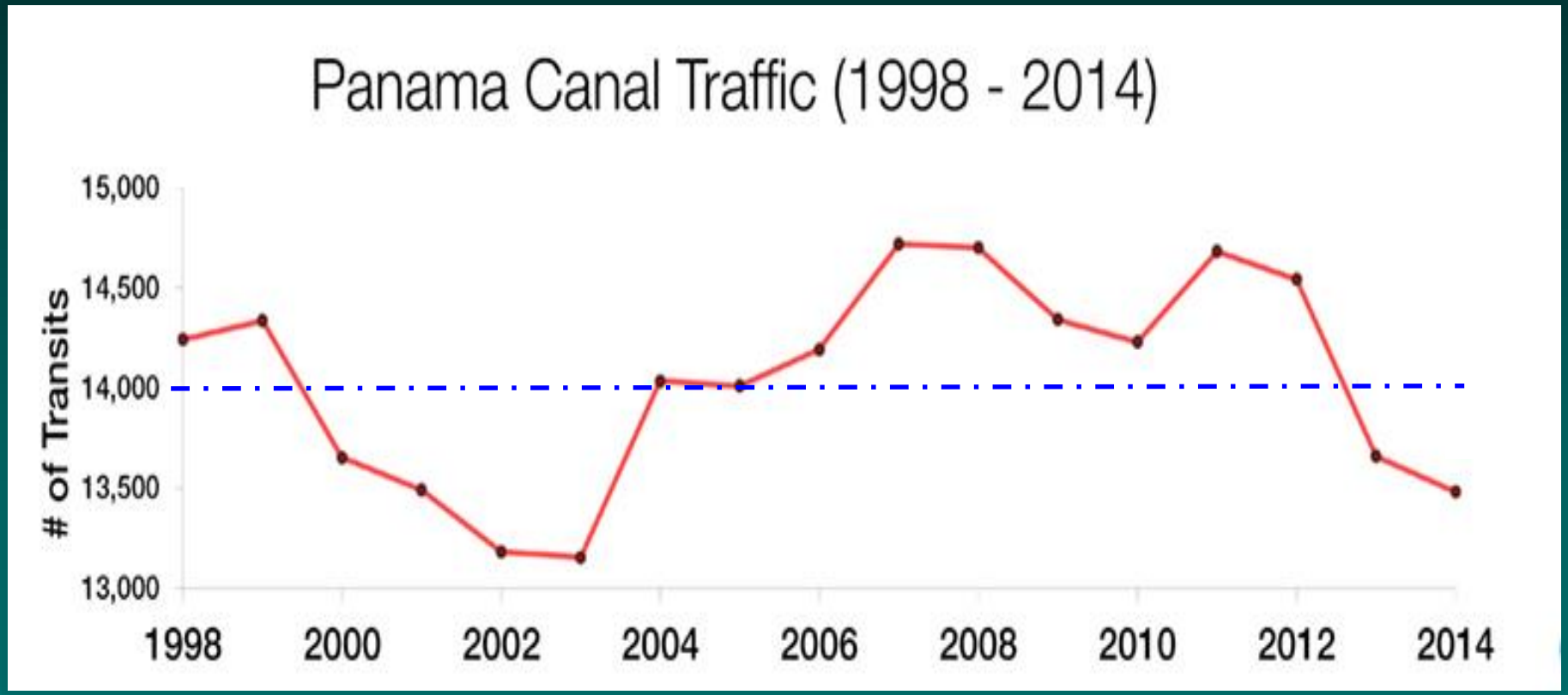
Source: ACP Expansion Project, Circle of Blue January 27, 2015

The Panama Canal Circa 1914

Panama Canal Pre-June 2016 (Old Panamax)



The New Third Lane Locks will ***Add More than 6,000 Vessel Transits*** Through the Panama Canal and will Double the Cargo Volume Transported



Source: ACP Expansion Project, Circle of Blue January 27, 2015

The Panama Canal Currently Accounts for 3% of the Volume of Global Trade, this Share Will Increase to 6 - 7 % over the next decade

Source: ACP Expansion Project, Circle of Blue January 27, 2015

VICKERMAN & ASSOCIATES, LLC

Panama Canal Third Lane Expansion

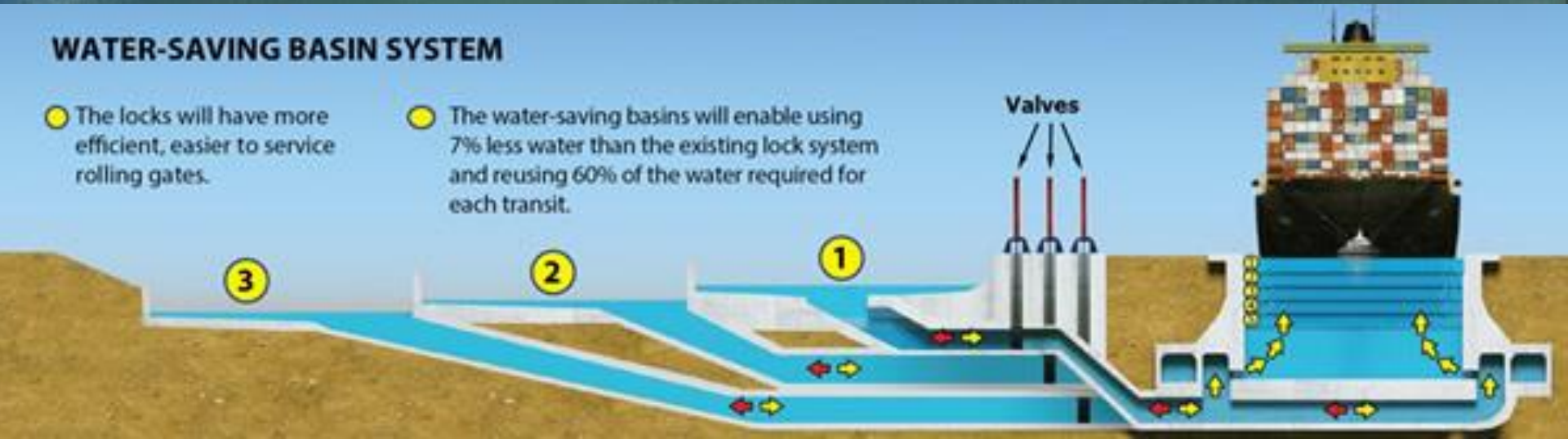
ACP
AUTORIDAD DEL CANAL DE PANAMA

100 años
CANAL DE PANAMÁ

VICKERMAN
& ASSOCIATES, LLC

Panama Canal Third Lane Expansion

Panama Canal Third Lane Expansion
Water-Saving Basin Reservoir System



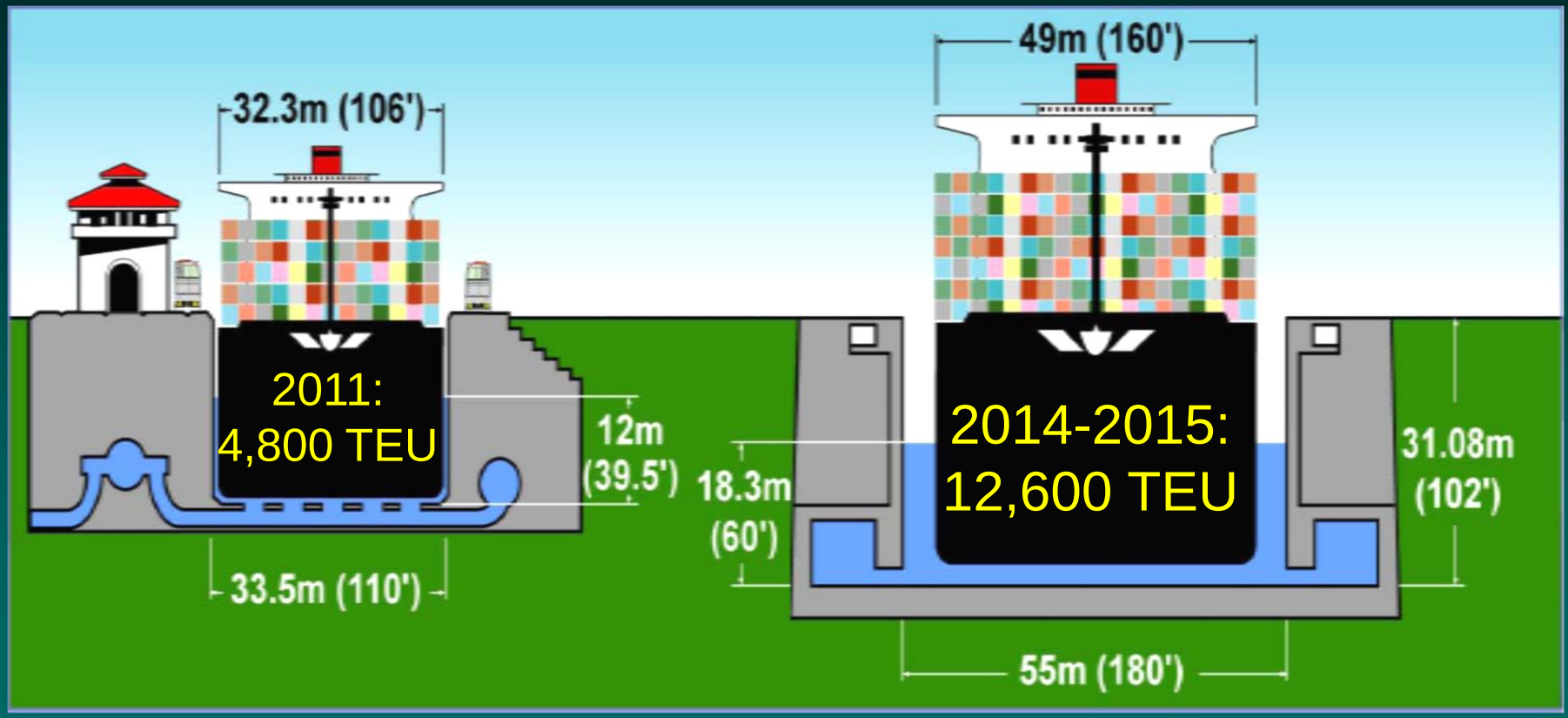
A $5.25 Billion Investment in a 3rd Set of Locks Equating to 16% of Panama's National GDP

Source: ACP Expansion Project, Circle of Blue January 27, 2015

VICKERMAN & ASSOCIATES, LLC

The Autoridad Del Canal de Panama

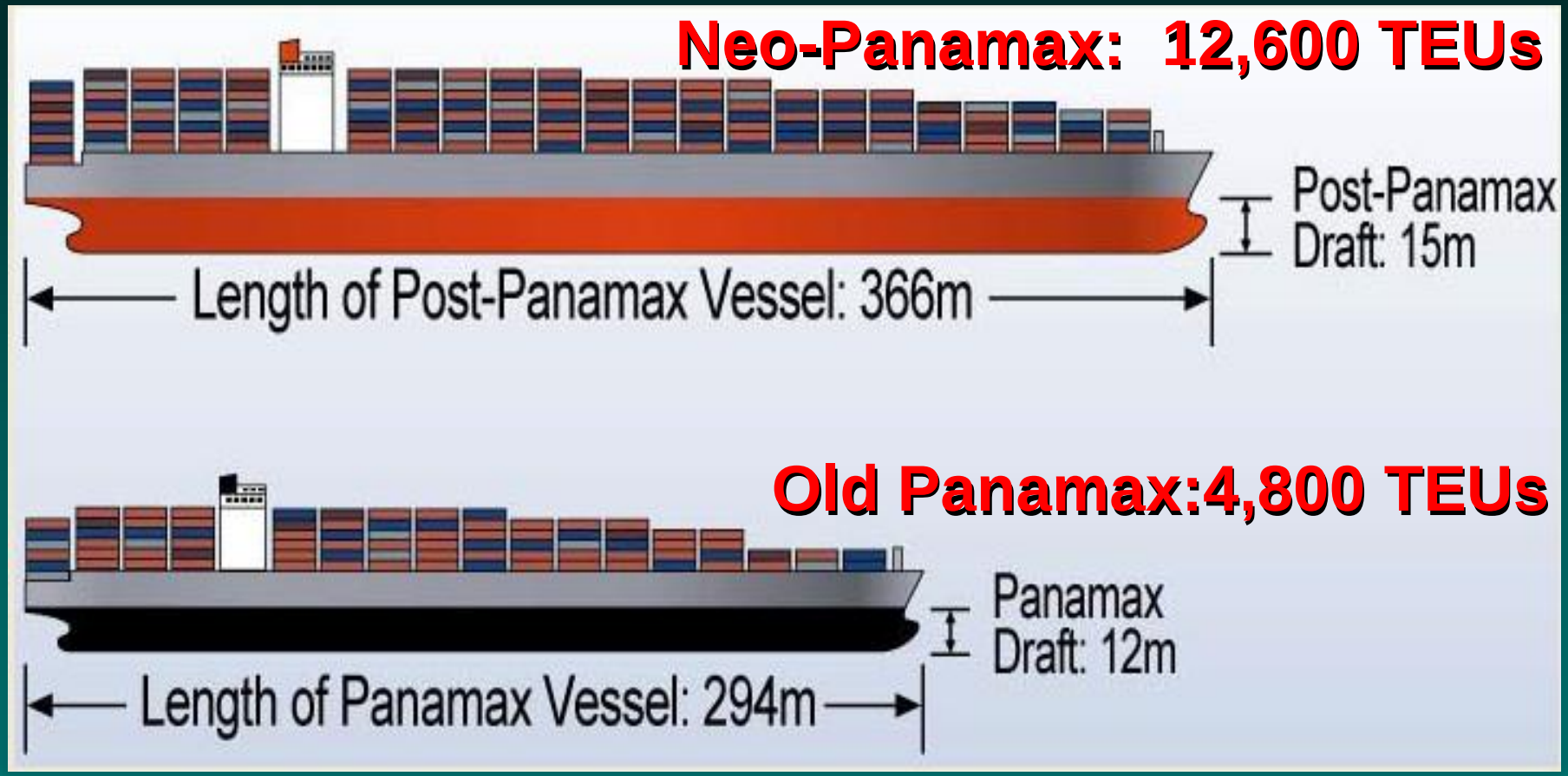
Panama Canal Third Lane Expansion Capabilities



Source: ACP Expansion Project

The Autoridad Del Canal de Panama

Panama Canal Third Lane Expansion Capabilities



Source: ACP Expansion Project, Circle of Blue January 27, 2015

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%

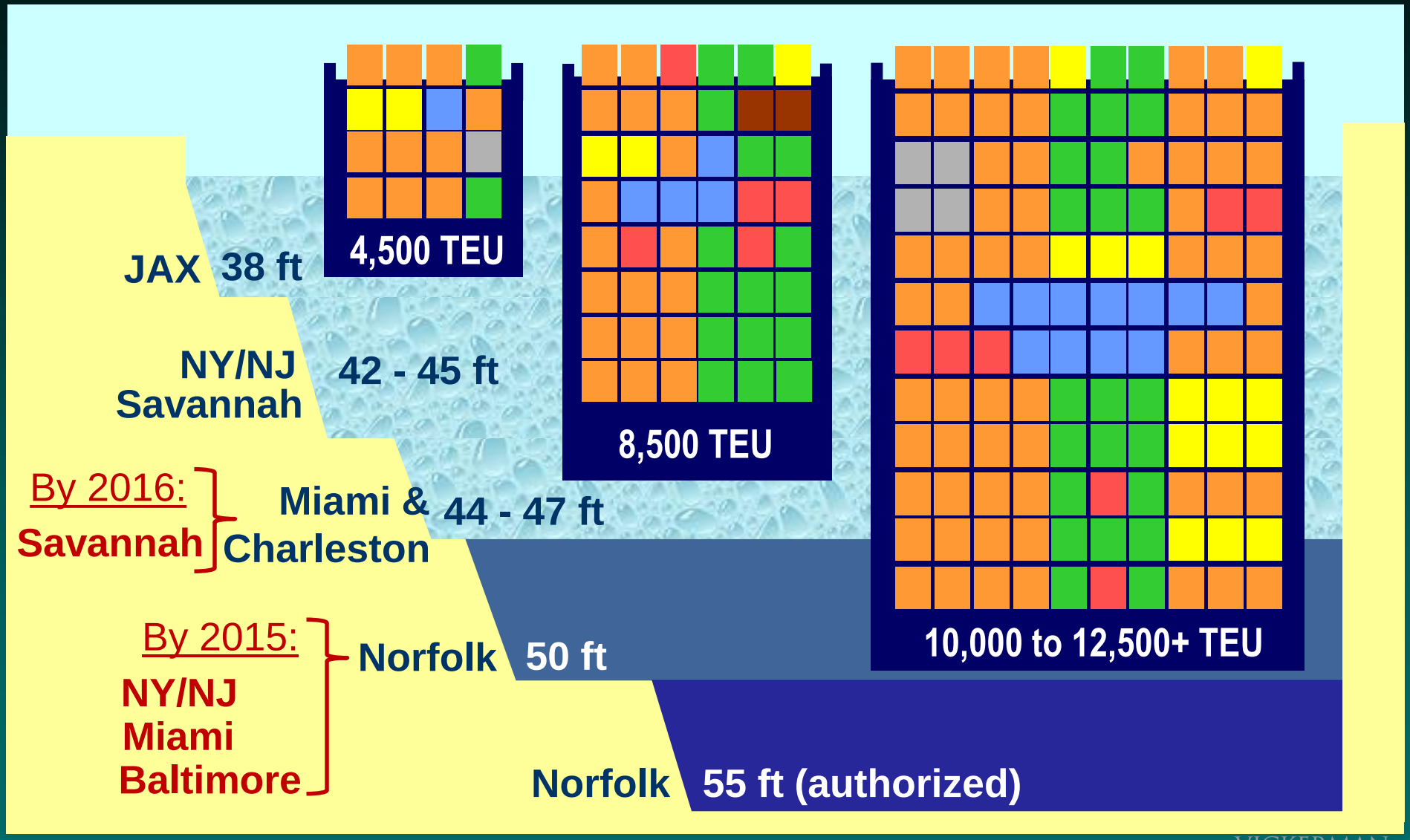
VICKERMAN & ASSOCIATES, LLC

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!

Today Only The Port of Virginia Can Handle The New 2016 NeoPanamax Vessels Fully Loaded



Source: Virginia Port Authority (VPA) October 2011

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

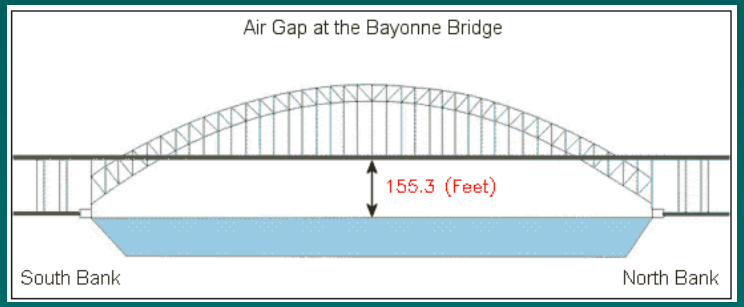
($1.6 Billion Program, Completion December 2014)

Raising of the Bayonne Bridge

(Estimated at $1 billion)

Future Clearance: 214 ft

Current Clearance: 155.3 ft



2017 AAPA Executive Management Conference

Emerging New Caribbean Transhipment Center

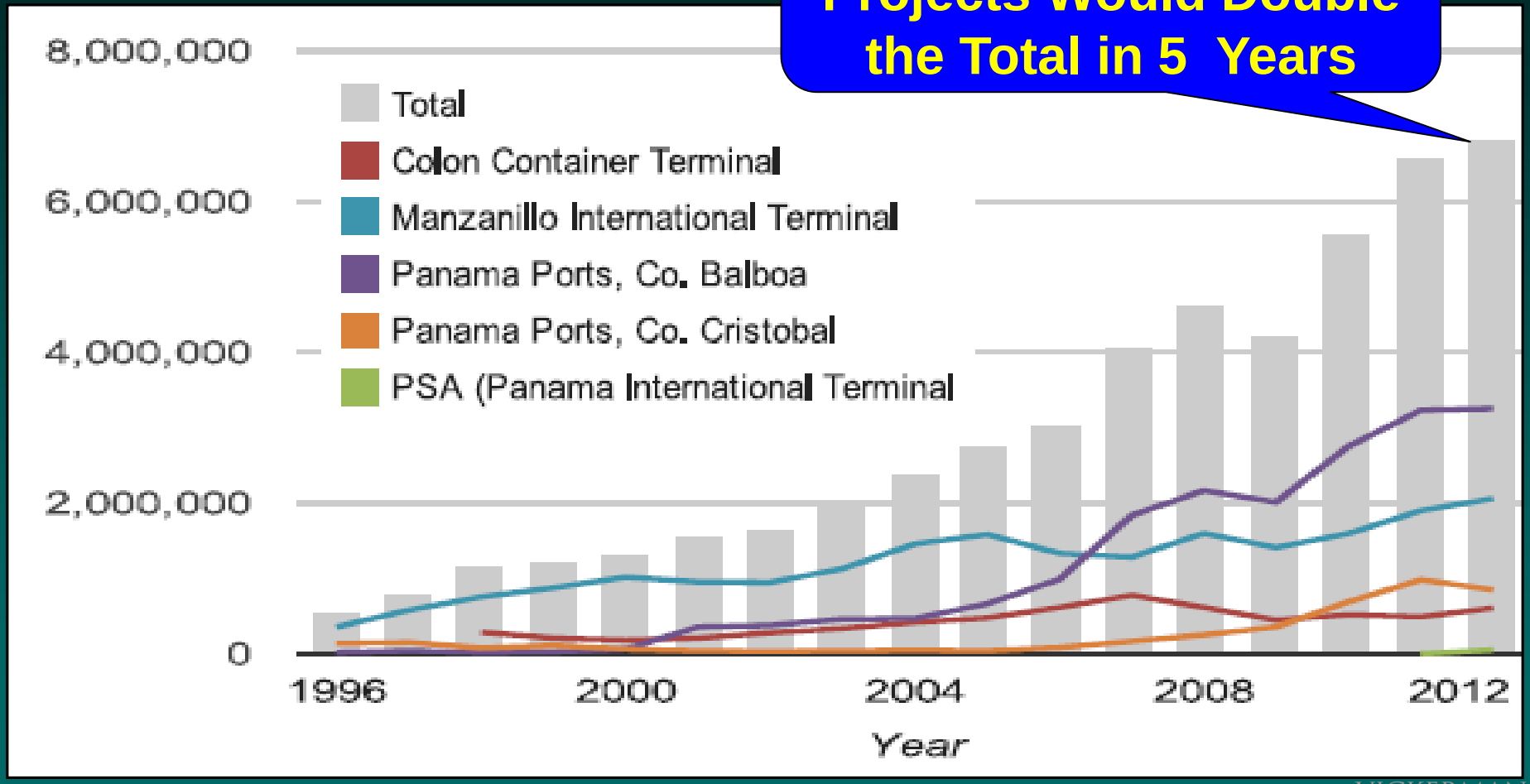
(Large Ship to Feeder Vessel Transfer)

VICKERMAN & ASSOCIATES, LLC

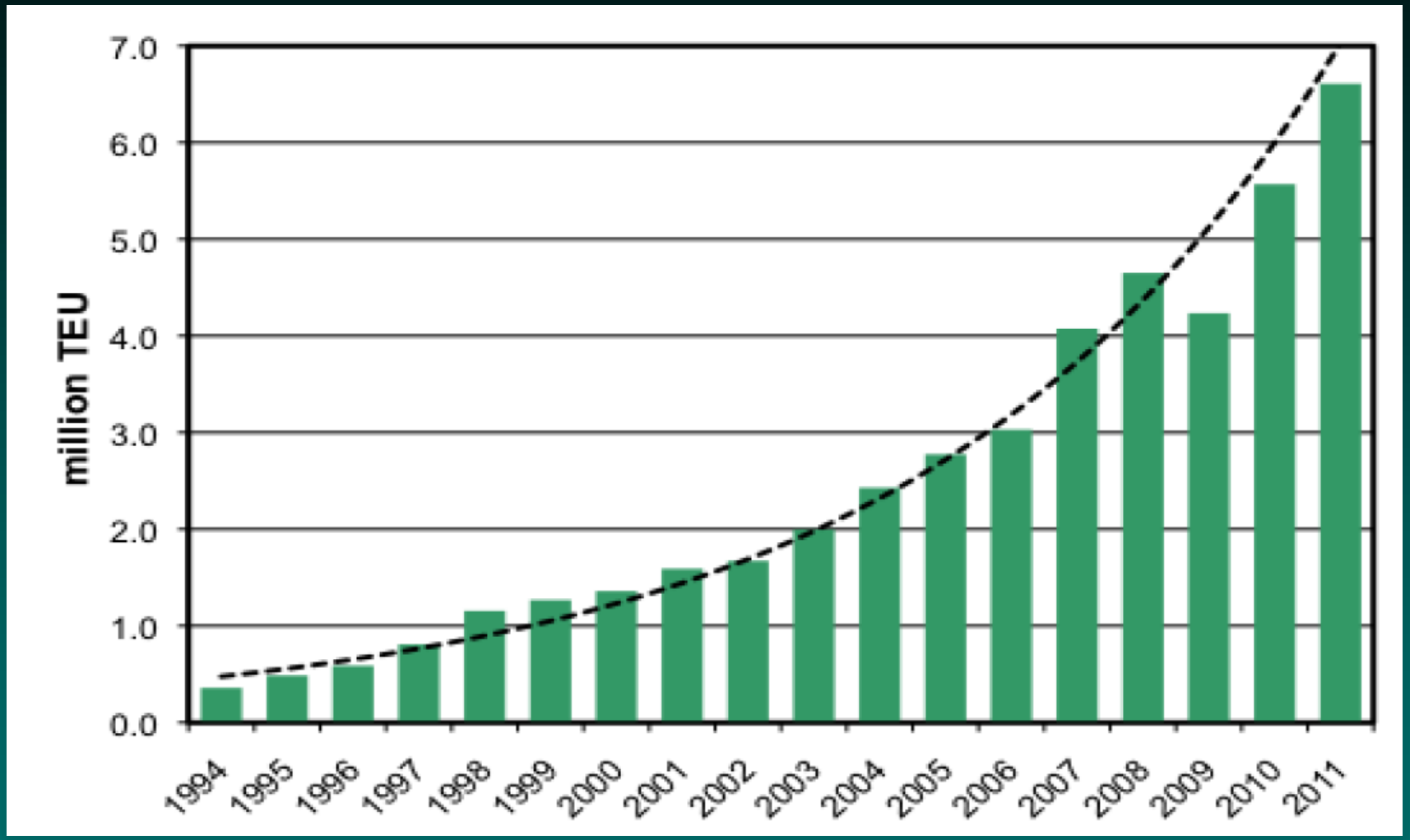
Panama Ports Annual *Transhipment Growth*

"The Singapore of Latin America"

Proposed New Port Projects Would Double the Total in 5 Years



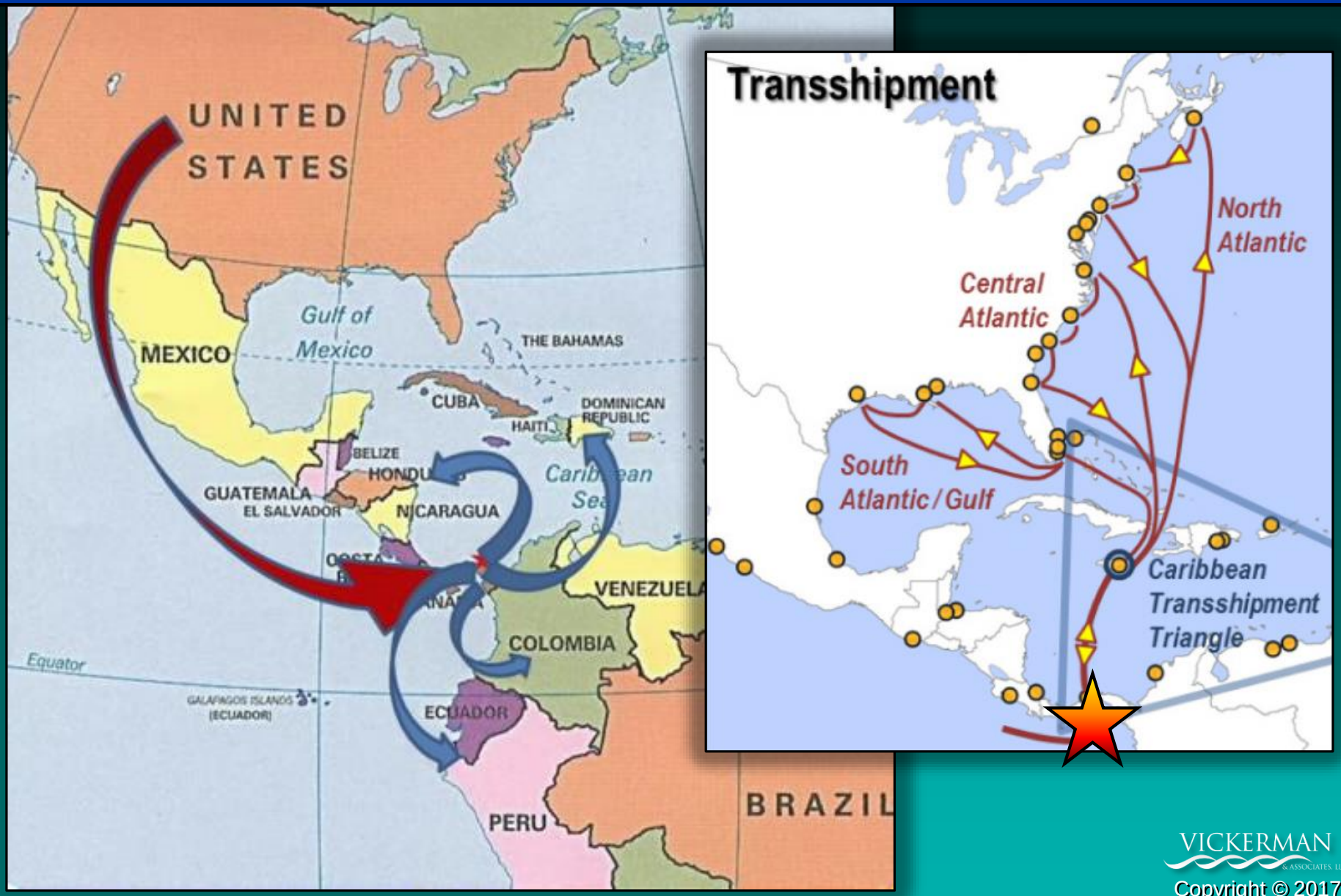
Panama Ports Container *Transhipment Growth*



6.8 Million TEUs – 18.5 % Growth Rate

VICKERMAN & ASSOCIATES, LLC

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



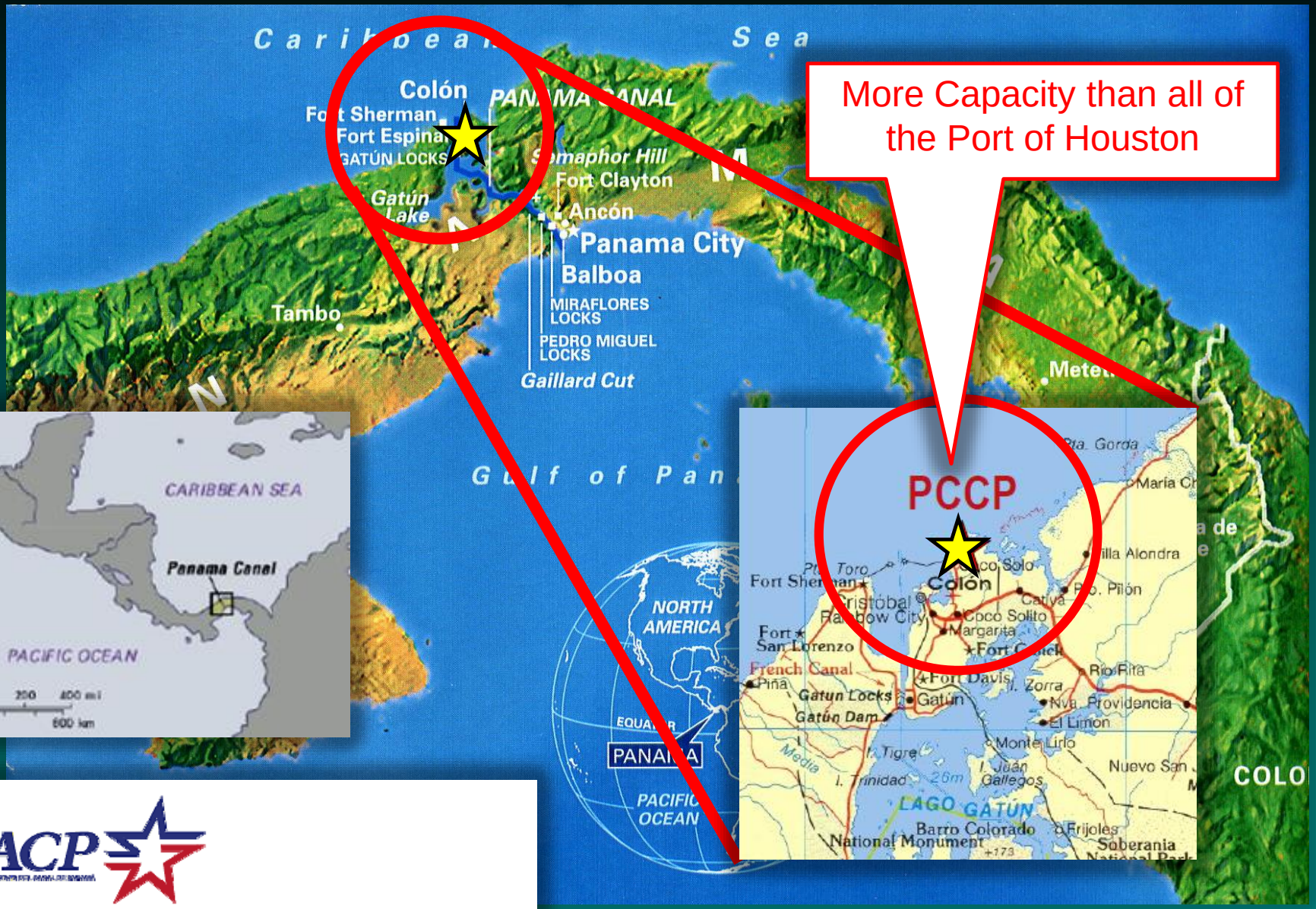
New Panama Canal Pacific Entrance Ports

More Capacity than all of the Port of Los Angeles

ACP

The Autoridad Del Canal de Panama

New Panama Canal Atlantic Entrance Port



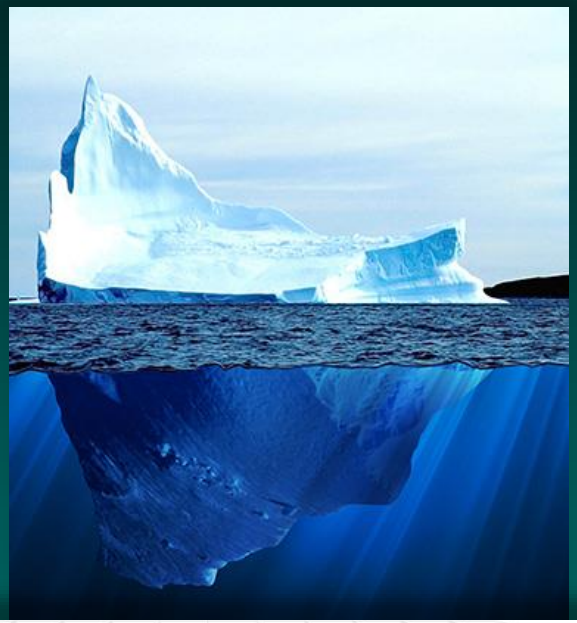
ACP

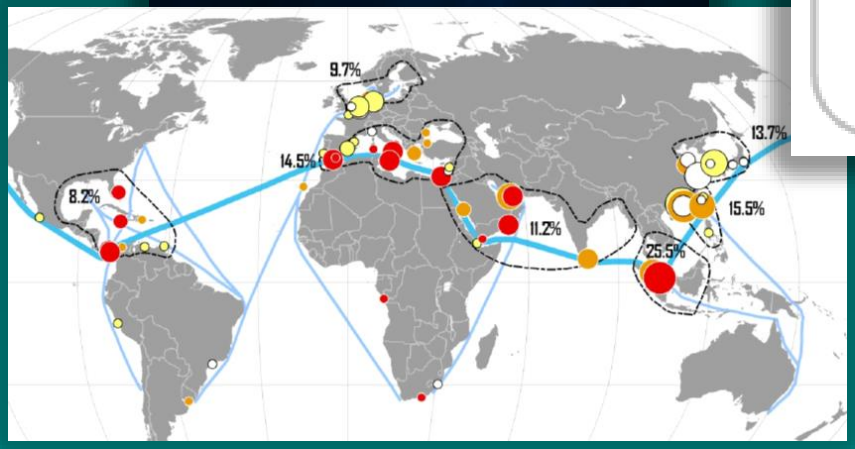
The Autoridad Del Canal de Panama

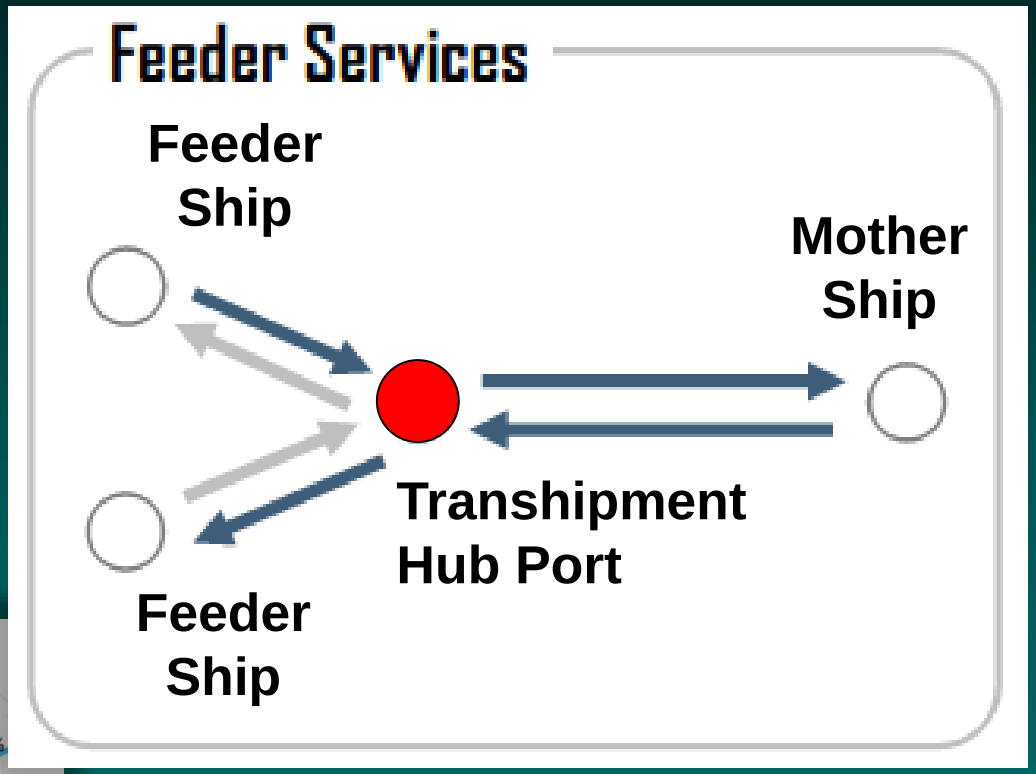
VICKERMAN & ASSOCIATES, LLC

North American Vessel Transshipment:

(Globally Transshipment accounts between 25 and 50% of all container volumes – In the US it's < 15%)







Induced Transshipment/Feeder Ship Operations

VICKERMAN & ASSOCIATES, LLC

2017 AAPA Executive Management Conference

Transforming Global Trade Logistics with New Ocean Carrier Alliances

The New ***Ocean Alliance*** would bring the World's 3rd, 4th, 5th and 9th biggest Container Lines Together in a Vessel-Sharing Agreement…

Forcing the hands of the remaining players to quickly choose their strongest partners from the remnants of the CKYHE, G6 and O3 alliances

VICKERMAN & ASSOCIATES, LLC

The New ***Ocean Alliance*** would bring the World's 3rd, 4th, 5th and 9th biggest Container Lines Together in a Vessel-Sharing Agreement…

"The OCEAN ALLIANCE in April 2017 plans to deploy the most expansive all-water trans-Pacific service network to U.S. East and Gulf Coast ports that has been seen in years, according to a U.S. maritime regulator."

JOC July 15, 2017

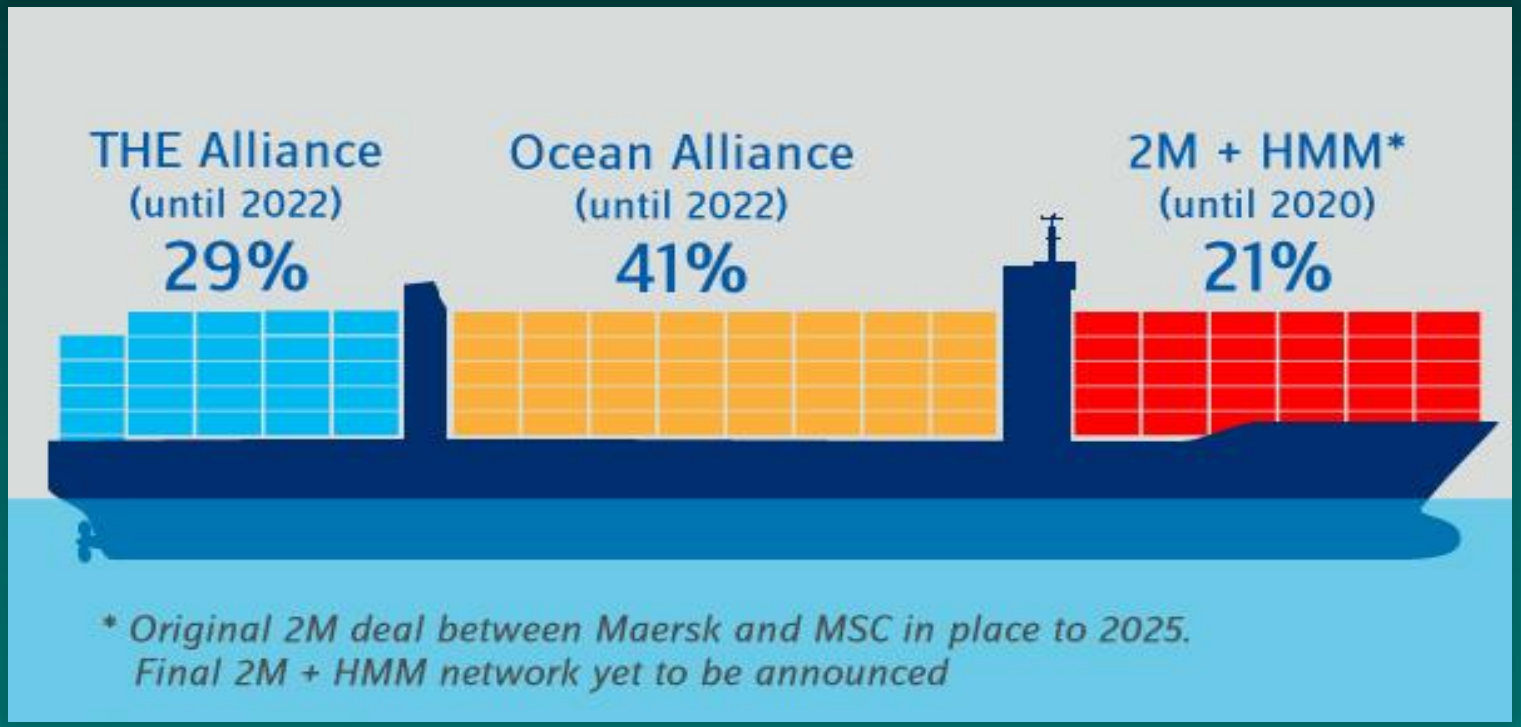
Source: JOC July 15. 2016

VICKERMAN & ASSOCIATES, LLC

Restructuring of the Vessel Sharing Alliances Takes Effect Late April 2017

(Ocean Alliance to Dominate the Overall Trans-Pacific Trade)

US ports will face unprecedented operational challenges when ocean carriers restructure April, 2017



Three alliances will control 91 % of the US trade volume

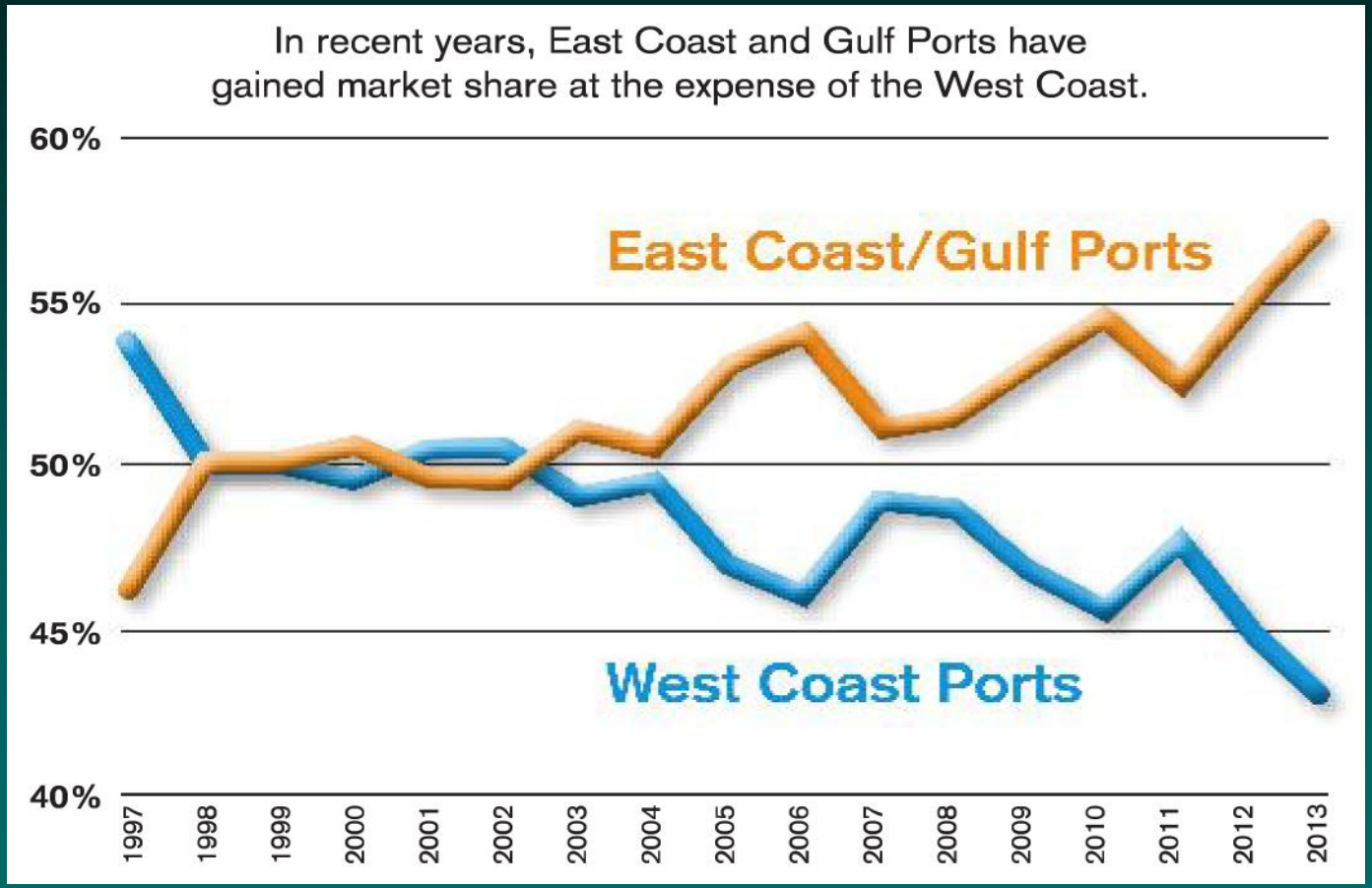
Source: Alphaliner – JOC - IHS Maritime & Trade

VICKERMAN & ASSOCIATES, LLC

Share of US Containerized Cargo – Imports

(US East Coast vs US West Coast Share)

In 2015 US East Coast ports handled 7.9 million TEU of loaded containers, up 12.6% year-on-year



US West Coast ports still handle 56% of the inbound loaded containers arriving in the US in 2015

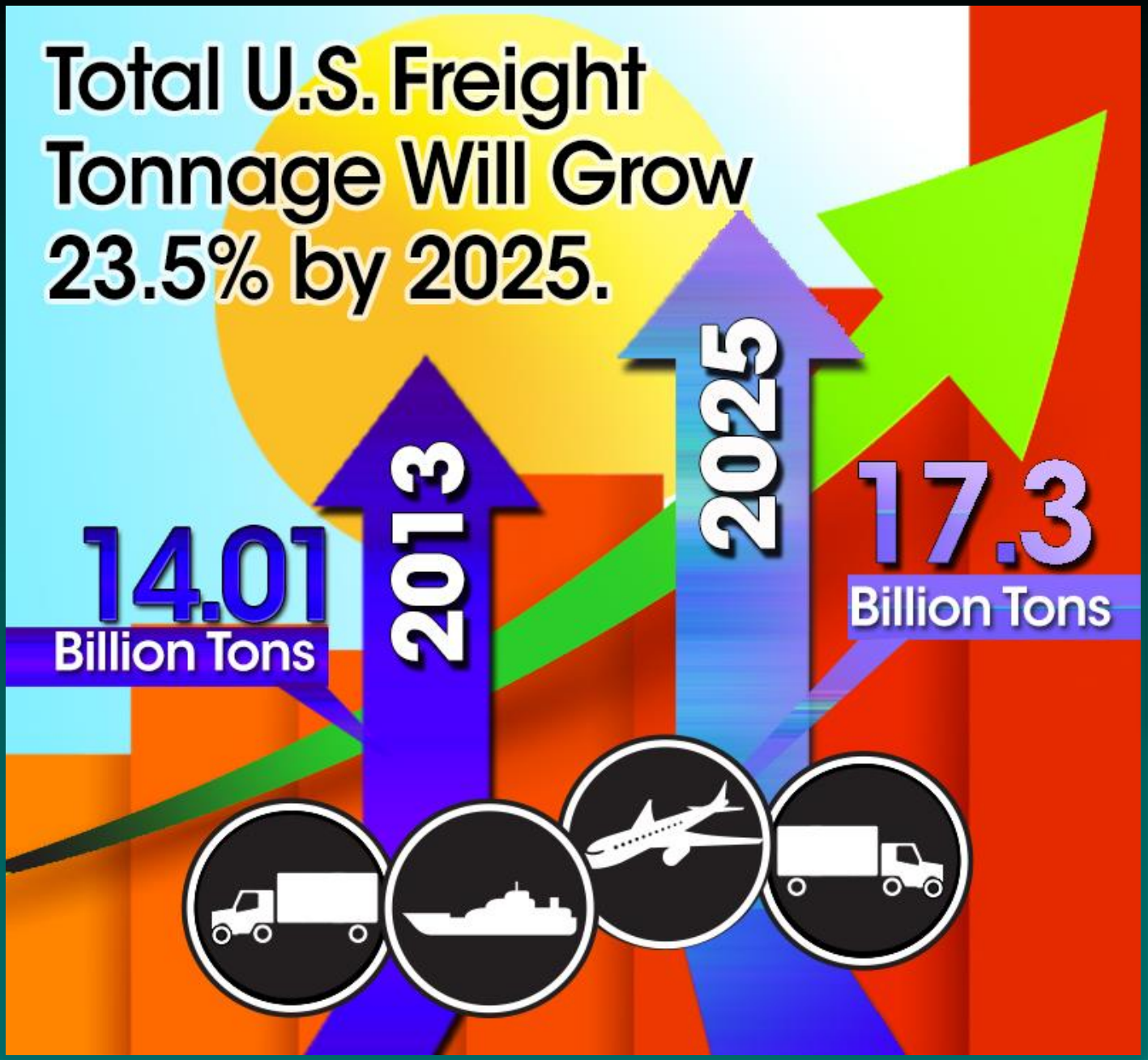
VICKERMAN & ASSOCIATES, LLC

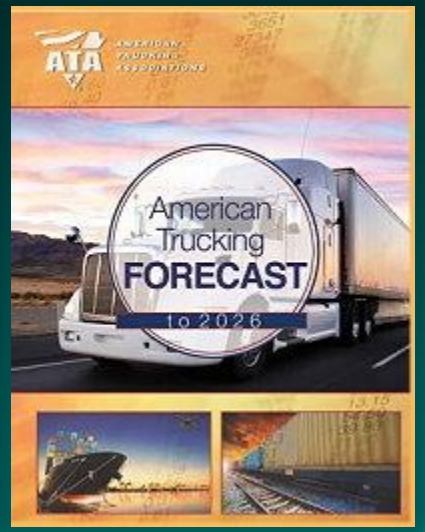
2017 National Advanced Marine Transportation System Recovery Unit (MTSRU) Workshop

North American Cargo Demand Trends

(Dé jà vu Experience)

Total U.S. Freight Tonnage Will Grow 23.5% by 2025.

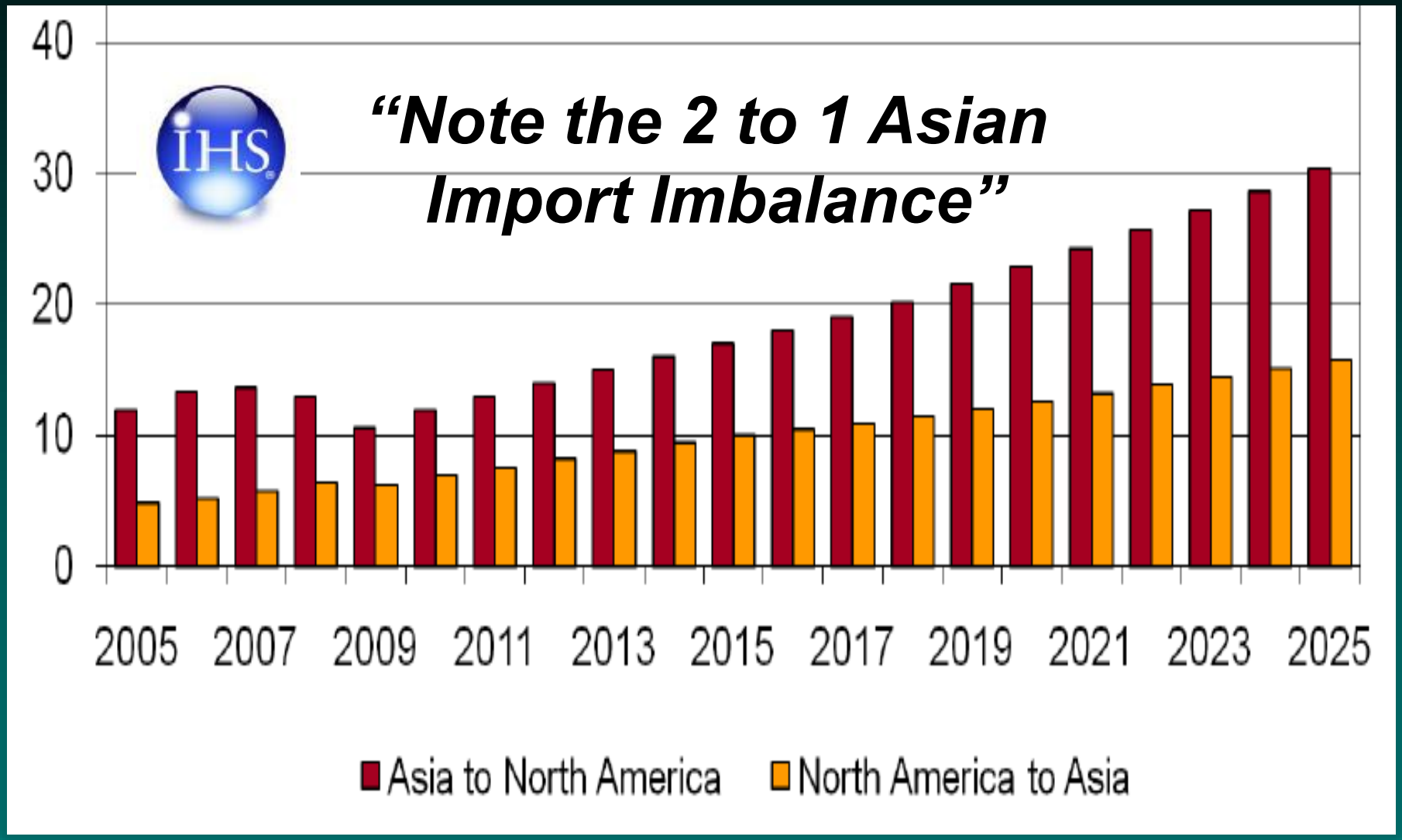




Source: ATA US Freight Transportation 2025 Forecast

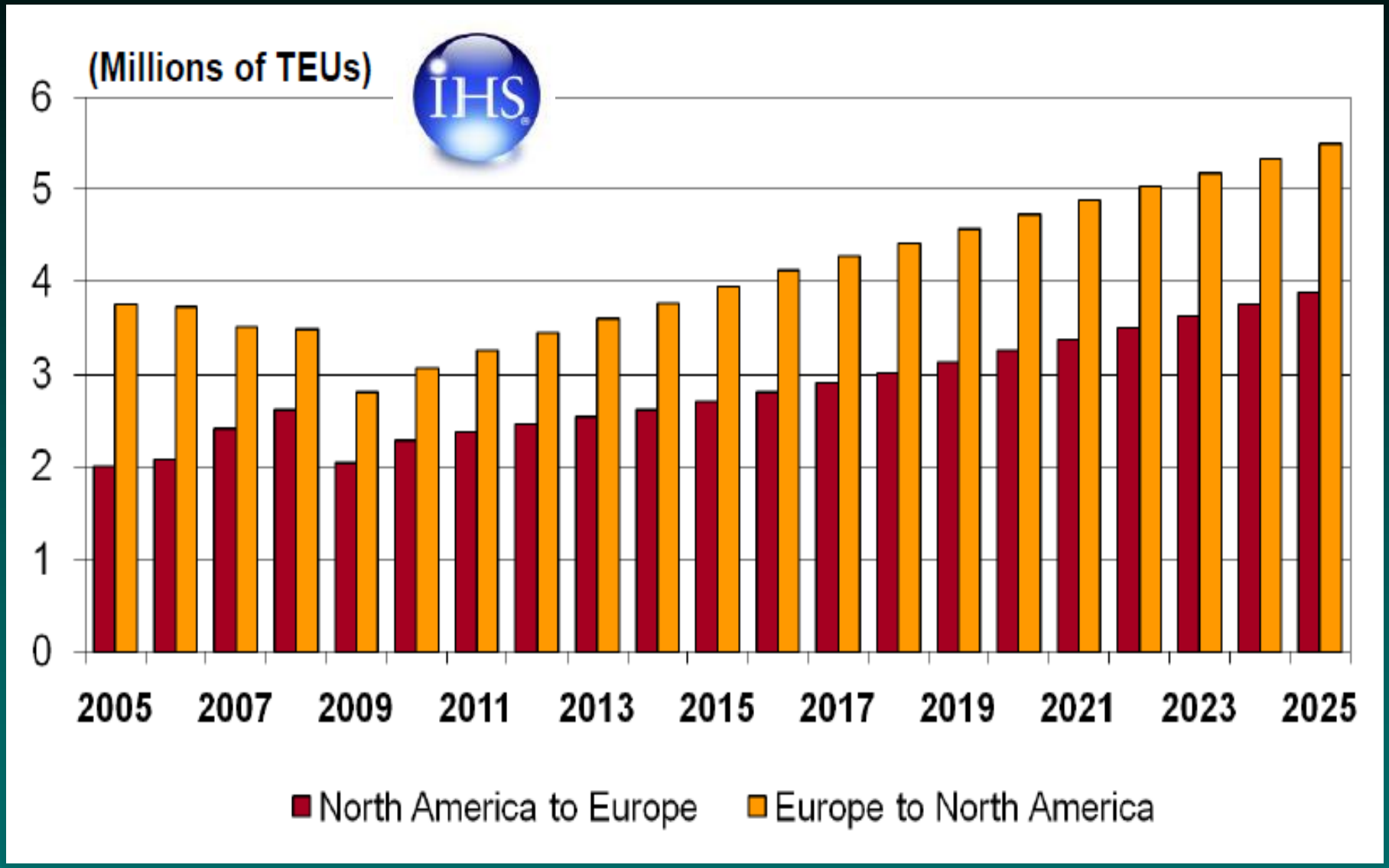
Transpacific Container Trade Recovery

(Millions of TEUs)



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

Transatlantic Container Trade Recovery



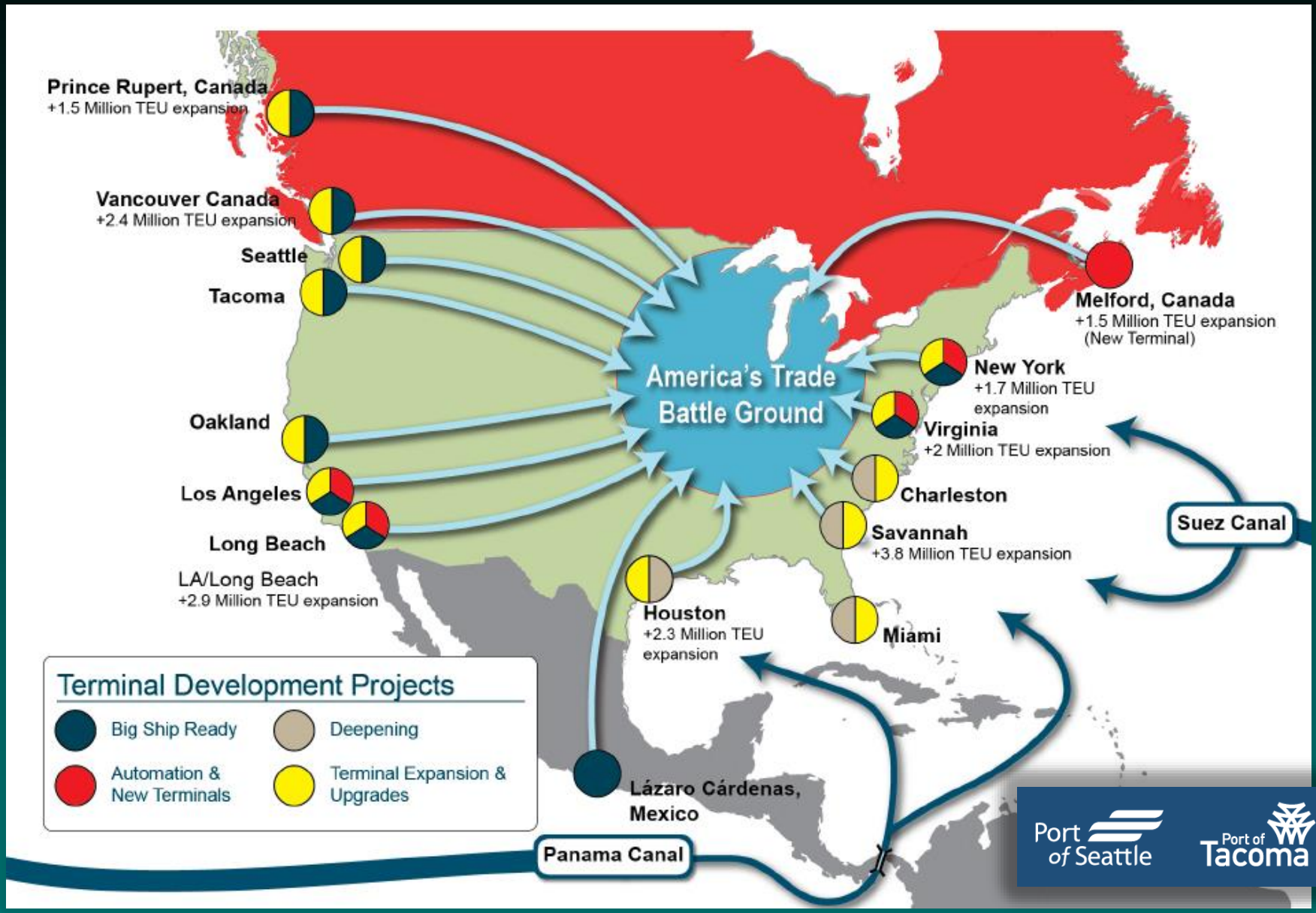
Source: IHS – Global Insight -The Global Outlook – October 14, 2010

2017 AAPA Executive Management Conference

Large Container Vessel Market Penetration into the US Midwest

VICKERMAN & ASSOCIATES, LLC

New State of US Marine & Intermodal Competition

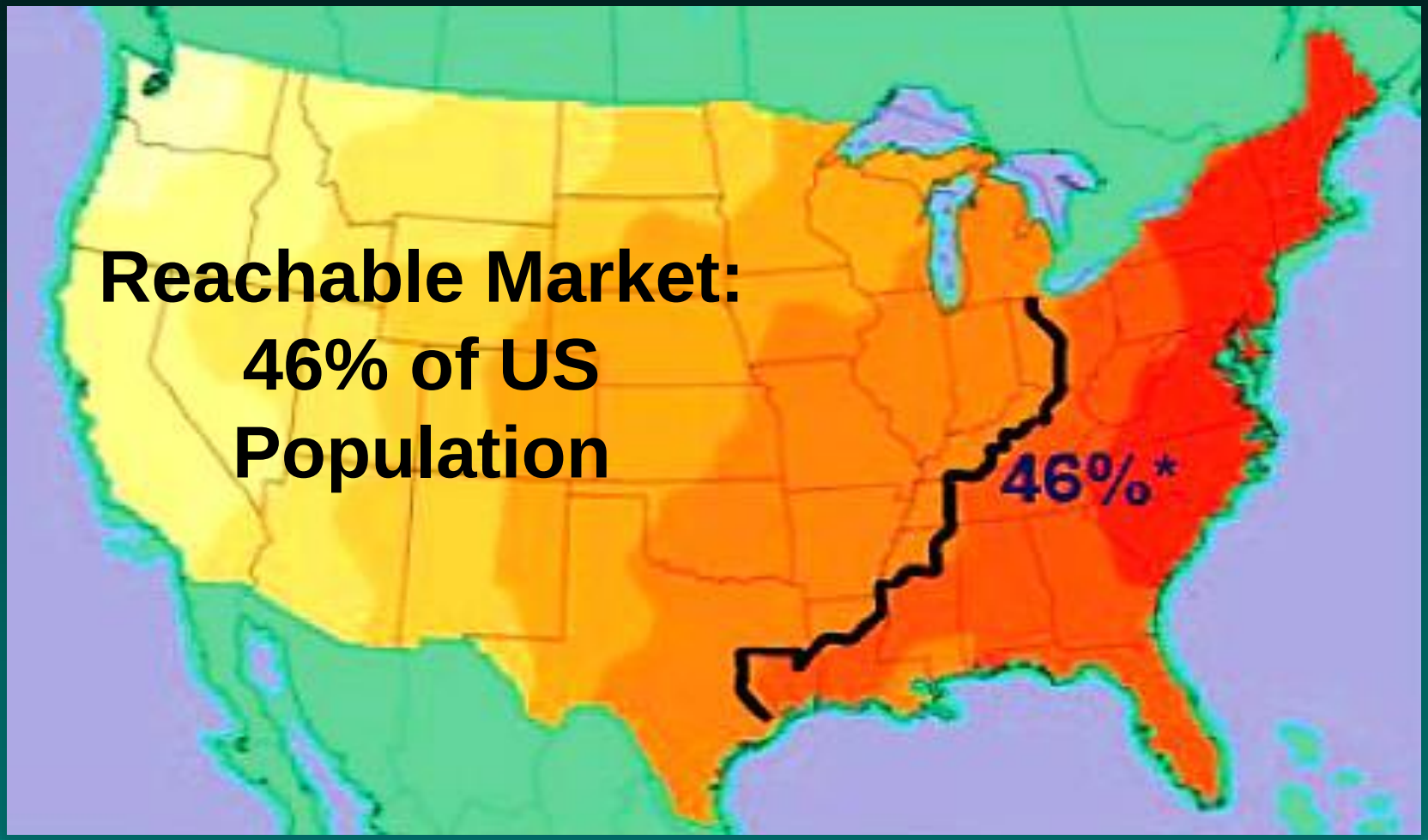


Source: NW Seaport Alliance Strategic Business Plan, May 6, 2015

VICKERMAN & ASSOCIATES, LLC

Prior to June 2016 - US Market Penetration

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



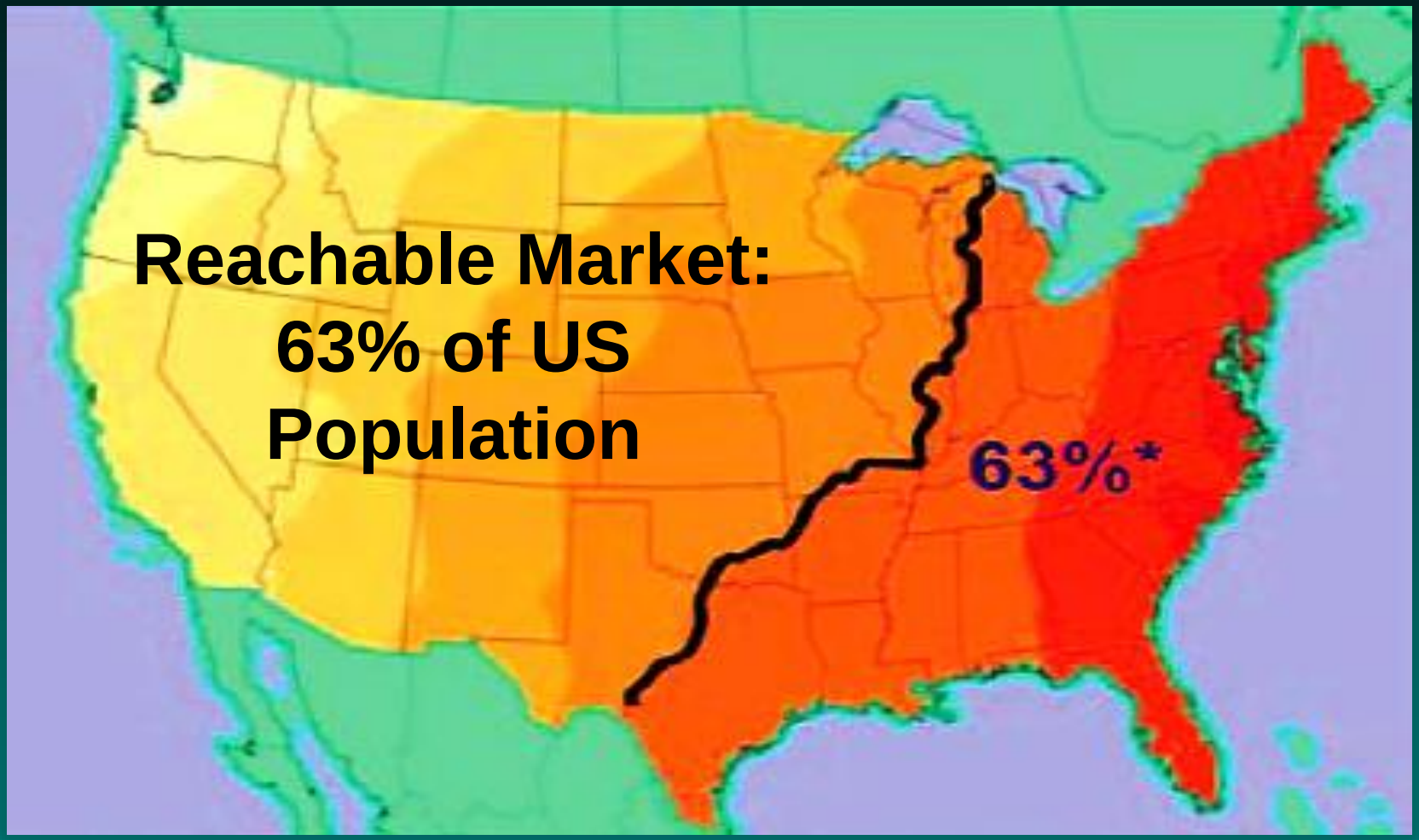
4,000 TEU ship, all-water.

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

VICKERMAN & ASSOCIATES, LLC

Dramatic US Market Penetration after June 2016

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

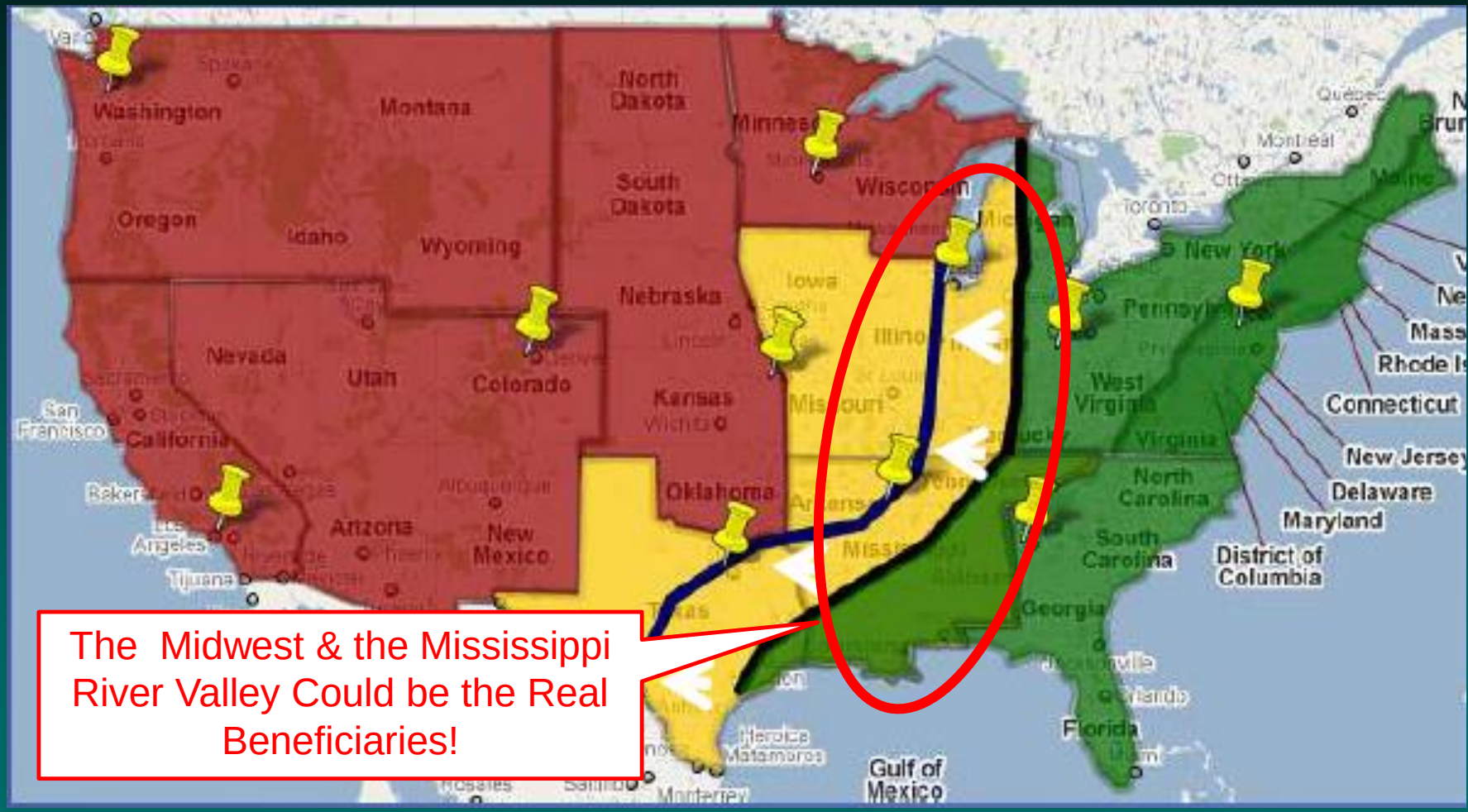


8,000 TEU ship, all-water.

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

Dramatic US Market Penetration after June 2016

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



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

Dramatic US Market Penetration after June 2016

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

The Panama Canal will prove to be a strong contender for Asian trade serving not only the US East Coast, but ALL of the Gulf and the Most of the Midwest by late 2017.

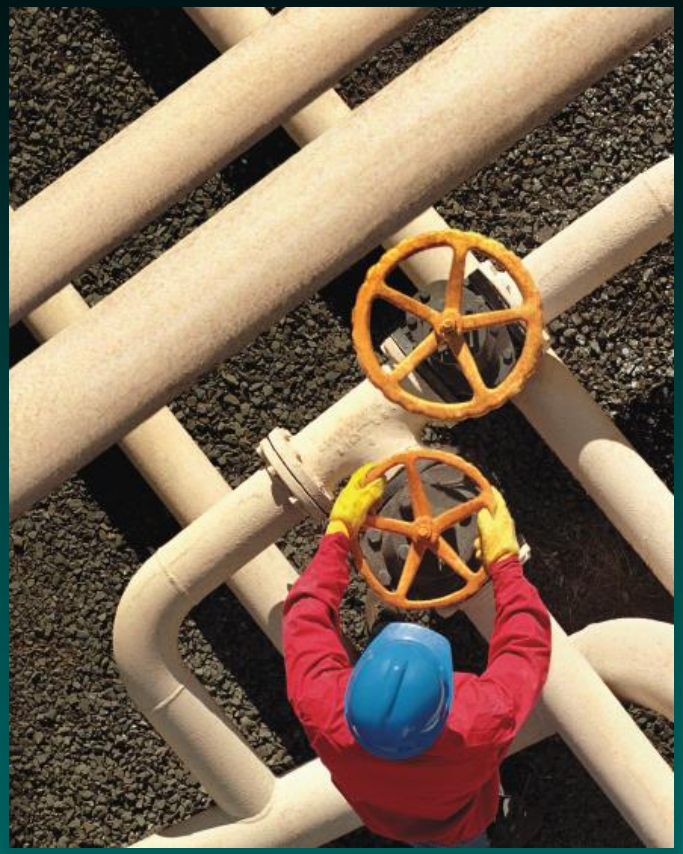
Source: Potential Effects of the Panama Canal Expansion on the Texas Transportation System, Texas DOT, Cambridge Systematics October 2011

2017 AAPA Executive Management Conference

America's New Energy Self Sufficiency

VICKERMAN & ASSOCIATES, LLC

Shale Gas: A Game Changer for US Competitiveness



US oil production recently hit a 20-year high and could surpass Saudi Arabia's output by 2019.

The US has a 100-year supply of natural gas, & will be the world's largest natural gas producer by end of 2017.

Source: US Energy Information Administration, US Department of Energy

July 25, 2016 First Ever LNG Vessel Through the New Panama Canal Locks

The Expanded Canal can accommodate 90 percent of the world's LNG tankers, which will have a major impact on global LNG flows and offer numerous benefits to shippers.

VICKERMAN & ASSOCIATES, LLC

LNG The Global Fuel of the Future:

Global energy market trends are set to transform the maritime industry, with major investments to be ploughed into new LNG terminals and huge projected growth in exports expected in the coming years.

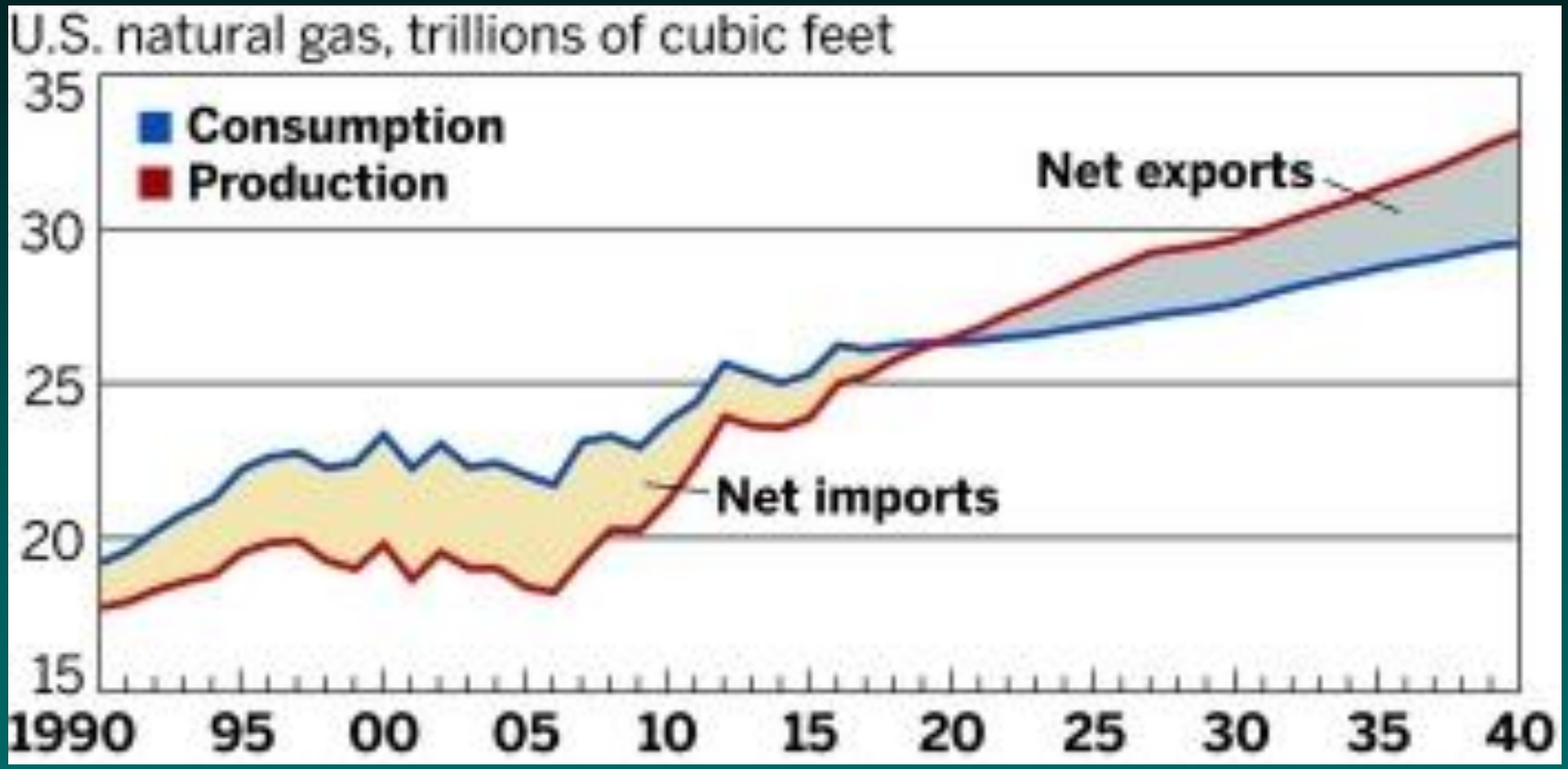
Consider: The United States is poised to become one of the world's top LNG exporters in the next five years, the Canal will allow vessels departing the U.S. East and Gulf Coast for Asia to enjoy significant reductions in voyage times (up to 22.8 days roundtrip), making U.S. gas deliveries to major Asian importers very competitive. Vessels departing the U.S. Gulf Coast for the West Coast of South America will similarly experience generous time savings.

VICKERMAN & ASSOCIATES, LLC

Independent Statistics & Analysis
U.S. Energy Information Administration

US Natural Gas Production

(Trillions of Cubic Feet)



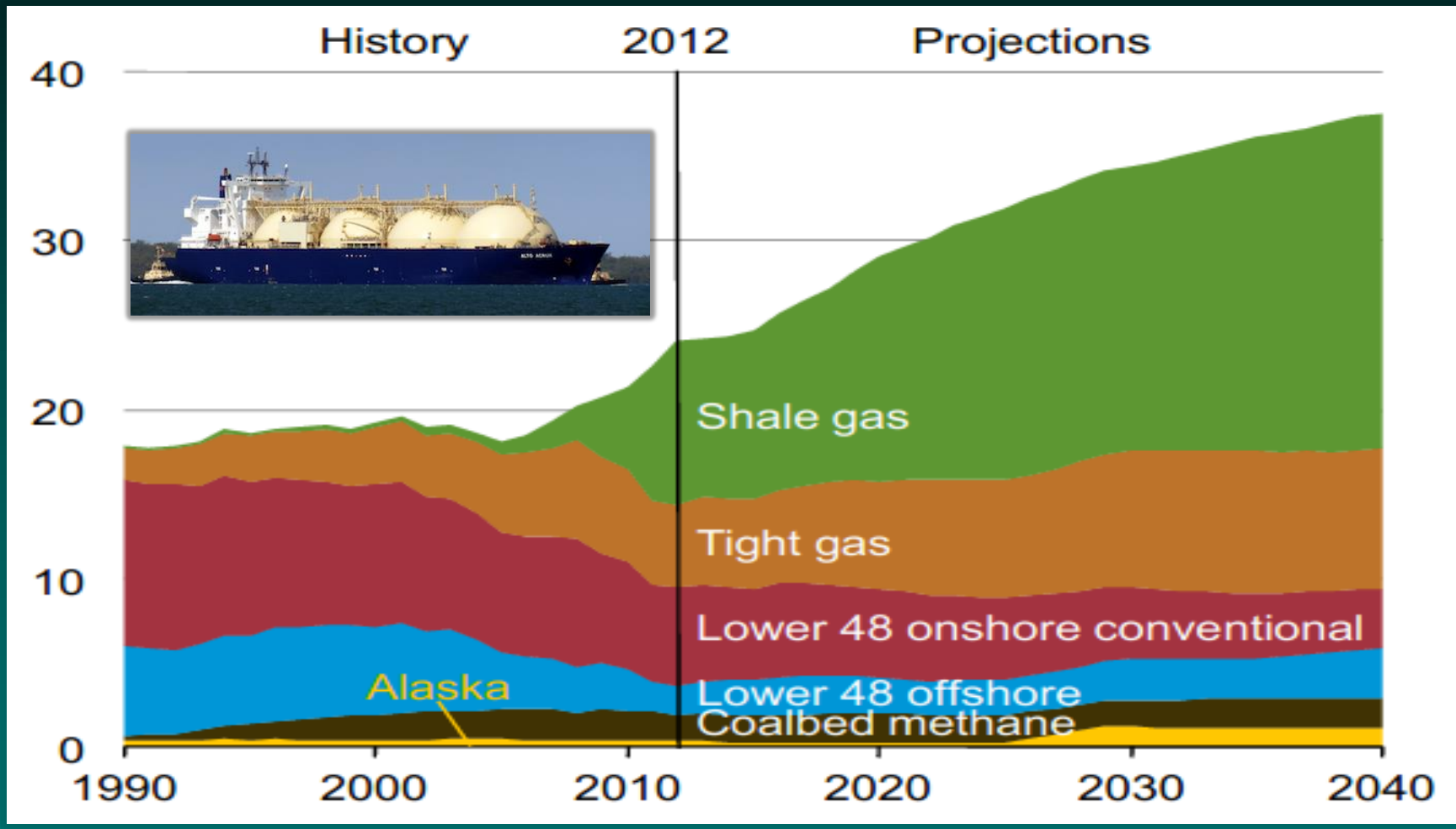
By 2020, U.S. is Projected to Be a Net Exporter of Natural Gas

Source: Derived from US Energy Information Administration: EIA AE 02014

Independent Statistics & Analysis
U.S. Energy Information Administration

US Natural Gas Production by Source

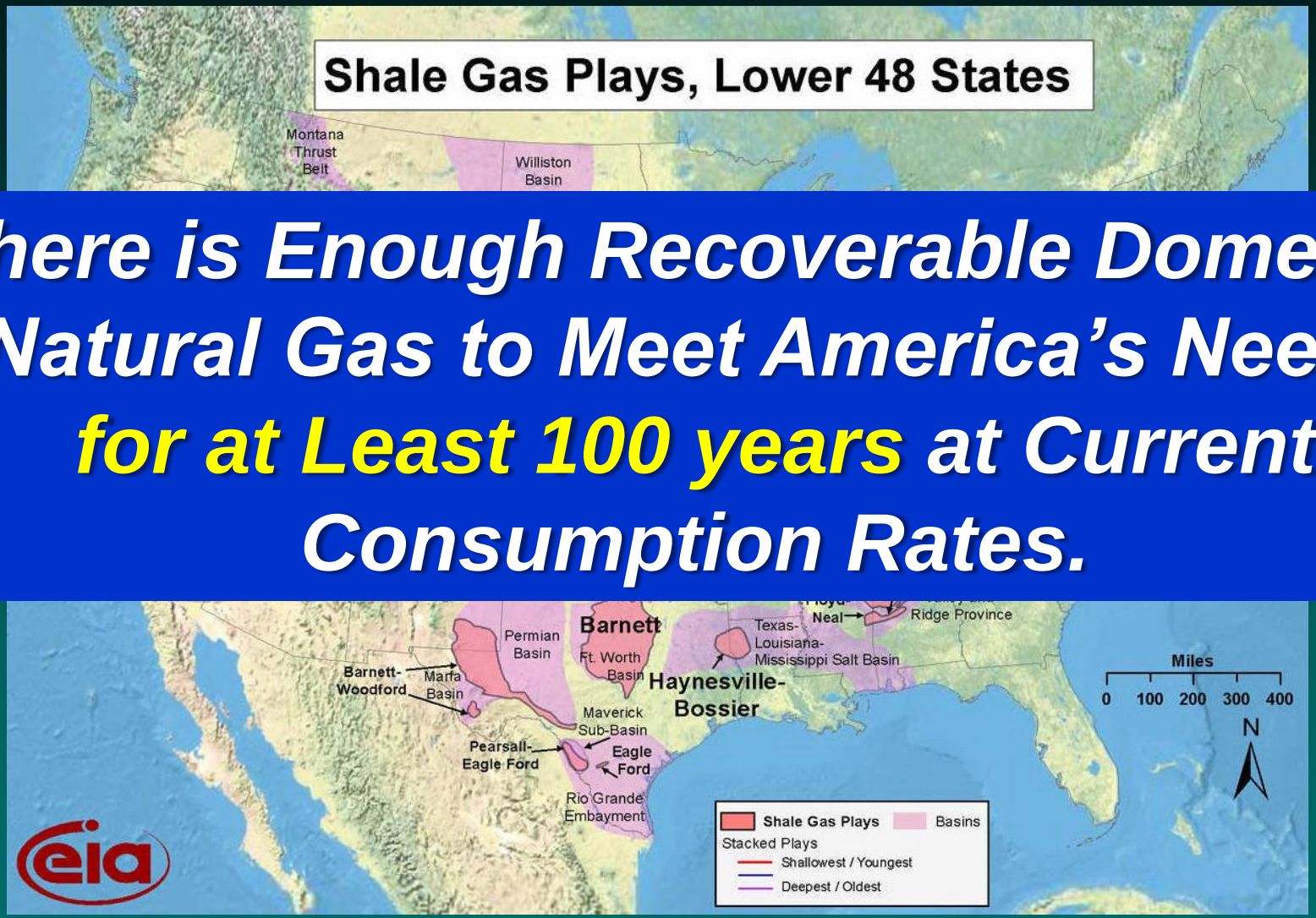
(Trillion Cubic Feet)



Source: Derived from US Energy Information Administration: EIA AE 02014

Independent Statistics & Analysis
U.S. Energy Information Administration

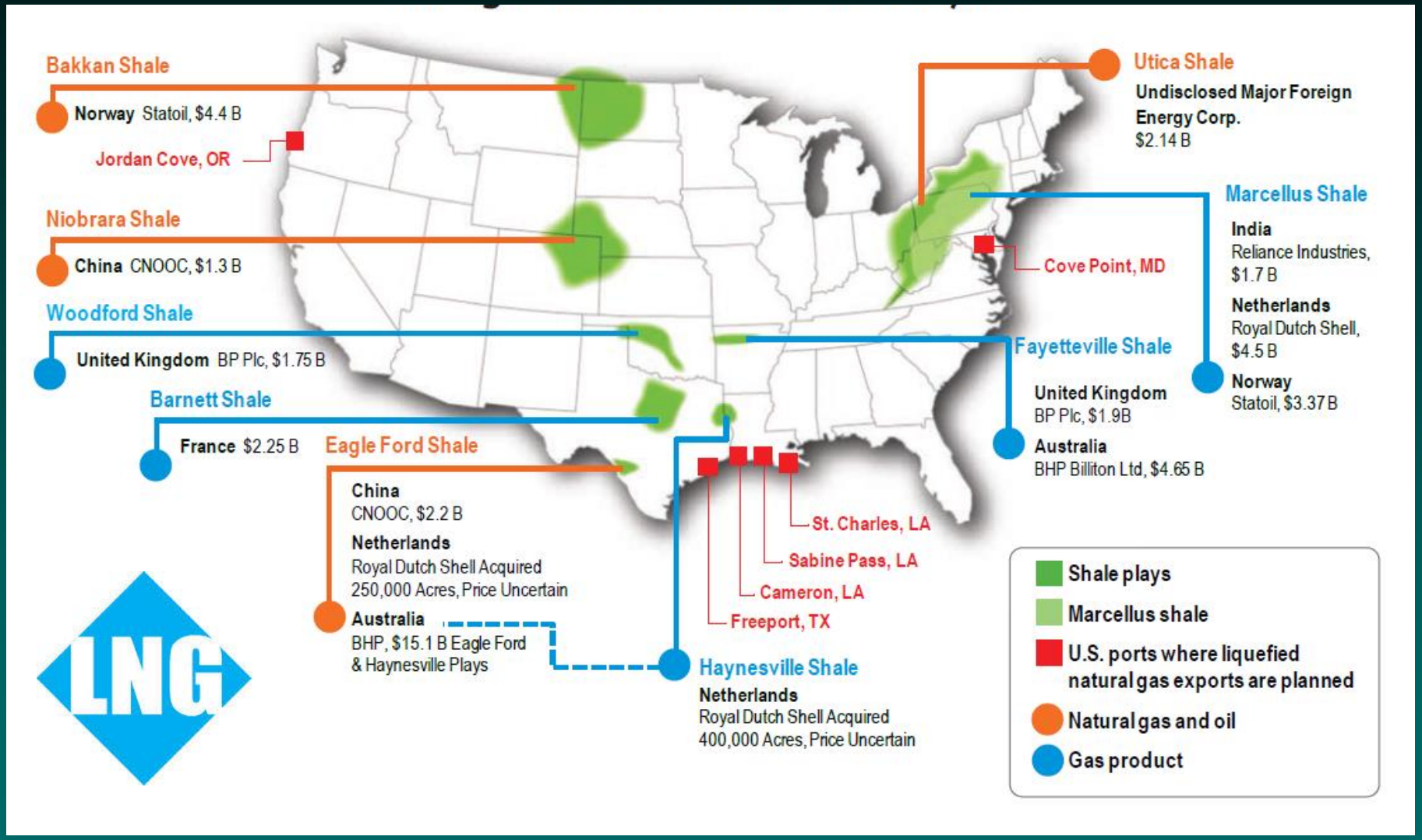
US Shale Gas Basins in North America



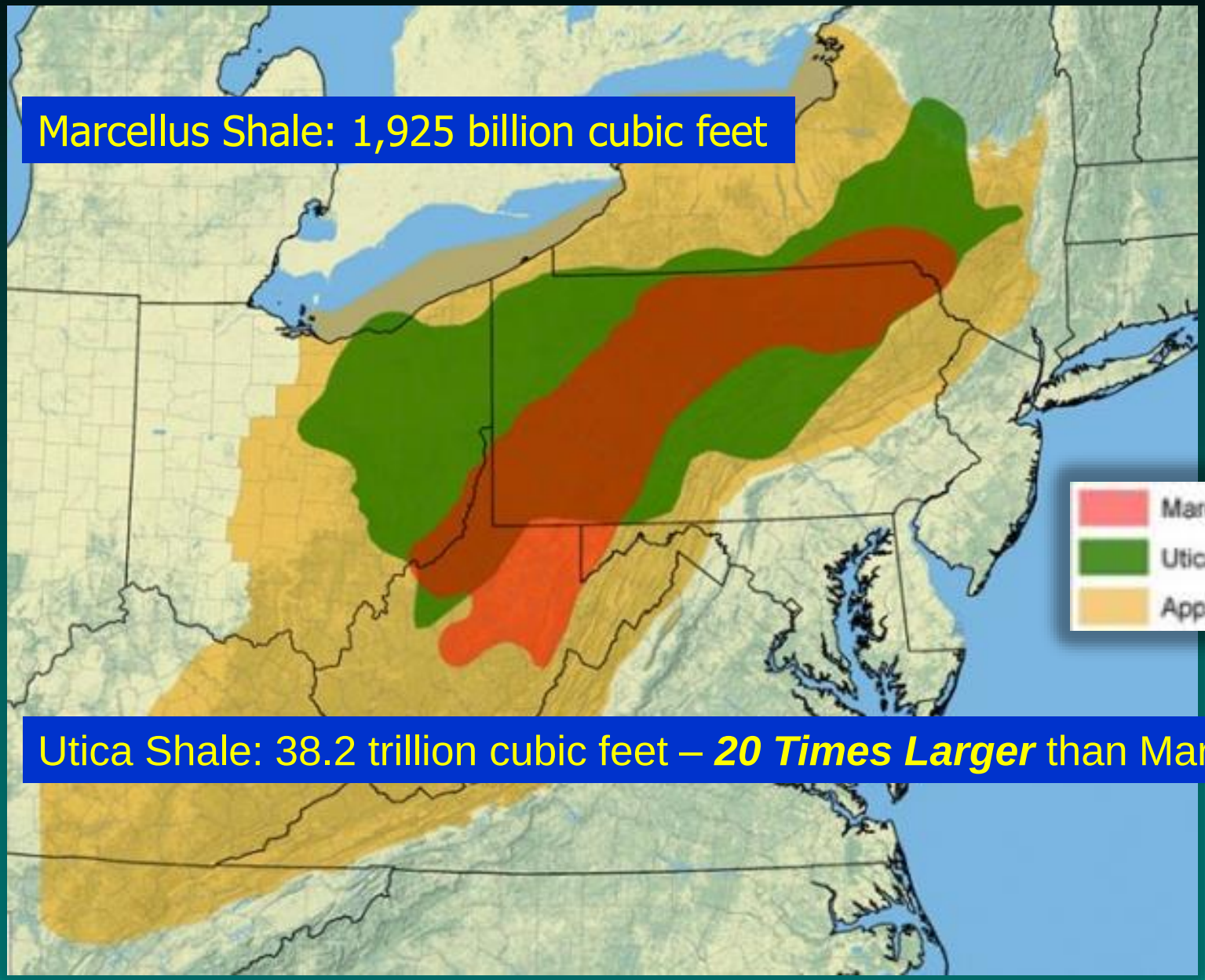
There is Enough Recoverable Domestic Natural Gas to Meet America's Needs for at Least 100 years at Current Consumption Rates.

Source: Derived from US Energy Information Administration: EIA AE 02014

Foreign Investment in US Gas and Oil

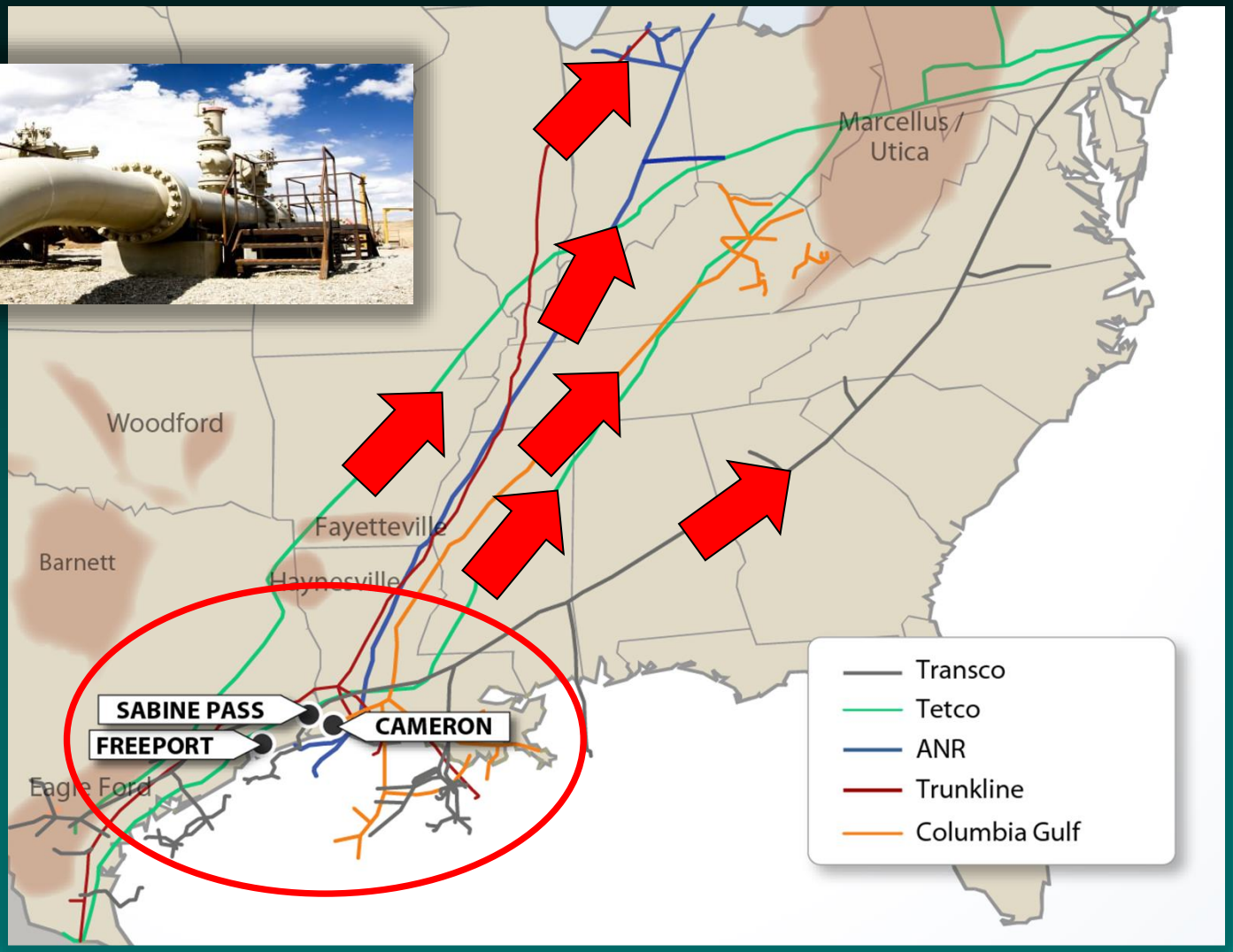


Marcellus/Utica/Appalachian Shale Basins



US LNG Exporters Target Marcellus Shale as Feed Gas

(Liquefaction Participants are Now in the Market for Dedicated Pipeline Supply to Match Their Exporting Needs)

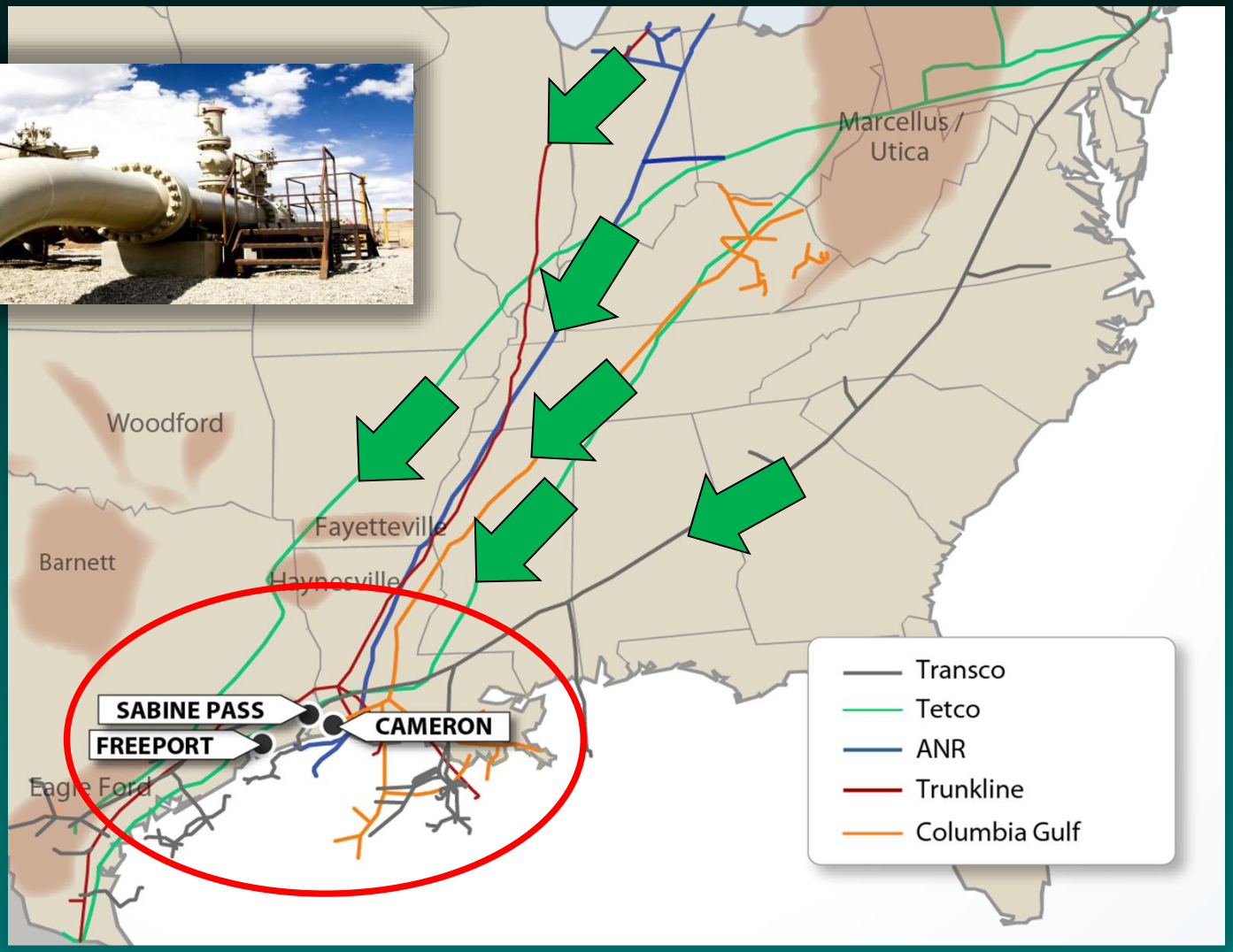


Source: Poten & Partners' in July 2014 LNG in World Markets Research Report

VICKERMAN & ASSOCIATES, LLC

US LNG Exporters Target Marcellus Shale as Feed Gas

(Liquefaction Participants are Now in the Market for Dedicated Pipeline Supply to Match Their Exporting Needs)



Source: Poten & Partners' in July 2014 LNG in World Markets Research Report

2017 AAPA Executive Management Conference

Inland Ports Defined: A Convergence of Logistic Trends

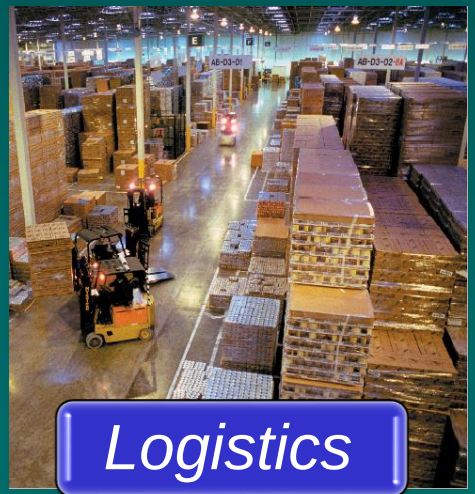
VICKERMAN & ASSOCIATES, LLC

Inland Ports Defined

A Convergence of Logistics Trends

Short Sea Shipping Technology

Intermodal Rail



Logistics

Automation

Distribution Center

VICKERMAN & ASSOCIATES, LLC

Emerging Major Inland Port Logistics Centers

Throughput Capacities in Millions of TEUs

VICKERMAN & ASSOCIATES, LLC

BNSF Logistics Park, Joliet. IL

A New Model For Freight Logistics Centers

Wal-Mart's New 3.4 million SF (78 acres under roof) Import Distribution Center

The Cost of This Import Distribution Center was Paid for by the Savings in Truck Drayage Between the Warehouse & the Intermodal Rail Terminal


The Inland Port:
"With Integrated JIT Delivery:
The Inland Port Can Greatly
Increase a Regions Freight
System Capacity"

REPORT CARD for America's INFRASTRUCTURE

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

AMERICA'S GPA:

D+

ASCE 2017 Report Card for America's Infrastructure

ESTIMATED INVESTMENT NEEDED BY 2020:

$4.6 TRILLION

Cost to Improve

Ports: C+

Inland Waterways: D

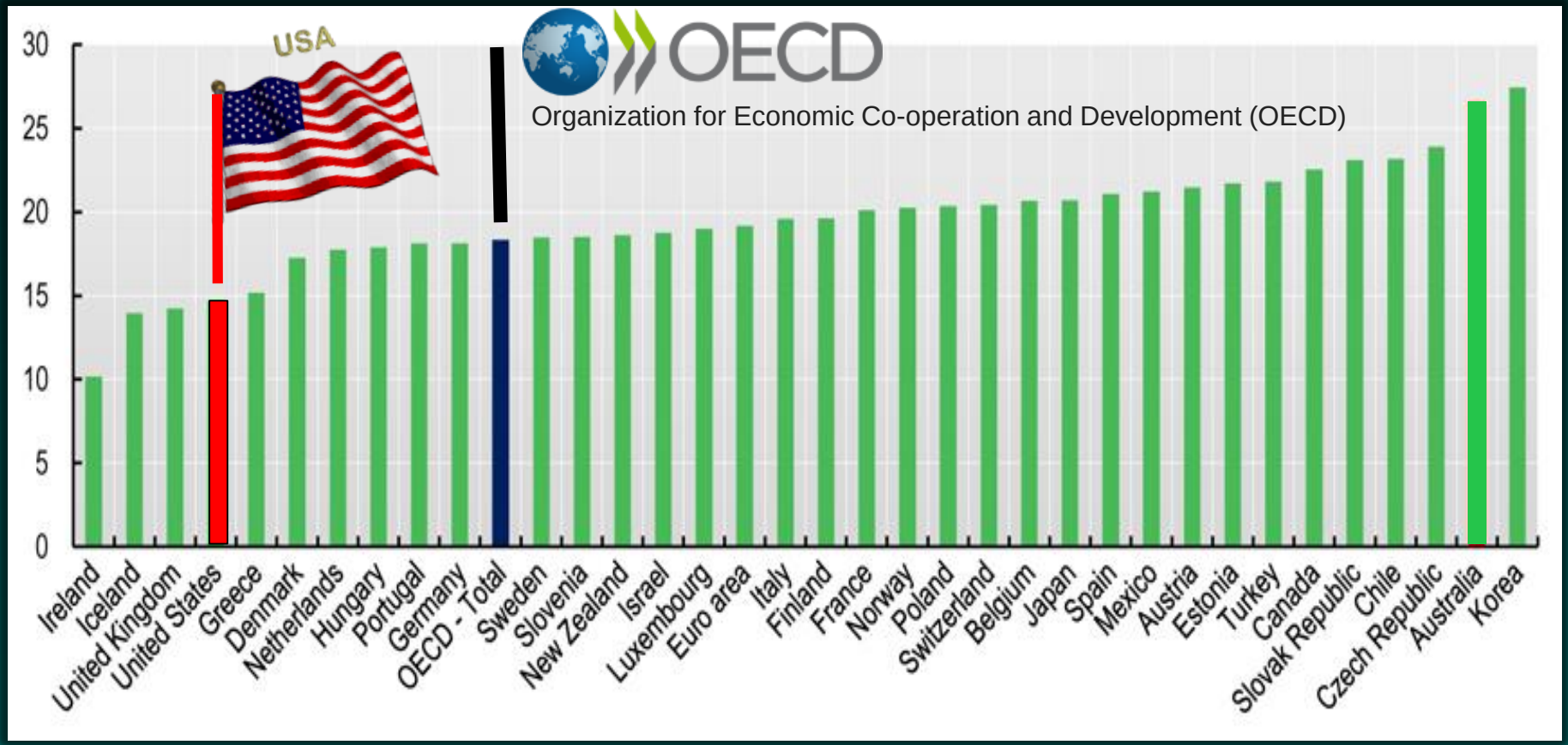
Roads: D

Failure to Act: It Costs Each US Family $3,400 per year

VICKERMAN & ASSOCIATES, LLC

International Gross Fixed Capital Formation as a Percent of GDP

(*US is 32nd in the World - Behind OECD Nations*)



AAPA

2017 AAPA Executive Management Conference

Thank You

VICKERMAN
& ASSOCIATES, LLC