



*Westin Hotel, Long Beach, CA*

*October 1, 2018*

# ***Competitive Dynamics for Carriers: Competition and Cooperation in the Container Market***

M. John Vickerman



Williamsburg, Virginia



Marine Terminal  
Management  
Training  
Westin Long Beach  
Long Beach, California



# Three Dramatic Mega Trade Trends will Increase Global Trade Demand

# Current Market Conditions Appear to be Improving for Marine Carriers



Expect the Global Maritime Trade Volume to Double by 2030...

Source: JOC.COM January 2018

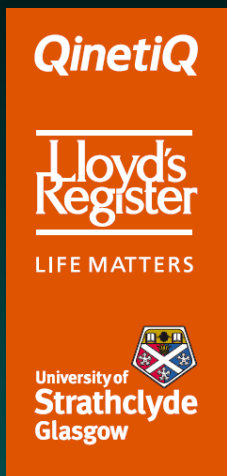


# Expect the Global Maritime Trade Volume to Double by 2030

*“In the next 10-15 years **world trade is projected to grow significantly.** It is estimated that this growth will result in a **doubling of seaborne trade volumes** from 10 billion tons of cargo annually today to **20 billion tons of cargo around 2030**”.*

Source: Danish Maritime Forum, 24-28 October 2016

# Three Mega Trade Trends to 2030



## I. INCREASE IN GLOBAL POPULATION:

**Global population is likely to be 8.5 billion by 2030, with 96% of growth coming from developing countries.**

**India will overtake China with the largest population.**

# Top Global Bilateral Trade Connections:

**2030:**  
8.5 Billion  
(Sino Centric)

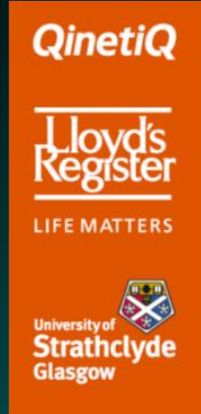


**2010:**  
6.9 Billion  
(Western Centric)



Source: Global Marine Trends 2030 – QinetiQ – Lloyd’s Register

# Three Mega Trade Trends to 2030:

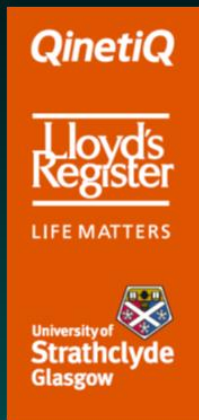


## II. GLOBAL GDP COULD GROW THREE TIMES WITHIN THE NEXT 20 YEARS

The countries with the largest growth in per capita GDP will be **China, Vietnam, India and Indonesia.**

**Purchasing power in developing Asia will rise 8 times between 2010 and 2030.**

# Three Mega Trade Trends to 2030:



## III. 40% HIGHER ENERGY DEMAND IN 2030

*China oil consumption could triple, overtaking the USA to become the largest oil consumer.*

*The USA will remain the biggest natural gas consumer, while **China will see the largest growth in natural gas consumption.***





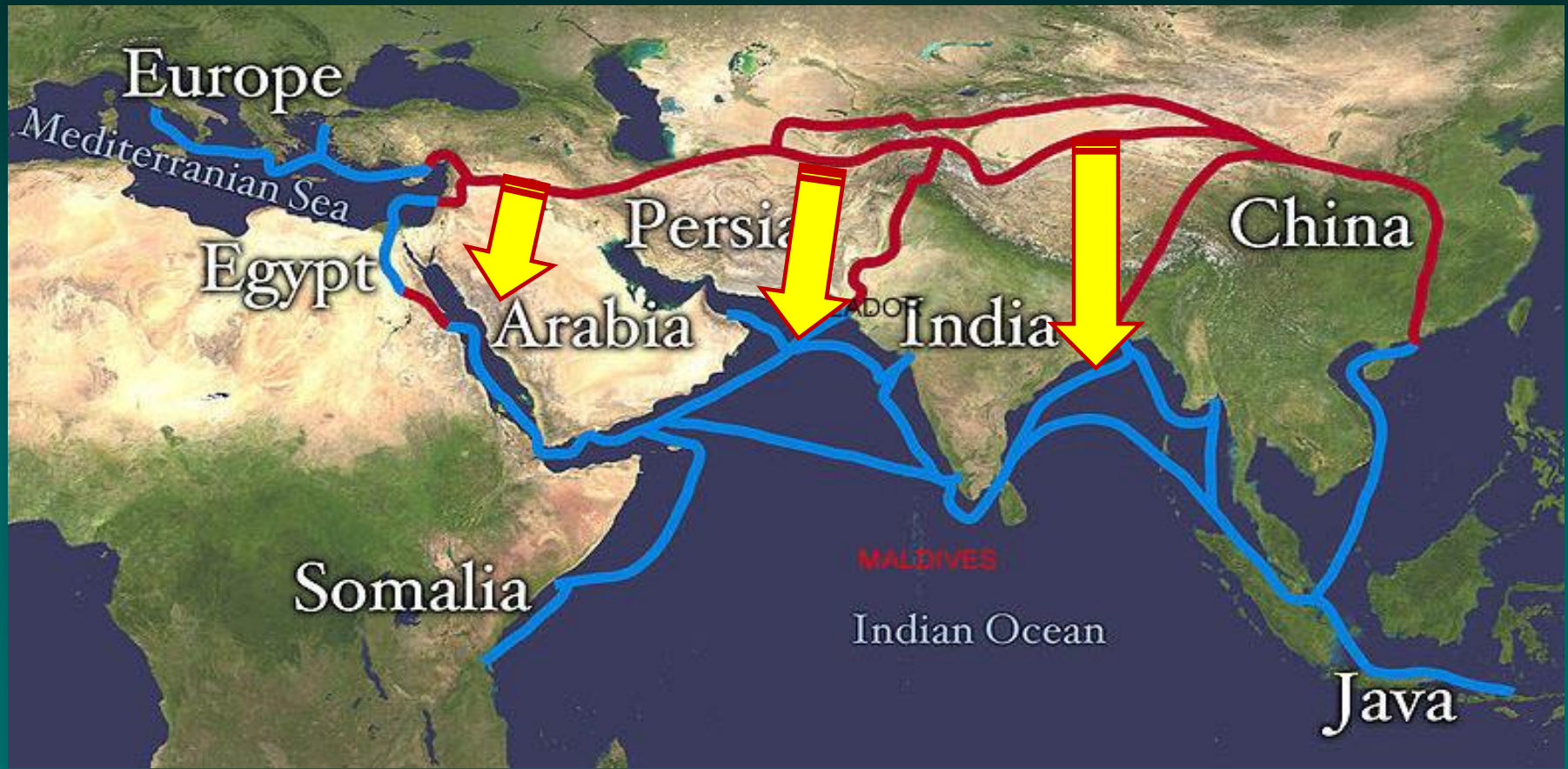
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# The Evolution of Today's Global Shipping Lanes



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

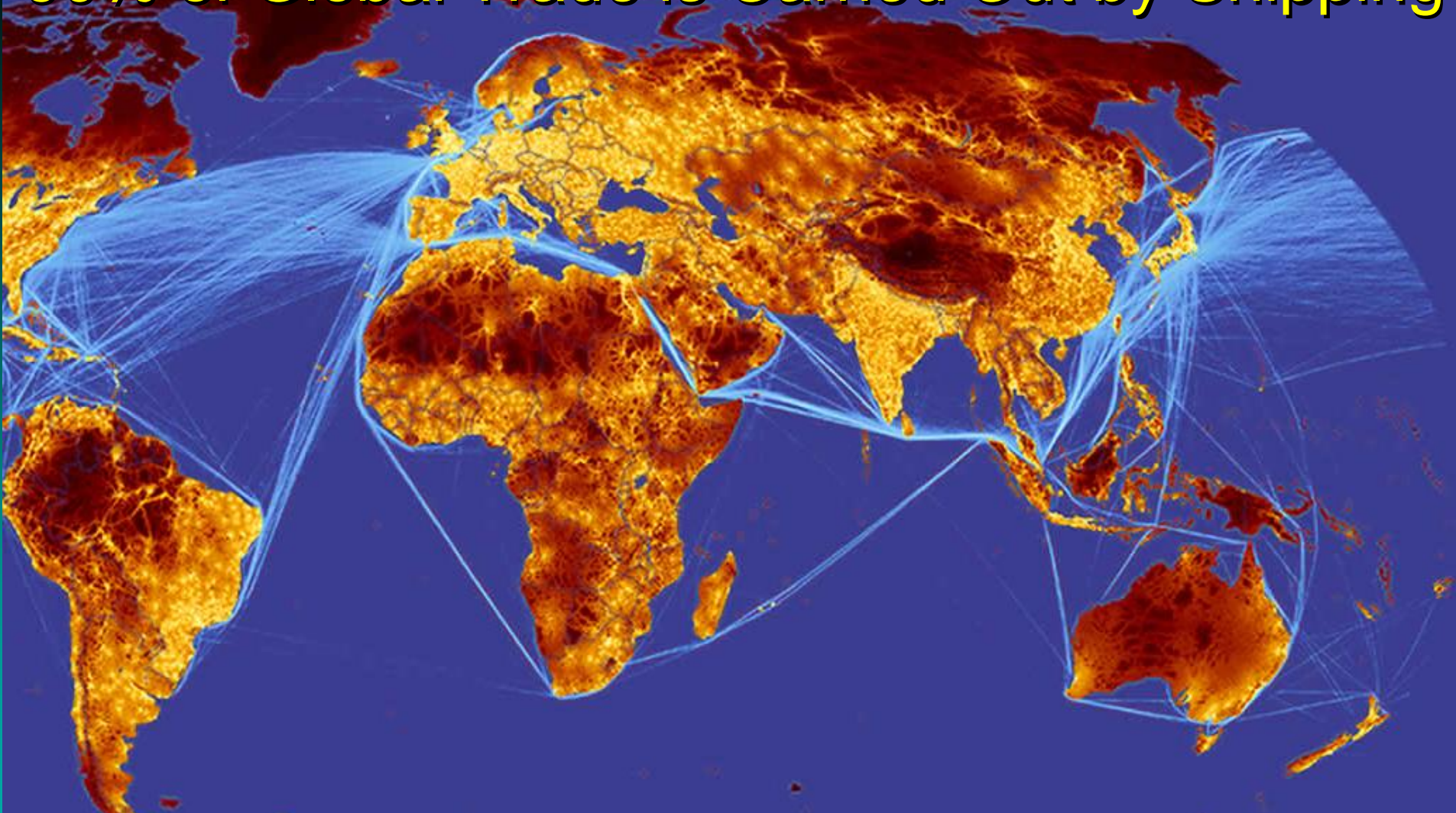


# ***The Marine Silk Road was a Precursor to:***



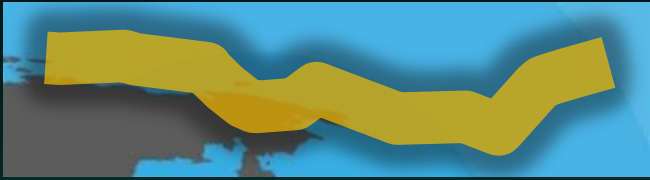
**Today's modern supply chain logistics, distribution and shipping transportation networks**

# 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:

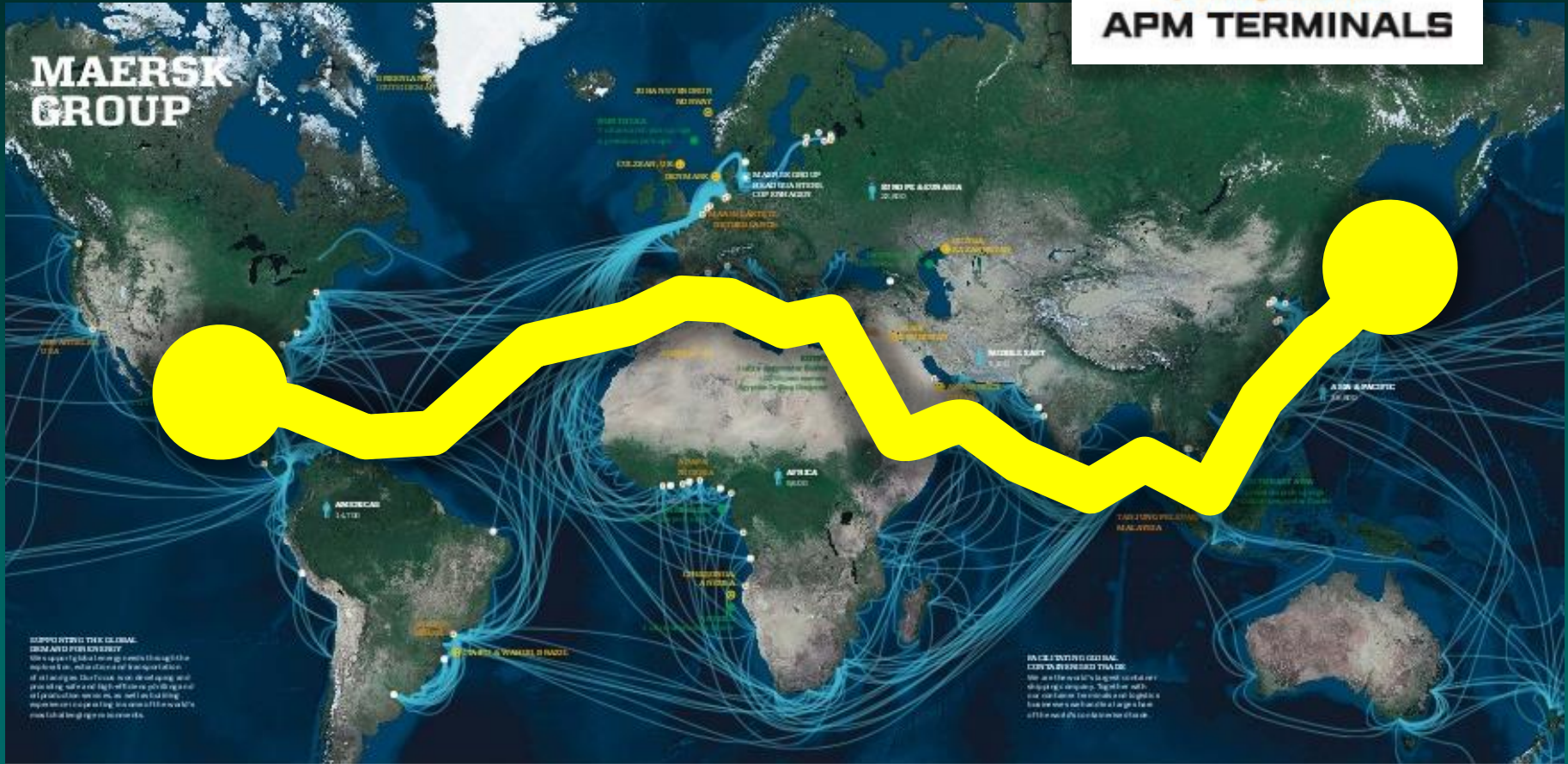


## The Marine Silk Road





# Maersk's Global Trading Routes Today

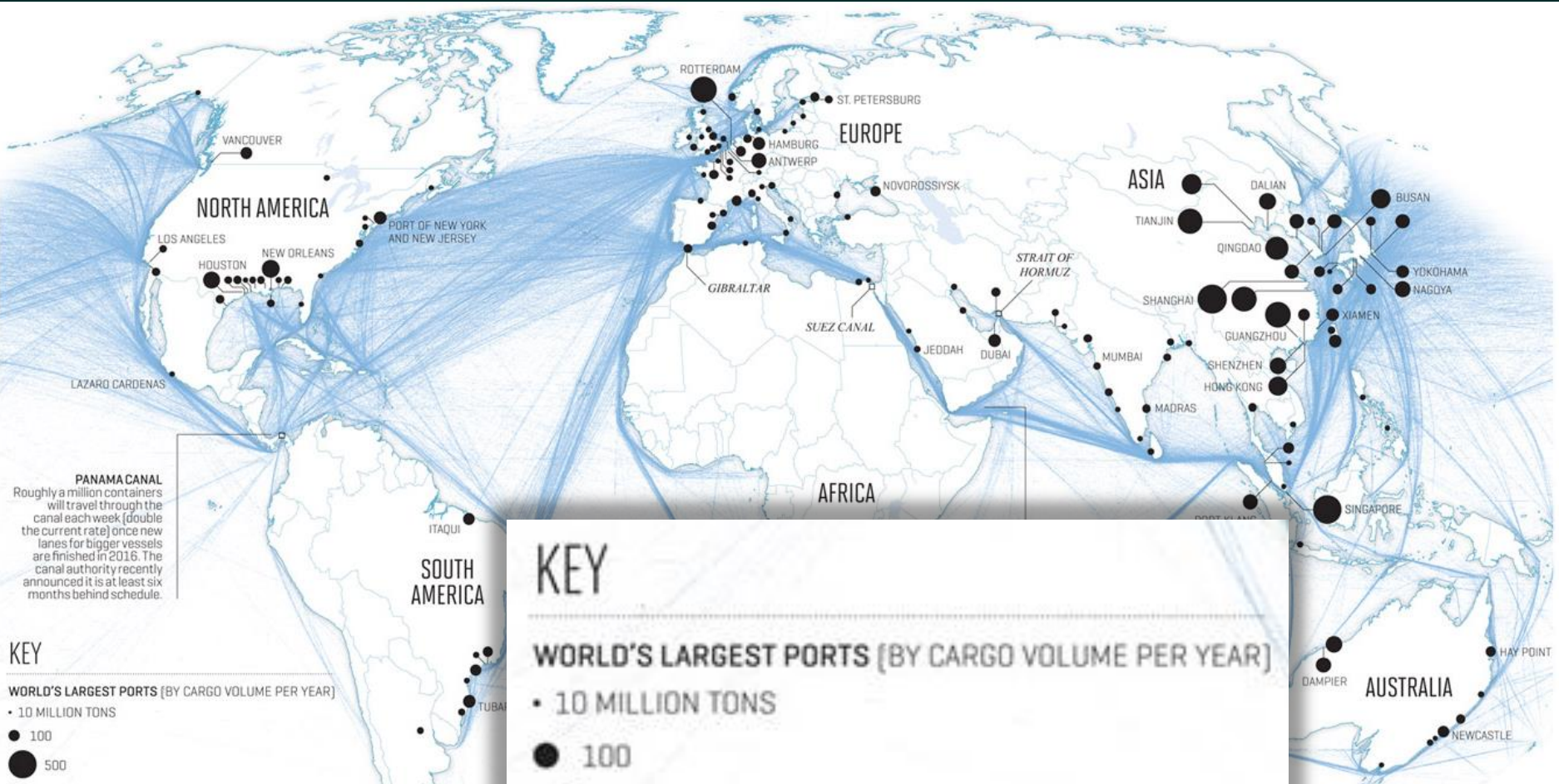


# Indian Ocean Electric Blue Shipping Lane Trails From the Marine Silk Road



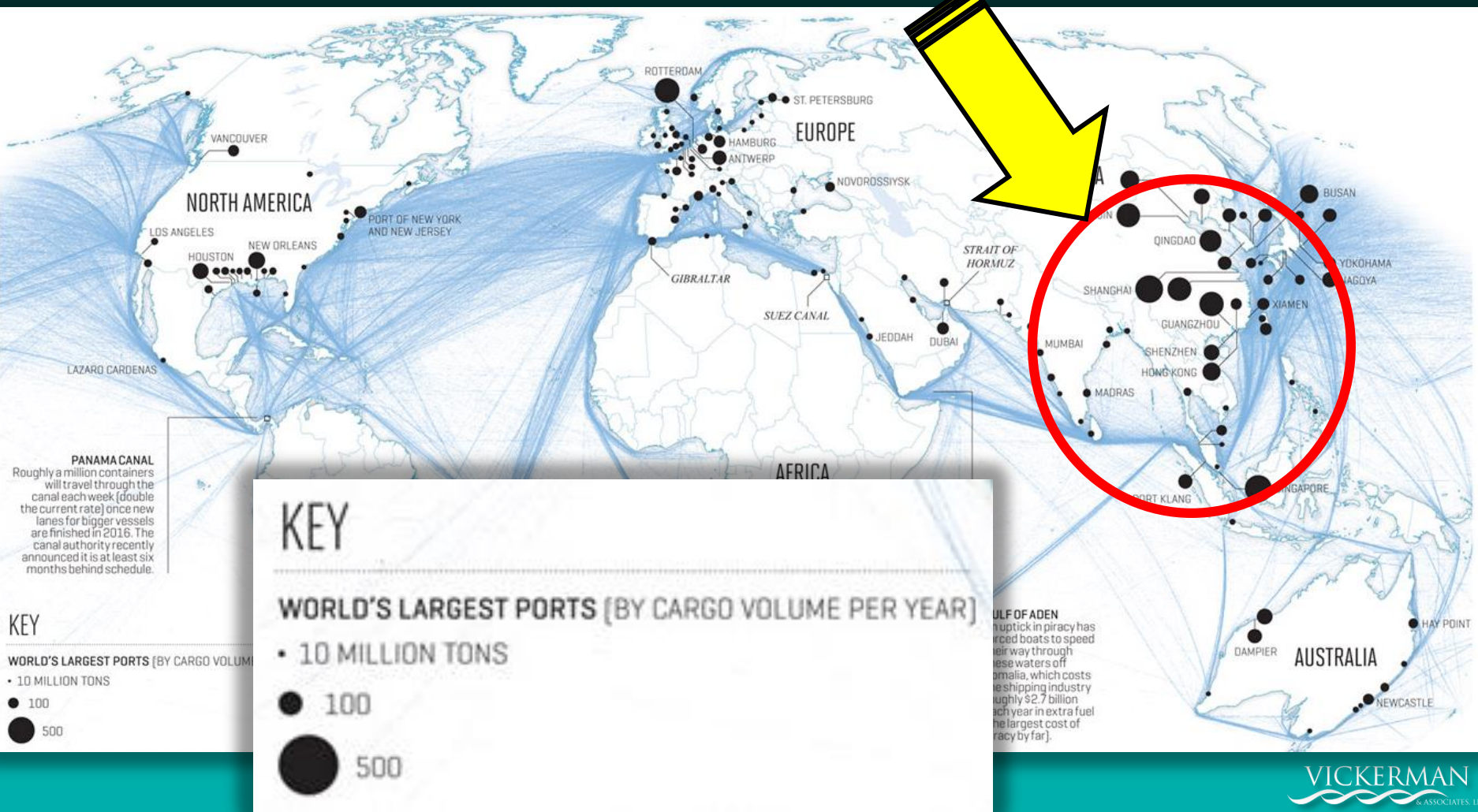
# The World's Largest Ports Are Connected Via The Marine Silk Road

## Where are the Biggest Ports?



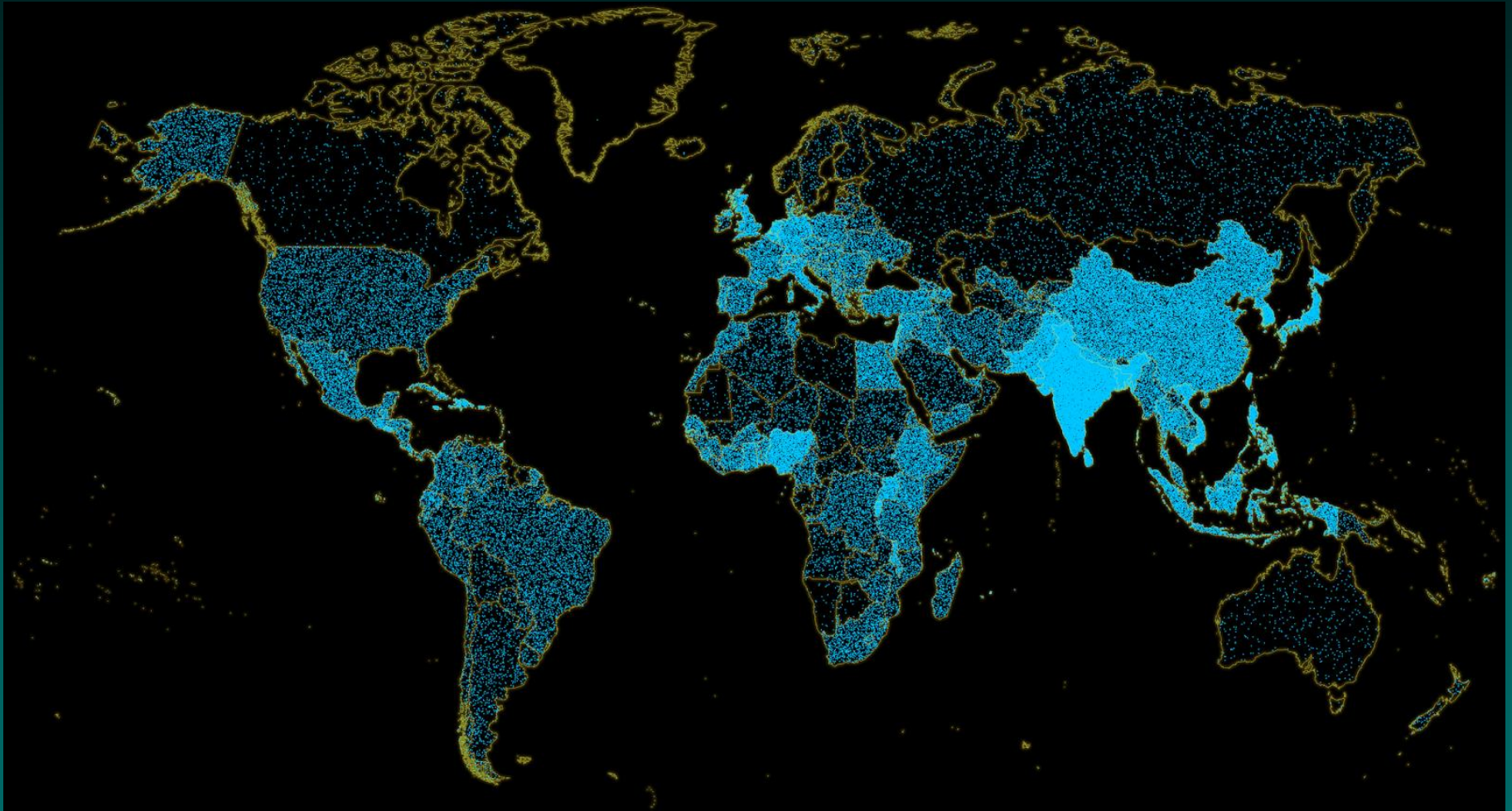


# The World's Largest Ports Are Connected Inside TM Via The Maritime Silk Road & the Circle





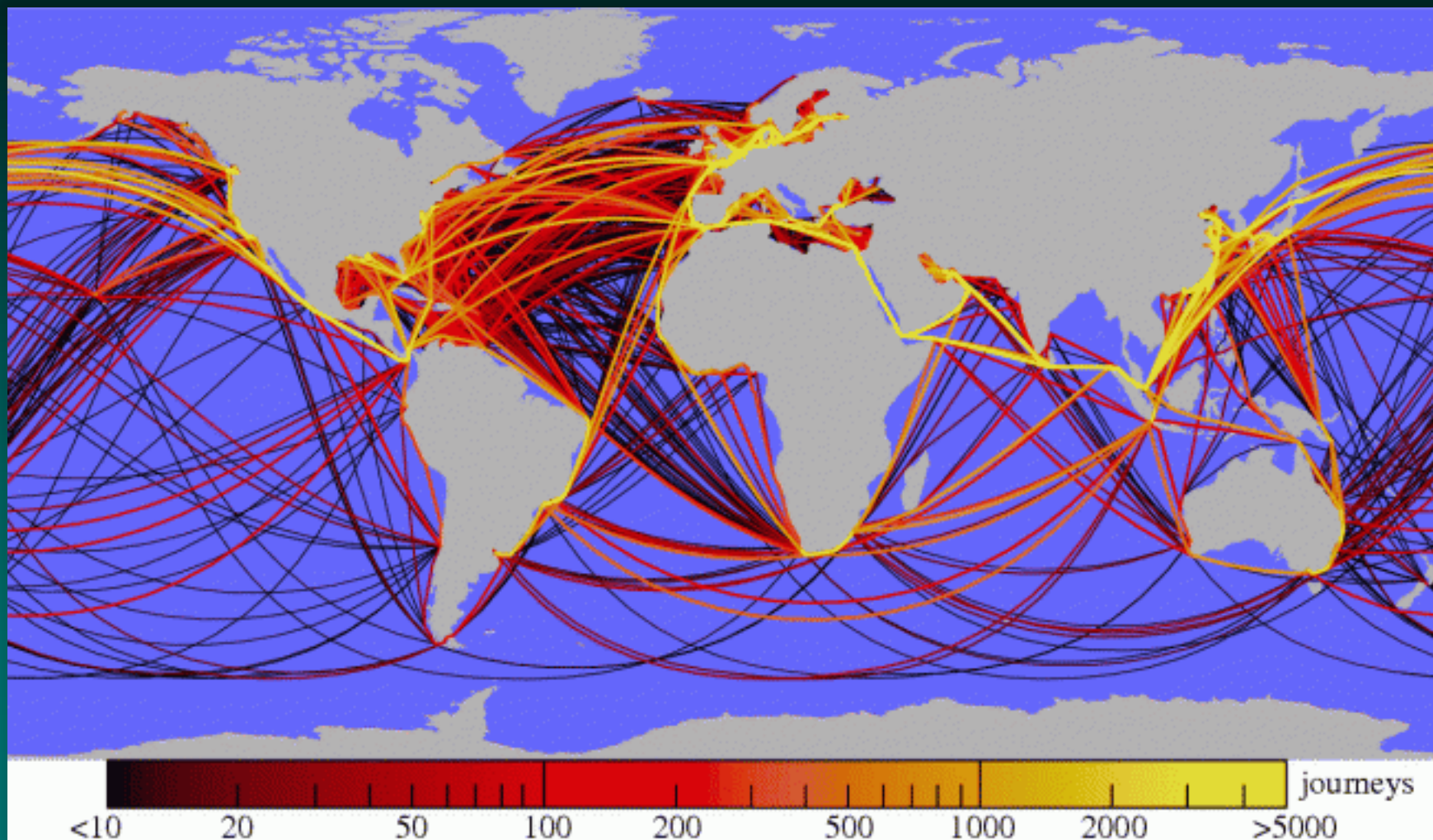
# NASA's Population Density Imagery



A standard dot density map of population (each dot represents 50,000 people).

# 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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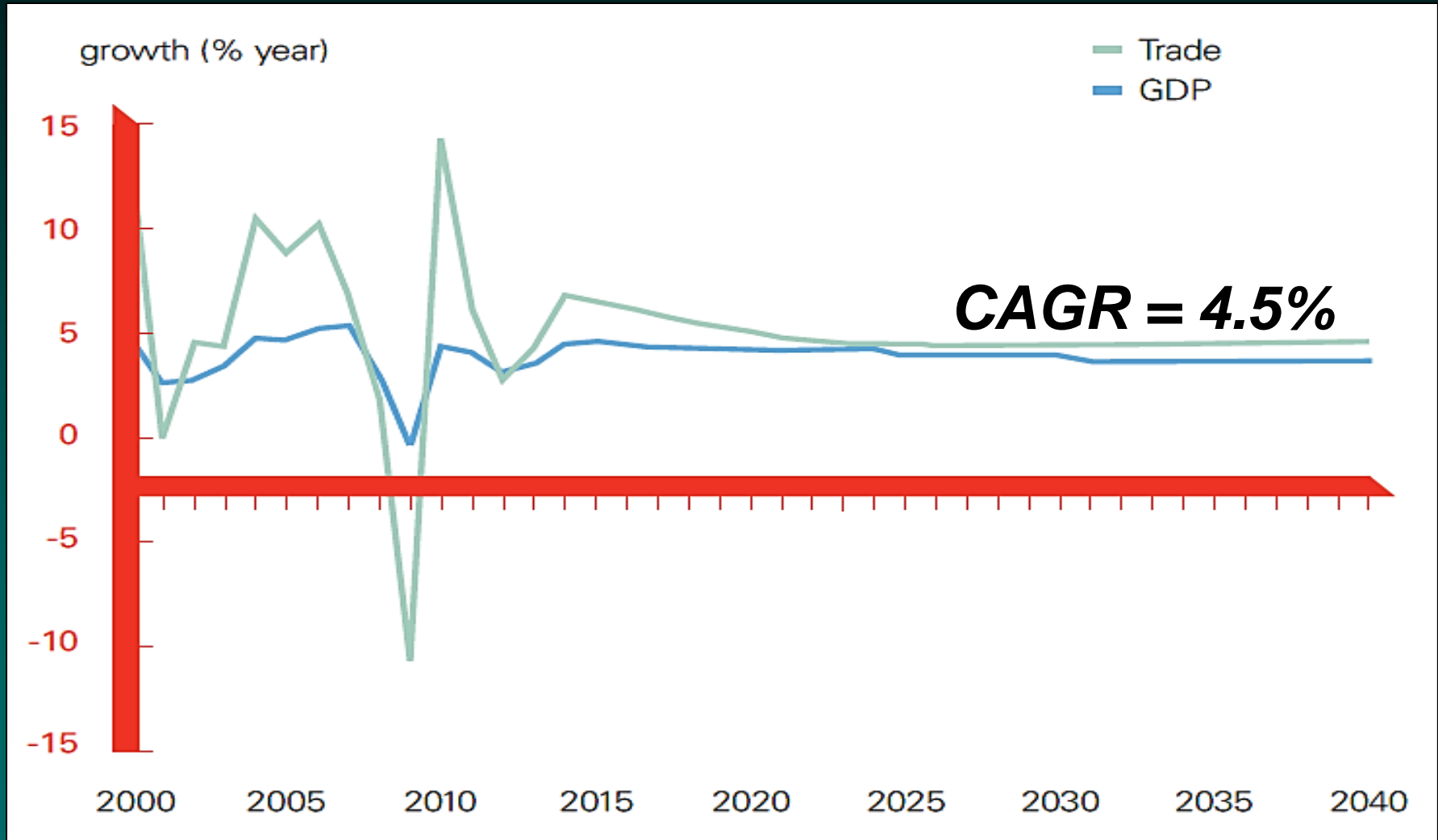
# International External Industry Pressures Driving Today's Logistics

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



# Growth in GDP and World Trade

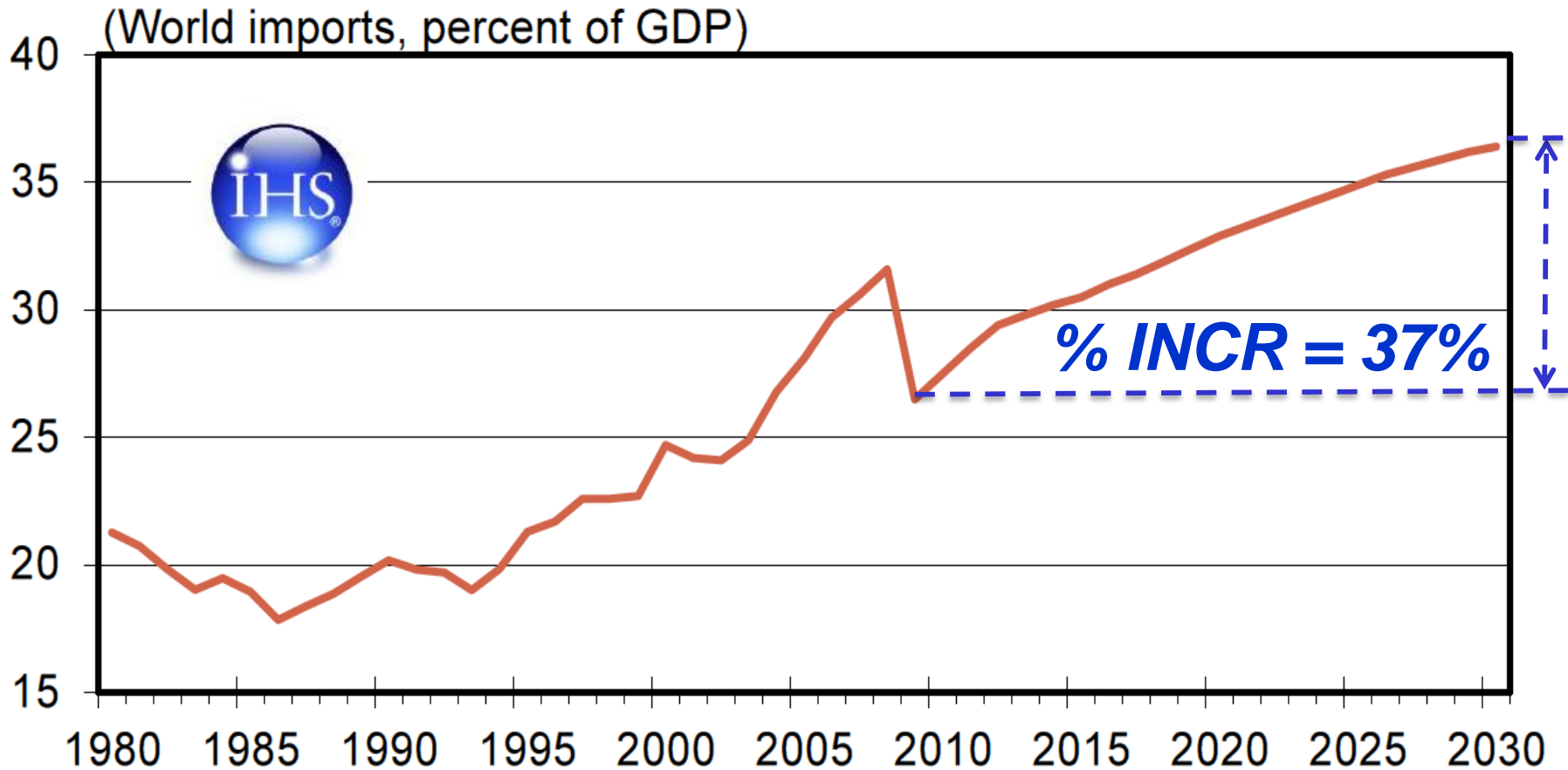
World trade will grow by **73%** in the next 15 years. With merchandise trade volumes in 2025 hitting \$43.6 trillion compared to today's \$27.2 trillion



Source: Oxford Economics 2013

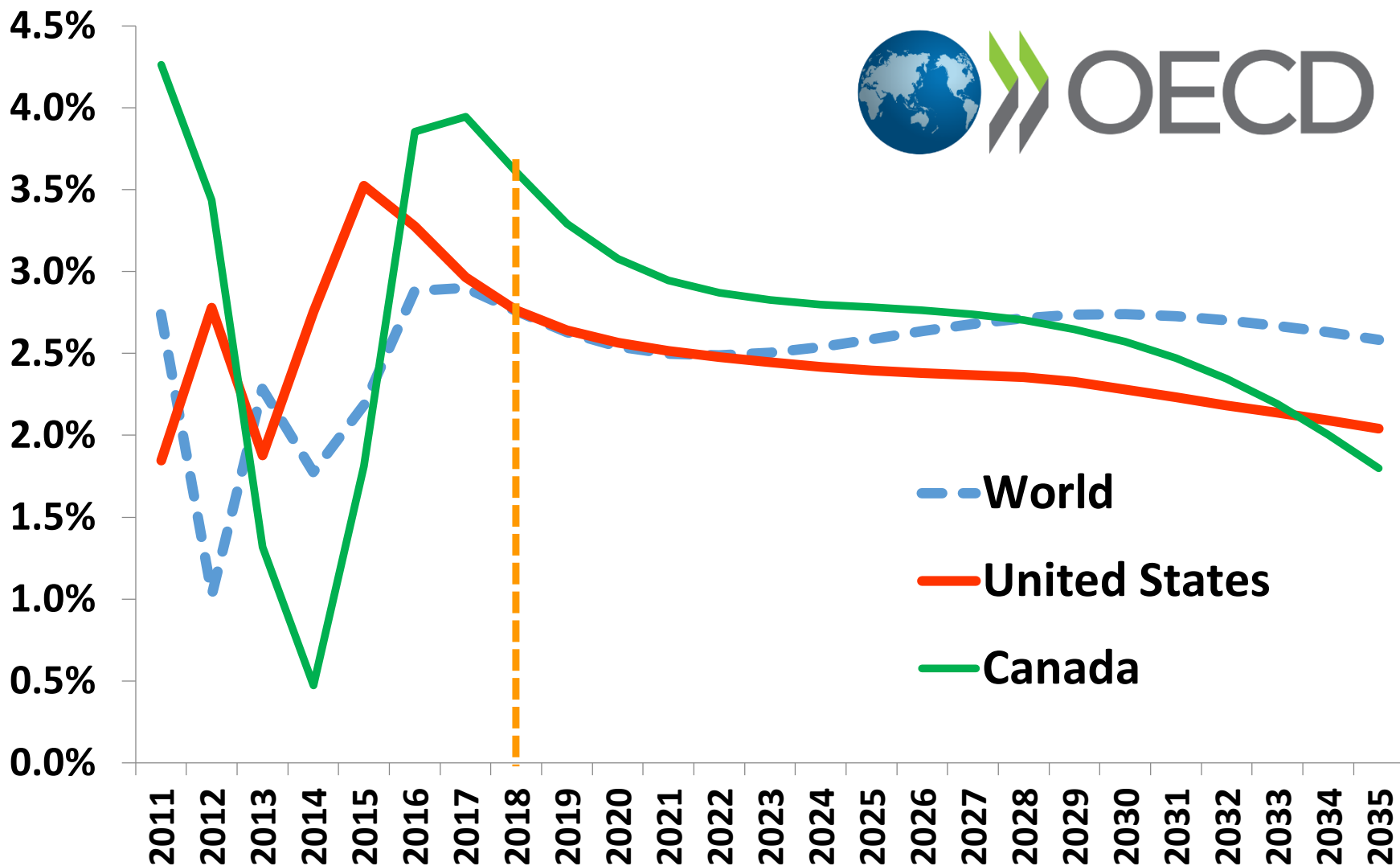
# World Trade's Share of the Economy Grows Again

Globalization trend is shifting, not reversing, long-term.



Source: IHS Global Insight – World Trade Service

# Long Term GDP Annual Growth Rates



Source: OECD Economic Forecast





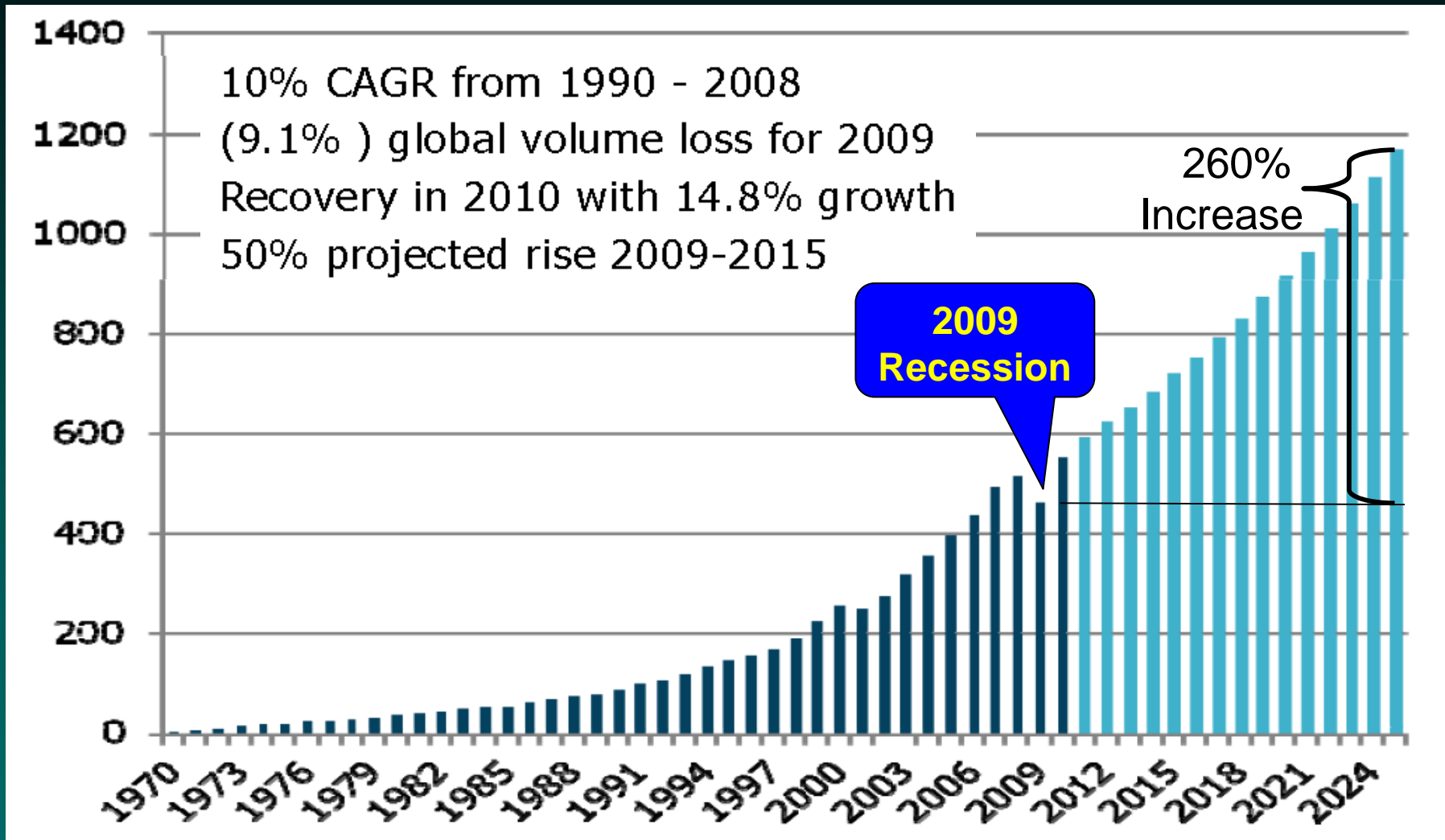
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# International Maritime Cargo Demand & Logistics Trends

# 2025 World Container Port Market Demand

(Millions of TEUs)



Source: Drewry Shipping Consultants

# South East Asian Manufacturing Centroid Shift



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

# Suez Canal's \$8.5 Billion Expansion Plan

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





# 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.**

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



# 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, **Doubling the Suez Canal Capacity by 2023**







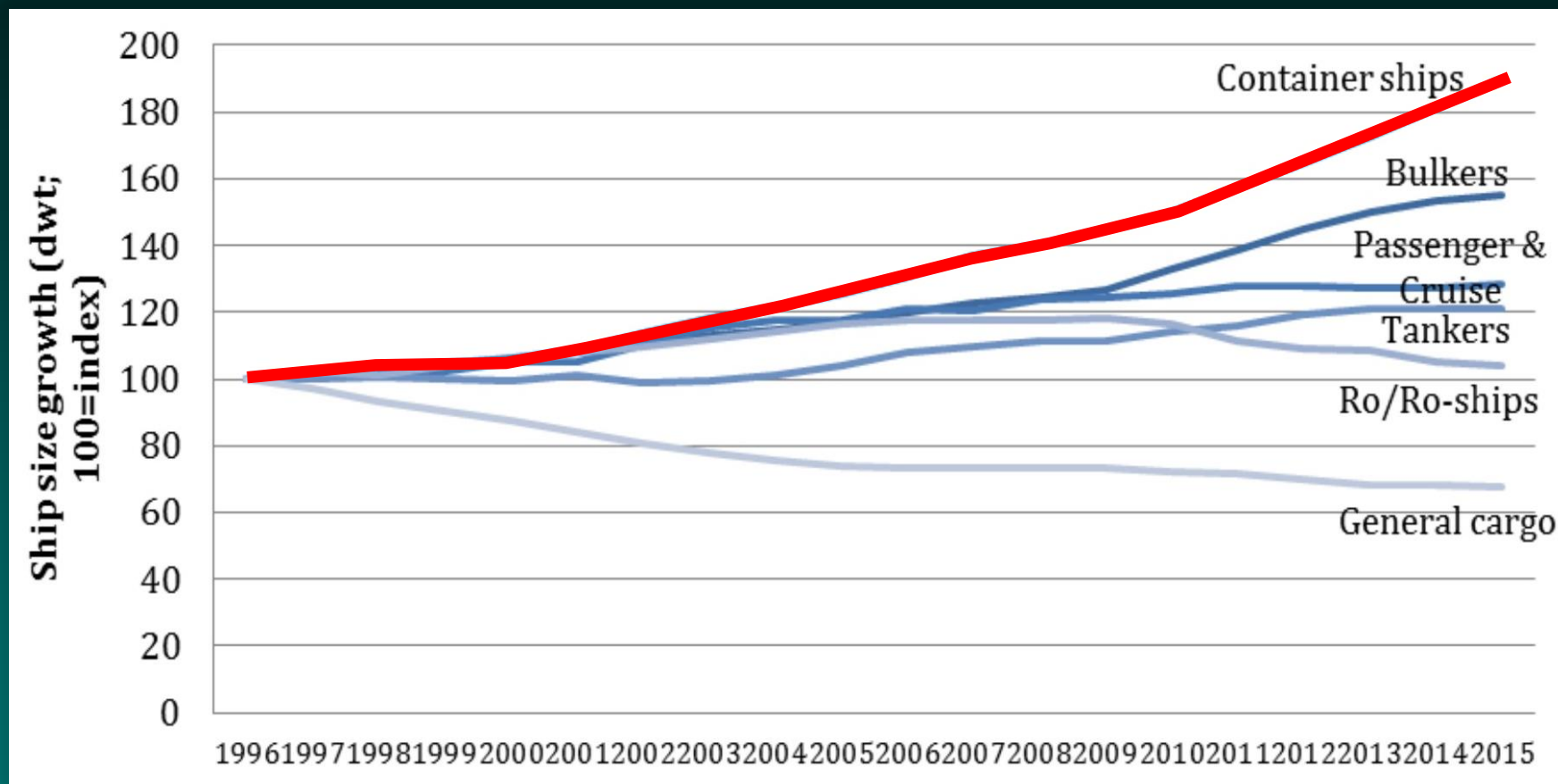
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# The Arrival of Mega Container Ships in North America

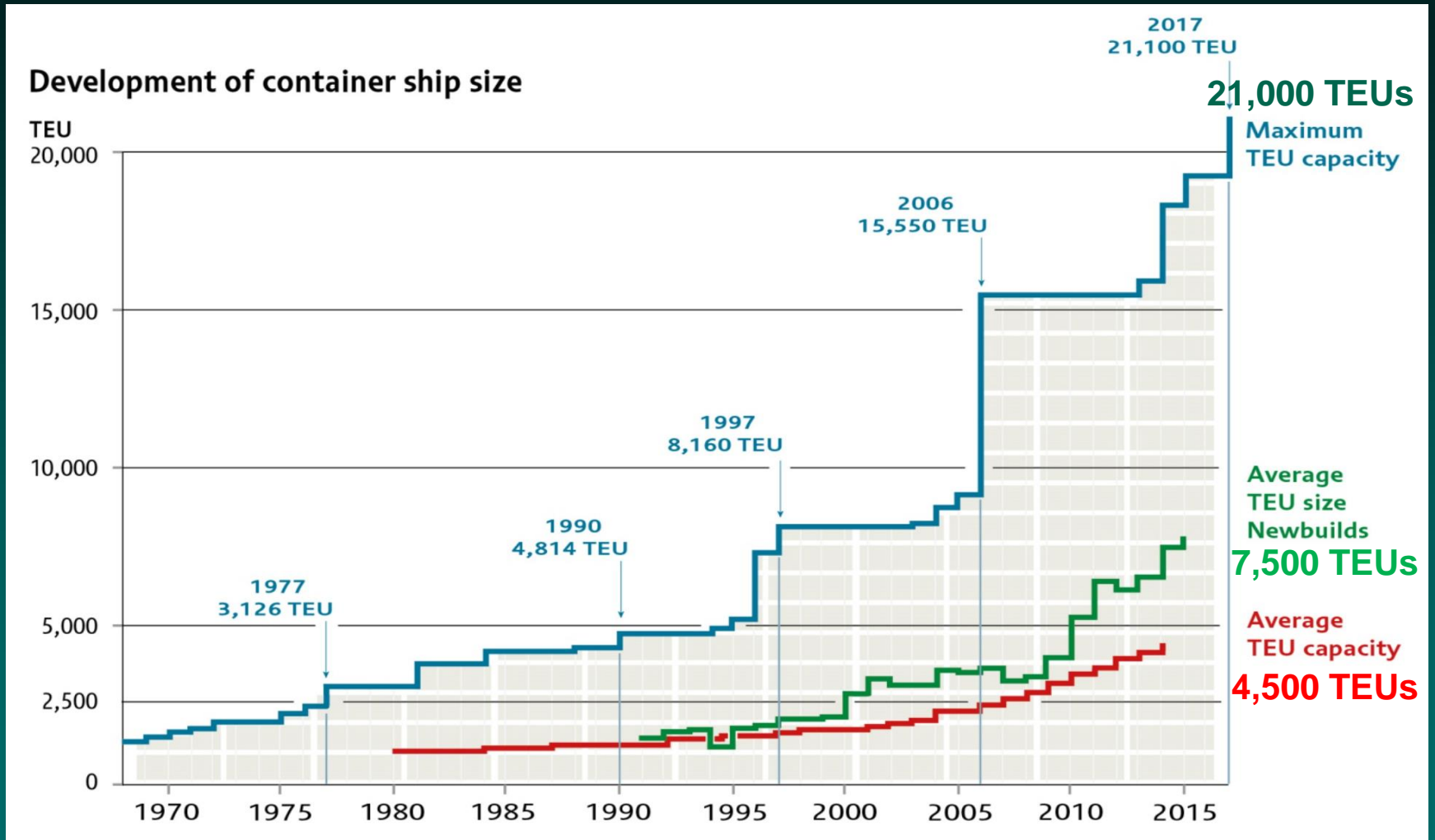
(The Advent of Ultra Large Container Vessels  
(ULCV) – Megamax MGX 24 Vessel)

# OECD Relative Global Vessel Size Growth Index for Various Ship Types



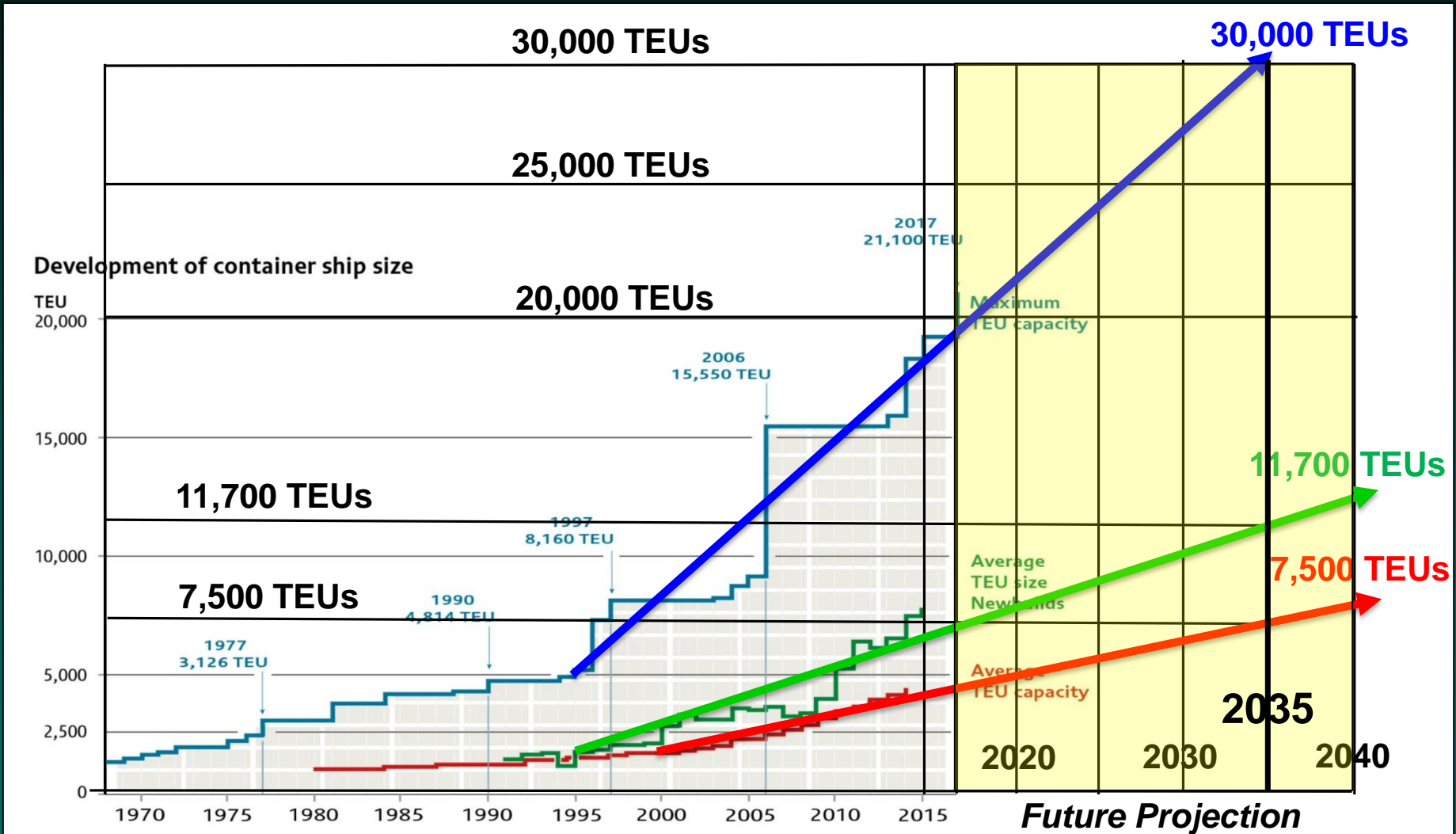
Size of container ships has been growing at a faster pace than all other ship types.

# OECD Historical Development of Container Vessel Size (1970 to 2017)



Source: Clarkson Services – OECD/ITF 2015 Project: Impact of Mega Ships

# Future Development “Extrapolated” OECD Container Vessel Size (2015 to 2035)



Source: Clarkson Services – OECD/ITF 2015 Project: Impact of Mega Ships



The Autoridad Del Canal de Panama

# Panama Canal Third Lane Expansion Capabilities

**Neo-Panamax: 12,600 TEUs**



**Old Panamax: 4,800 TEUs**



# Largest NEO-PANAMAX Containership to Transit the New Panama Canal – August 2017

(OCEAN Alliance's weekly South Atlantic Express (SAX) service)



## CMA CGM's THEODORE ROOSEVELT:

TEU Allowance: **14,855 TEUs**

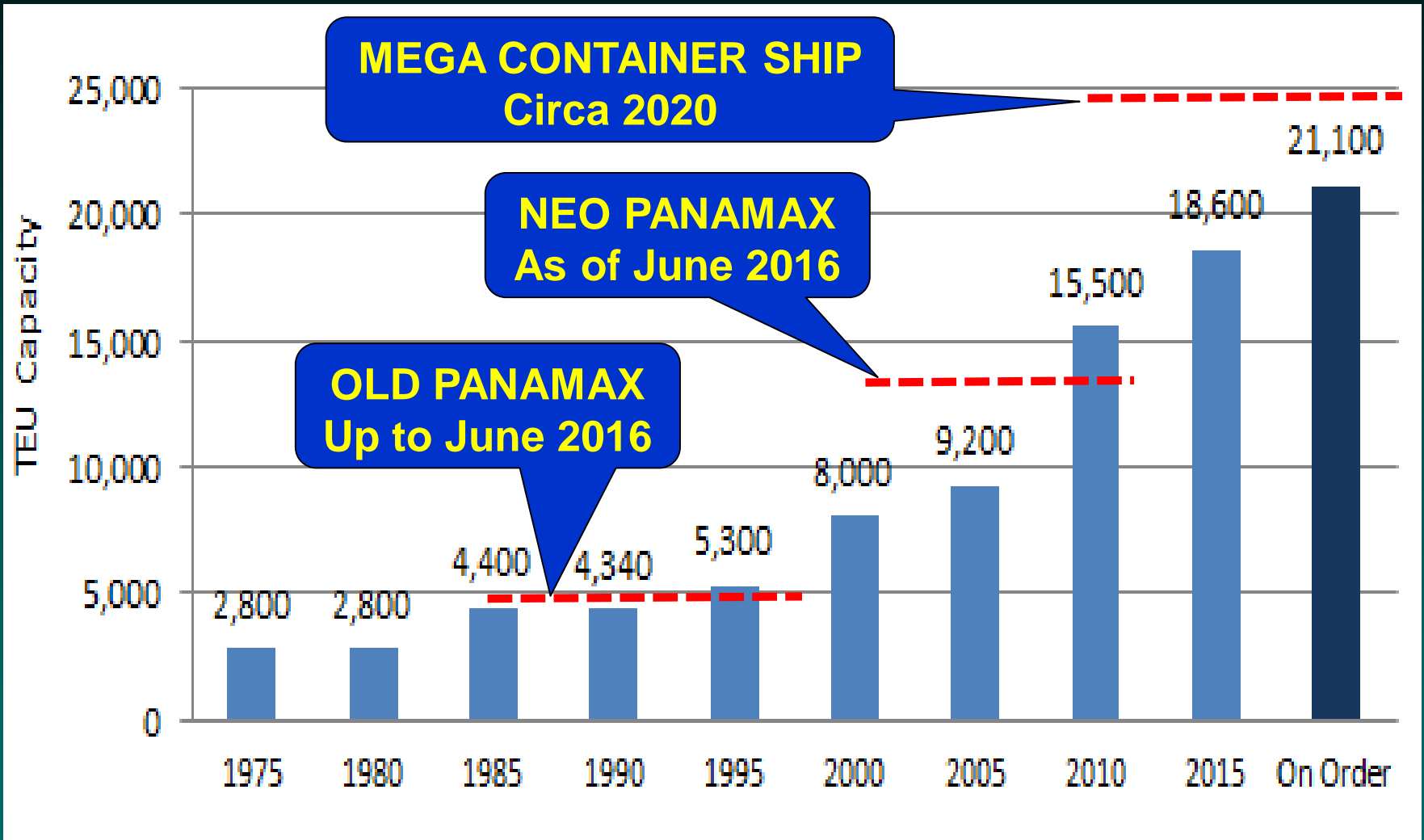
Vessel LOA: 365.9 meters (**1,200.66 ft.**)

Vessel Beam: 48.2 meters (**158.31 ft.**)

Vessel Max. Draft: 16 meters (**52.49 ft.**)

# 40 Years of Container Ship Size Growth

(TEU Capacity)



Source: HIS Maritime & Trade Historical Vessel and Orderbook Data

# 50 Years of Container Vessel Evolutionary Growth

## 50 years of Container Ship Growth

1968 — Encounter Bay 1,530 teu  
 1972 — Hamburg Express 2,950 teu  
 1980 — Neptune Garnet 4,100 teu

Container-carrying capacity has increased by approximately 1,200% since 1968

1984 — American New York 4,600 teu

1996 — Regina Maersk 6,400 teu

**Old Panamax:  
4,800 TEUs**

1997 — Susan Maersk 8,000+ teu

2002 — Charlotte Maersk 8,890 teu

2003 — Anna Maersk 9,000+ teu

2005 — Gjertrud Maersk 10,000+ teu

2006 — Emma Maersk 11,000+ teu

**Neo-Panamax:  
14,800 TEUs**

2012 — Marco Polo (CMA CGM) 16,000+ teu

2013 — Maersk Mc-Kinney Møller 18,270 teu

2014/  
2015 — CSCL Globe/MSO Oscar 19,000+ teu

2018 — ???????? 22,000 teu

**Near Term Mega Vessel: 24,000 TEUs**





# The Recent Mega Container Vessels are Too Large for the New Panama Canal Third Lane Expansion

## EARLY CONTAINER SHIP

17 meters wide  
137 m long  
9 m draft  
800 containers

## MAXIMUM SHIP SIZE, EXISTING LOCKS

32.3 m wide  
294.1 m long  
12 m draft  
4,500 containers

## MAXIMUM SHIP SIZE, NEW LOCKS

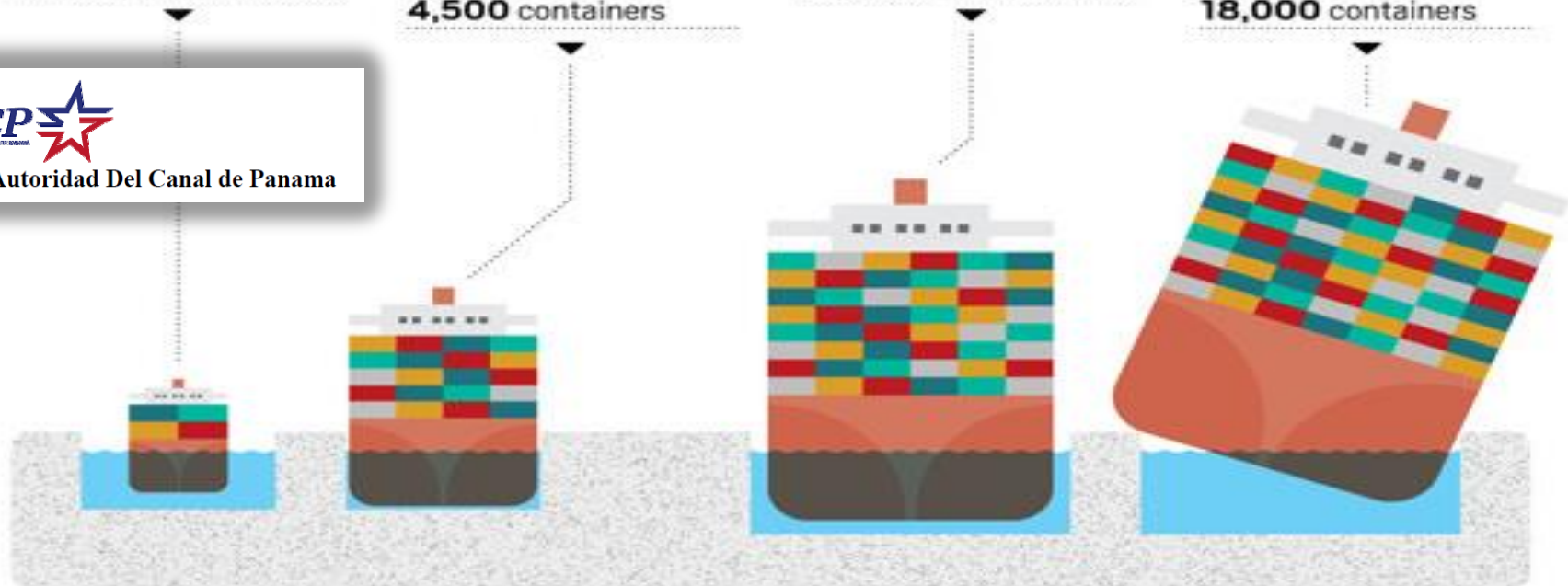
49 m wide  
366 m long  
15.2 m draft  
12,500 containers

## THE LARGEST CONTAINER SHIP, MAERSK'S TRIPLE E

59 m wide  
400 m long  
14.5 m draft  
18,000 containers



The Autoridad Del Canal de Panama



## EXISTING LOCKS

33.5 m wide / 12.8 m deep / 304.8 m long

## NEW LOCKS

55 m wide / 18.3 m deep / 427 m long

Source: A.P. Moeller-Maersk, Panama Canal Authority

# May 8, 2017 Largest Container Vessel to Call at the Port of Virginia



**COSCO Development** Container Ship – 13, 092 TEUs

Containership COSCO DEVELOPMENT at 1,200 feet long and 158 feet wide, It is 100-plus feet longer than the U.S. Navy's newest aircraft carrier the Gerald R. Ford

# The Biggest Ship Ever in San Francisco Bay

CMA CGM Benjamin Franklin

1,300 ft. LOA , 177 ft. beam, 18,000 TEUs

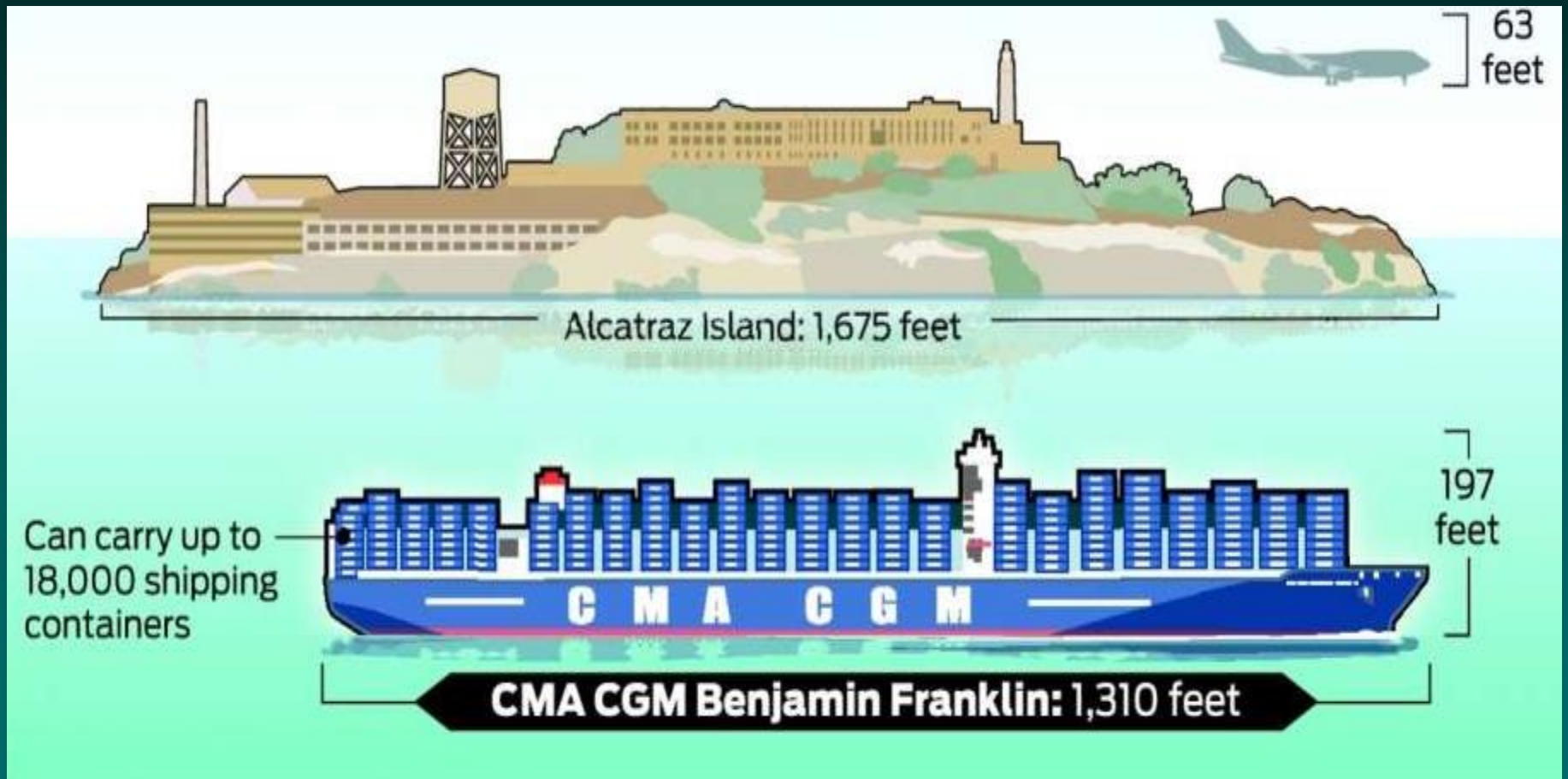


Source: CMA CGM, The SF Chronicle

# The Biggest Ship Ever in San Francisco Bay

CMA CGM Benjamin Franklin

1,300 ft. LOA , 177 ft. beam, 18,000 TEUs



Source: CMA CGM, The SF Chronicle

# 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)



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..

# CMA CGM Orders 9 New 22,000-TEU Vessels



CMA CGM Group's US\$1.5 billion order for nine LNG Powered 22,000-TEUs container ships for delivery from the **end of 2019**. *Asia-Europe trade may be set for 24,000 TEU ships from 2019*

Source: American Shipper - Lloyd's List

# Hyundai Heavy Industries (HHI) Confirms Orders of “Megamax” Boxships to Daewoo Shipbuilding & Samsung Heavy Industries For TWELVE 23,000 TEU Container Ships (Delivery in the second quarter of 2020)

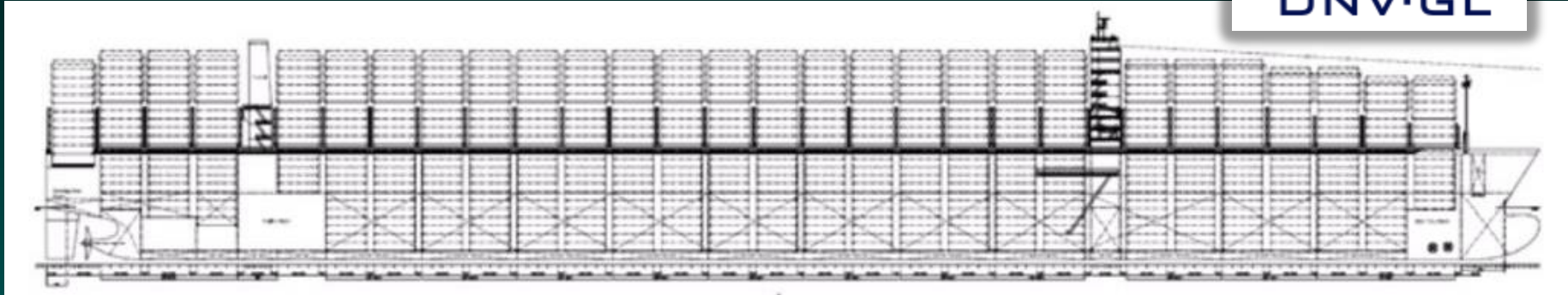


- The twelve 23,000 TEU vessels will be deployed in the Asia-North Europe trade.
- All the “*ECO FRIENDLY*” new vessels will be sequentially delivered in the right time to prepare for the 2020 environmental regulations.

Source: Maritime Executive September 2018

# Next Generation: *Suezmax 26,000 TEUs*

26 Bays, 25 Rows - Ultra Large Container Ships (ULCS)



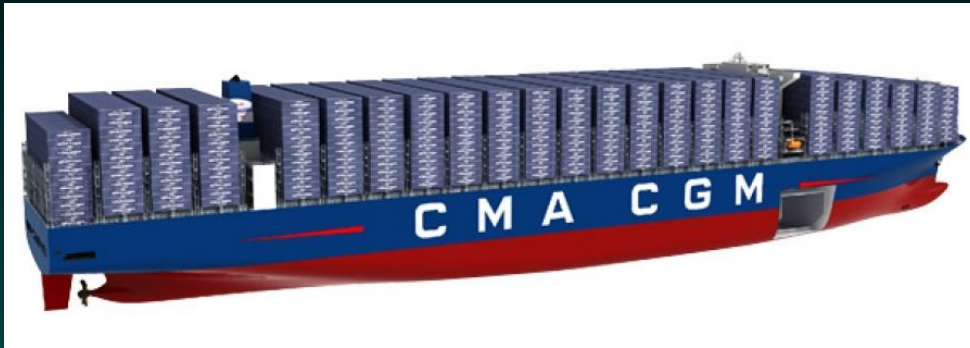
With a Beam of 25 rows & Length of 26 bays  
(LOA: 430 meters – 1,411 feet)  
the ULCS capacity could reach **26,300 TEU.**

*Port of Antwerp: New Terminals in Europe  
are using 26,000 TEU design vessels*

Source: DNV GL in-house methodology - "Concept Design Assessment"



# Ultra Large Container Vessels (ULCV): Megamax-24 Era (Post Neo-Panamax Comparative Vessel Characteristics)



**ALPHALINER**

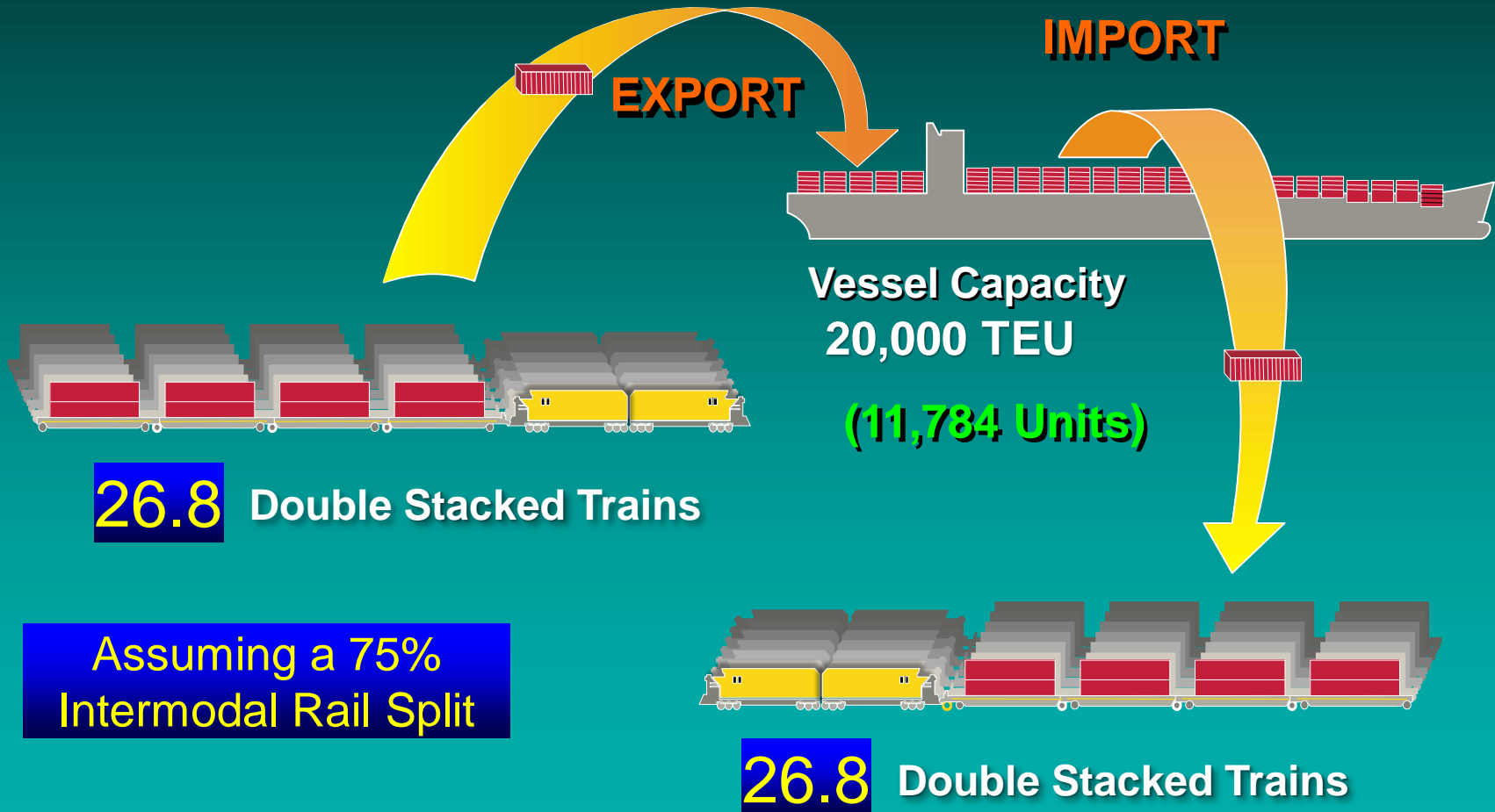
## Alphaliner: Megamax - 24 MGX-24 Vessel

Length: 24 Container Bay  
 Breath: 24 Deck Rows  
 Height: 24 Container Tiers  
 In Hold: 12 container Tiers

Mega Container Vessel	Alphaliner Designation	TEU Capacity	Length ft.	Beam ft.	Loaded Draft ft.	Explanatory Notes
ACP "Neo-Panamax"	-	12,600	1,200	160.7	49.90	ACP Neo-Panamax Data
MAX Neo-Panamax	-	14,500	1,201	158.31	52.49	CMA CGM's T. Roosevelt
<b>Post Neo-Panamax</b>	<b>MGX-20</b>	<b>20,000</b>	<b>1,312</b>	<b>192.49</b>	<b>52.49</b>	<b>Design Vessel LNG</b>
Post Neo-Panamax	<b>MGX-22</b>	22,000	1,315*	193.57	52.49	CMA CGM 22,000 Option to go to 24 Rows
Post Neo-Panamax	<b>MGX-24</b>	24,000	1,319	201.44	52.49	
Post Neo-Panamax	<b>MGX-26</b>	26,000	1,411	209.31*	52.49	<b>ULCV Suezmax 26,000 TEUs</b>

\* Calculated Value/Derived Value

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





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# Breakthrough in Terminal Automation & Remote Control of STS Cranes

# Today's Crane Operator View – STS Crane



# Moving Crane Operations Away from the Terminal: DP World Terminal 4 Jebel Ali Dubai (UAE)

(13 ship to shore (STS) cranes and 35 automatic stacking cranes (ASC) – By Late 2018 Port Volume will be 22.1 million TEUs > Top 3 US Ports Combined



All STS and Stacking Cranes at Terminal 4 Jebel Ali will be operated from a control room located away from the of the terminal.

# Port of Rotterdam – Maasvlakte II



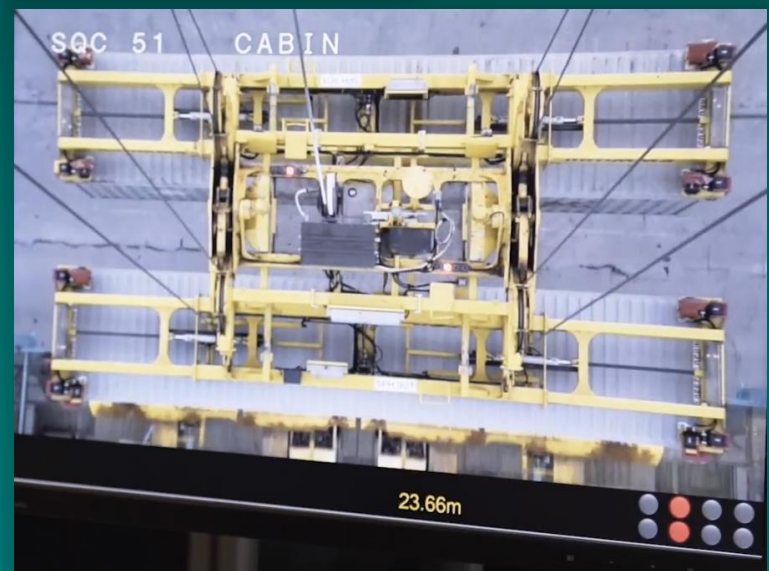
# Port of Rotterdam – Maasvlakte II

## Remote Ship to Shore (STS) Crane Operators



# Port of Rotterdam – Maasvlakte II

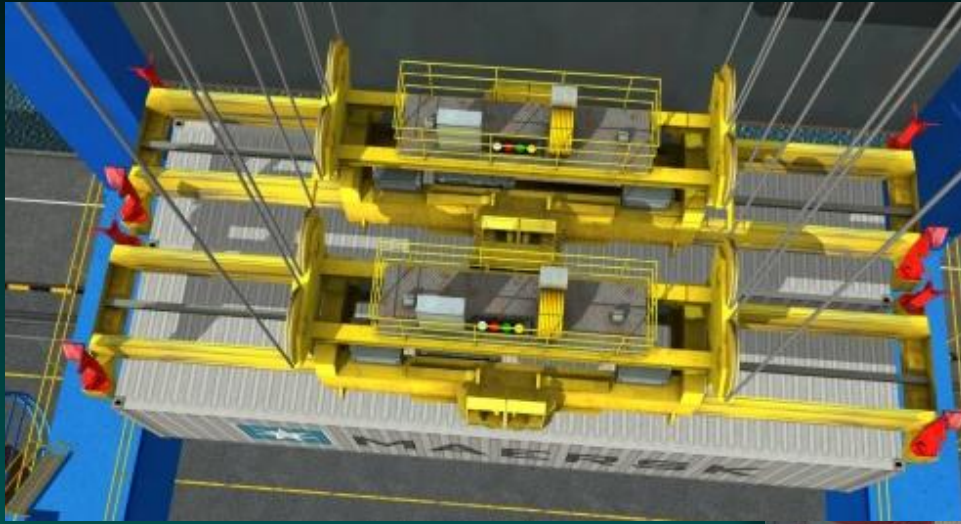
## Remote Ship to Shore (STS) Crane Operators





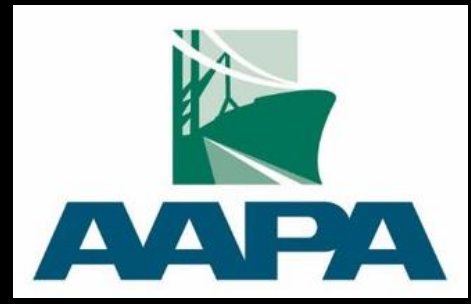
# Semi-Automated STS Gantry Cranes Operations

Spreader capability to lift tandem, triple, quad & 6 pack loads





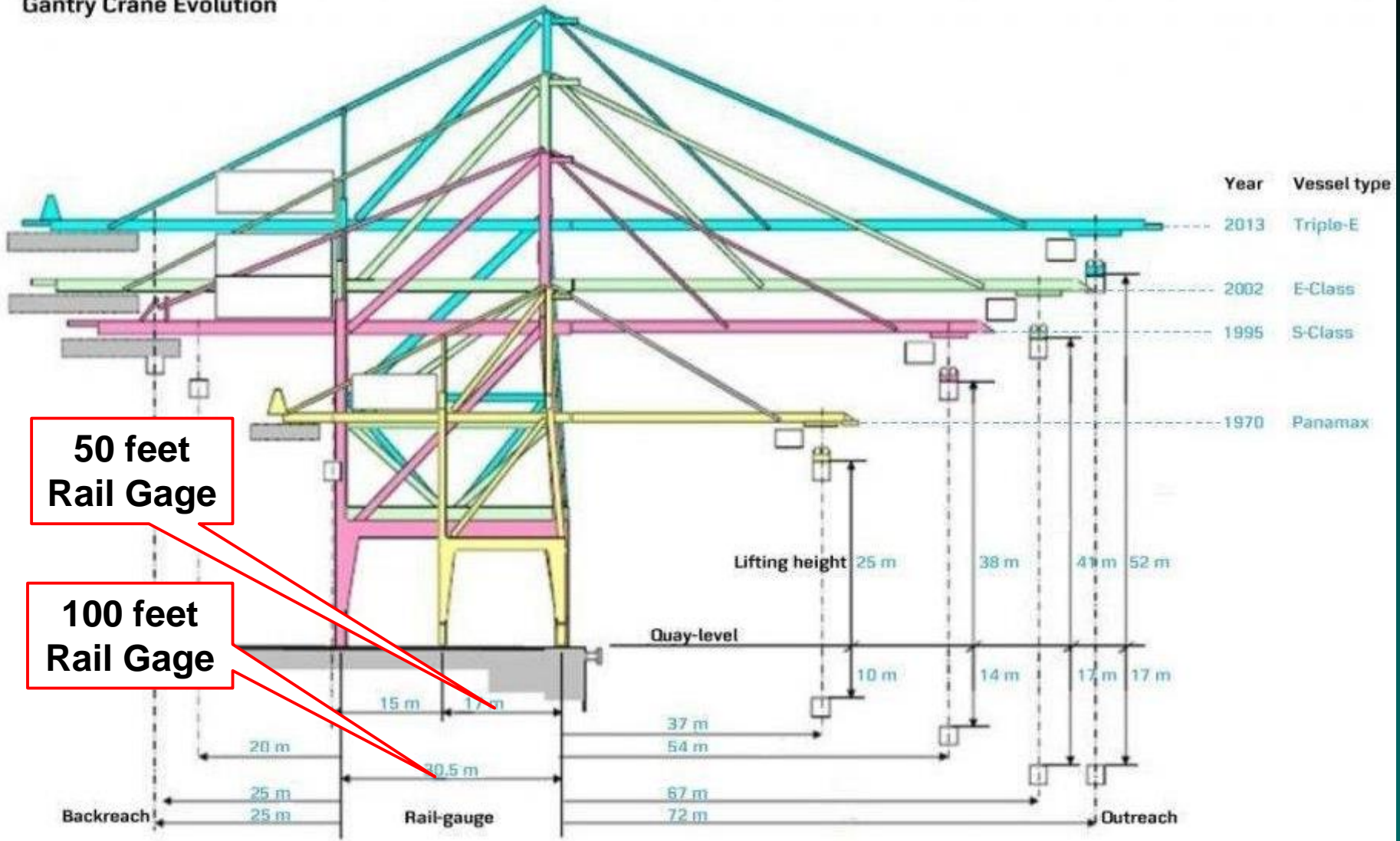
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# A Jump from the Current STS 100 ft. Crane Gage to a New 150 ft. STS Gantry Cranes

# Today's STS Wharf Gantry Crane Evolution

Gantry Crane Evolution



50 feet Rail Gauge

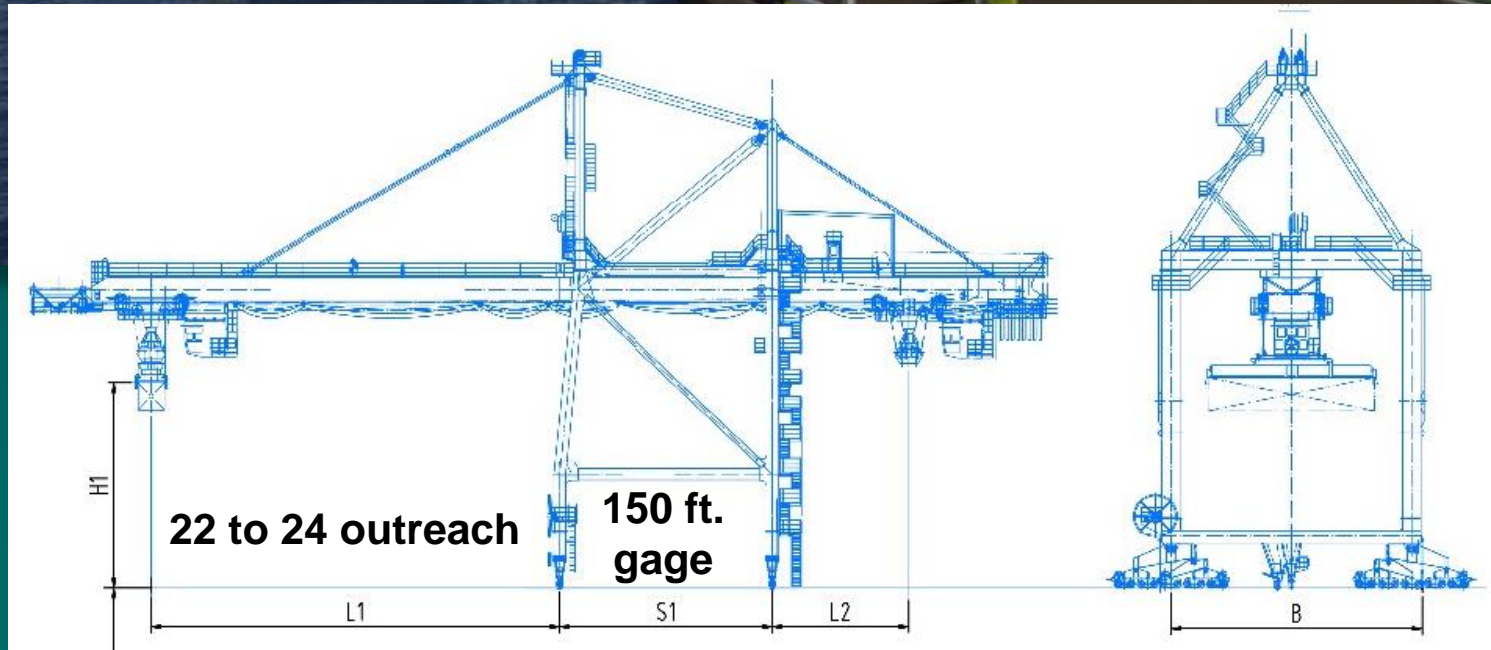
100 feet Rail Gauge

APM Terminals released the following graphic today showing how container cranes have evolved in size over the years.

# 150 ft. Gage Semi-Automated STS Gantry Cranes

Four STS Gantry Cranes

RTG Container Yard



# Wide Gage STS Container Terminal 3 Jebel Ali Dubai (UAE)

(STS Gantry Crane Gage = 42 m = 137.8 ft)



رافعات رصيف يتم تشغيلها عن بعد  
Remotely Operated Quay Cranes



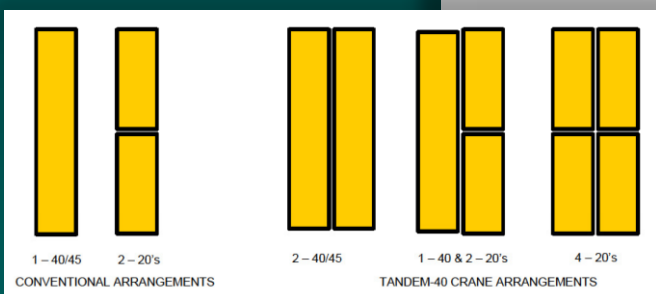
STS Crane Operations from Remote Control Room

**Encoder Systems** for modern automated STS container cranes reduce costs and increases safety

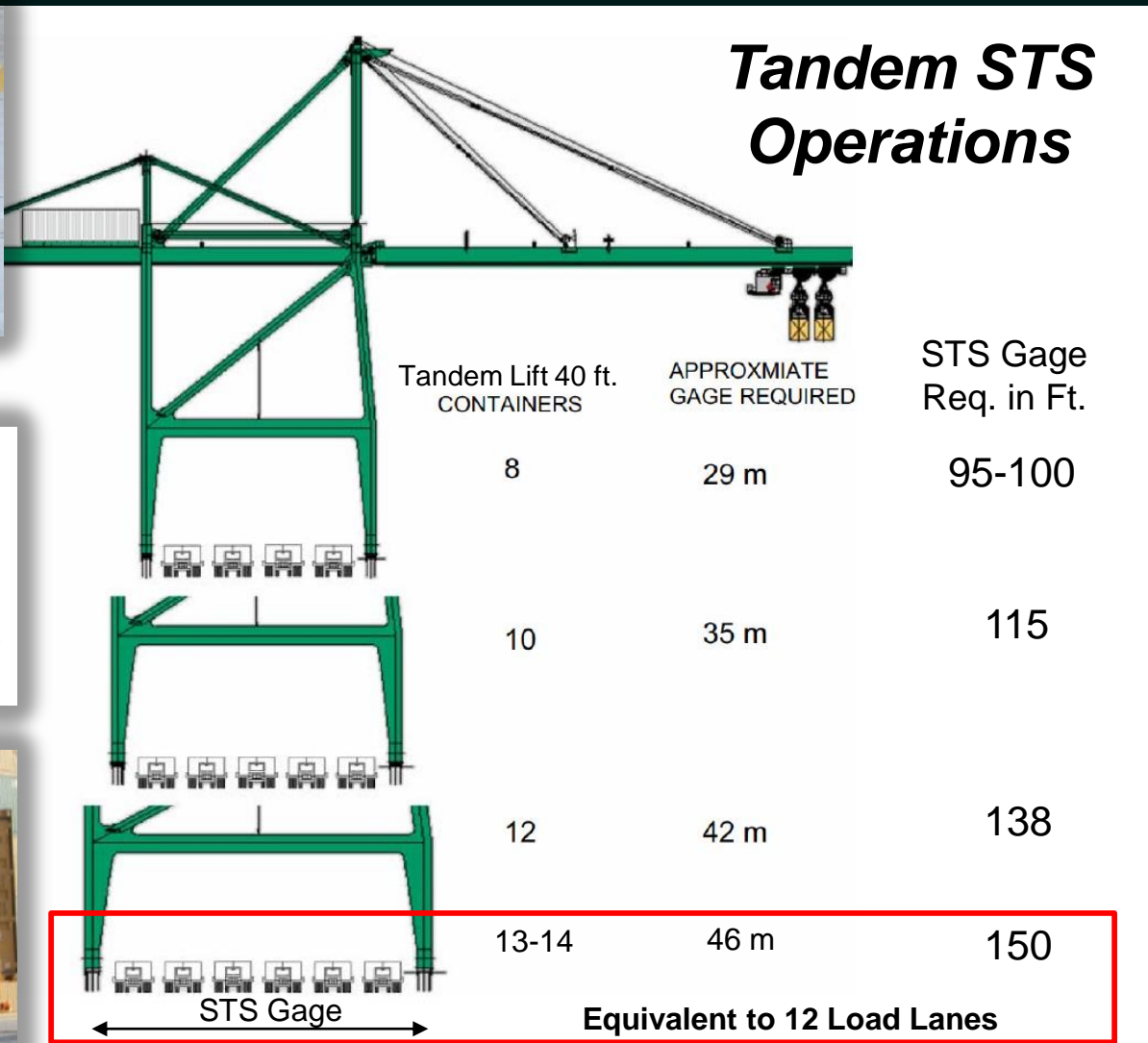
# Increased STS Gage Improves Crane Stability, Reduces Wheel Loads, Decongests Quay Operations and Improves Productivity



Twin Yard Hostler Delivery



Multi-Container Bomb Cart



Source: Liftech Consultants Inc.



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***The US Midwest & The  
Mississippi River Are the  
New Intermodal Freight  
Battle Ground***

# New State of Marine & Intermodal Competition

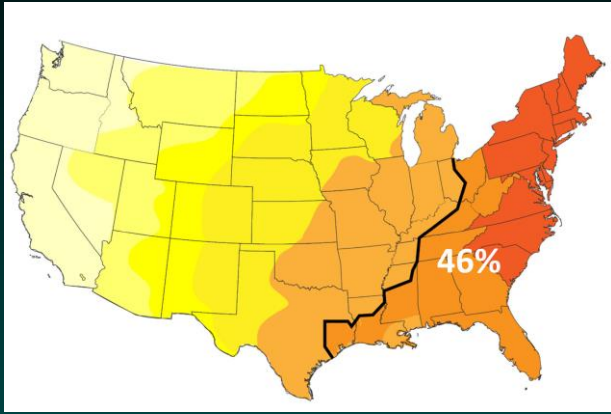


Source: NW Seaport Alliance Strategic Business Plan, May 6, 2015

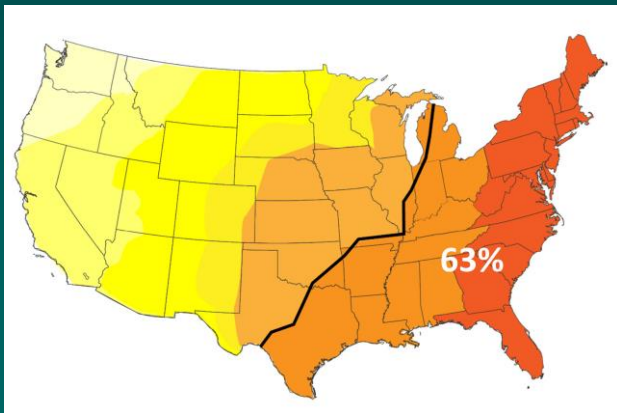


# US Market Penetration Via Panama Canal Expansion

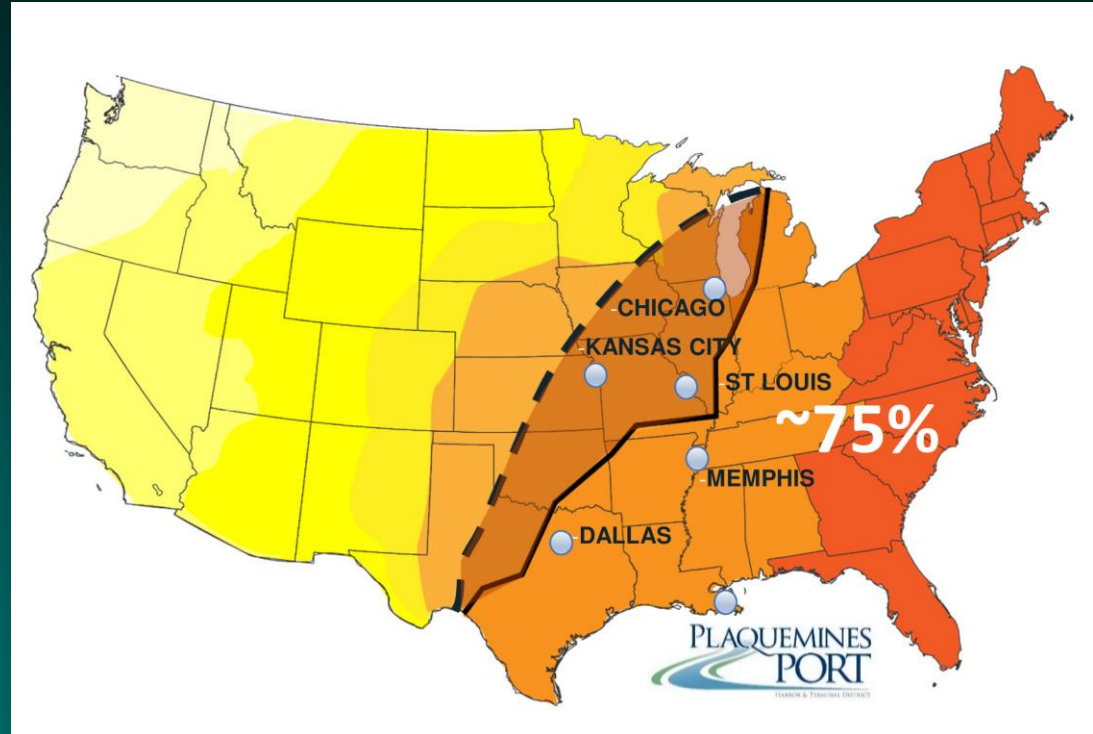
*(Economies of Scale)*



**46 % Penetration, Before 2016**  
**Via All Water, 4,500 TEU Vessels**



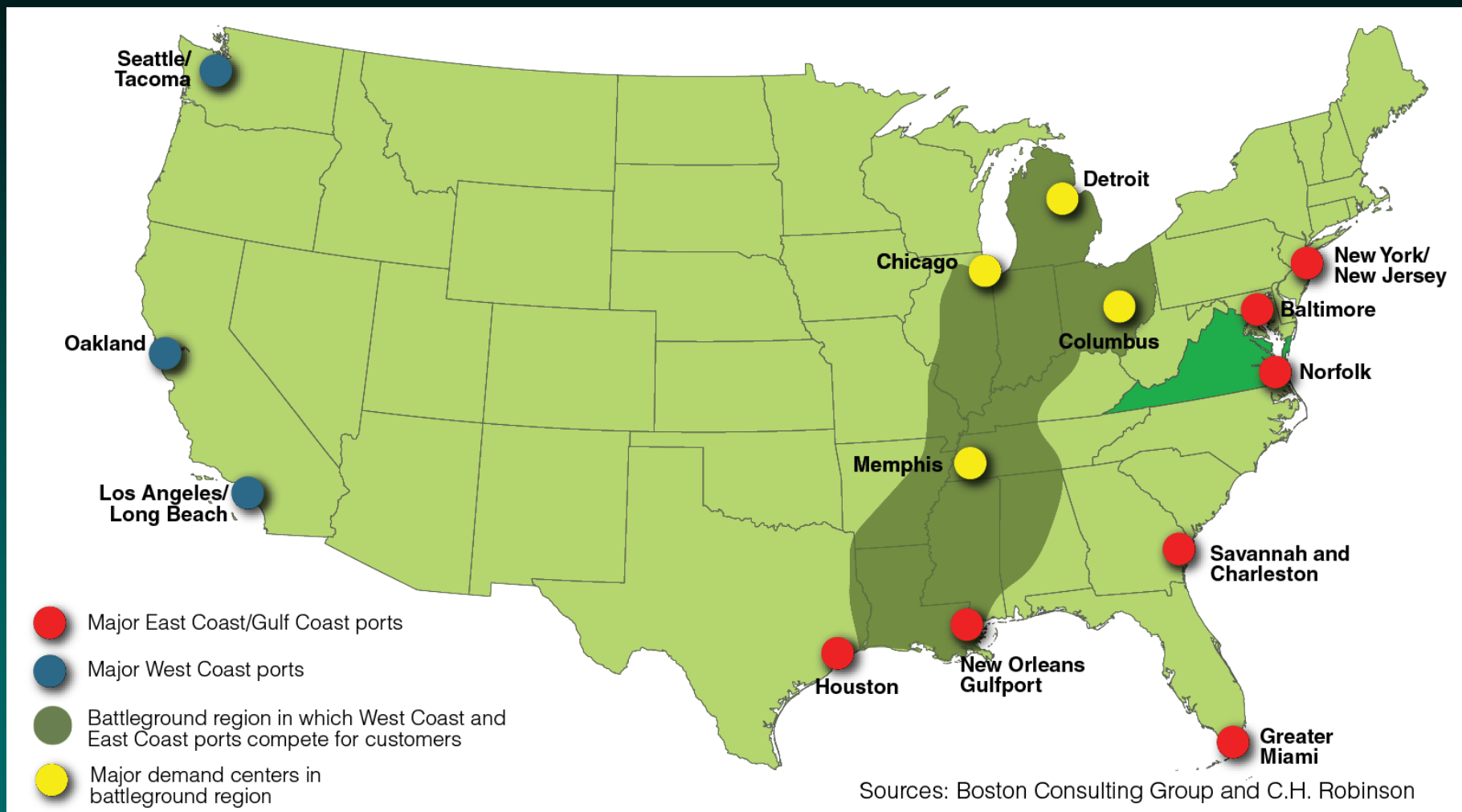
**63 % Penetration, After 2016**  
**Via All Water, 8,000 TEU Vessels**



**75 % Penetration, 2018 & Beyond**  
**Via All Water & Pendulum Service**  
**14,500 TEU Vessels**

# New Container Port Battleground Region

(Representing 15% of the US GDP)



Source: Boston Consulting Group & C. H. Robinson

# New Container Port Battleground Region

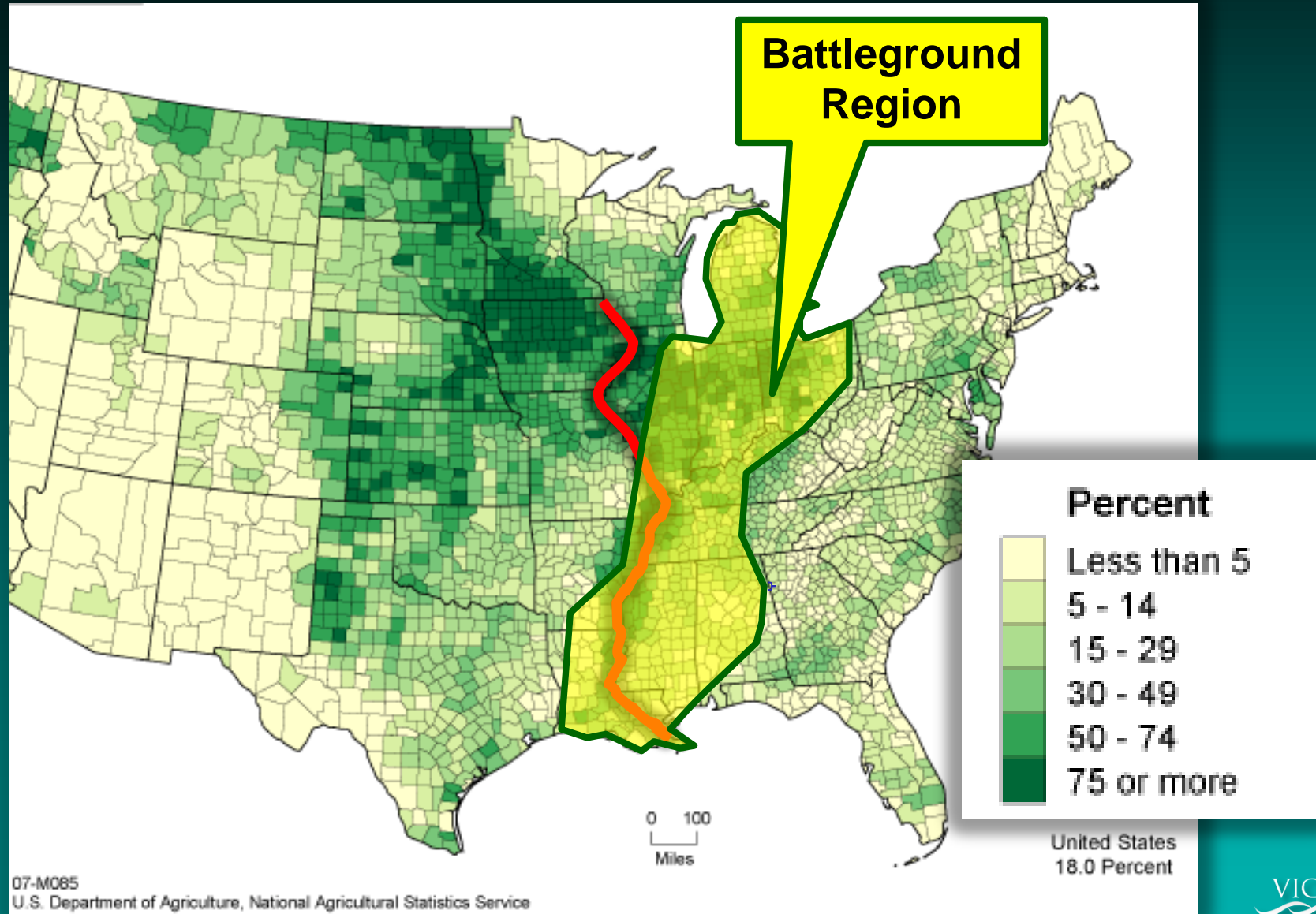
(Representing 15% of the US GDP)



Source: USDC Bureau of Economic Analysis – Boston Consulting Group Analysis

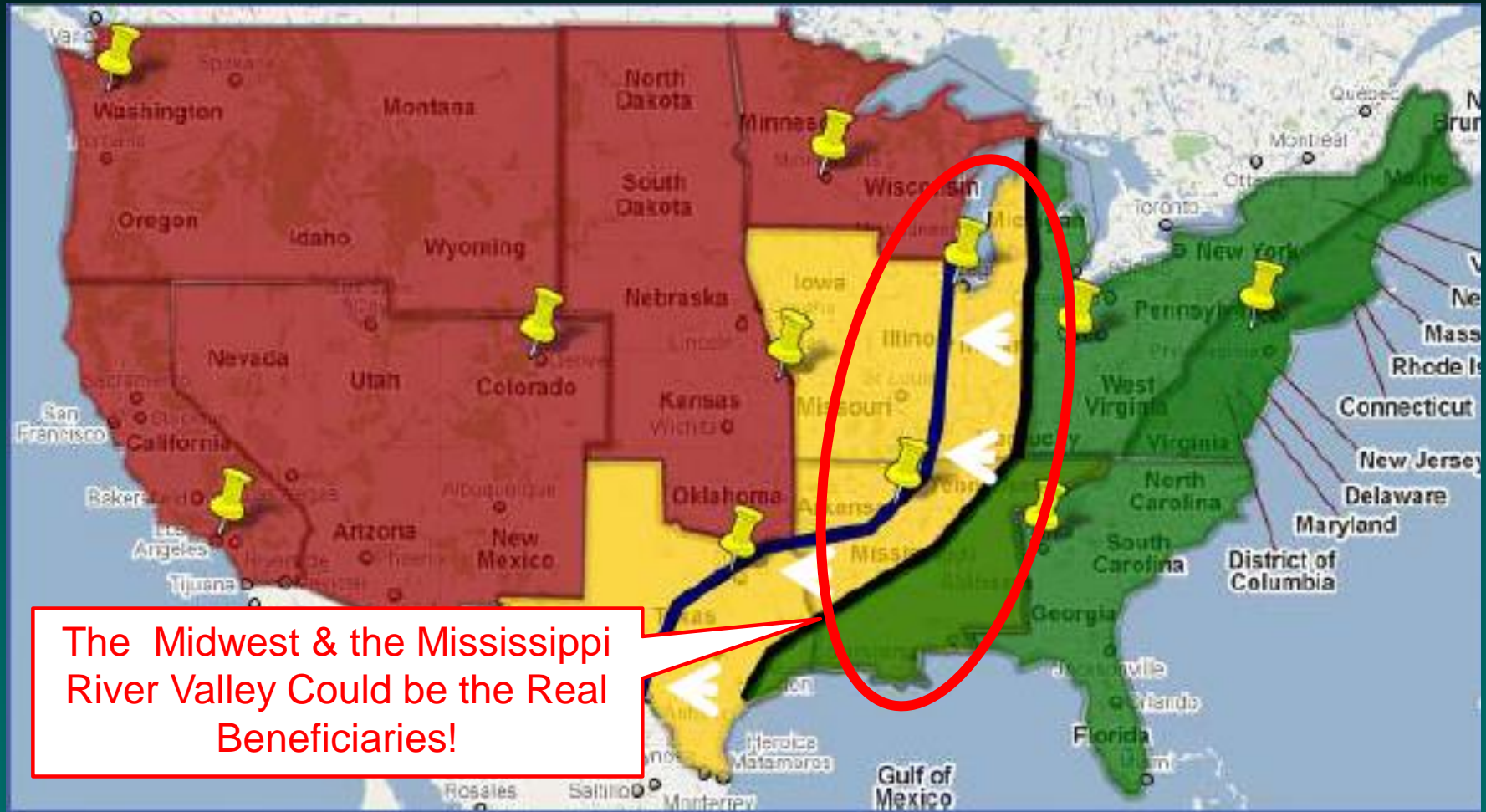
# North American Cropland Intensity

(Acres of Cropland as a percent of Land Area)



# Dramatic US Market Penetration after 2017

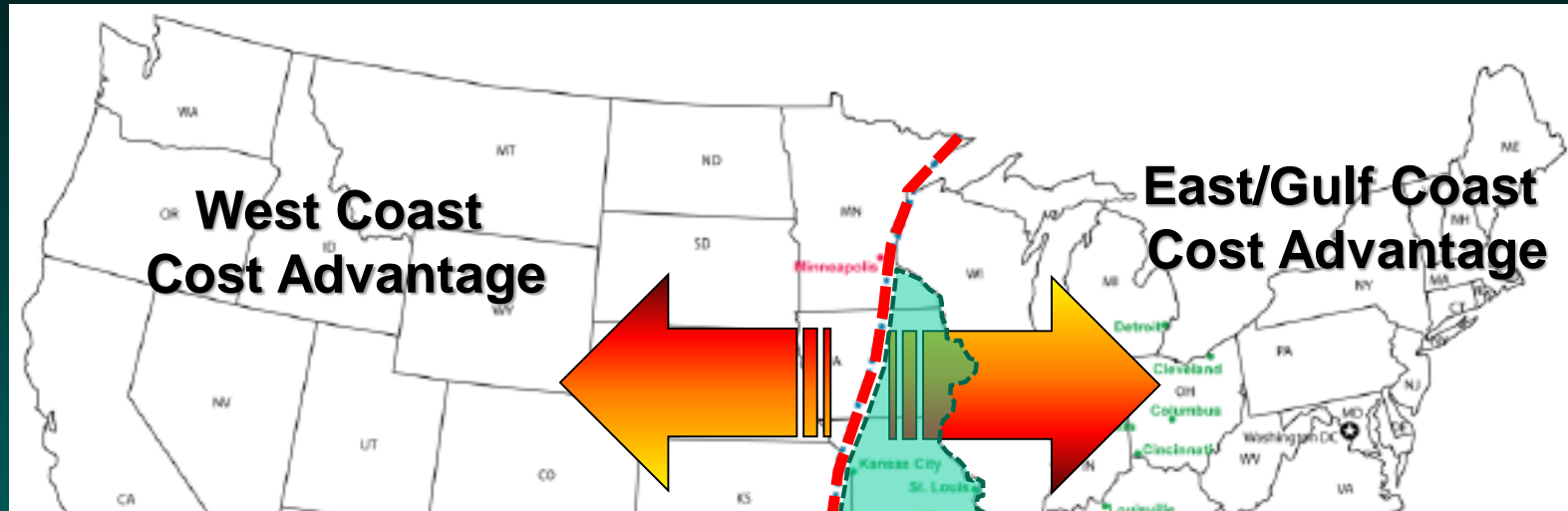
*Panama Canal Economies of Scale with permit deeper market penetration into the US*



The Midwest & the Mississippi River Valley Could be the Real Beneficiaries!

# Dramatic US Market Penetration Is Coming

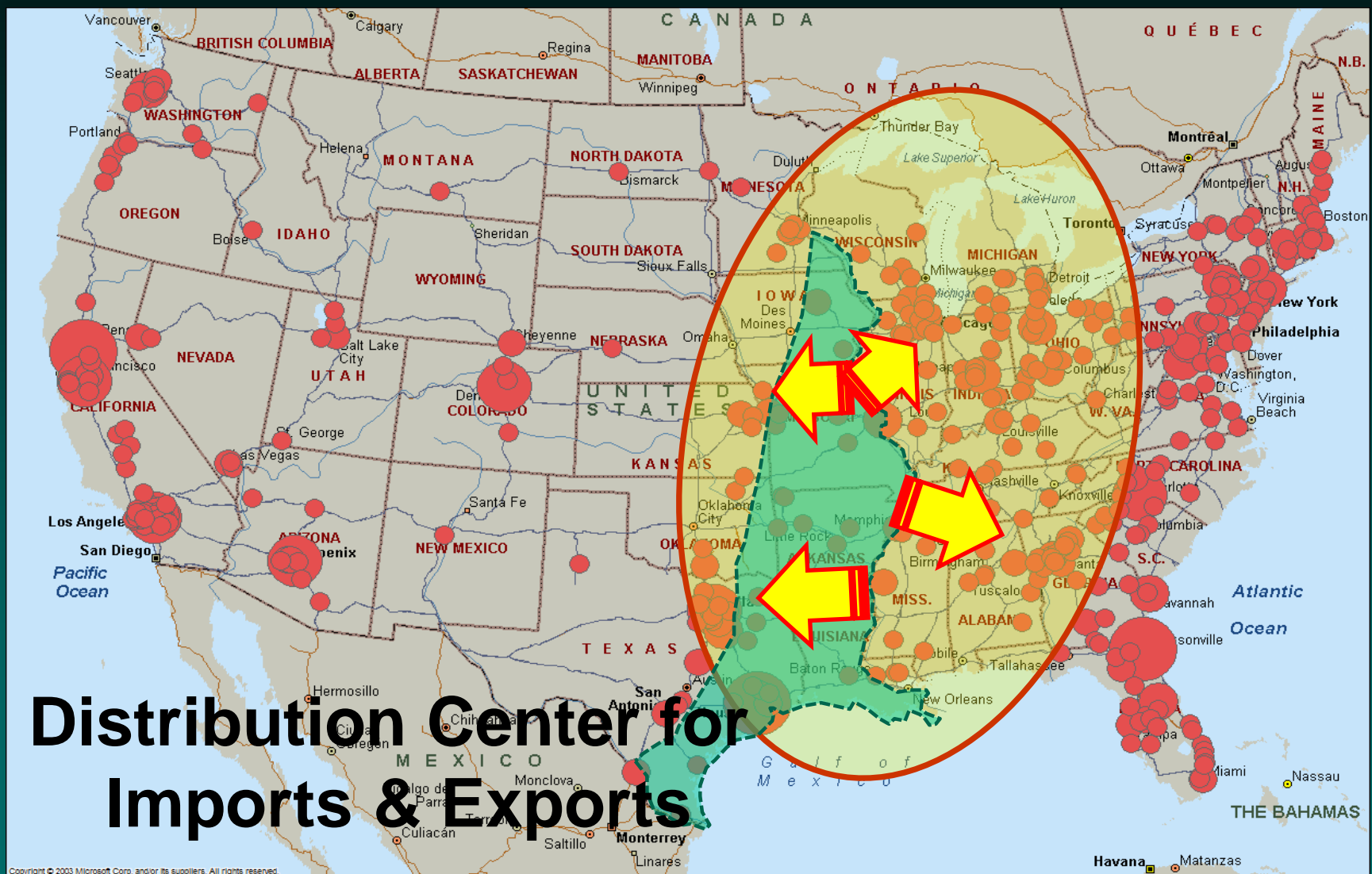
*Panama Canal Economies of Scale with permit deeper market penetration into the US*



**The Panama Canal will prove to be a strong contender for Asian trade serving not only the US East Coast, but ALL of the Gulf and the Most of the Midwest by 2020**

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

# 2017 - 2020 Regional Competitive Inland Port & Distribution Center MS River Region



**Distribution Center for Imports & Exports**

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The logo for NAWE (National Association of Waterway Engineers) features the acronym in green, bold, sans-serif font above a blue wavy line representing water.

**NAWE**



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# What Are The Future Mega Ship Possibilities for the Lower Mississippi River?



# Historical Rules Are Changing on the Lower Mississippi River





# Mississippi River Deepening: Southwest Pass to Baton Rouge

(50 to 55 foot depths are possible in the Future)

Mississippi River Ship Channel  
Gulf to Baton Rouge, LA - General Reevaluation Report  
**Table D-32 Project Results**

	<b>48 Foot River Depth</b>	<b>50 Foot River Depth</b>
Average Annual Benefits	\$105,900,000	\$147,810,000
Average Annual Costs	\$103,520,000	\$138,700,000
Net Benefits	\$2,380,000	\$9,110,000
BCR	1.02	1.07

*Project authorized to 55 feet - full channel. Smaller but positive BCR at 55 feet depth.*

# Can Mega Container Vessels Physically Call in the Lower Mississippi River Region?

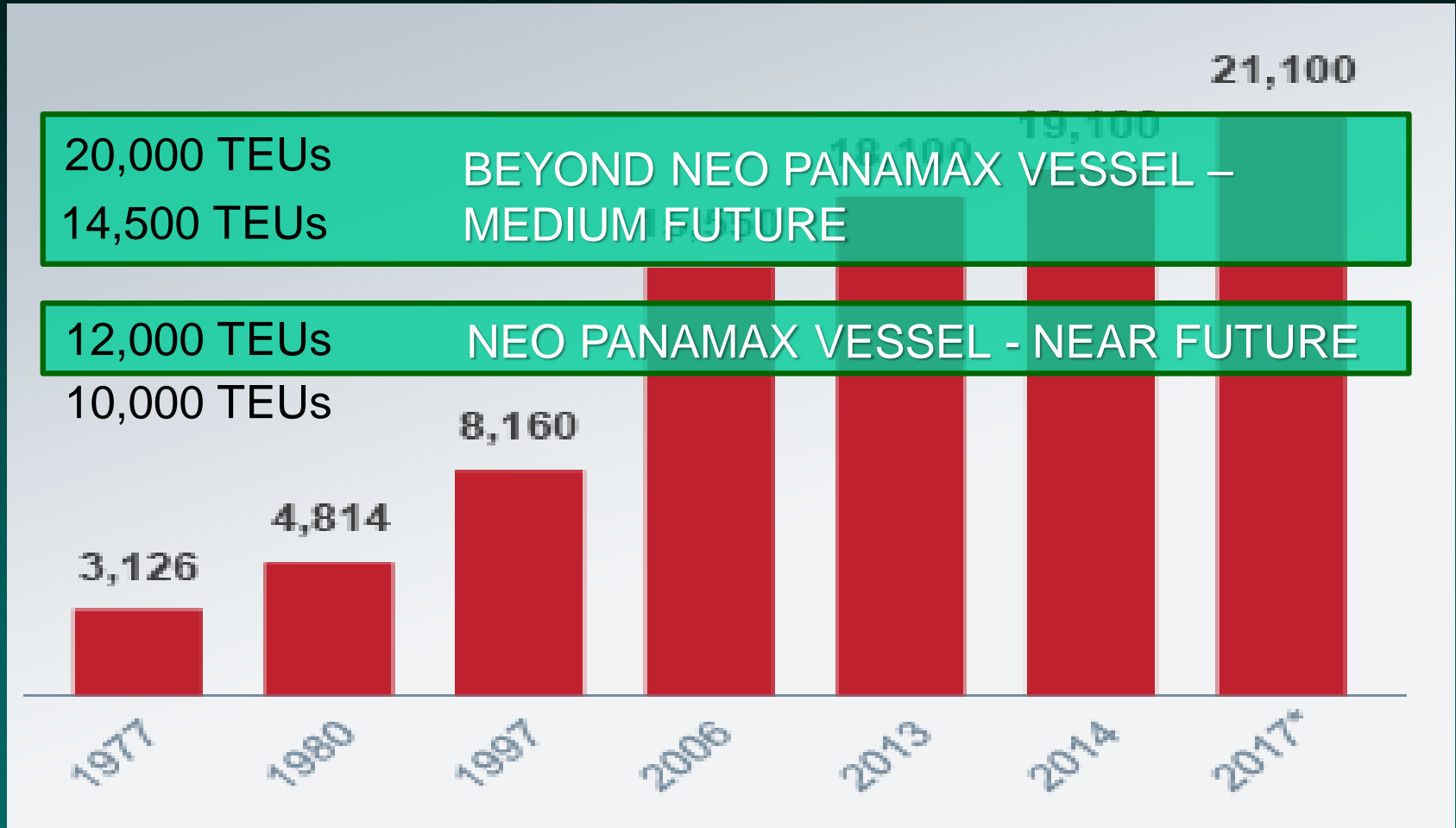


# ***Maersk's Triple E Container Ship*** ***1.5 times the Size of the NEW Panama Canal*** ***Wide Body Shallow Draft 18,000 TEU Vessel*** ***(Same Design Draft of the 8,000 TEU Susan Maersk)***



***(Design Draft of 14.5 Meters = 47.57 feet)***

# The World's Largest Container Ships On the Mississippi River



 Mississippi River Container Vessel Size

Source: OECD/ITF

# It Is Not Inconceivable that by 2030 the Lower Mississippi Design Vessel May Well be a 14,500 to 20,000 TEU Container Ship





Marine Terminal  
Management  
Training  
Westin Long Beach  
Long Beach, California



# Emerging New Inland Waterway Vessel Technology

# “Deck” Barge Loaded with Containers



# “Hopper” Barge Loaded with Containers



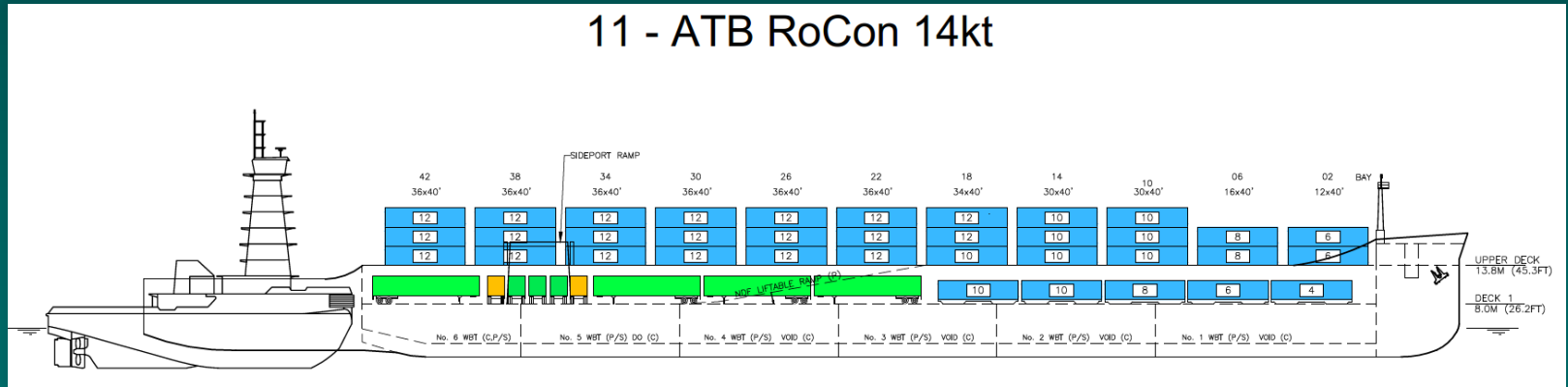
Source: USDOT Maritime Administration MARAD



# Proposed Domestic AMH/Short Sea Container Services

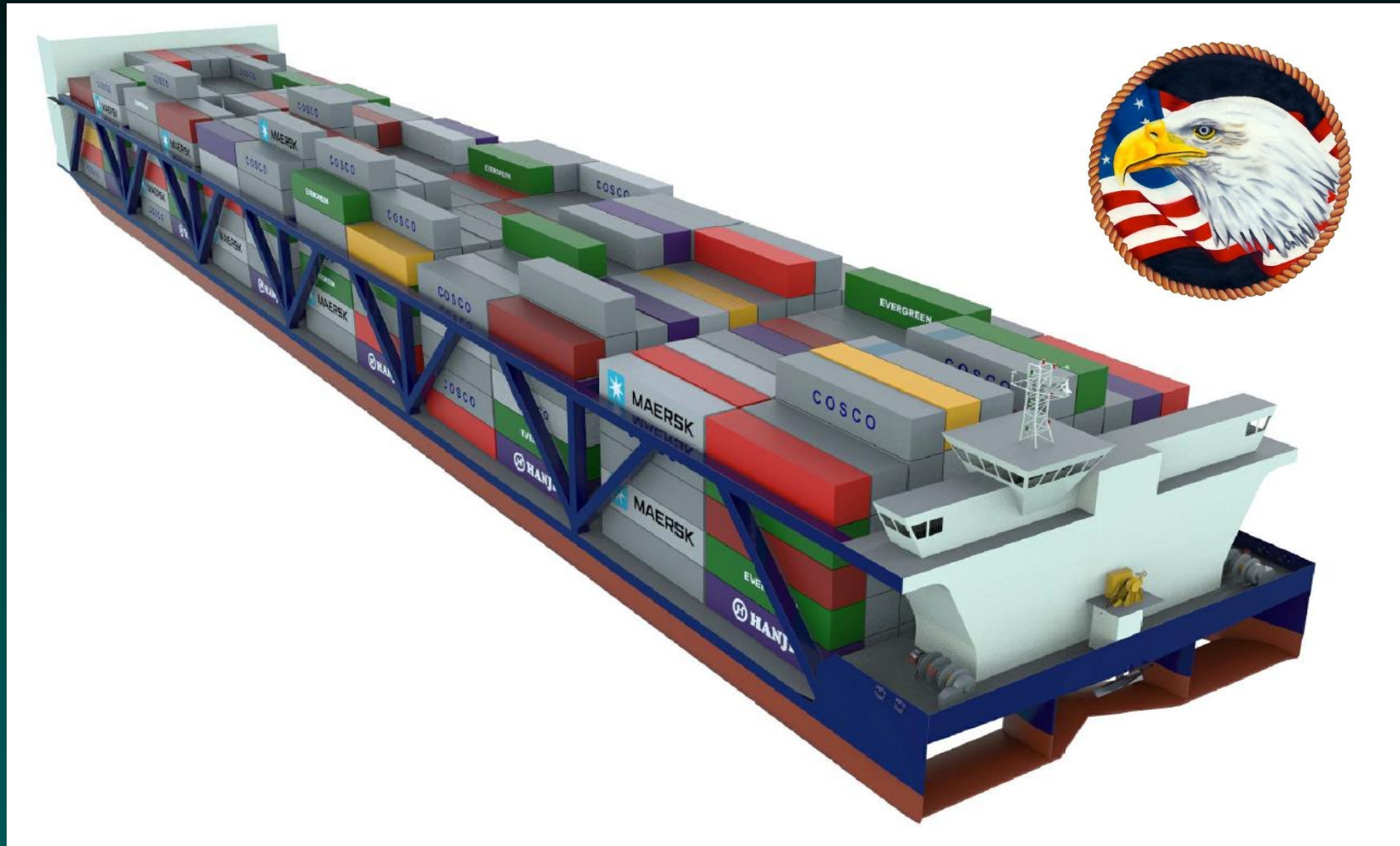


Proposed New England Marine Highway Project's articulated tug barge short sea container service connecting New York City and Portland, Maine - **900 TEUs**



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

# 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

# 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.

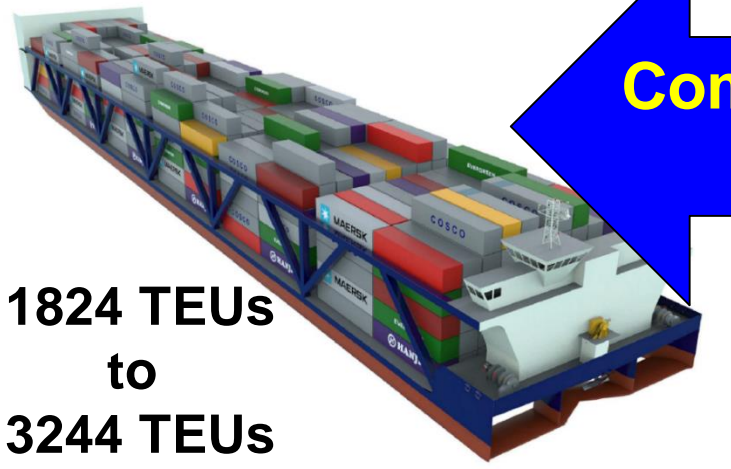


# American Patriot Holdings, LLC (APH) Prototype Container Vessel



A “*State of the Art*” Hull Design to Ensure Optimal Speed in All River Conditions Utilizing LNG as Main Propulsion Fuel coupled with the Patented Z-Wake Bow Design.

# Inland Waterway Vessel/Barge Transfer to Ocean Container Transport



**Commercially  
Viable**



200 - 900 TEUs

**Are the Cargo &  
Quantity Viable?**



Marine Terminal  
Management  
Training  
WestIn Long Beach  
Long Beach, California



***Thank You***

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