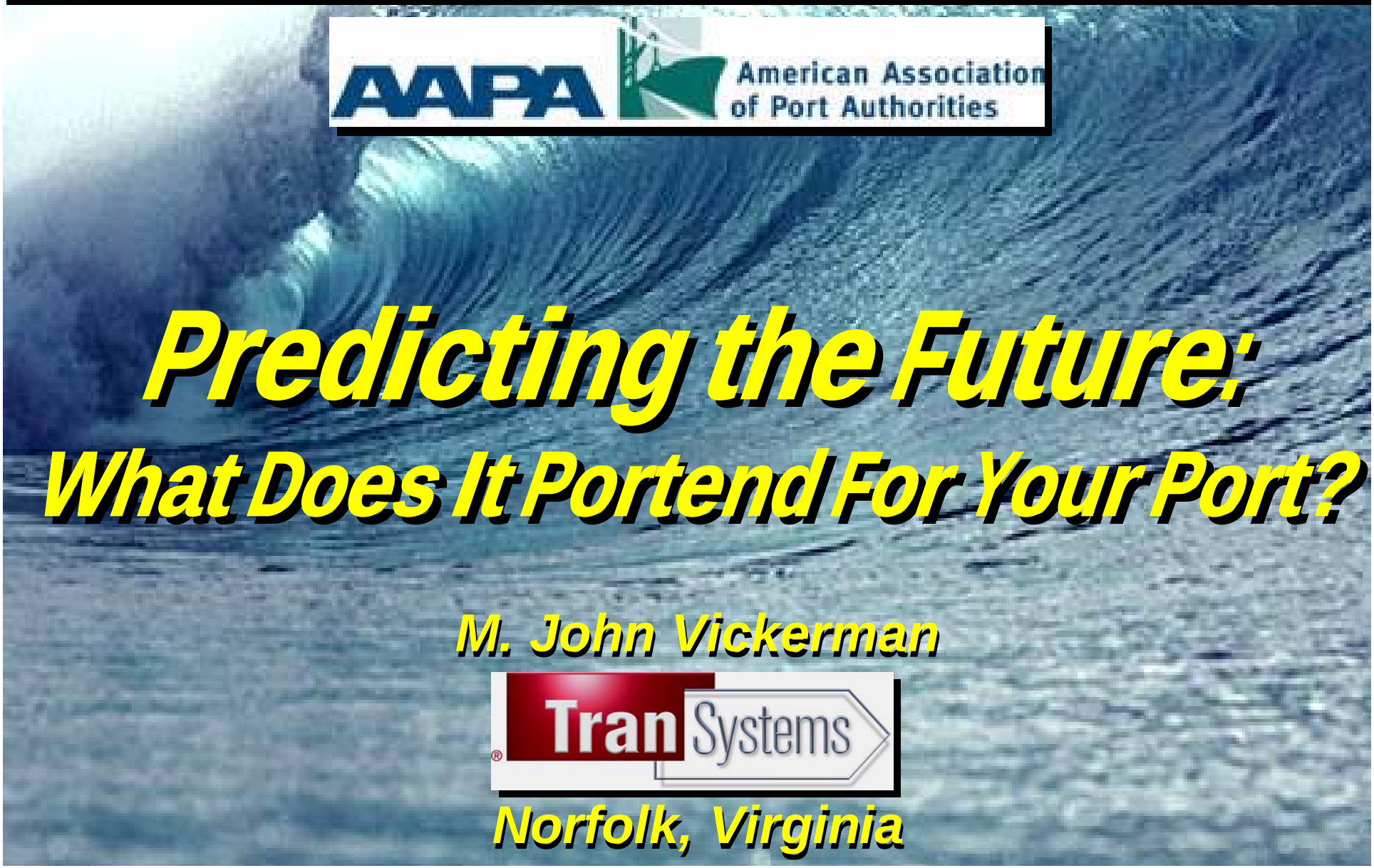
2006 AAPA Commissioners Seminar
Montréal, Québec, Canada



Predicting the Future:
What Does It Portend For Your Port?

M. John Vickerman

TranSystems

Norfolk, Virginia

The Year is 2020

Dubai Ports World's Fast Transshipment Logistics Base

TranSystems

Agenda

- Port & Intermodal External Industry Pressures
- International Maritime Cargo Demand Trends
- The Growing Asian Import Trade Challenge
- Can North America Handle the Forecasted Volumes?
- International Port Productivity Comparisons
- Maritime Vessel Technology Trends
- North American Domestic Truck Growth
- North American Class I Rail & Intermodal Growth
- Growing Environmental Concerns for Marine Vessel Emissions

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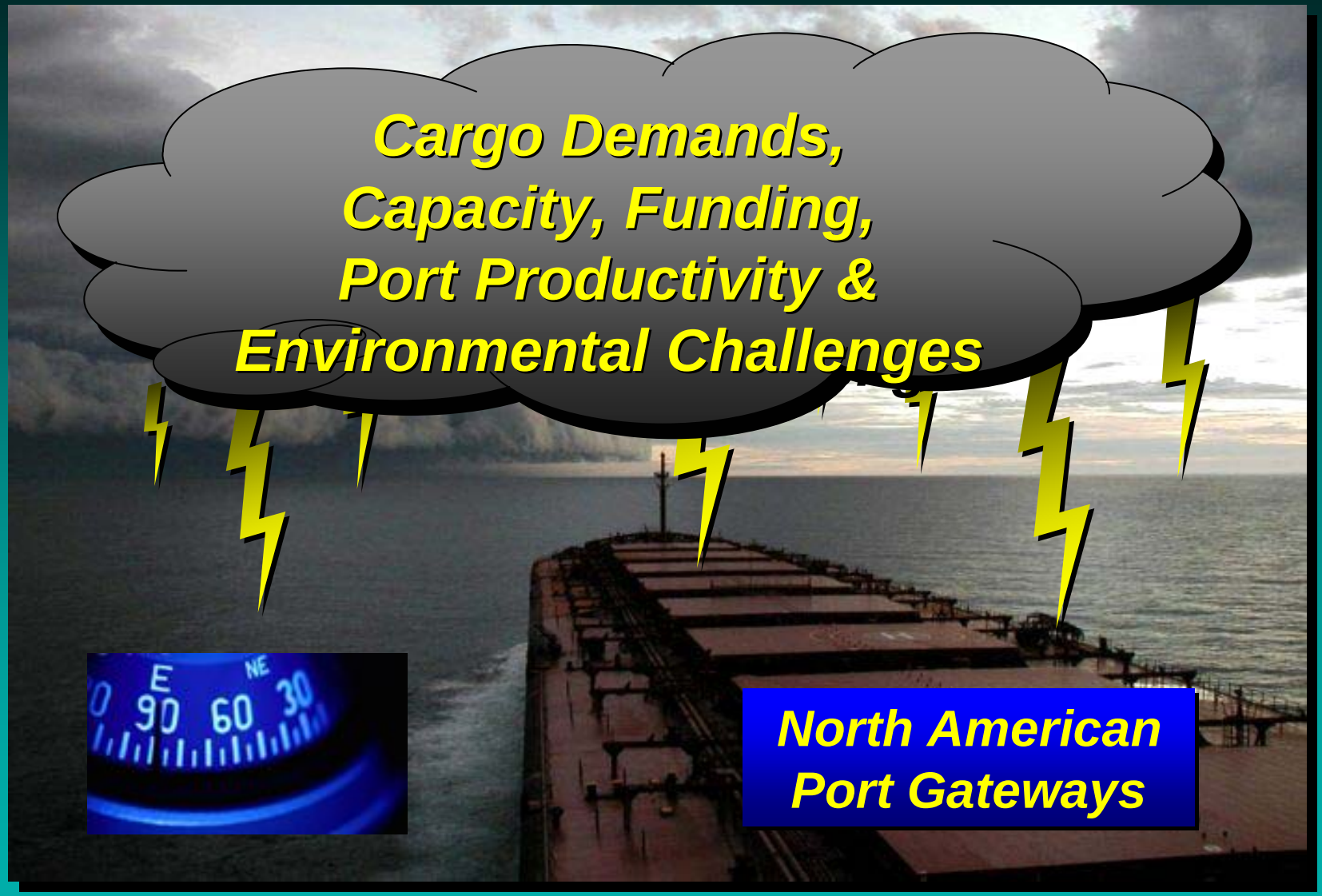
Global Trade: Current Course & Direction?



Vessel Cargo Handling Circa 1950

Cargo Handling Circa 2005

US Navy Fast Frigate Circa 2035

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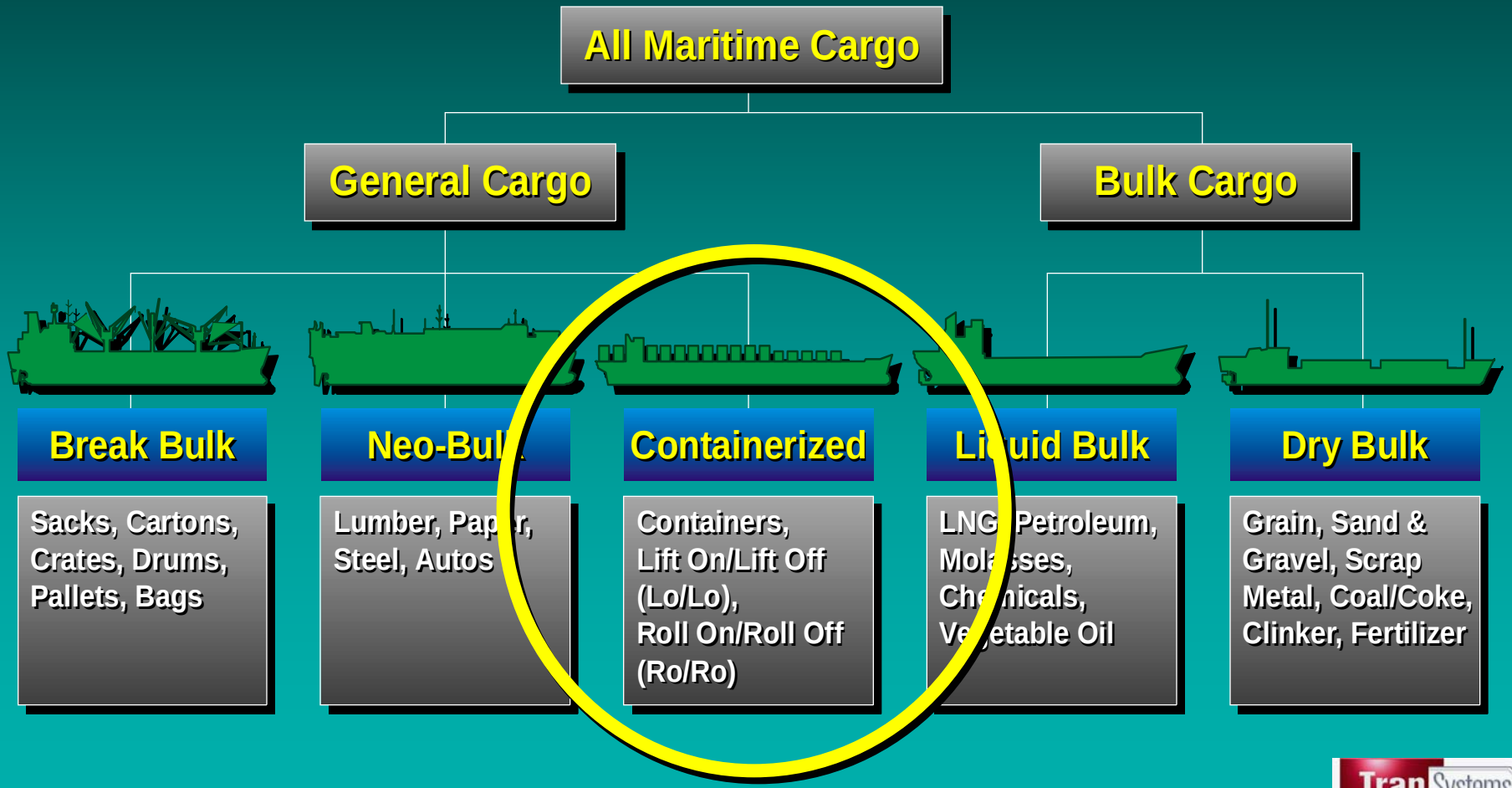
Functional Classification of Global Maritime Cargoes



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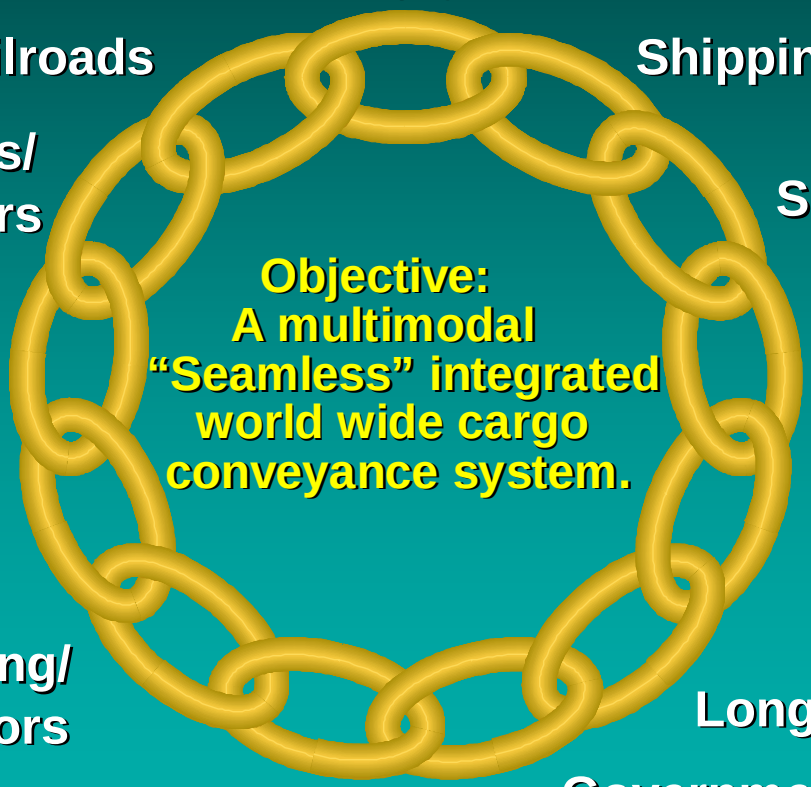
The "Port"

One of the Many Diverse Constituencies in the Cargo Transportation Logistics Chain




Port &
Intermodal
External Industry
Pressures

The North American Freight Paradox:

The Nation's Ports and Their Intermodal Linkages are Experiencing the *"Best of Times and the Worst of Times"* in Terms of Growth and Demands on Capacity

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At Current Productivity and Growth Levels by 2020 North American Ports & Their Associated Intermodal Systems Will Be Severely Congested

Where's my cargo?

Americas Systems Inc. develops a port system that allows companies to obtain information on shipments

BY CHRIS DUPIN

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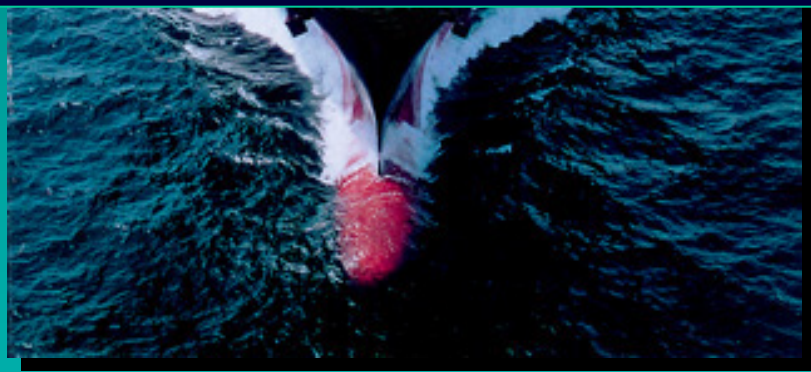
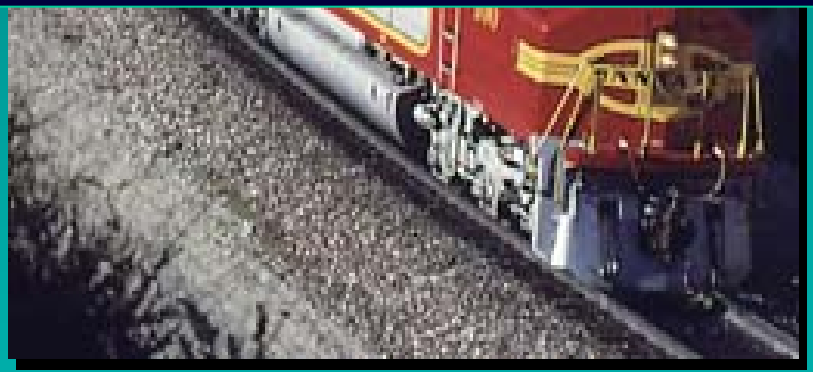
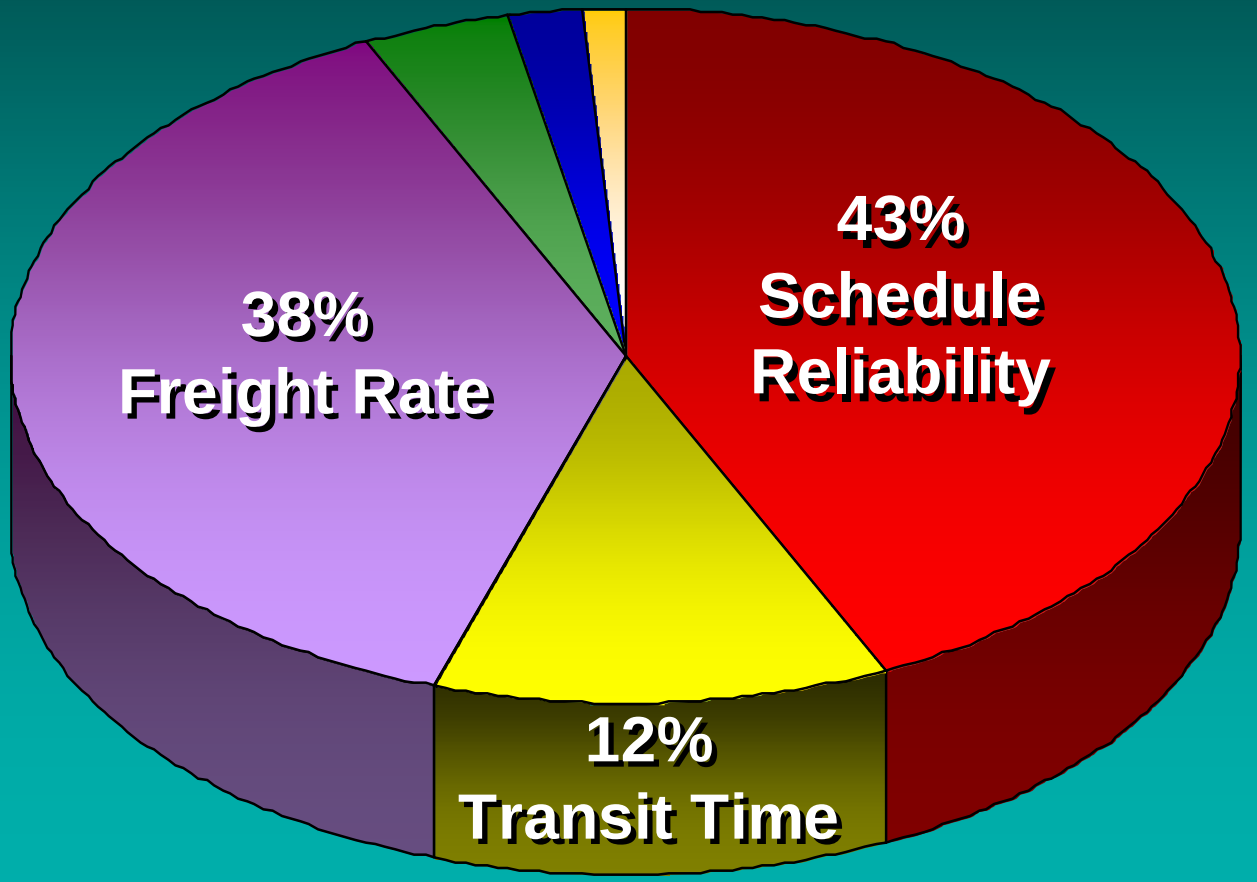
We do not have an "intermodal system" as such. Rather we have an aggregation of multiple, private and public modes, each of which are "stove-piped" within their own individual areas of interest with little or no true cross communication and collaboration.





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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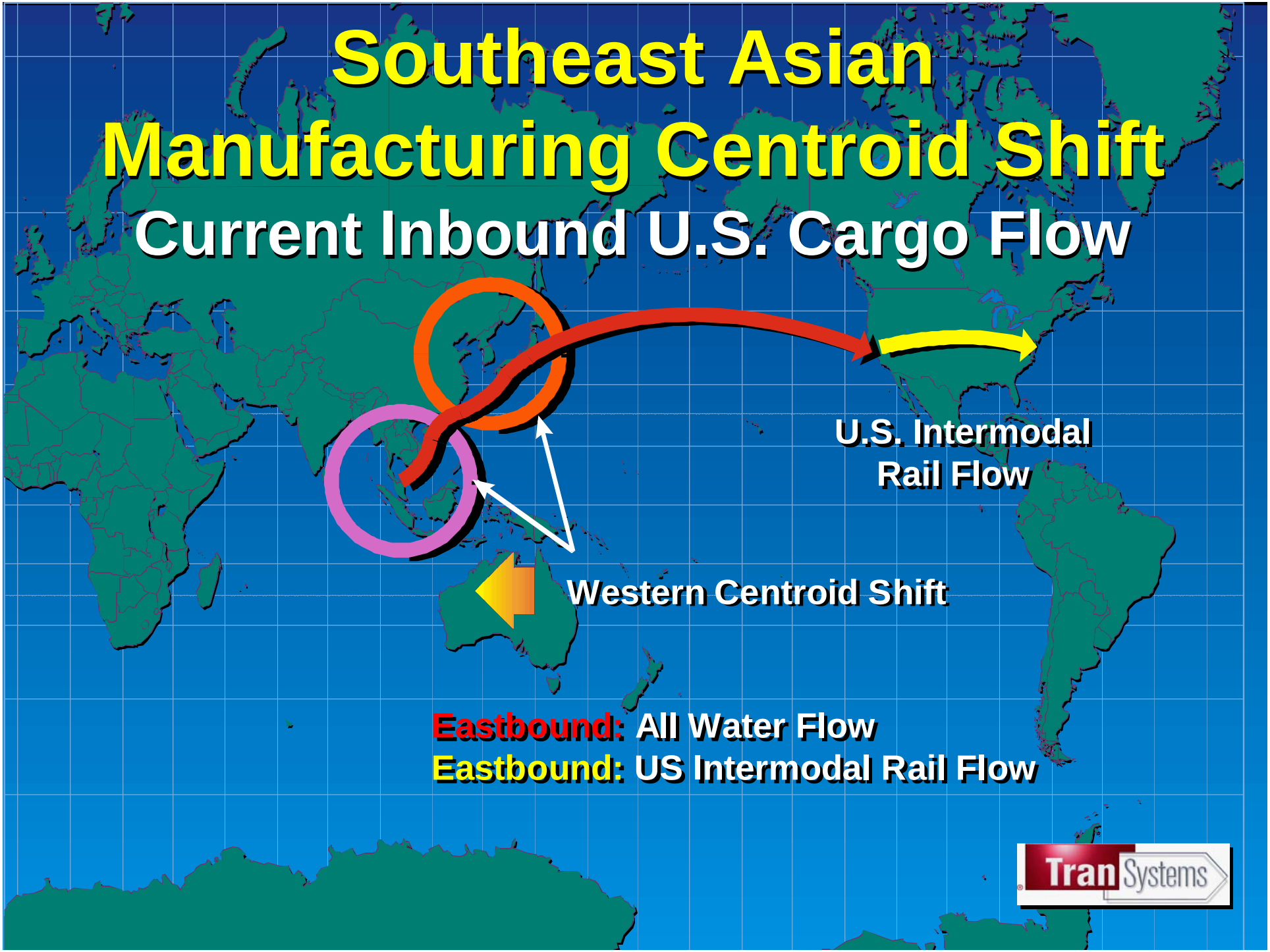
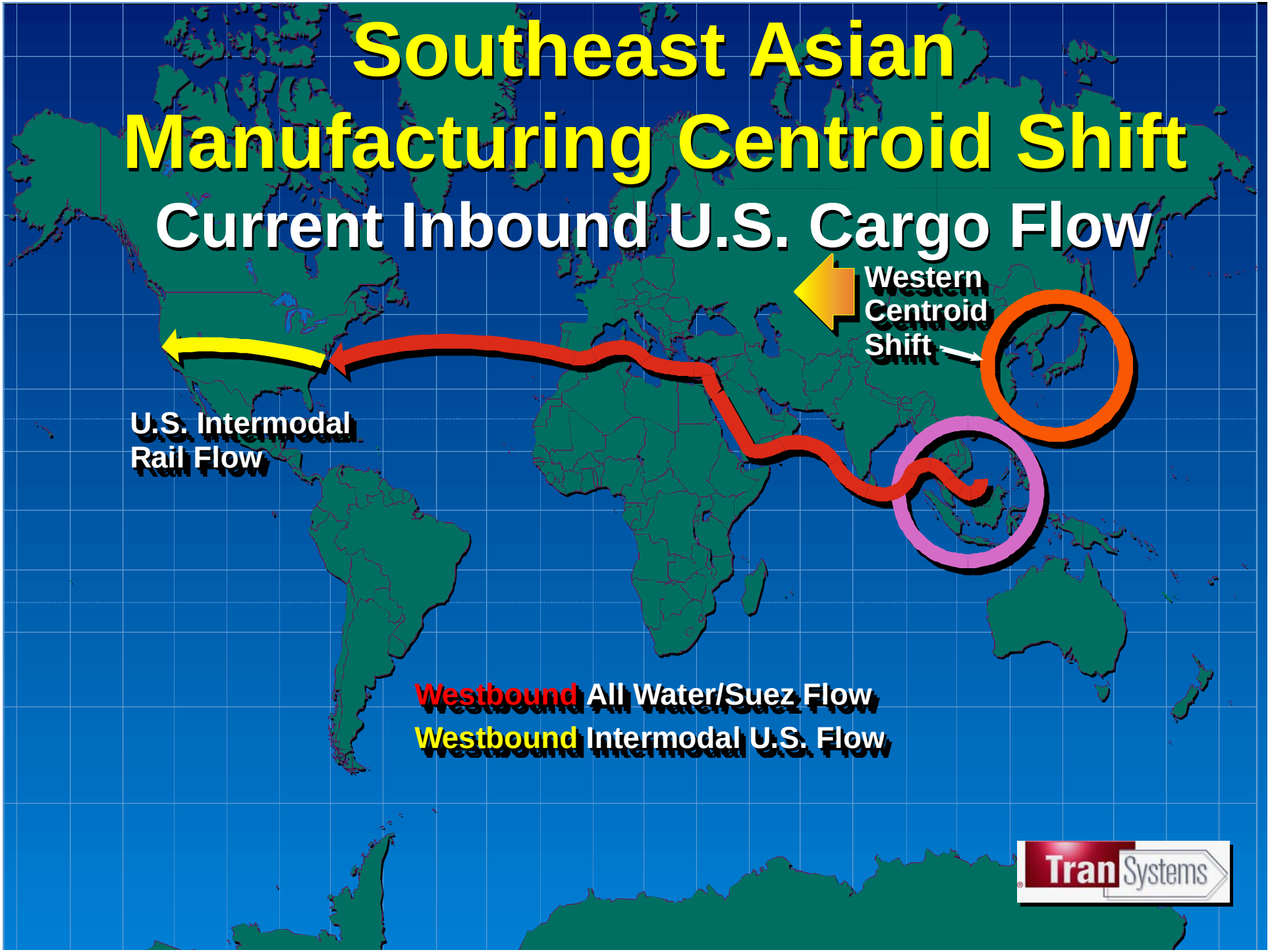
Southeast Asian Manufacturing Centroid Shift

Current Inbound U.S. Cargo Flow



Southeast Asian Manufacturing Centroid Shift

Current Inbound U.S. Cargo Flow



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Ports are Experiencing Dramatic Surges in Seaport Security Costs

Port of Miami's Security Costs Today are 600% Higher Than that of 2001

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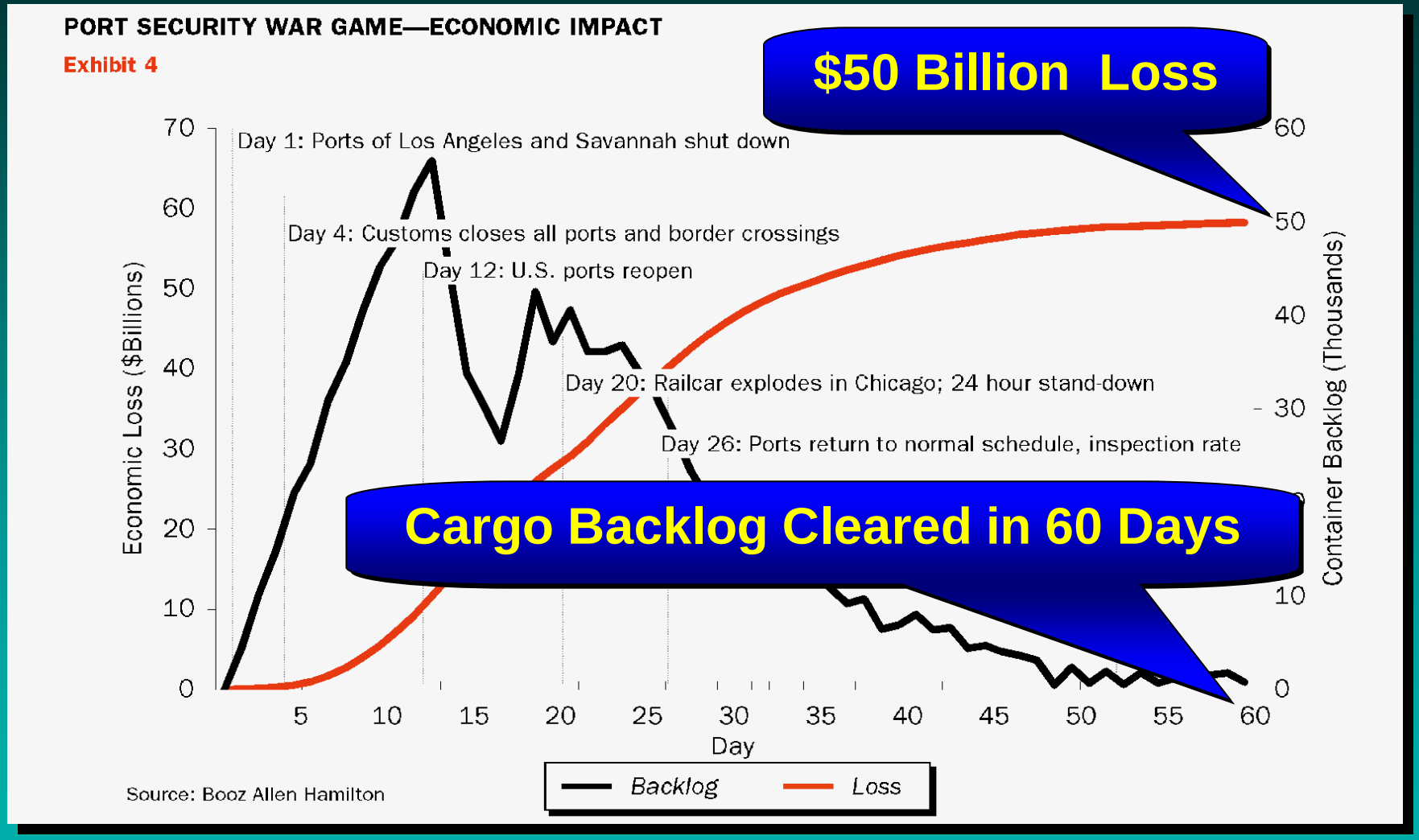
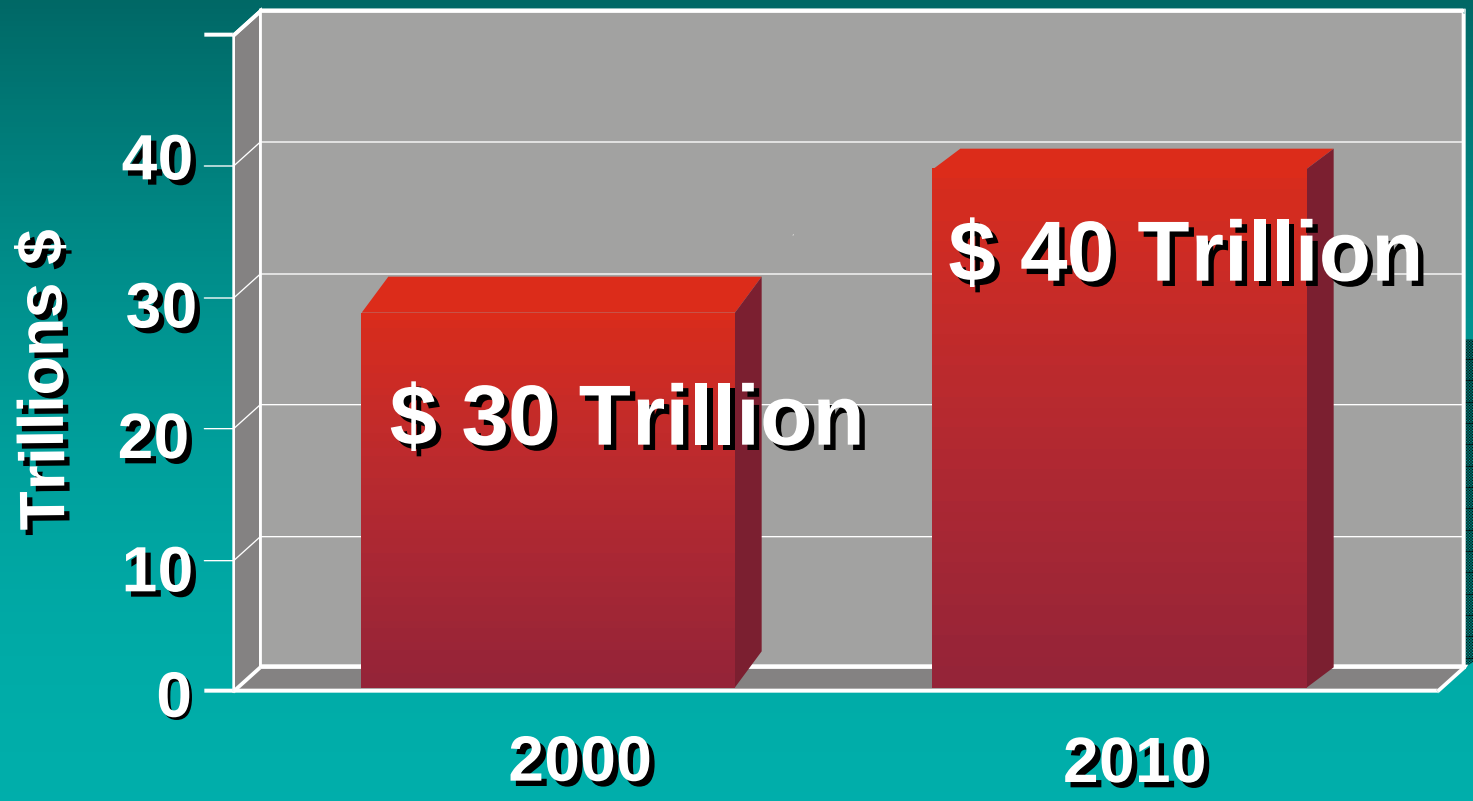
US Port Security Breach:
Supply Chain Disruption




International
Maritime
Cargo Demand
Trends

World Bank's 2010 "Global Economic Prospects"

World Output will Increase 33% in 10 years



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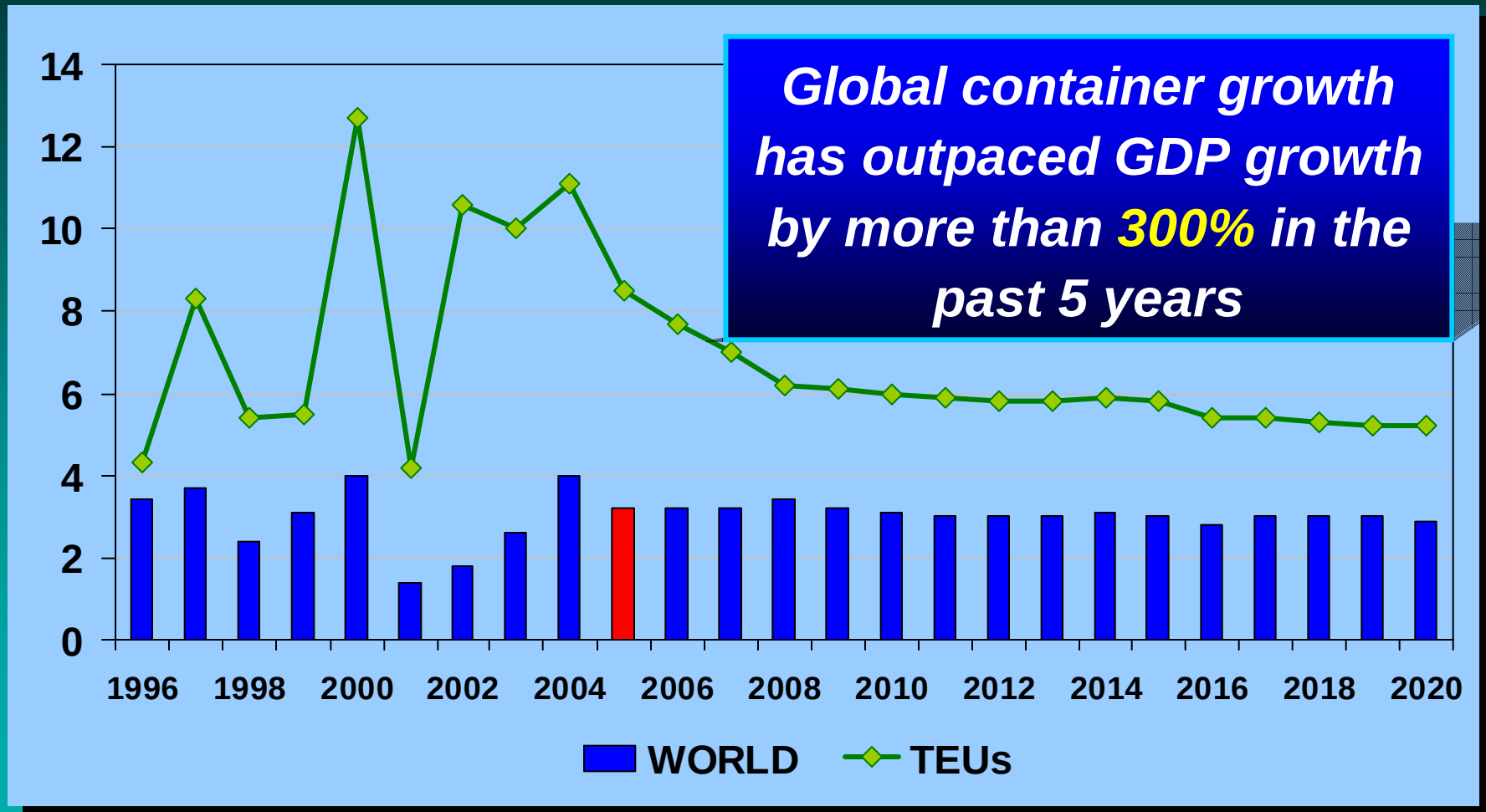
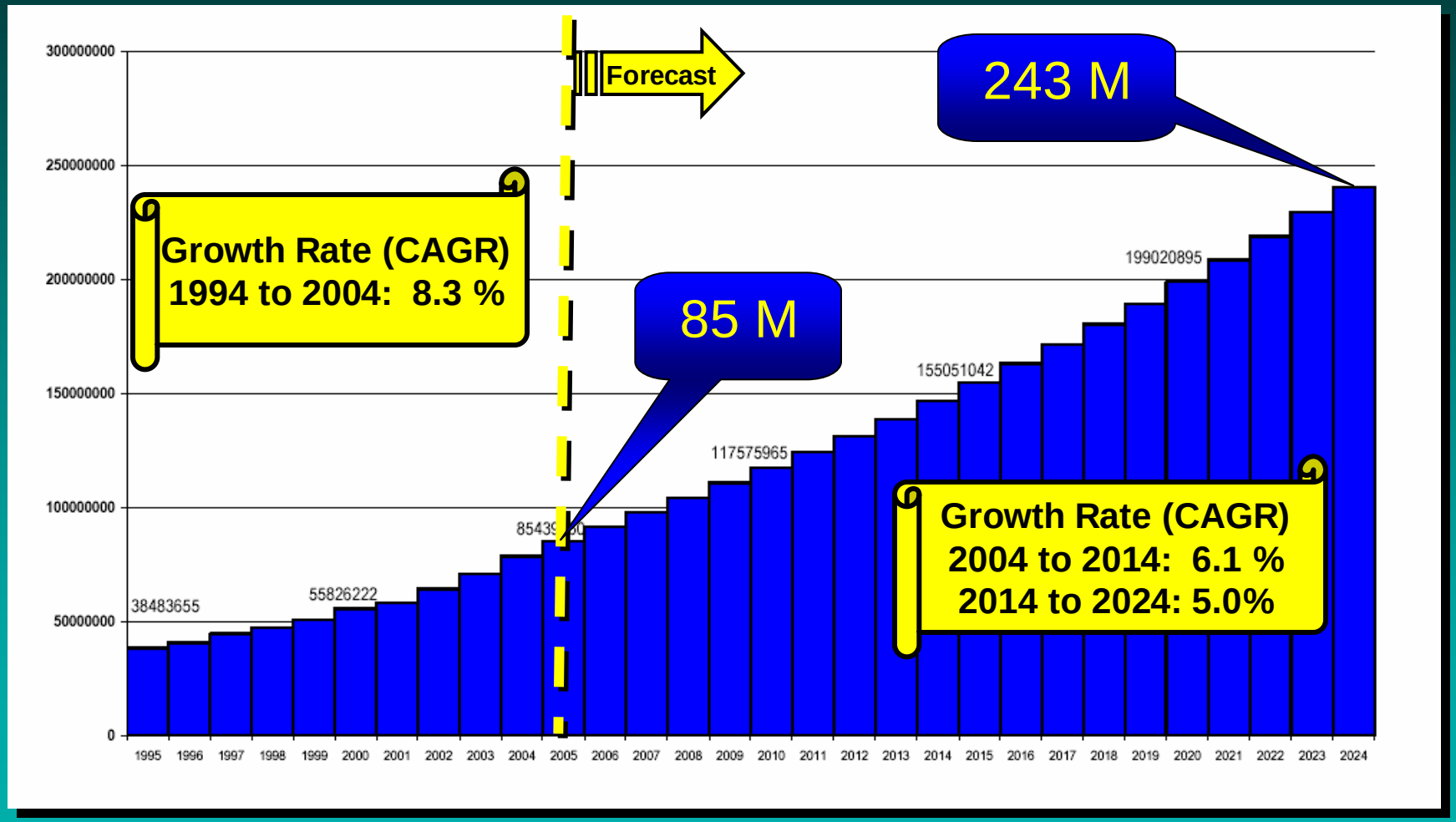
Ocean Container Trade Volume Will Continue to Grow Faster than the World Economy



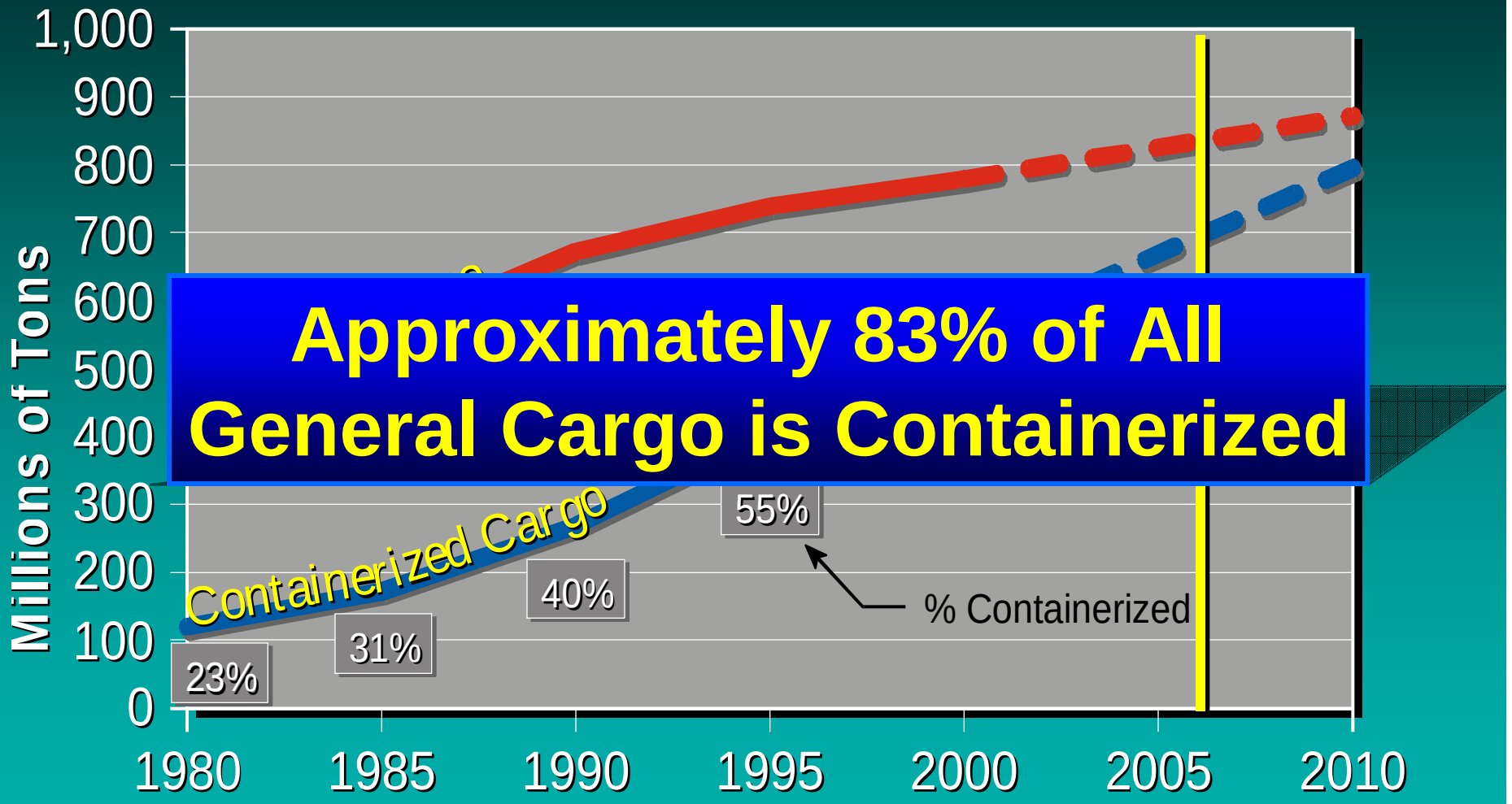
Source: Global Insight World Service and World Trade Service

World Container Forecast to 2024 in TEUs
(186% Increase in Next 20 Years)



Source: Global Insight, 2004

World Containerization of the General Cargo Trades



Approximately 83% of All General Cargo is Containerized

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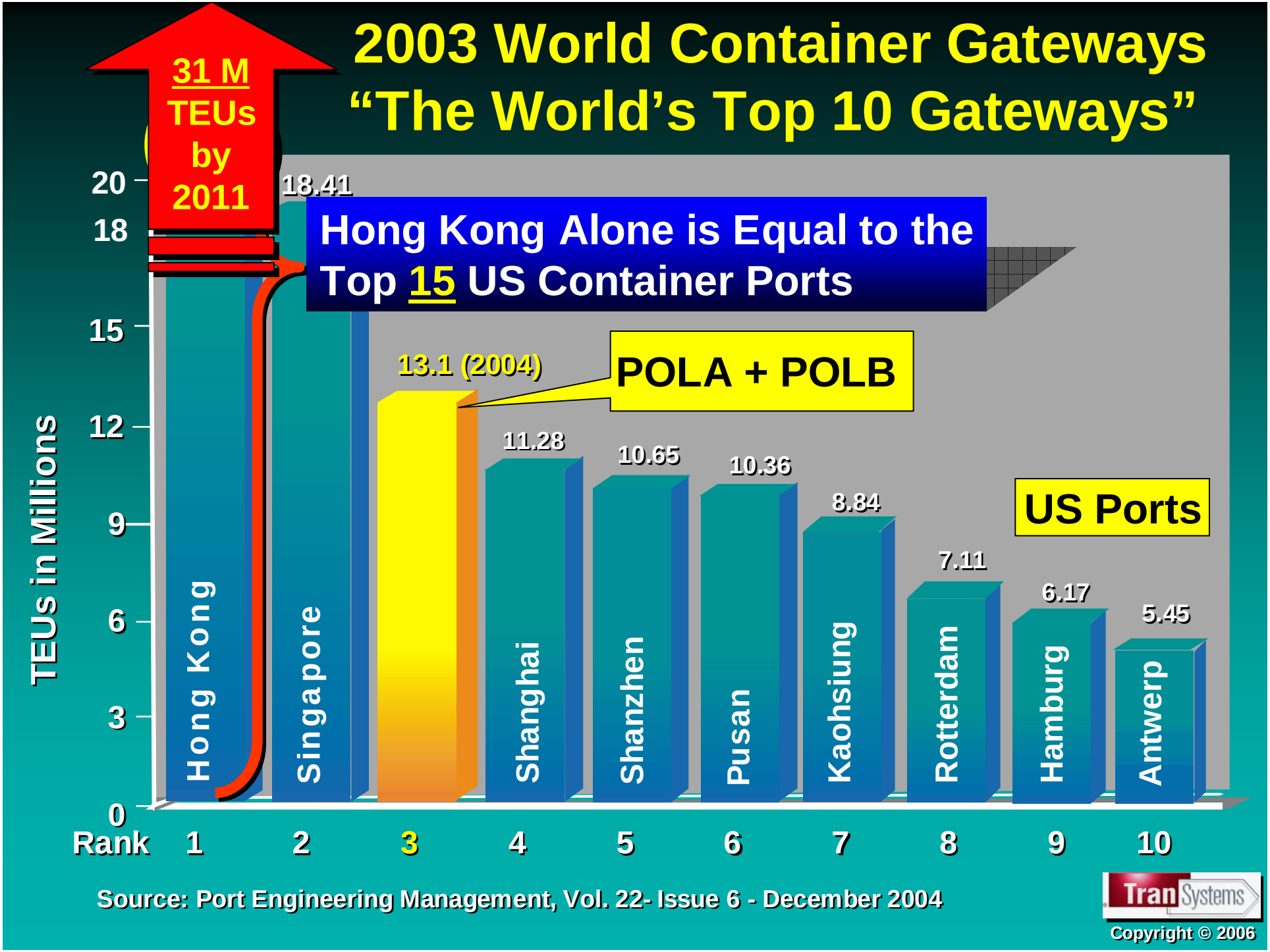
2003 World Container Gateways
"The World's Top 10 Gateways"



Source: Port Engineering Management, Vol. 22- Issue 6 - December 2004

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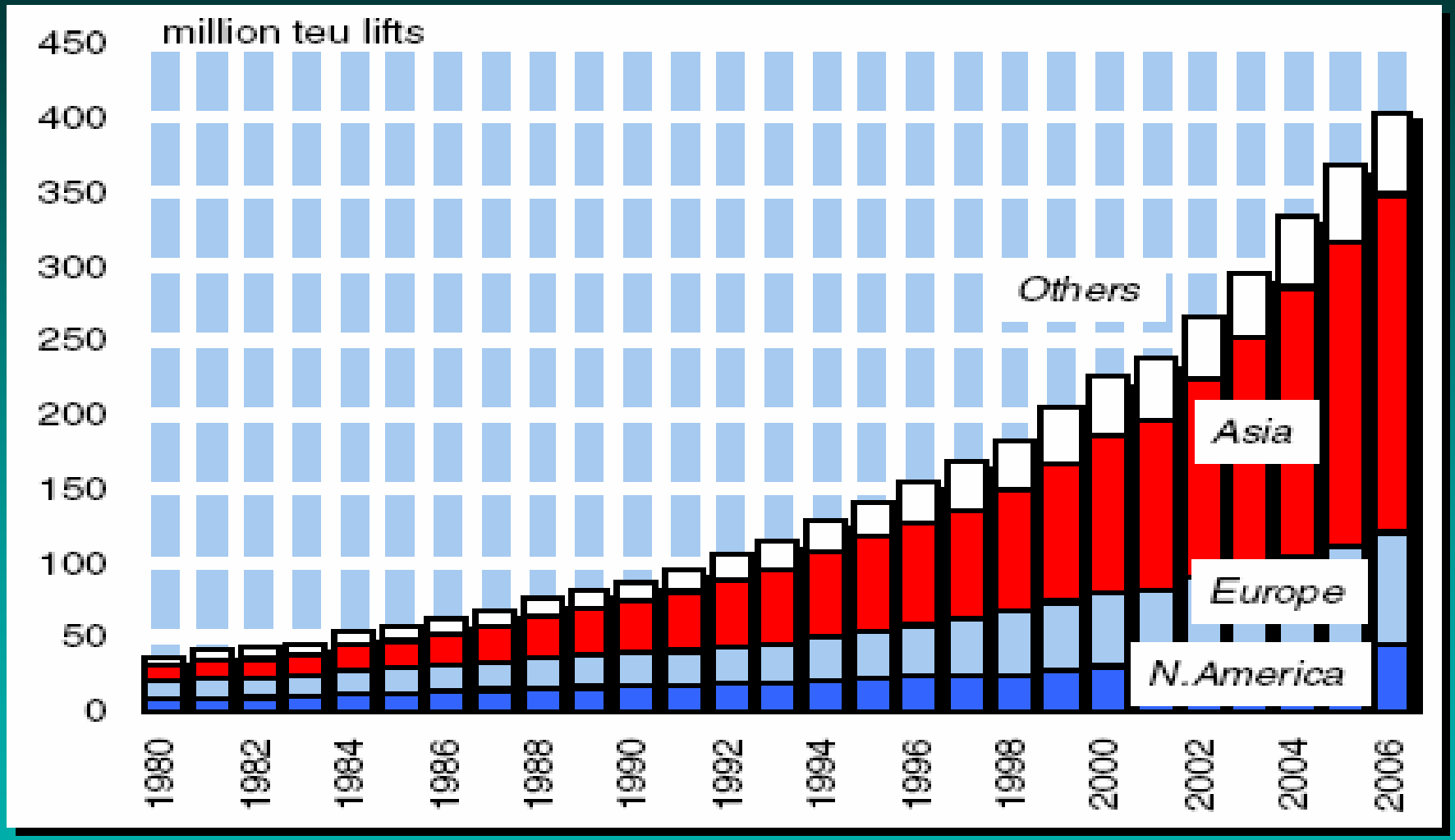
The Growing Asian
Import
Trade Challenge

Global Interdependent Economics Have Resulted in a Major Product Sourcing Shift to Asia



Source: Clarkson Research Studies

Global Market Economic Shifts (Country GDP Rank)

	2000	2010	2020	2030	2040	2050	
#1	USA	USA	USA	USA	USA	CHINA	#1
	Japan	Japan	CHINA	CHINA	CHINA	USA	#2
	Germany	Germany	Japan	Japan	INDIA	INDIA	#3
	UK	UK	Germany	INDIA	Japan	Japan	
	France	CHINA	UK	Russia	Russia	Brazil	#5
	Italy	France	INDIA	UK	Brazil	Russia	
#7	CHINA	Italy	France	Germany	UK	UK	
#8	Brazil	INDIA	Russia	France	Germany	Germany	
#9	INDIA	Russia	Italy	Brazil	France	France	
	Russia	Brazil	Brazil	Italy	Italy	Italy	

Source: Global Insight, 2005

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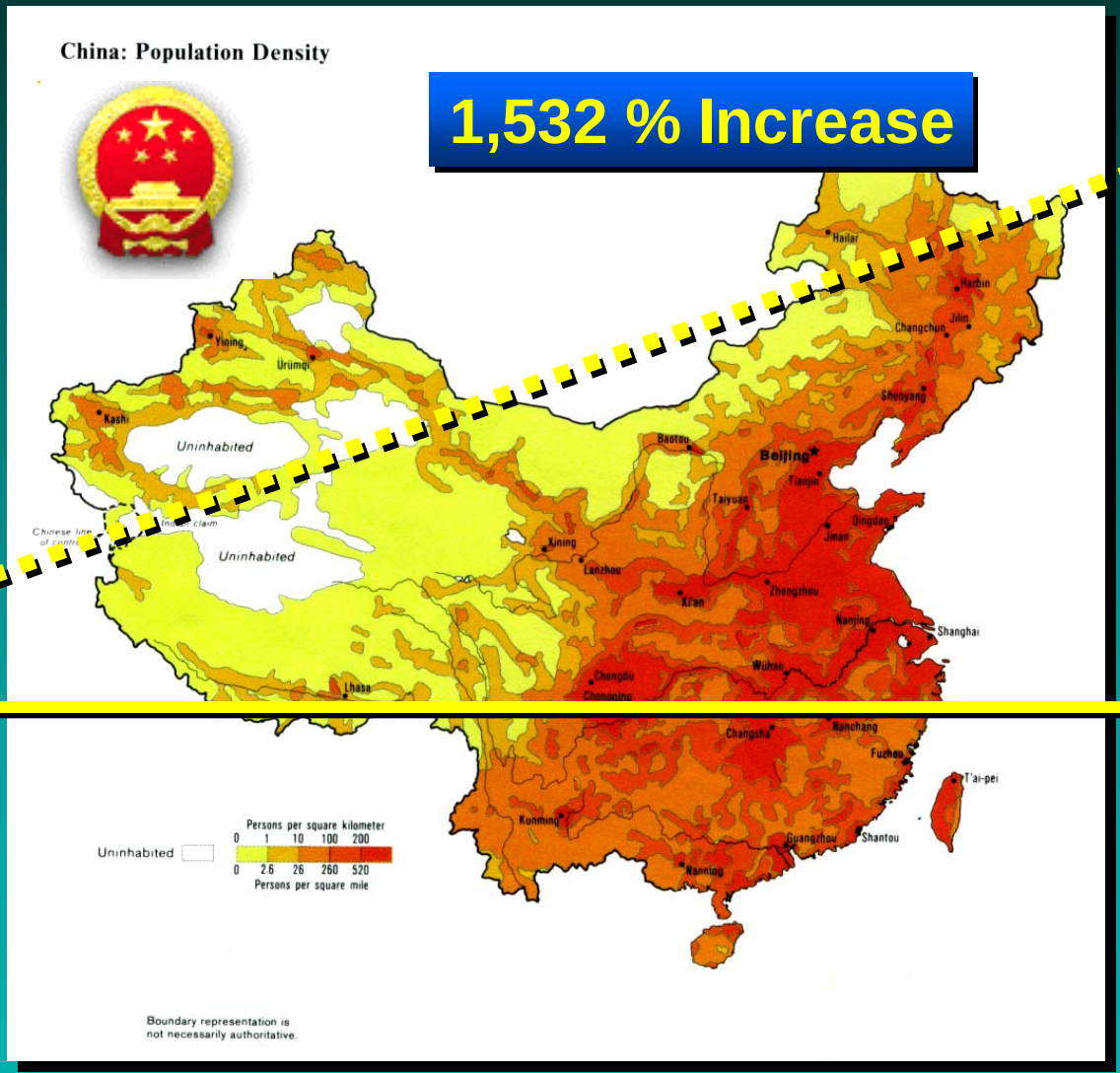
China – US 25 Year Trade Growth
(Billions US $)



$2.5 B

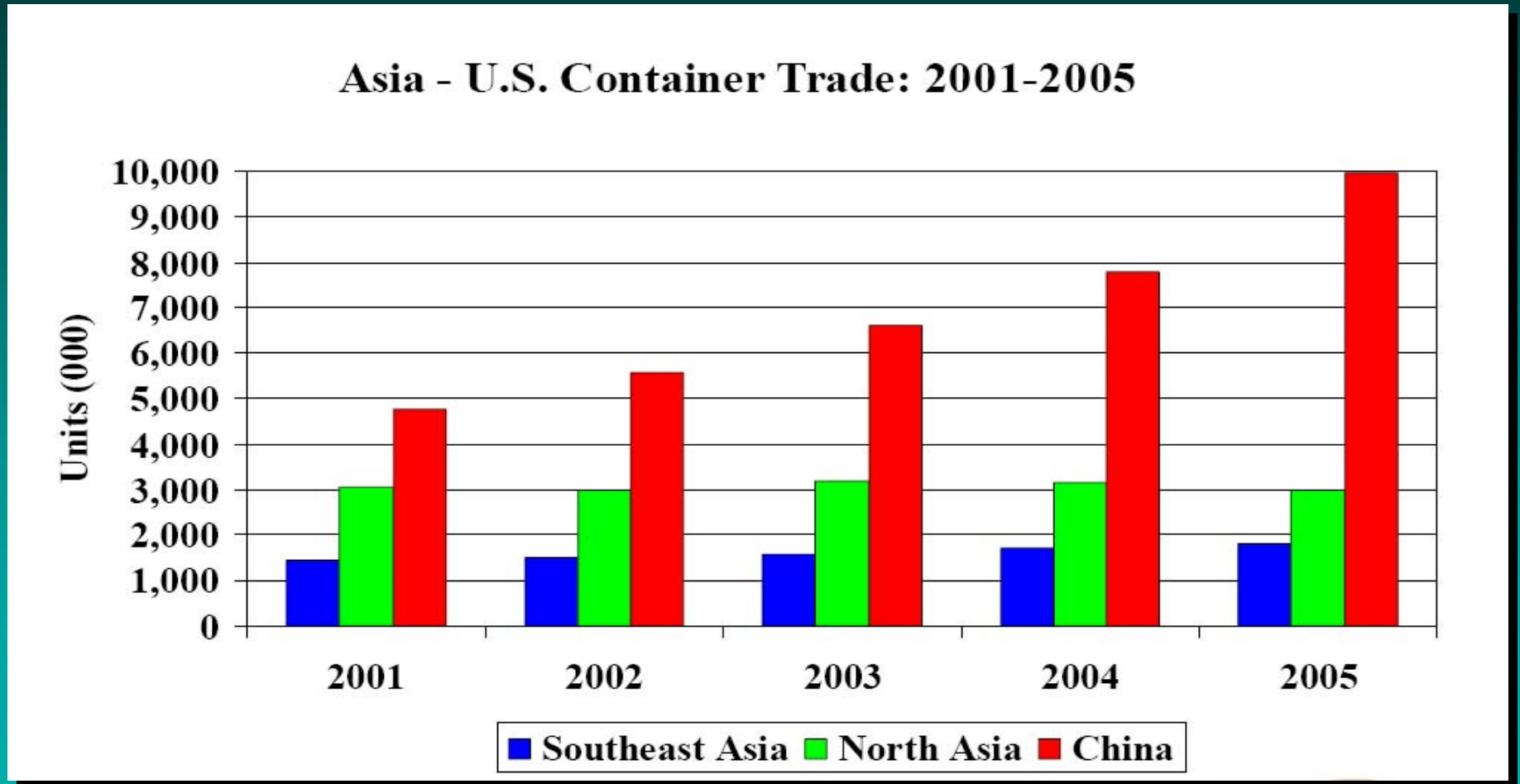
$40.8 B

1,532 % Increase

1979

2004

Last 5 Years Asia- US Container Trade Increased 12% CAGR and China Accounted for 95% of the Increase



Source: PIERS, Port Reported Throughput, Norbridge

China-US: Twin Engines of the World

Population:
US: 298 million
China: 1,307 million
(1/5 World)

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

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China is Leading a Global Economic Rebound Becoming the World's Manufacturing Powerhouse

- Global manufacturing is now centered in China.
- GDP will double by 2010 and quadruple by 2020.
- By 2008… the second largest global trading country.
- China's cargo is 70% of the total Pacific cargo flows.
- China's container volumes will increase from 60 million TEUs to over 100 million TEUs by 2010.

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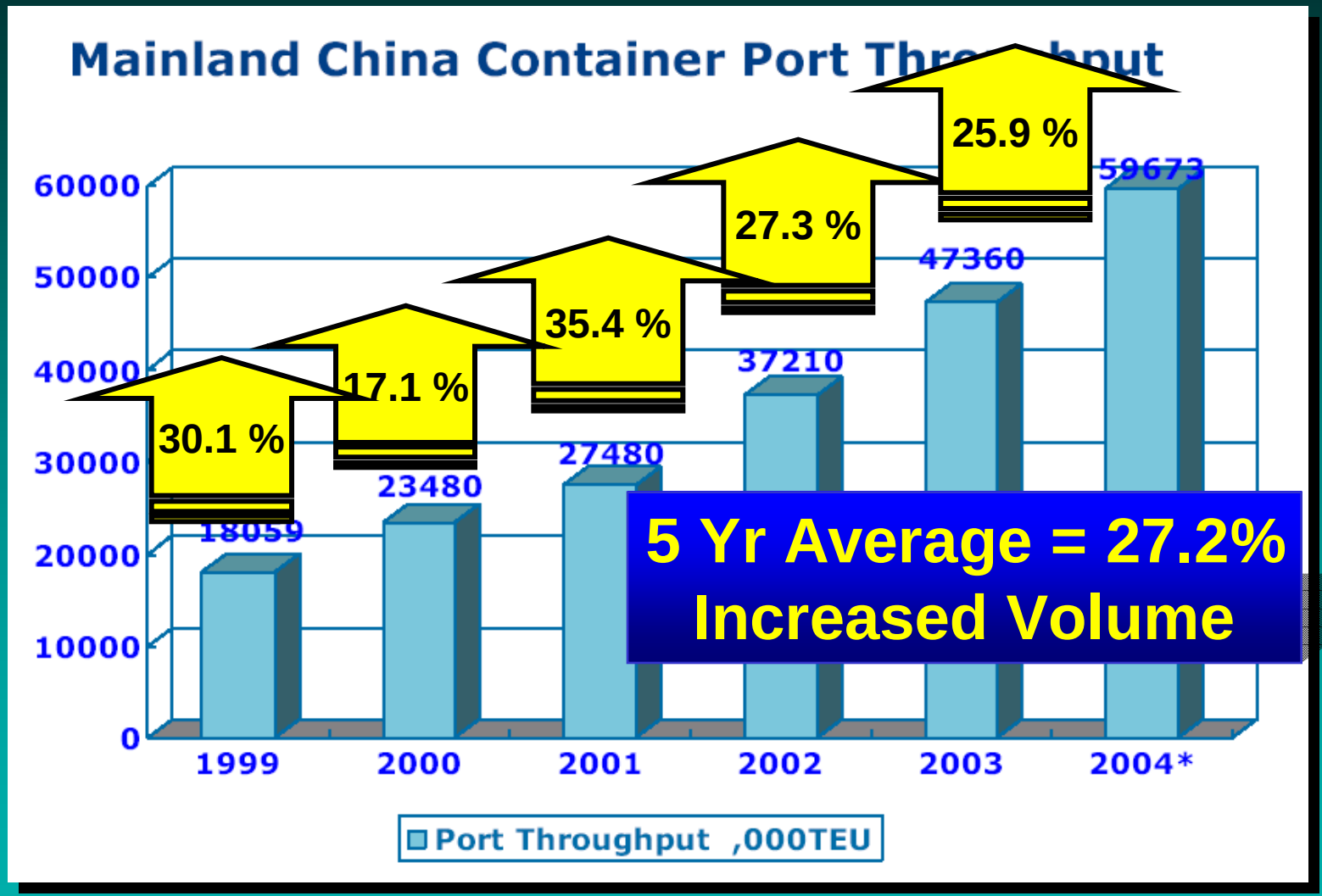
Mainland China Container Port Growth

(Compound Annual Growth Rates)



China's Ministry of Railways Signed a 5 year Cooperation Agreement with the US BNSF Railroad for Intermodal Rail Development

- Develop China's high volume efficient intermodal network
- $242 billion program to 2020
- On-dock & near-dock intermodal transfer yards at ports
- Ministry to build 18 mega-terminals with 7 at seaports, 40 smaller Intermodal terminals

铁路

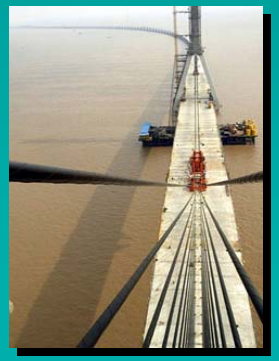
BNSF Burlington Northern Santa Fe Railway

TranSystems

Shanghai International Shipping Center

Yangshan Deep Port & Logistics Park

20 Mile New Port Access Bridge Constructed in 3 yrs



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Shanghai International Shipping Center

Shanghai Close-Port New City

A new city
Integrating global freight logistics

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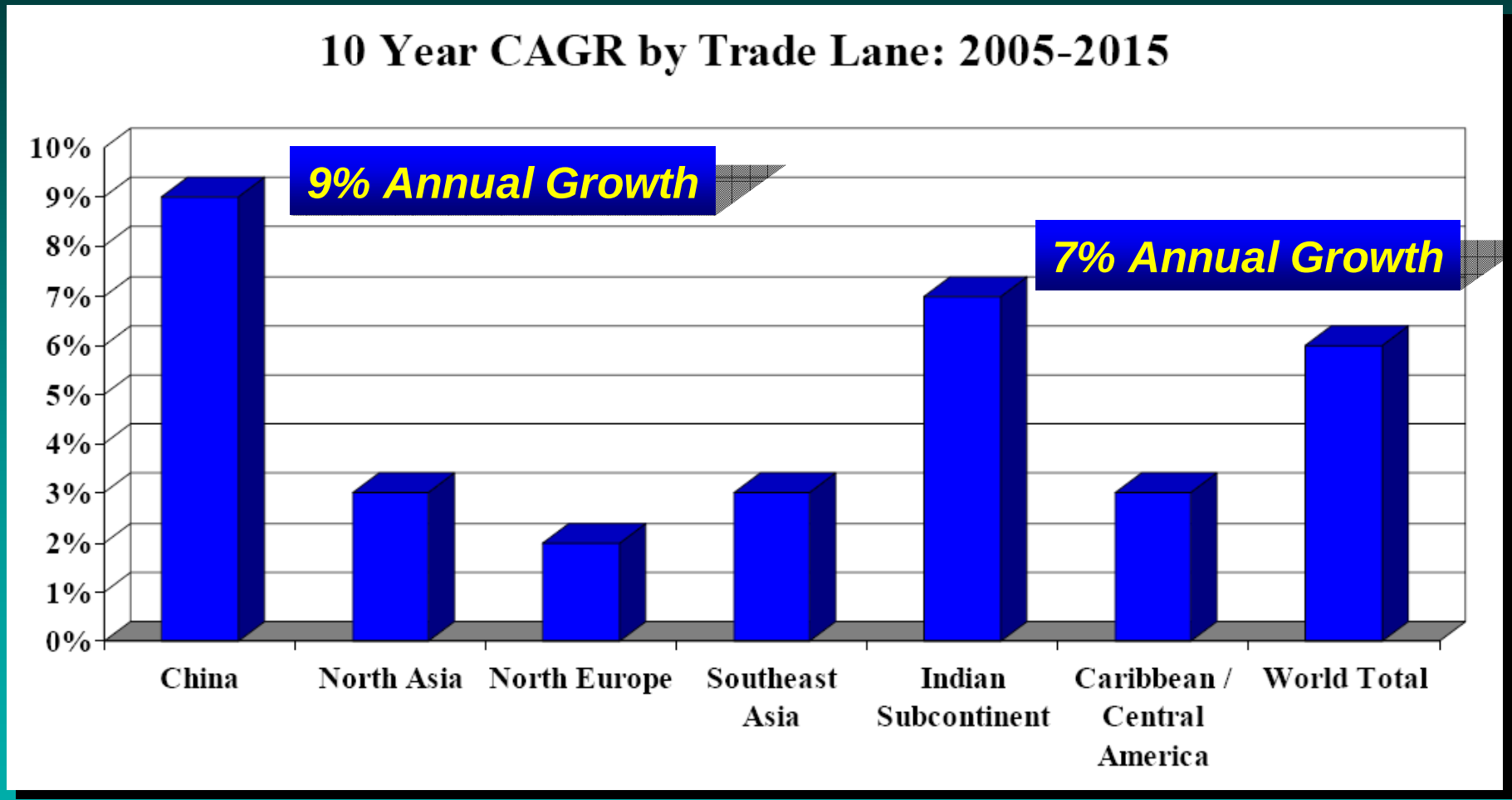
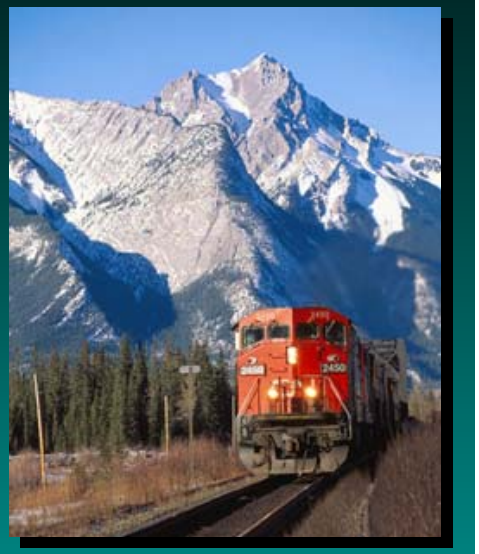
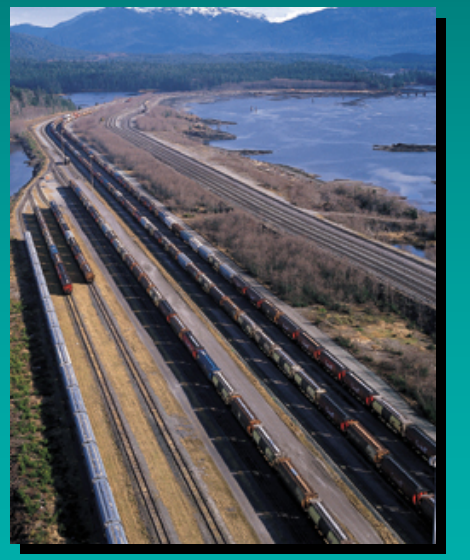
To 2015 China & India Are Projected To Continue To Drive North American Container Trade



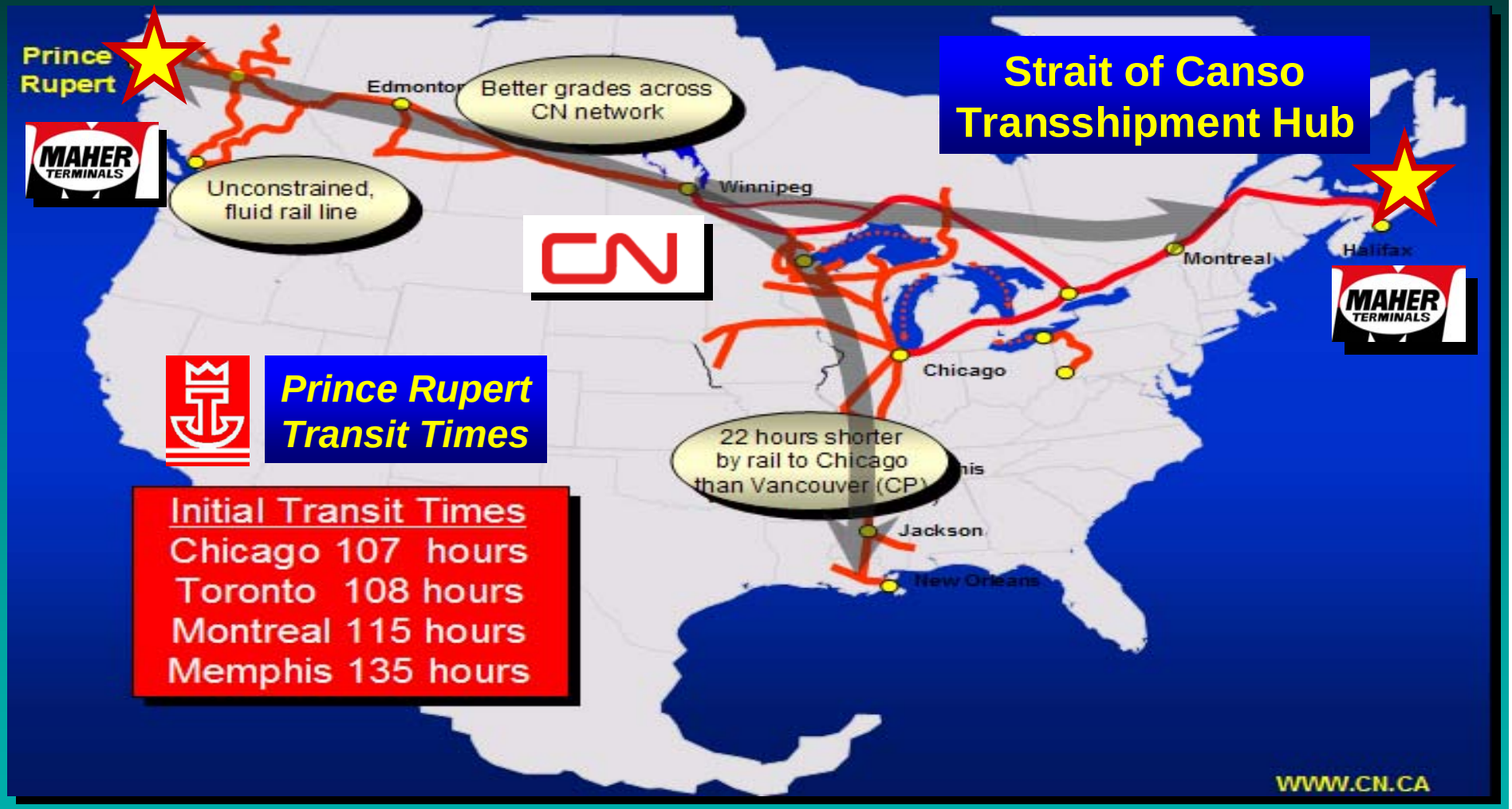
Source: Global Insight, Norbridge

New North American Container Gateway





The Emerging CN Transcontinental Land Bridge



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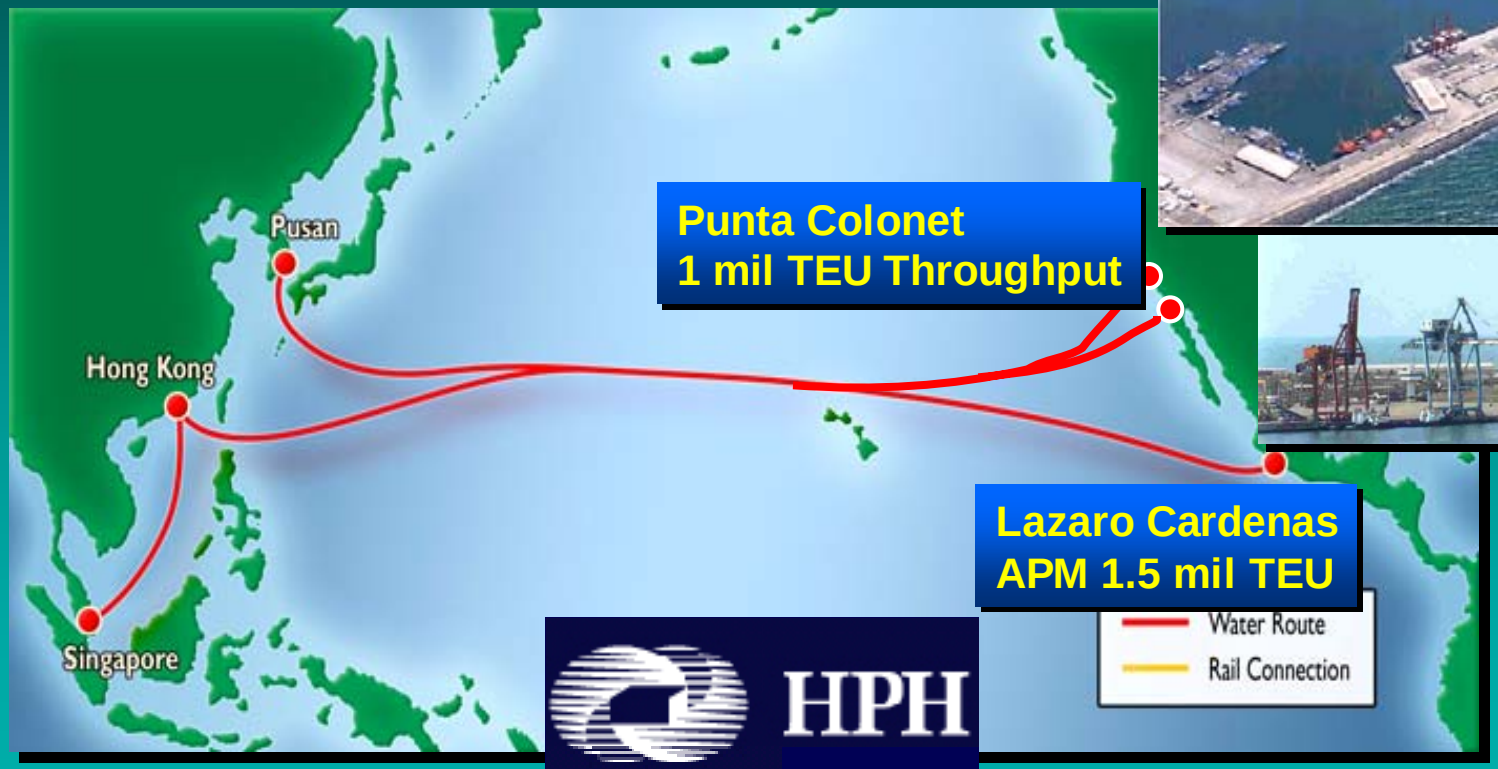
Major West Coast Mexican Port Developments
Planned To Avoid Port of LA/LB Congestion



Punta Colonet
1 mil TEU Throughput

Lazaro Cardenas
APM 1.5 mil TEU

HPH

$1. 2 Billion in Port Infrastructure

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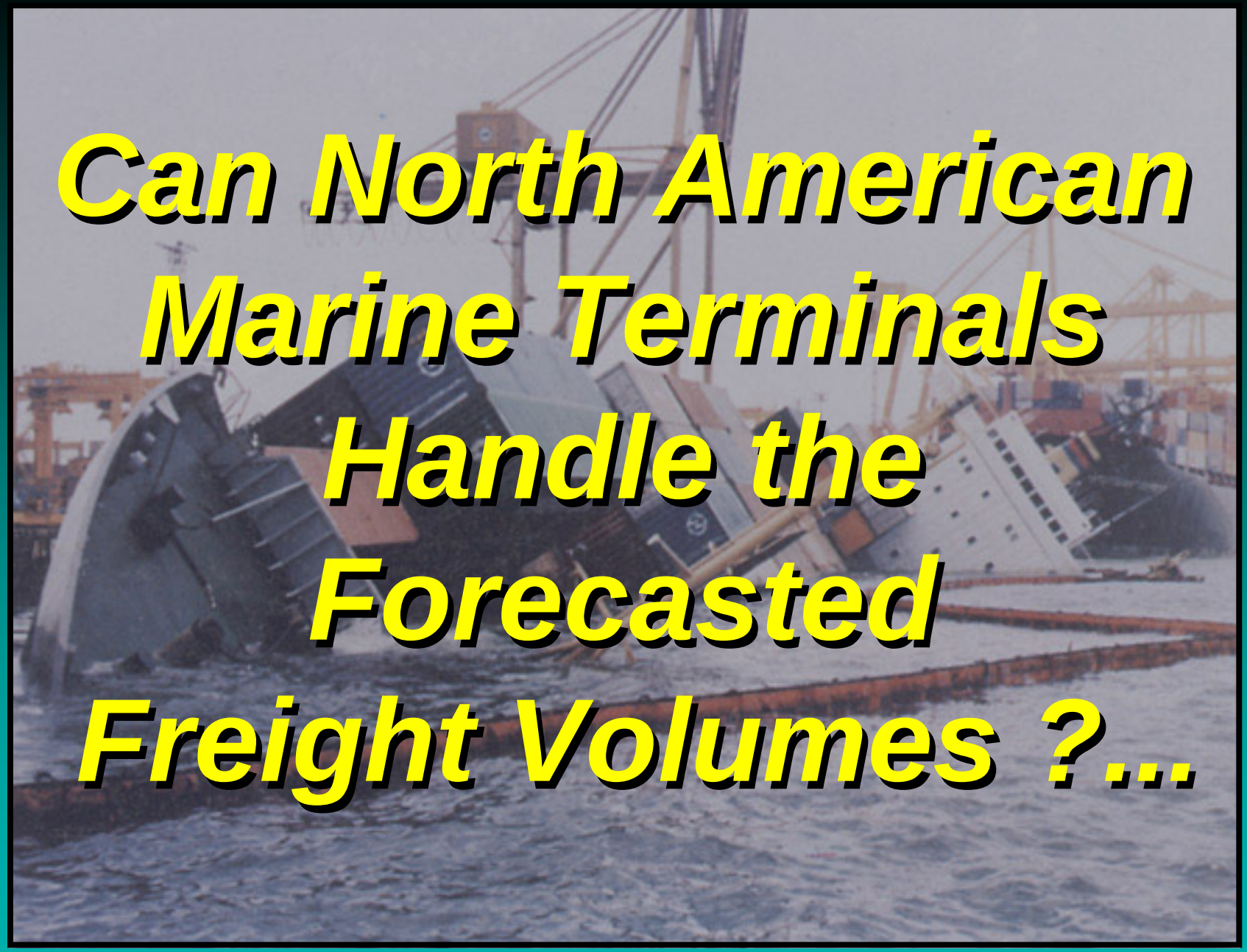

Can North American Marine Terminals Handle the Forecasted Freight Volumes ?...

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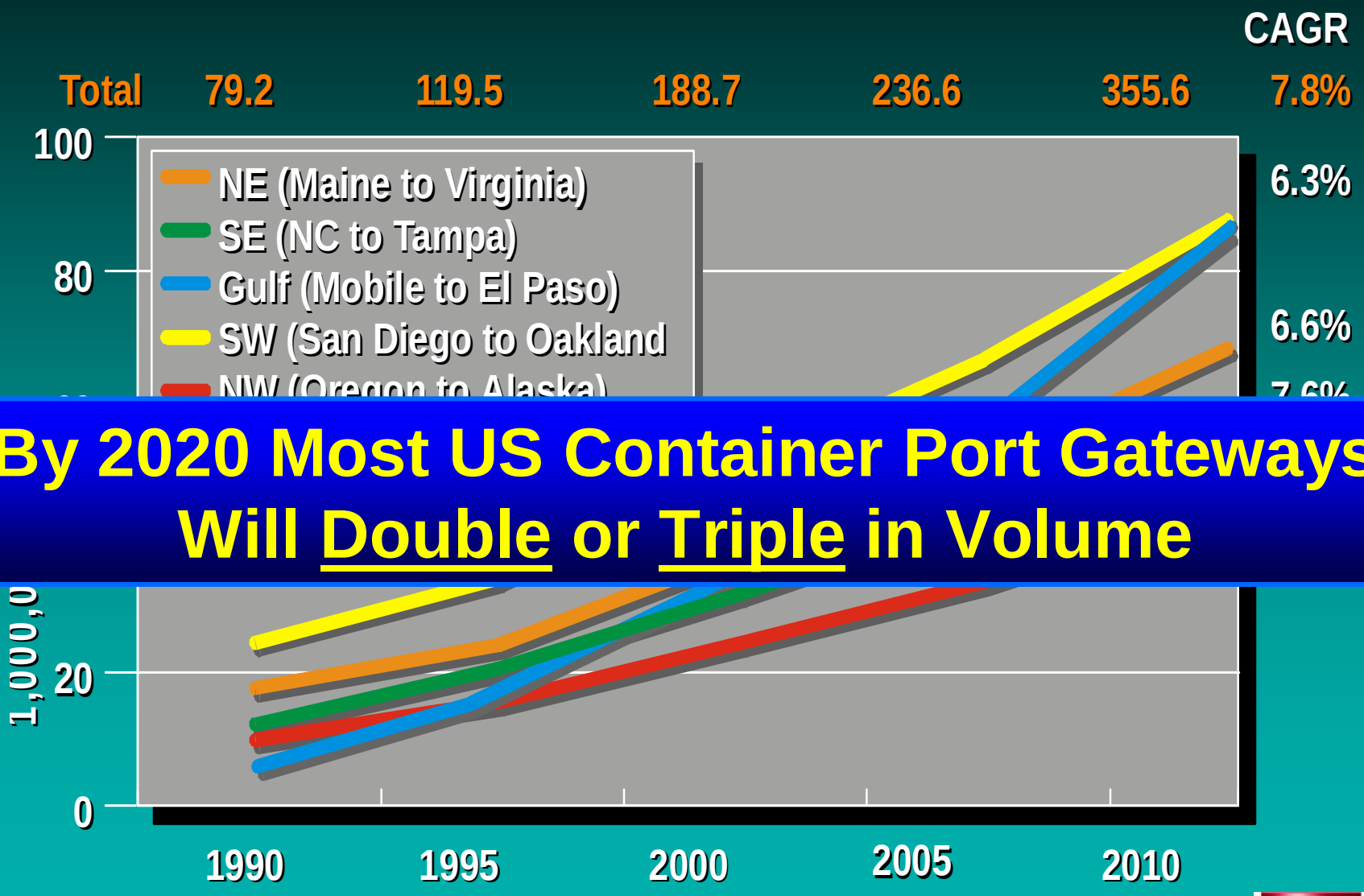
U.S. Containerized Tonnage Forecast



By 2020 Most US Container Port Gateways Will Double or Triple in Volume

Source: DRI/McGraw Hill

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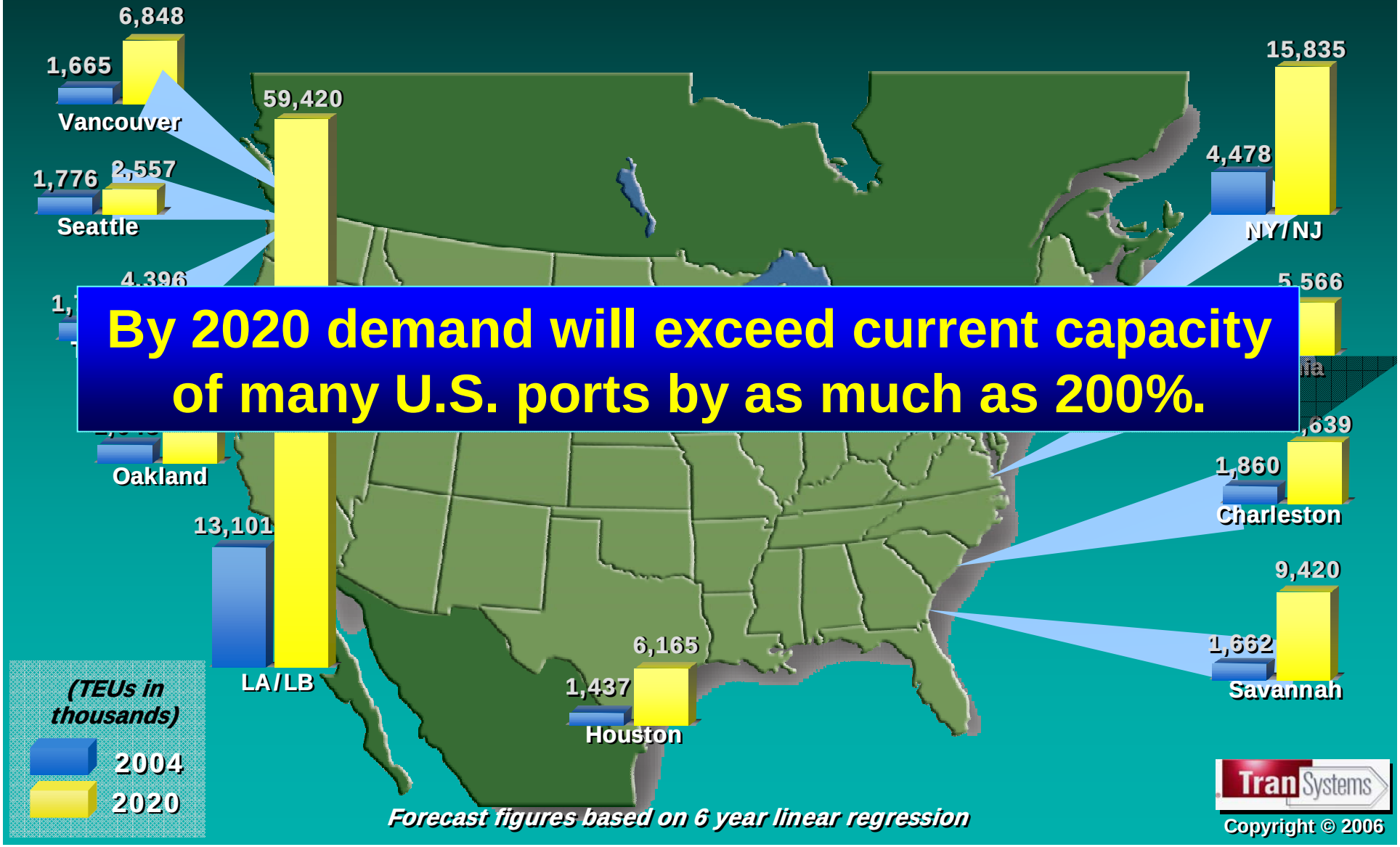
North American Maritime Container Current and Future Trade Growth



By 2020 demand will exceed current capacity of many U.S. ports by as much as 200%.

Forecast figures based on 6 year linear regression

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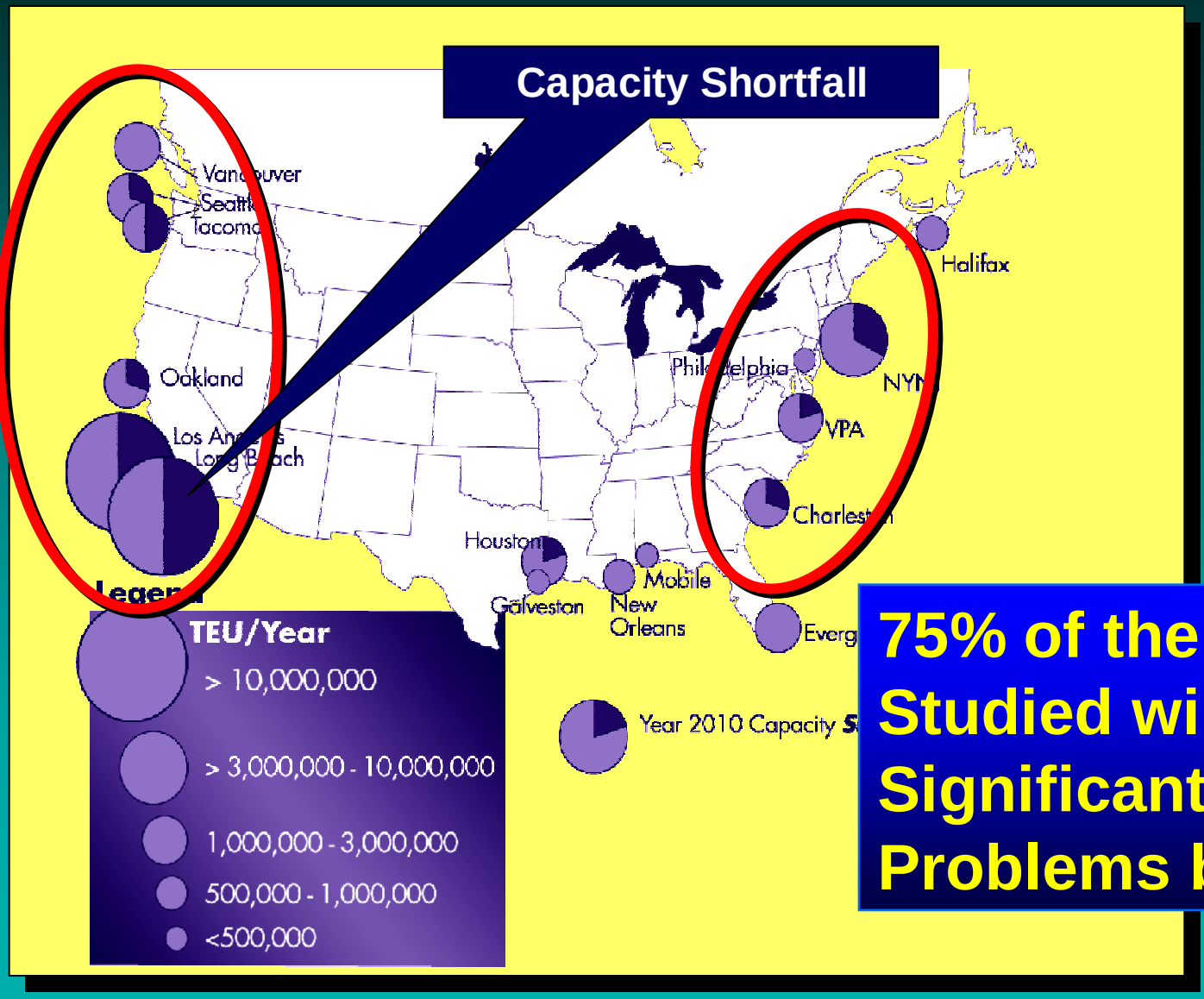
2010 Projected Public Port Capacity Shortfall



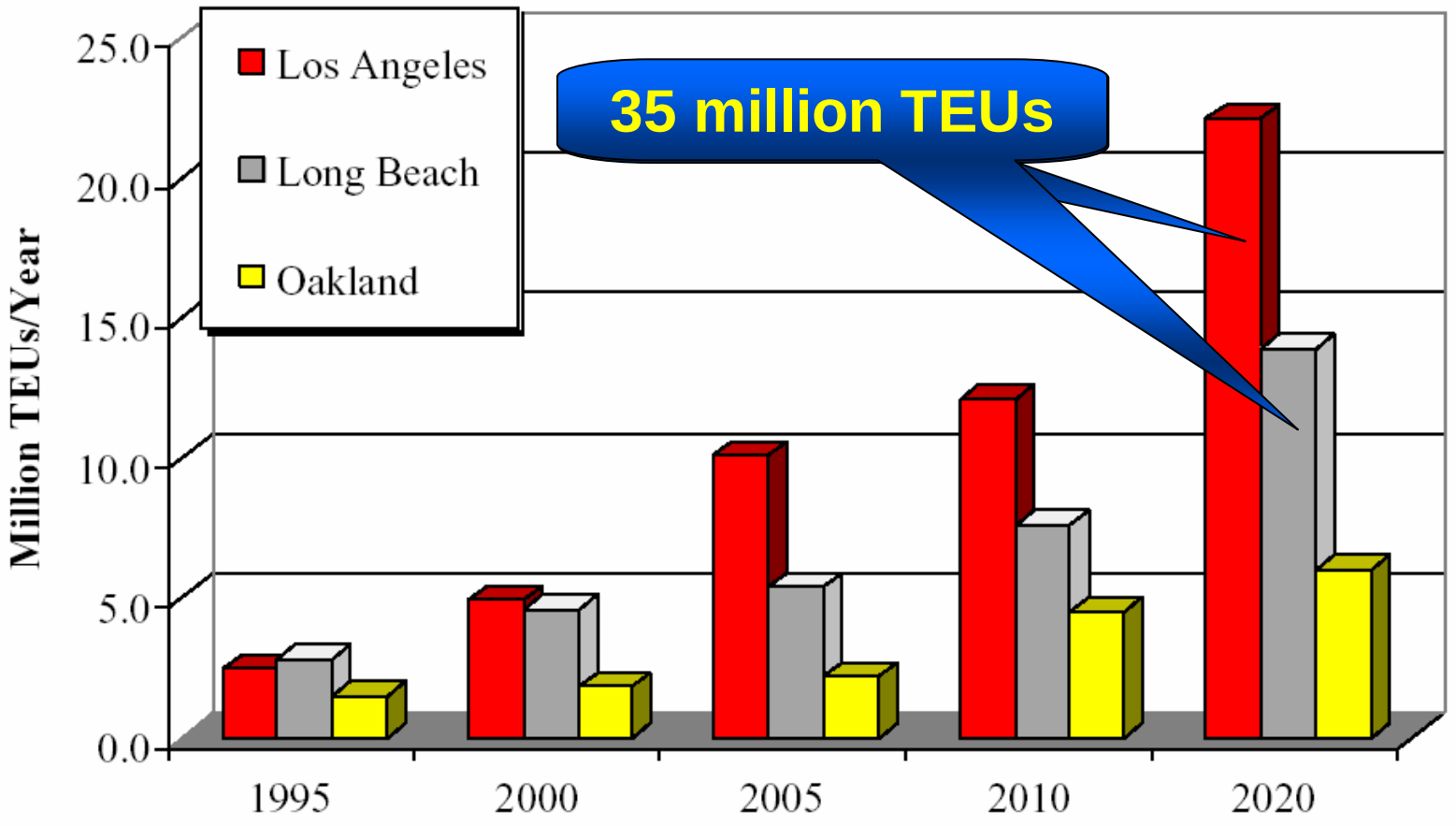
75% of the 16 Ports Studied will have Significant Capacity Problems by 2010

San Pedro Bay Ports of Ports of Los Angeles and Long Beach Container Growth Implications:

"At current growth and per acre productivity, in 18 years the two Ports will require 3,624 new acres of container terminal"*

* Source: Port of Long Beach

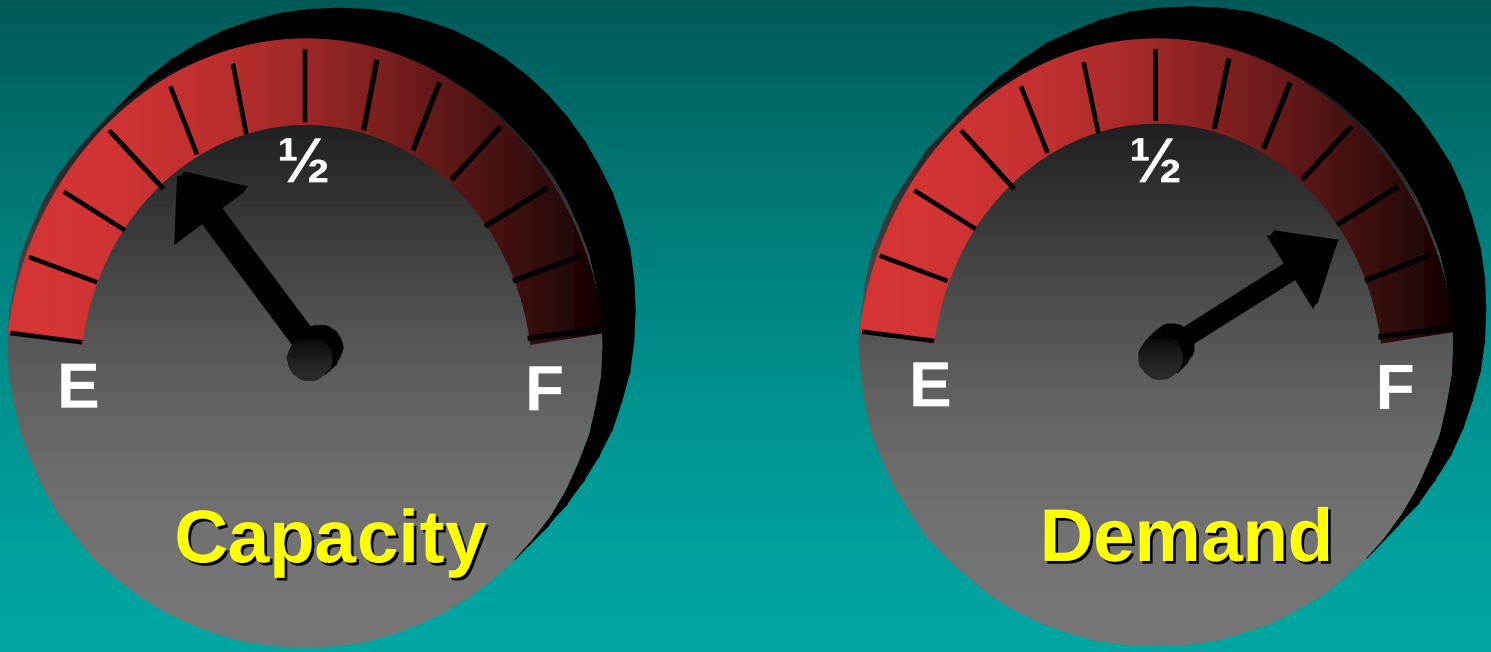
Explosive Southern California Port Container Growth Forecasted



Source: California Goods Movement Action Plan – Jan 2005 Draft

Capacity vs. Demand Bottom Line:

Balancing Capacity and Demand is Both a Public and Private Issue



North America's future economic and environmental health is at risk as a result of declining transportation efficiency and reliability.

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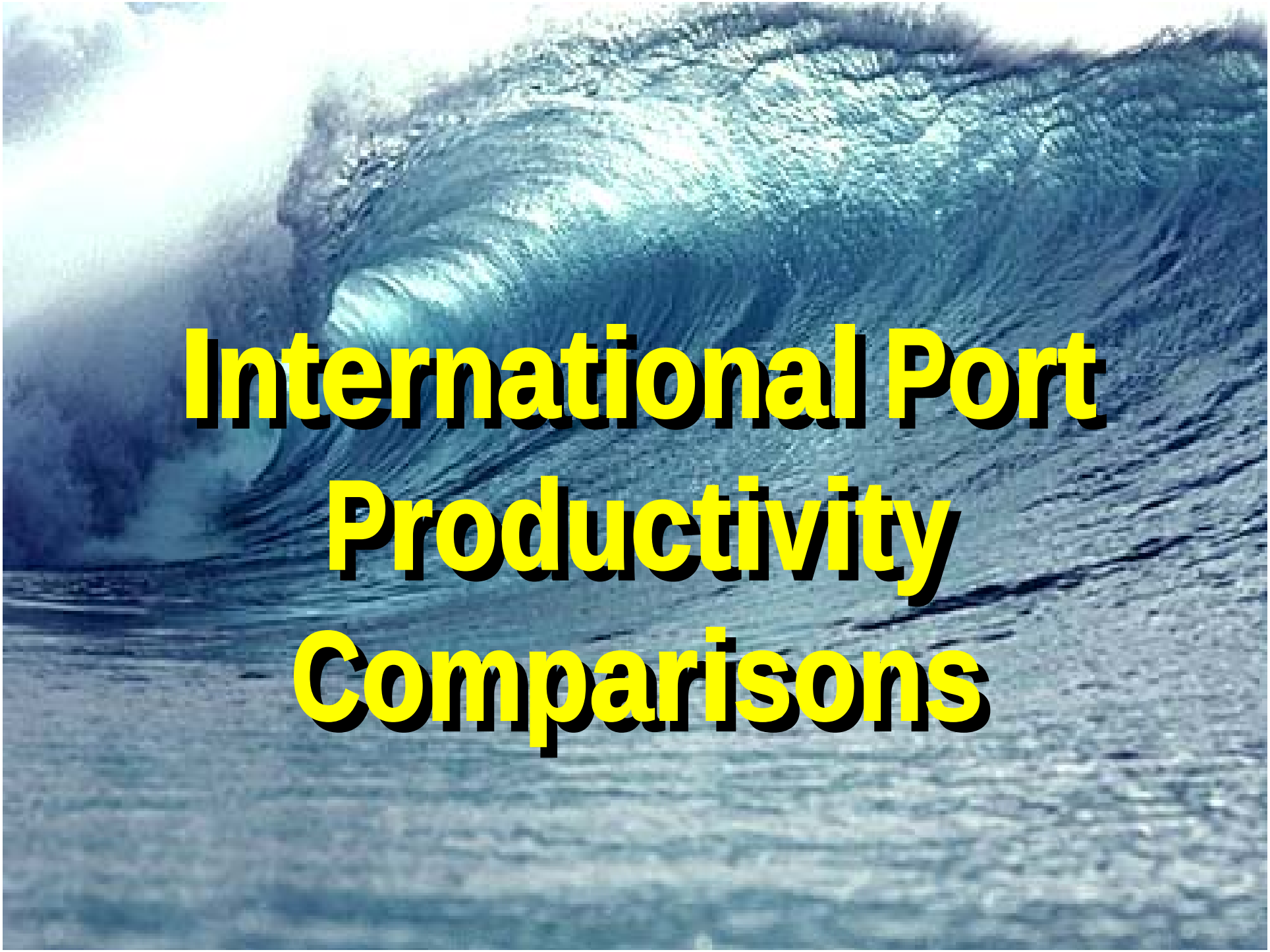
International Port
Productivity
Comparisons

Global Port Terminal Productivity

North American Ports Are Not As Productive As The Most Productive International Ports By a Factor Of More Than 4 To 1

Global Marine Terminal Productivity

(Circa 1999 to 2004)

(Throughput measured in TEUs/Acre/Year)

	1999	2004	5YR CAGR
Asian Ports	9,272	16,595	15.3%
European Ports	4,284	6,396	15.4%
United States Ports	2,894	4,028	7.7%
US West Coast Ports	3,543	4,944	7.5%
US Gulf Coast Ports	3,149	4,635	9.4%
US East Coast Ports	2,021	2,661	6.8%

Source: 1999 - 2004 CI Database, Seaports of the Americas, Port Data

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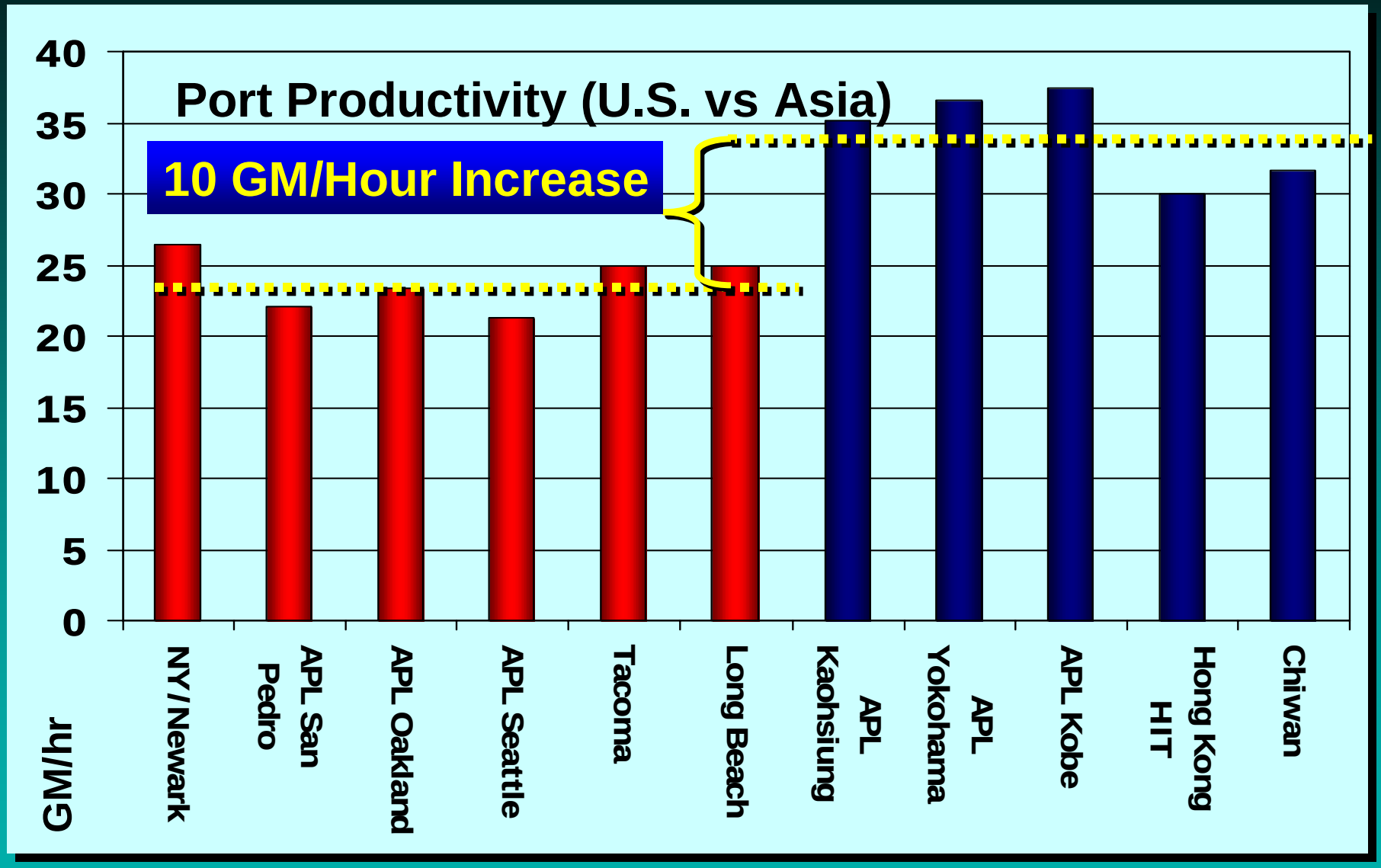
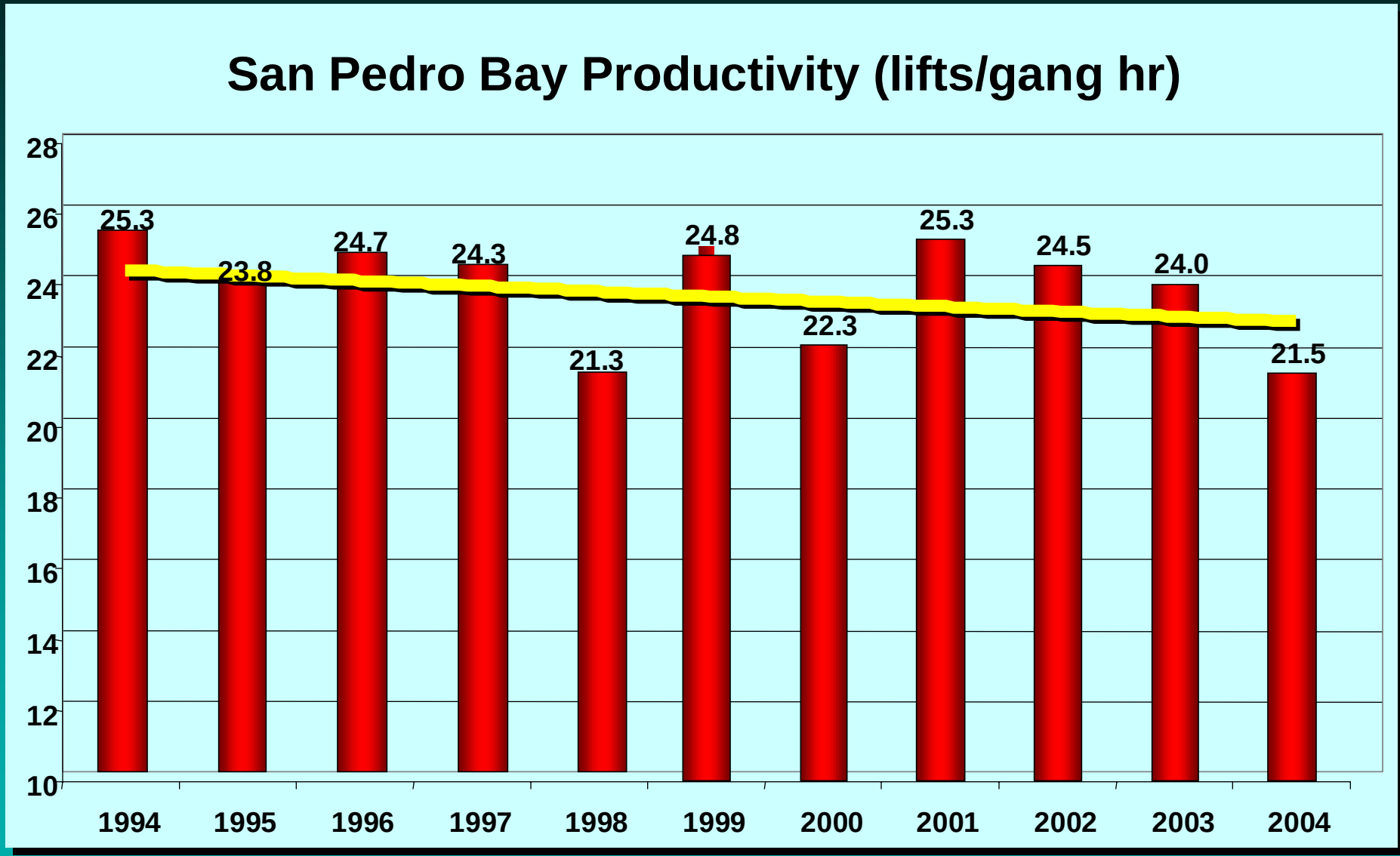
US Port Productivity Is A Concern



Source: APL, Transportation Research Board

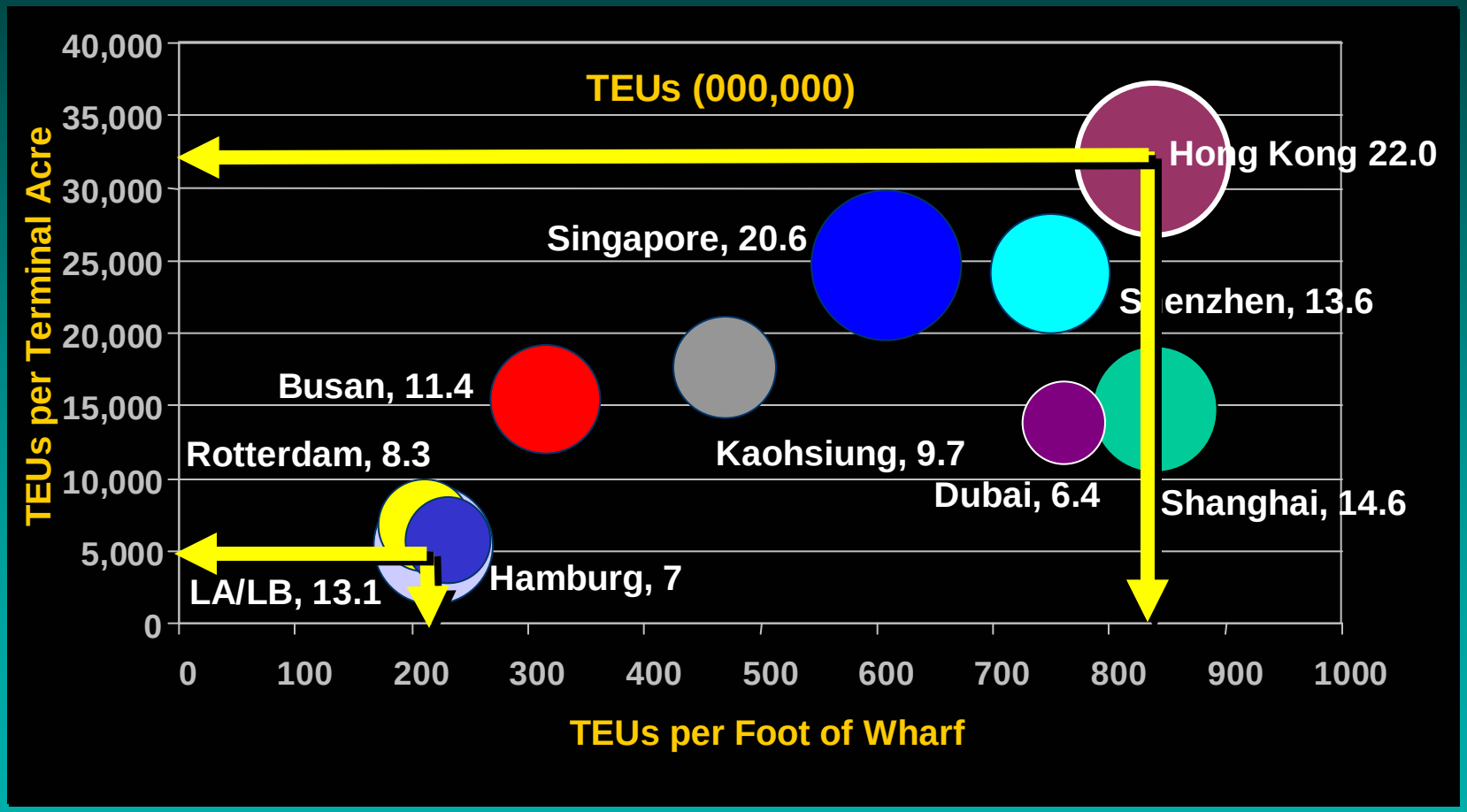
West Coast Port Productivity Is A Major Concern



Source: APL, Transportation Research Board

2005 International Port Productivity Top 10 Ports

(in Millions of TEU Throughput)



Source: Computed from Seaports of the Americas – 2005,
Containerization International Yearbook - 2005 and port-provided data bases/interviews

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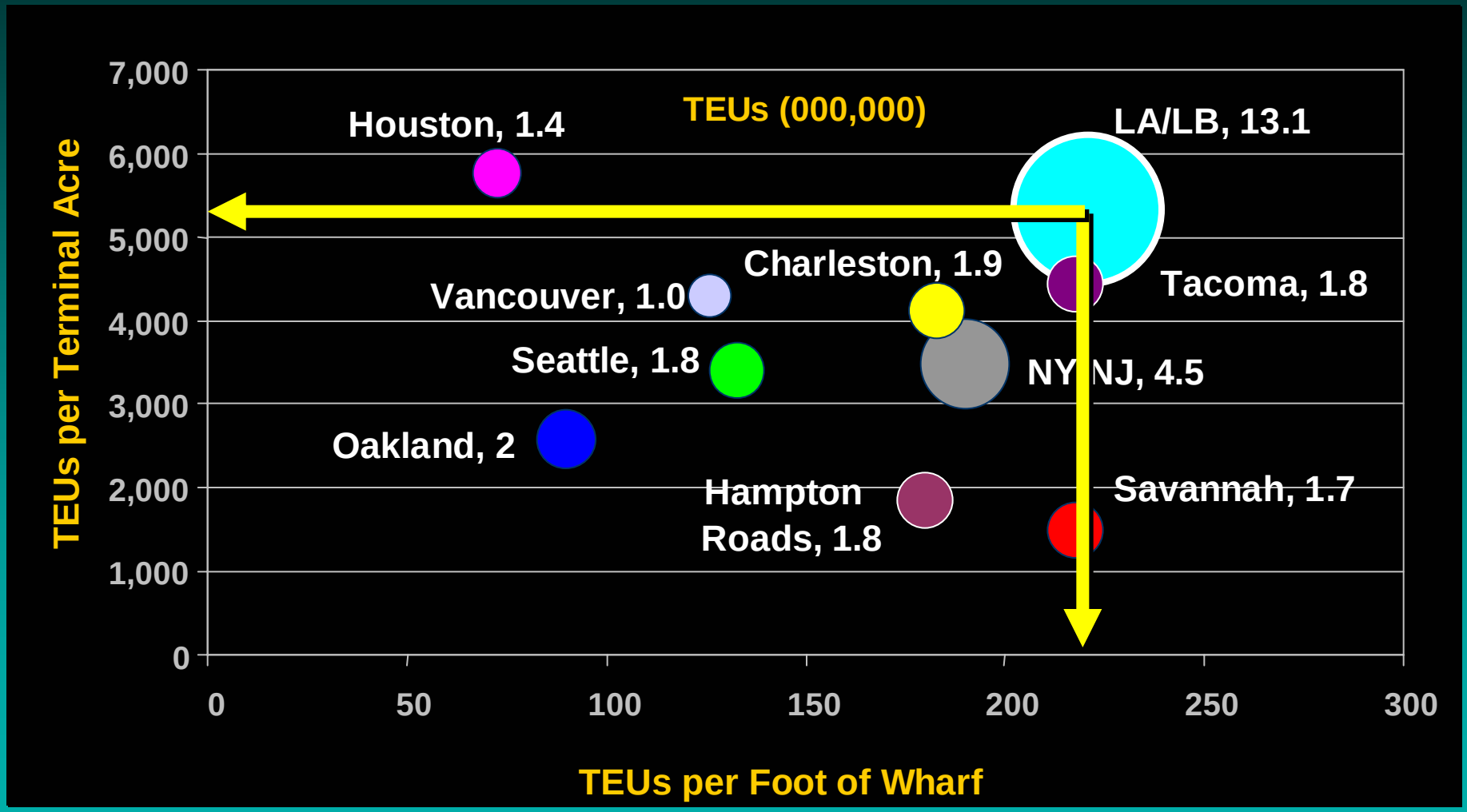
2005 North American Port Productivity
Top 10 Ports

(in Millions of TEU Throughput)



Source: Computed from Seaports of the Americas – 2005,
Containerization International Yearbook - 2005 and port-provided data bases/interviews

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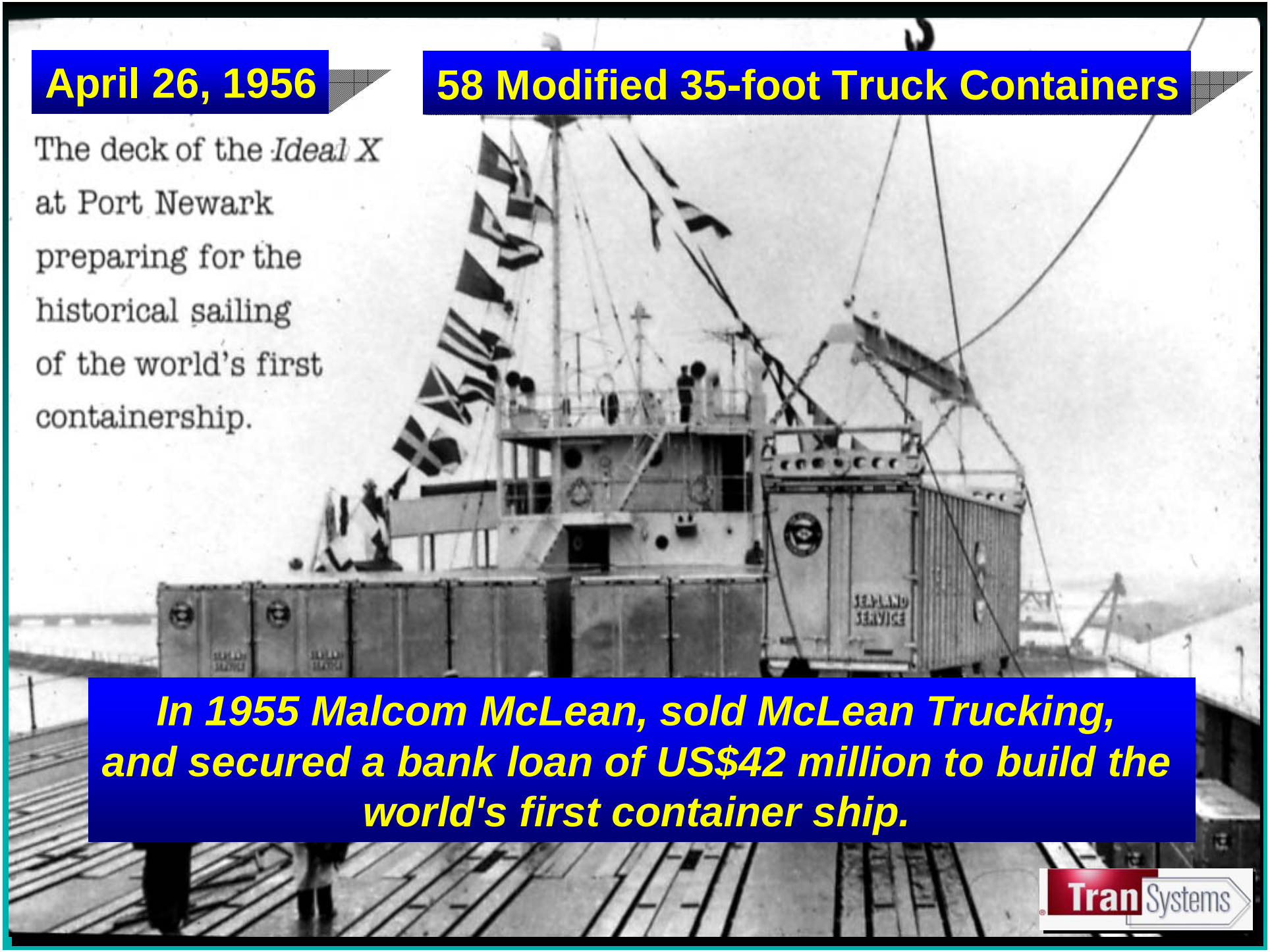
Maritime Vessel
Technology
Trends

April 26, 1956

58 Modified 35-foot Truck Containers



The deck of the *Ideal X* at Port Newark preparing for the historical sailing of the world's first containership.

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

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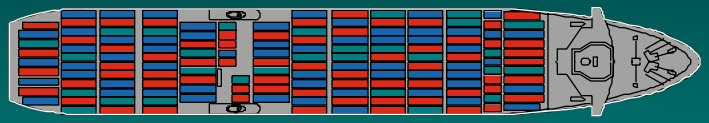
World Container Ship Evolution

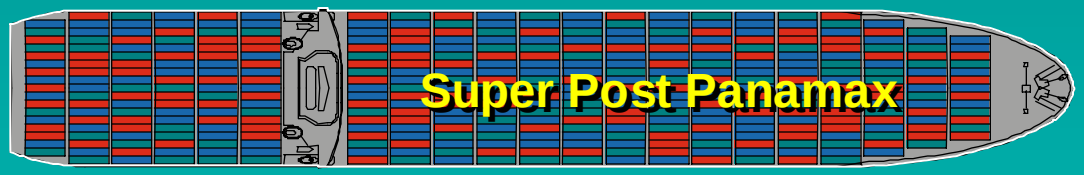
1st Generation (Pre-1960 - 1970)



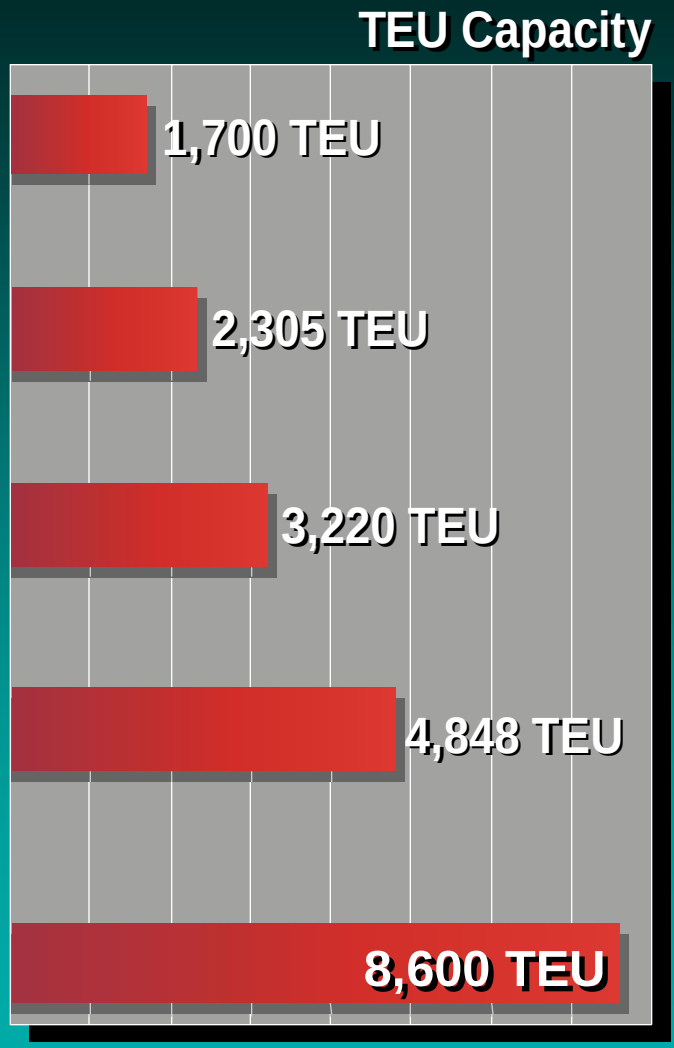
2nd Generation (1970 - 1980)

3rd Generation (1985)

4th Generation (1986 - 2000)



5th Generation (2000 - 2005)



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

(Current Max Panamax = 5000 TEUs)

Today's Mega Ships - Measuring Up

Eiffel Tower – 990 feet

Regina Maersk – 1043 Ft, 140 Ft wide, 6000+ TEUs

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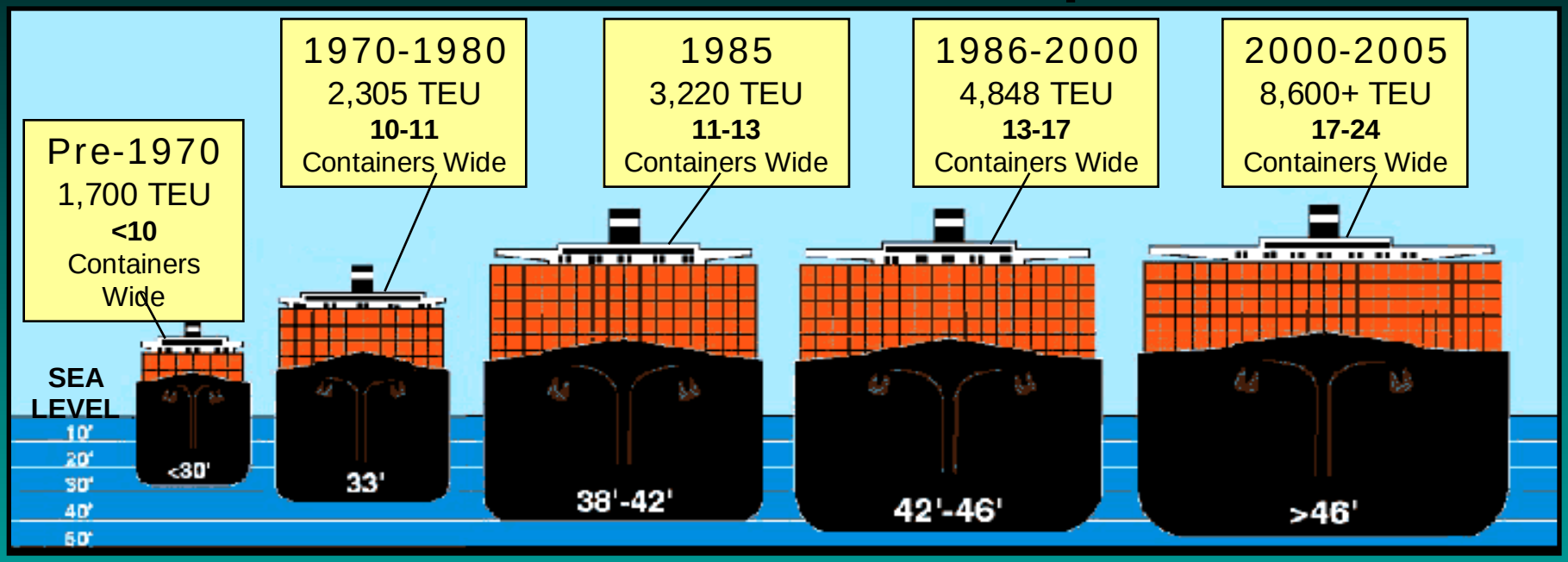
Today's Mega Ships - Measuring Up

How Wide, How Deep?



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2005 COSCO Orders Four 10,000 TEU Vessels

LENGTH OVERALL	349 M (1145 FT.)
BREADTH	45.6 M (149.6 FT.)
MAX. DRAFT	17.2 M (56.4 FT.)
OPERATING SPEED	25.8 KNOTS

Source: Lloyd's Register, February 2005

The Hatch-Less Container Vessel

Per P&O Nedlloyd:

- **15% Faster Port Productivity**
- **84% Less Re-Stows**
- **Less Damaged Boxes**

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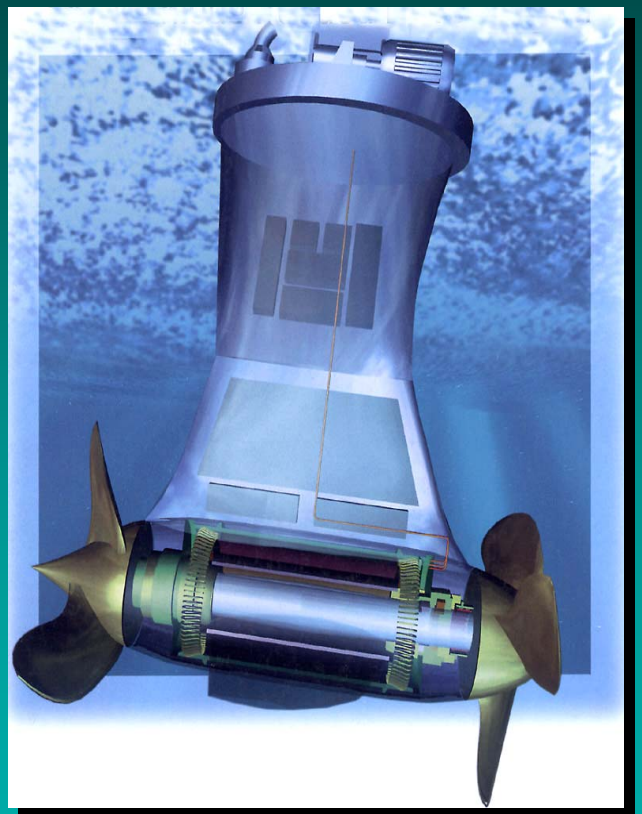
Containerships & Recent Cruise Vessel Technological Advances…What's Next?



SSP Propulsor
Schottel / Siemens

Azipod
Eagle Class Cruise Vessel

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The 15,000 TEU Containership

"…the ship is a flight of fancy… but such a ship is within the current state of the shipbuilder's art…"

R. G. McLellan, P&O Containers

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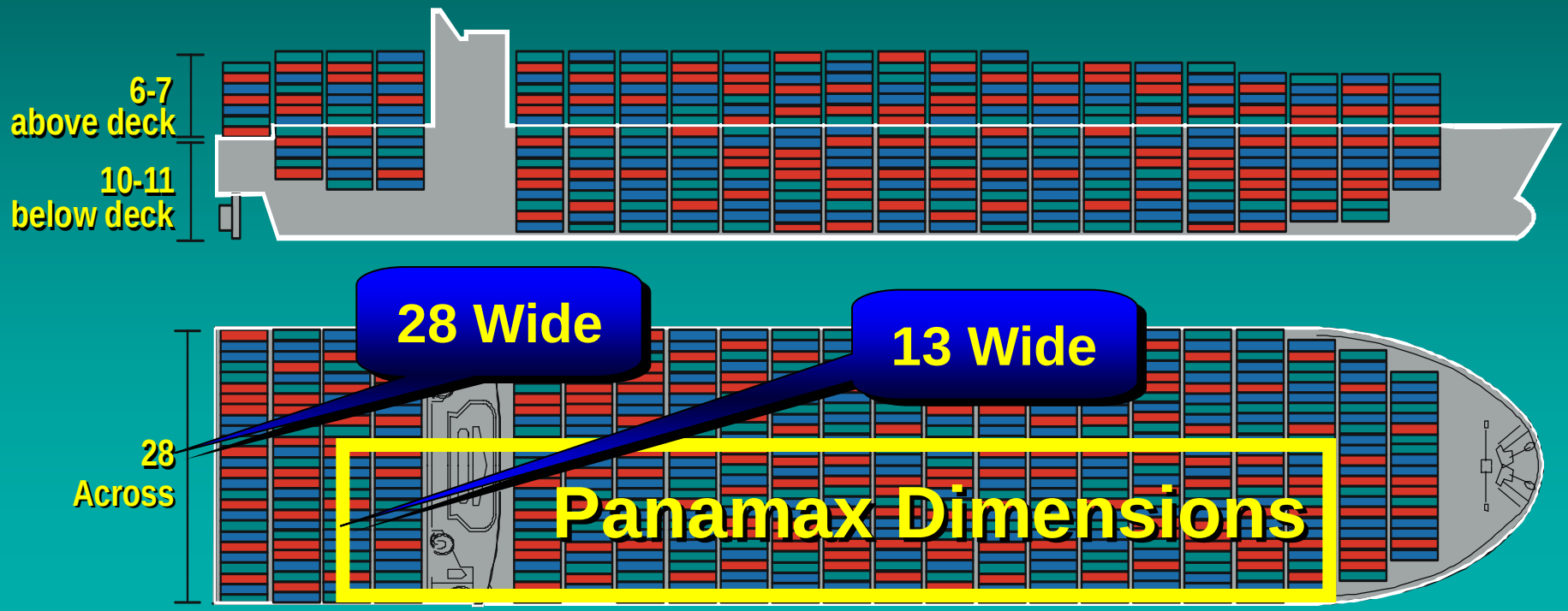
The 15,000 TEU Containership

LOA. = 400 m (1,312 ft.)
Draft = 14 m (46 ft.)
BEAM = 69 m (226 ft.)



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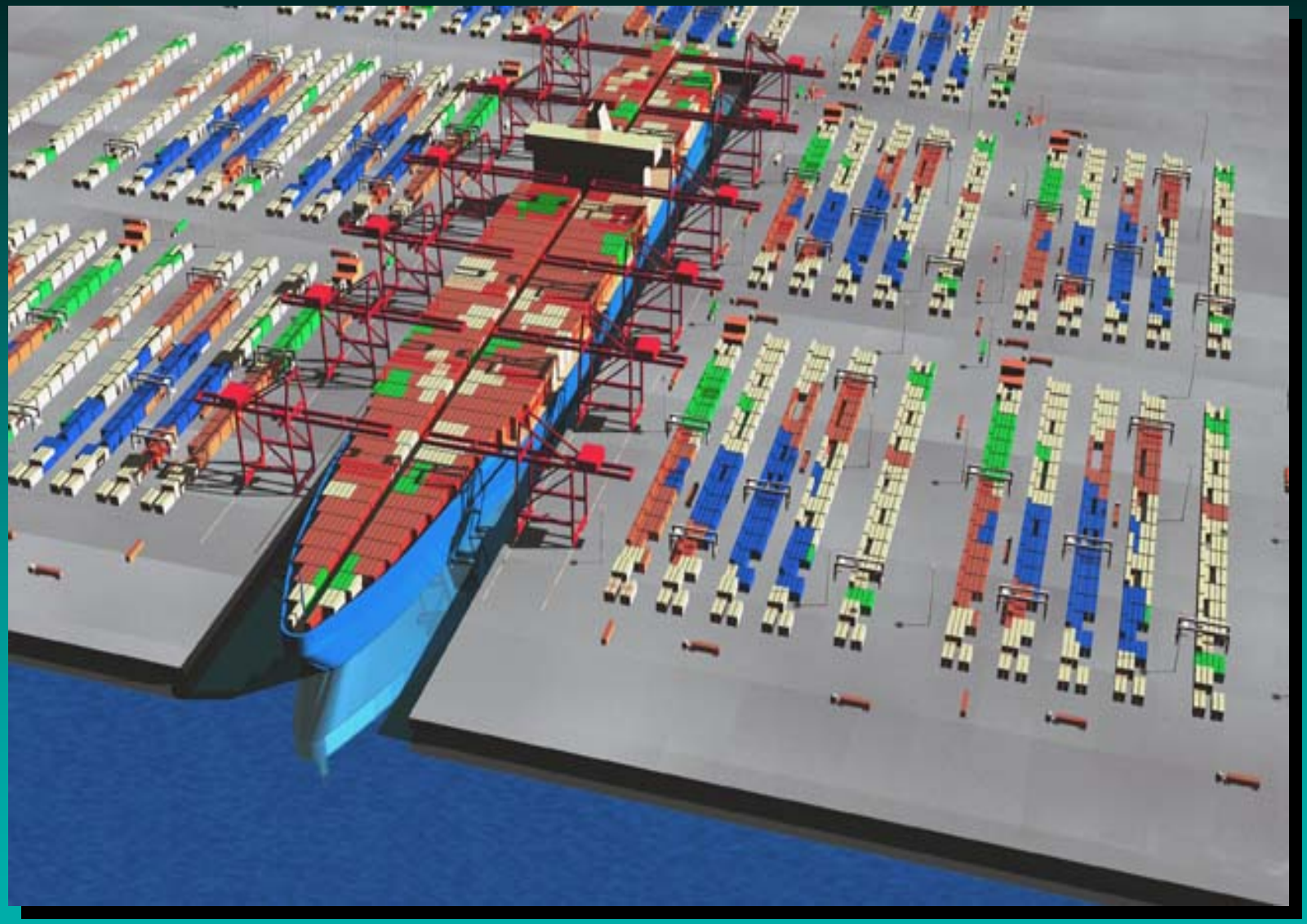
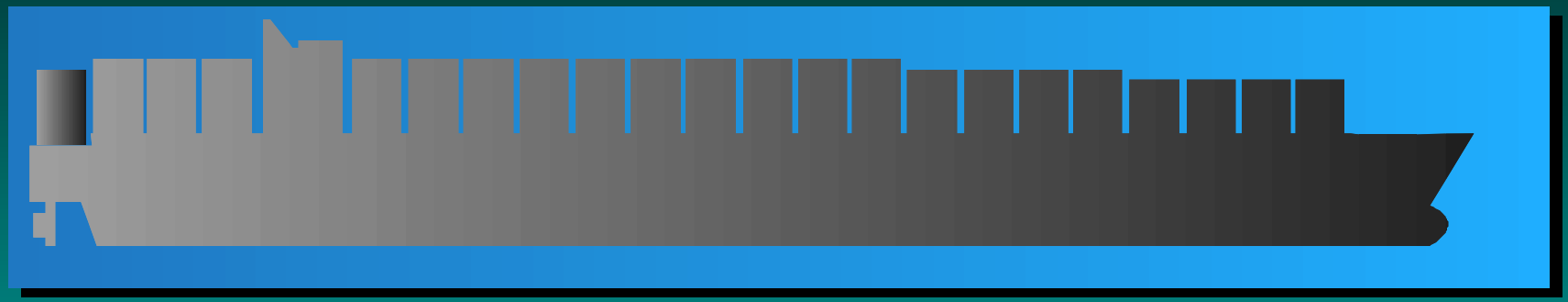
Container Ship-in-a-Slip Concept



The 18,000 TEU Malaccamax Reported Predictions/Benefits



- By 2010 on Asia-Europe Trade Route
- **30% Cheaper** than 4800 TEU Panamax Vessel, primarily due to "Economies of Scale"
- US$40/TEU Savings

Source: Dynamar Consultancy, Rotterdam

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Emergence of North American Fast Feeder Short-Sea Coastal Vessels

The New Frontier:
Transshipment and Short Sea

2,000 - 3,000 TEU
Feeder Ship

10,000 to 15,000 TEU Mega Ship

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Short Sea Shipping
COOPERATIVE

Short Sea Shipping
Coastwise Maritime Trade

Taking Freight off of Congested Roads

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Emerging Viable Container On Barge Coastal Shipping Concepts & Inland Intermodal Port Potential

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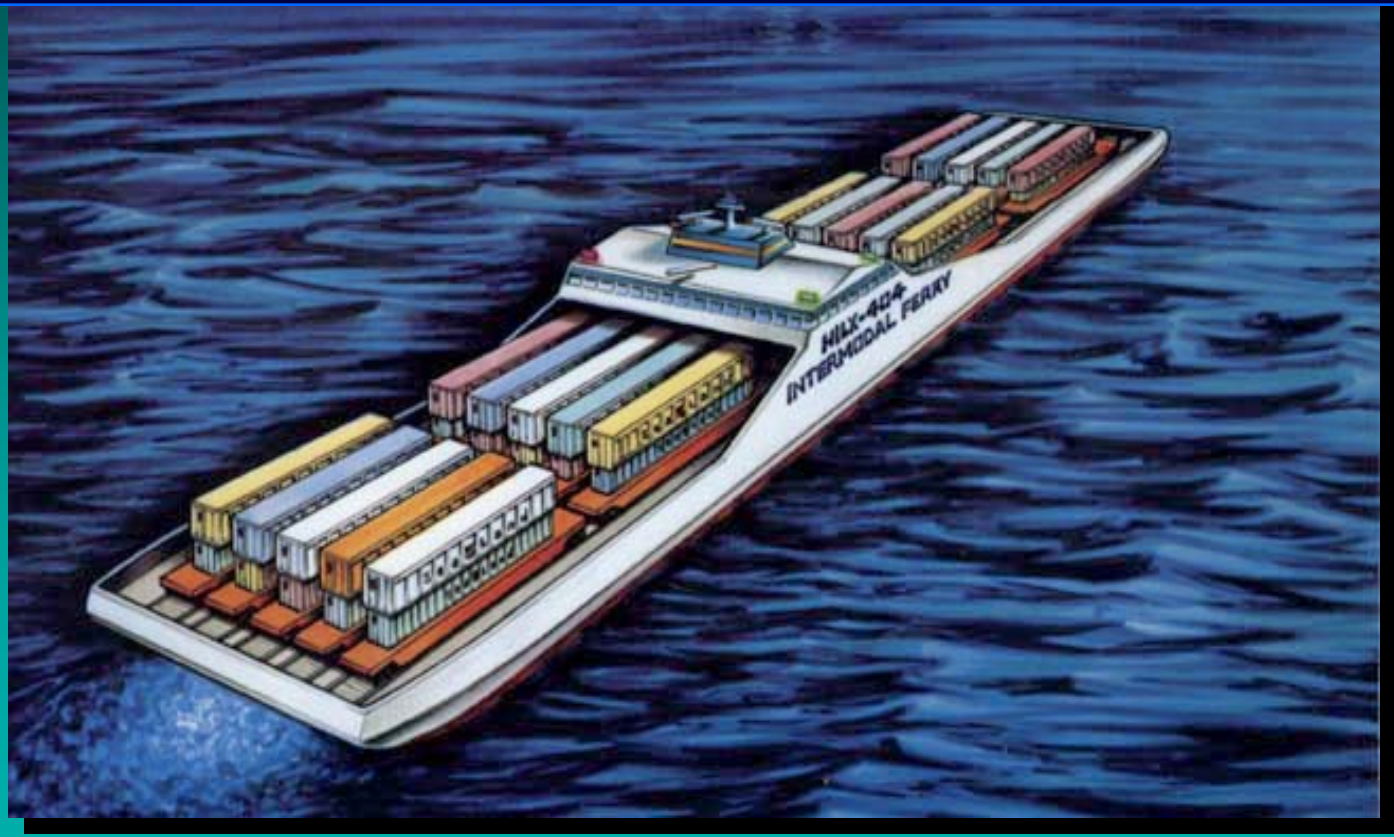
High-Speed, Low Wake, Intermodal Float Technology



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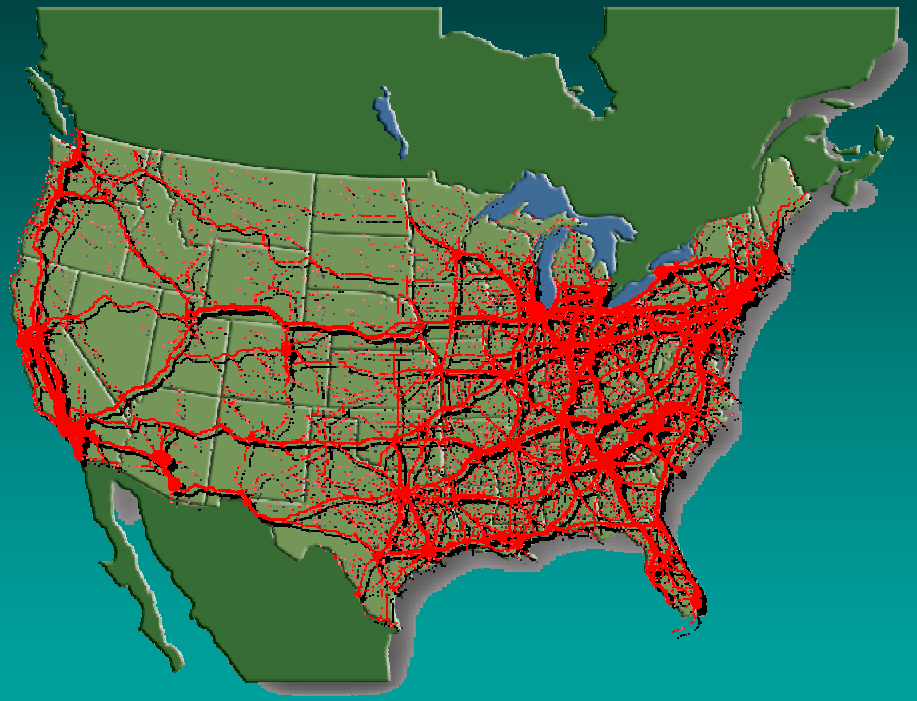
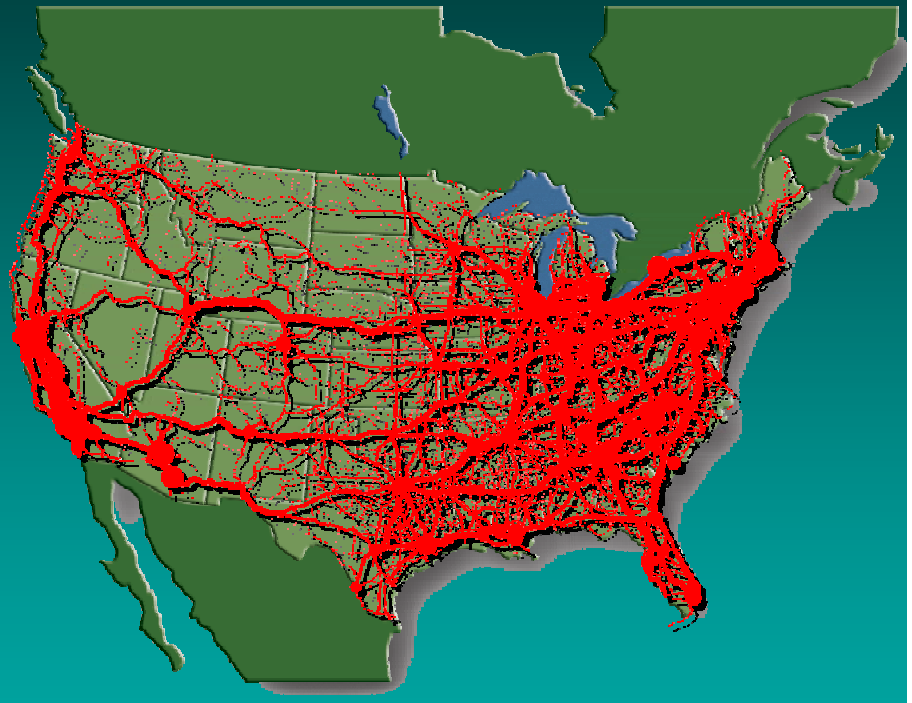
North American
Domestic Truck
Growth and
Congestion

Future US Truck Traffic Growth

Today

2020





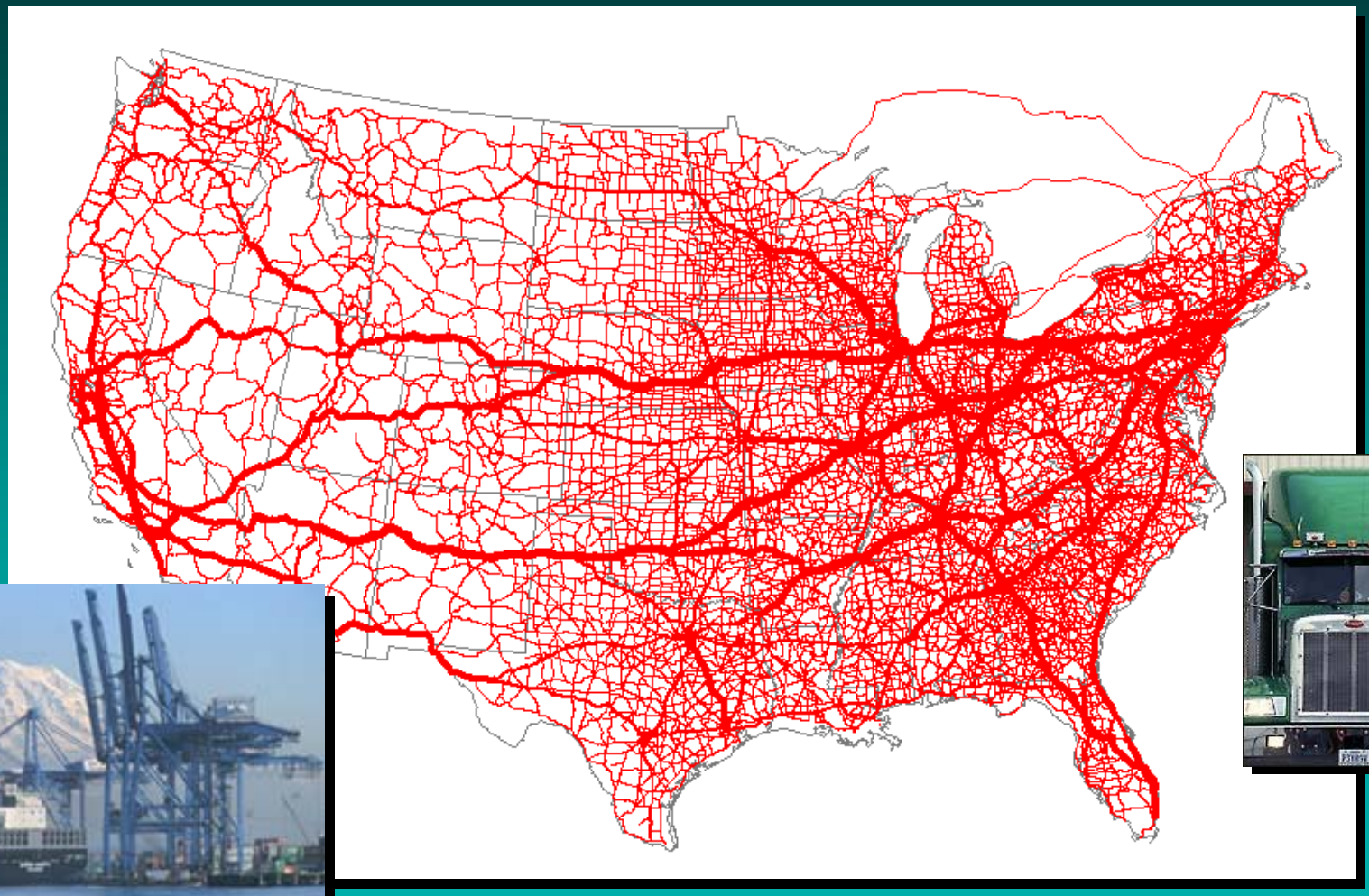
Truck Volume Scale

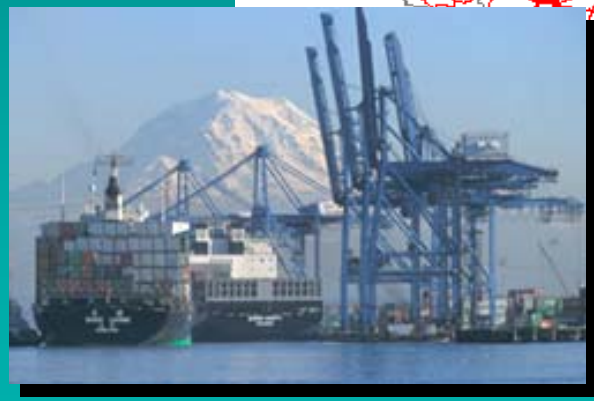
50,000 25,000 12,500

Source: USDOT FHWA Freight Analysis Framework

TranSystems

2020 Truck Freight Flows
High-Value & Time Sensitive Products



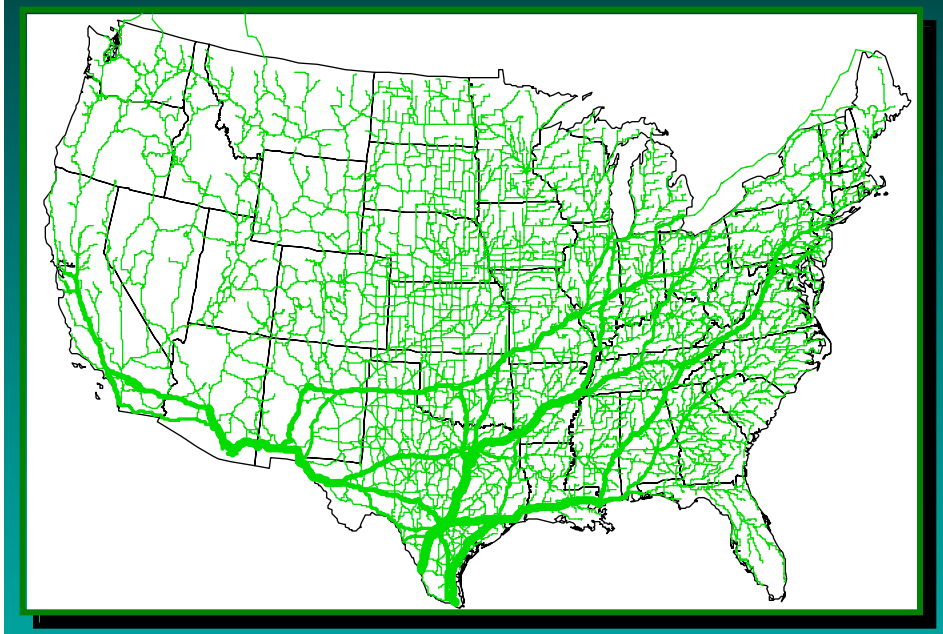


Source: USDOT FHWA Freight Analysis Framework

2020 NAFTA US Truck Traffic Flows

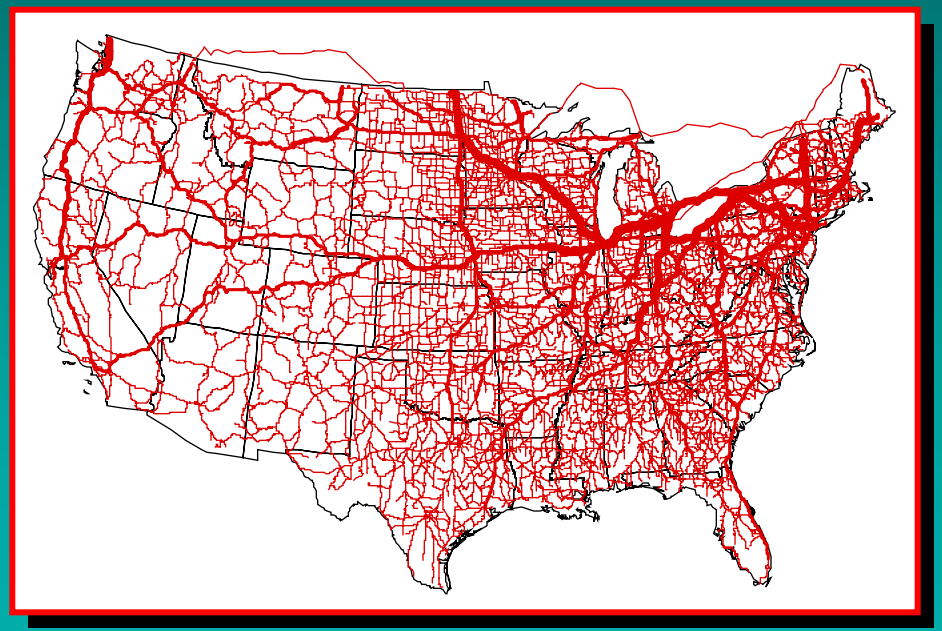
US/Mexico Truck Traffic

US Highway Network (Tons)



US/Canada Truck Traffic

US Highway Network (Tons)



Source: USDOT FHWA Freight Analysis Framework

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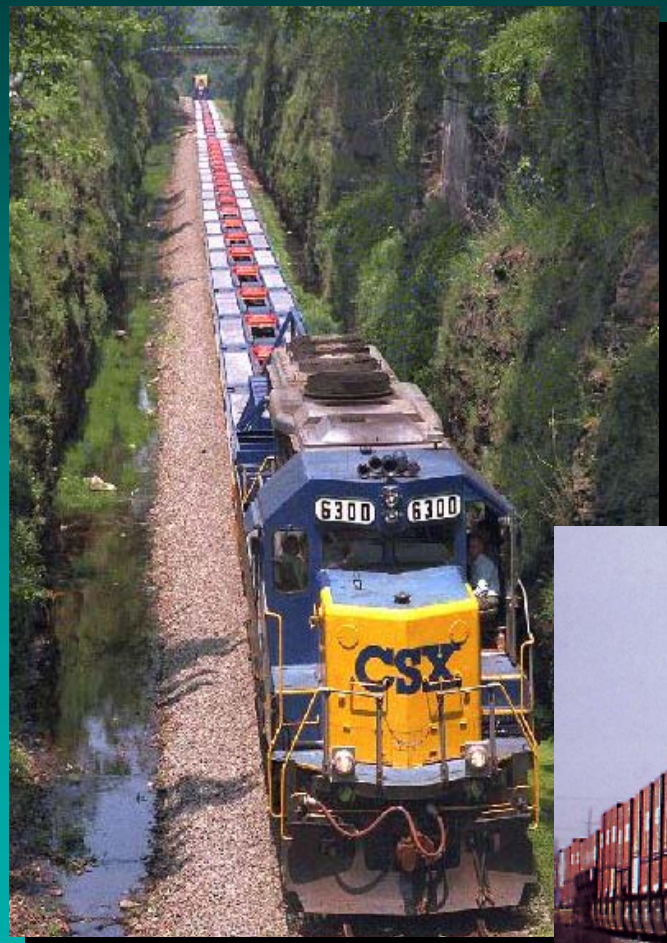
Source: Port of Portland, Oregon


North American
Class I Rail &
Intermodal Growth

North American Intermodal Rail Freight Movement Trends



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The Railroad Industry…
Since the US Staggers Act:
35% less track
32% fewer locomotives
27% fewer railcars
60% fewer employees
But:
well over 50% more freight!

Weekly Eastbound Double-Stack Services — April 1984 (1 Set)

Source: Mercer Management Consulting

Weekly Eastbound Double-Stack Services
April 1993 (241 Sets)

Seattle/Tacoma/
Portland

51

34

Salt Lake City

Oakland

62

LA/Long Beach

45

44

5

Dallas

Mexico
City

Houston

Kansas City

Chicago

Detroit

Toronto

Montreal

New
England

New York

Cincinnati

Columbus

St. Louis

Baltimore

Hampton
Roads

Charlotte

Memphis

Atlanta

Charleston

Savannah

Jacksonville

New
Orleans

Miami

Source: Mercer Management Consulting

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U.S. Double-Stacked Train System

East-West 10,000 ft Train Bypass

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Emerging New North-South Double Stack Intermodal Rail Corridors

* for the region

Source: Double-Stack Container Systems: Implications for U.S. Railroads and Ports, U.S. DOT/VZM/TranSystems

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Future US Rail Traffic Flows

Today

2020

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A 10,000 TEU Mega-Container Vessel Can Produce High Intermodal Rail Volumes (One Weekly Vessel Call)

13.4 Double Stacked Trains

13.4 Double Stacked Trains

75% Intermodal Split

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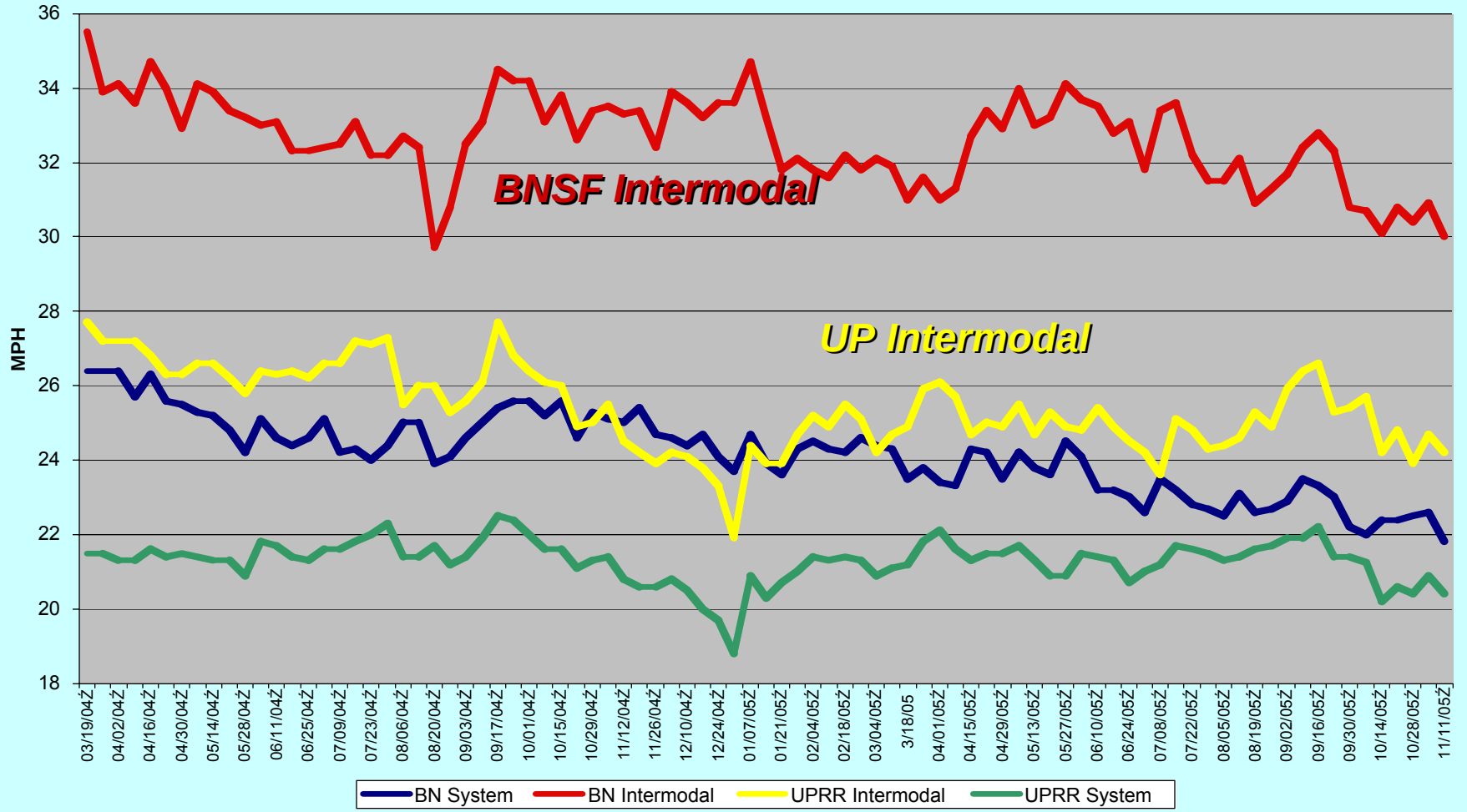
BUILDING AMERICA™

BNSF RAILWAY

Rail & Intermodal Performance

(March 2004 through November 2005)



(Average Velocity - MPH)

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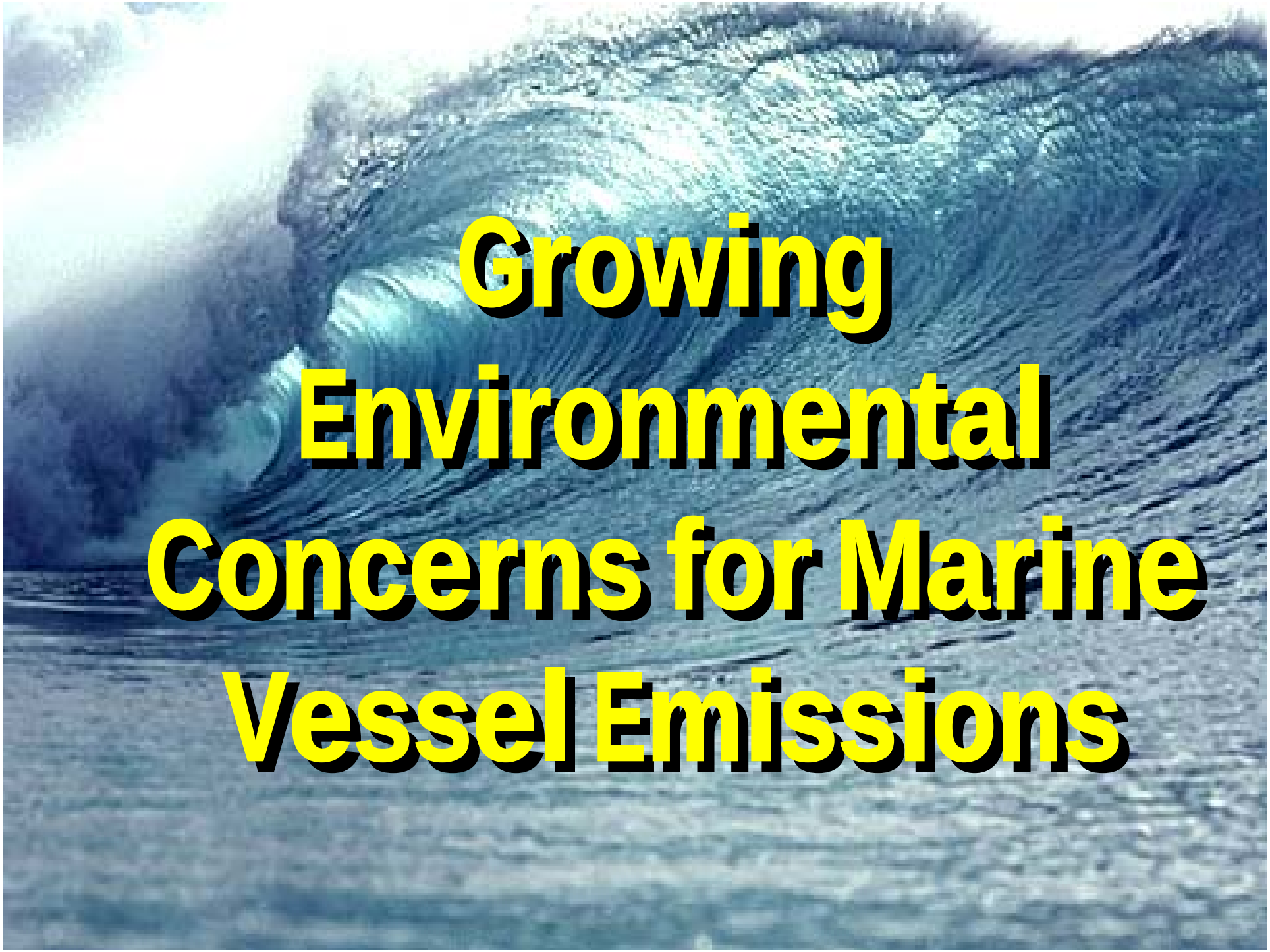
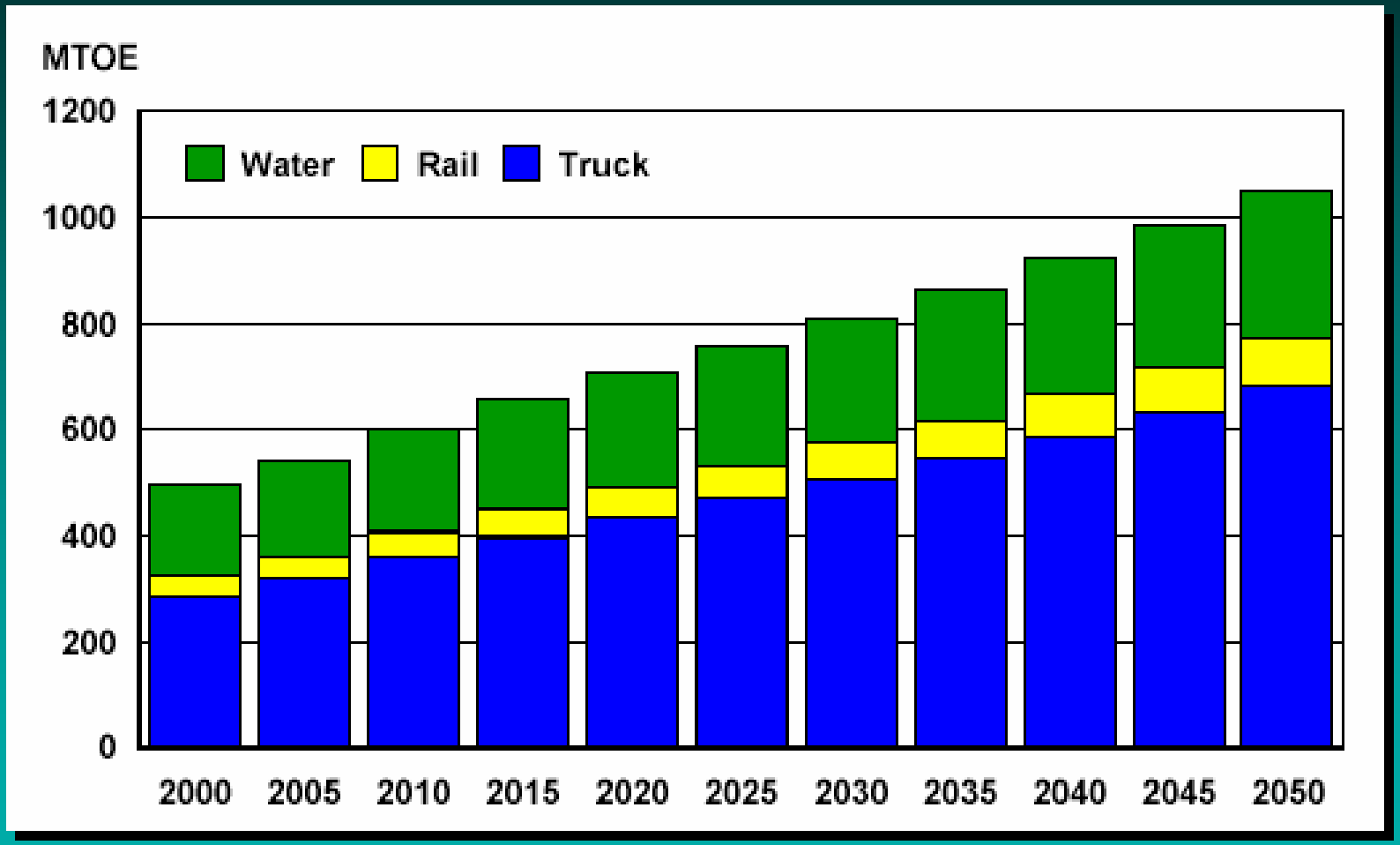

Growing
Environmental
Concerns for Marine
Vessel Emissions

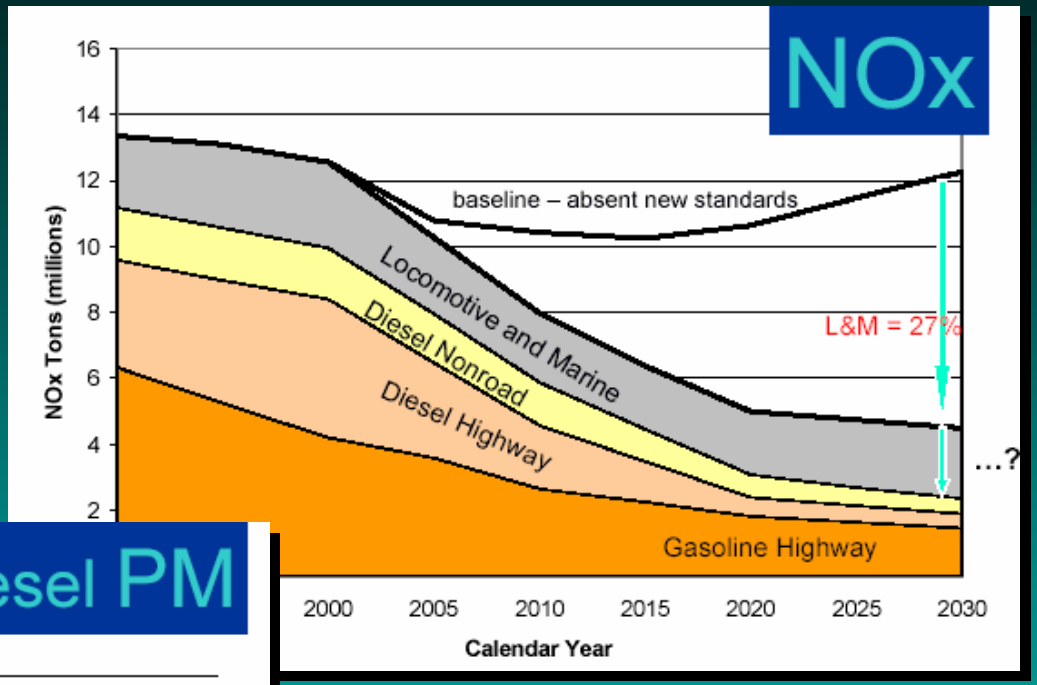
Global Freight Energy Use is on the Rise

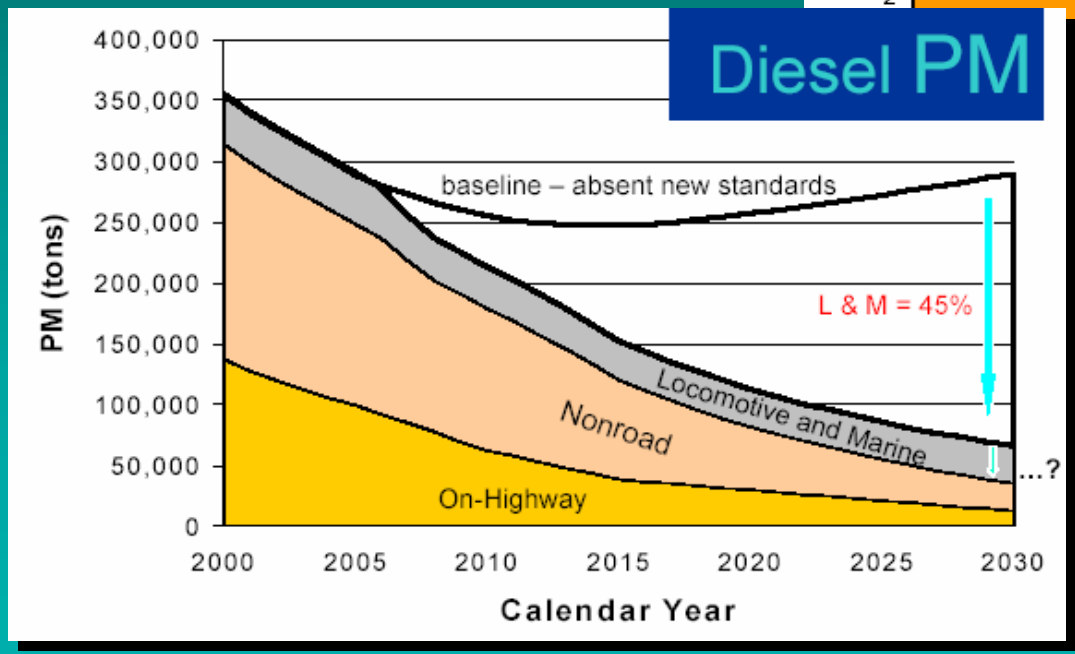


Source: 2005 Haagen Smit Worldwide Emissions Overview & NRDC " Harboring Pollution"

Global Diesel PM & NOx Baseline Projections

Land Based Pollutants Have Declined with Regulation, but the Unregulated Marine Based Pollutants are Increasing

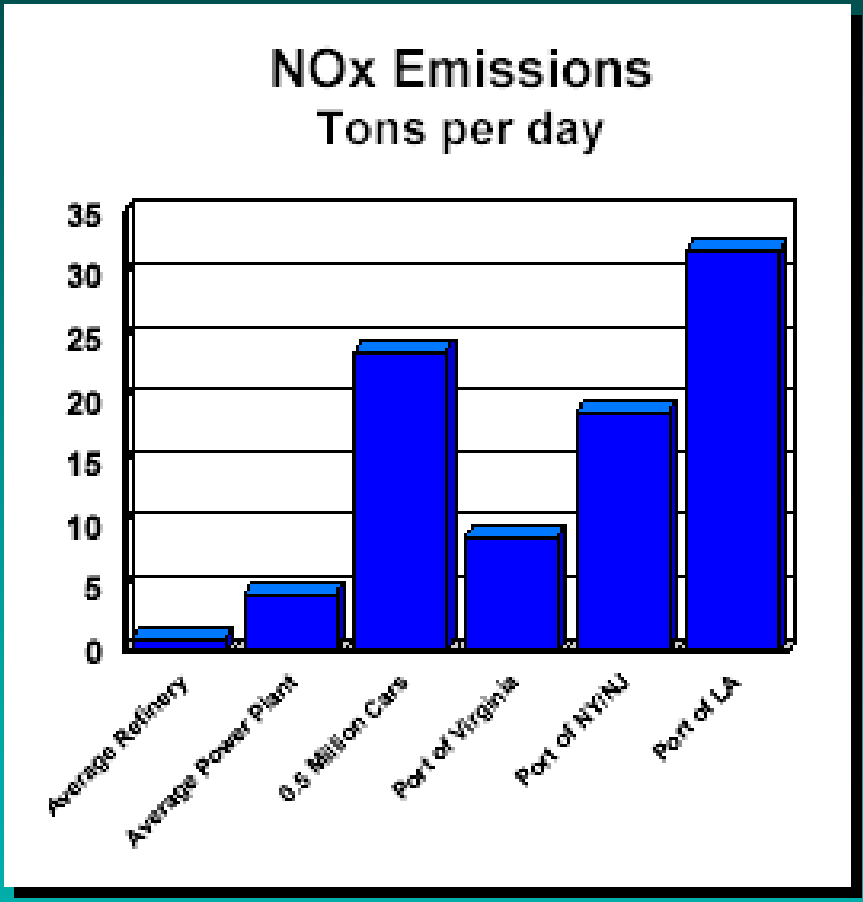


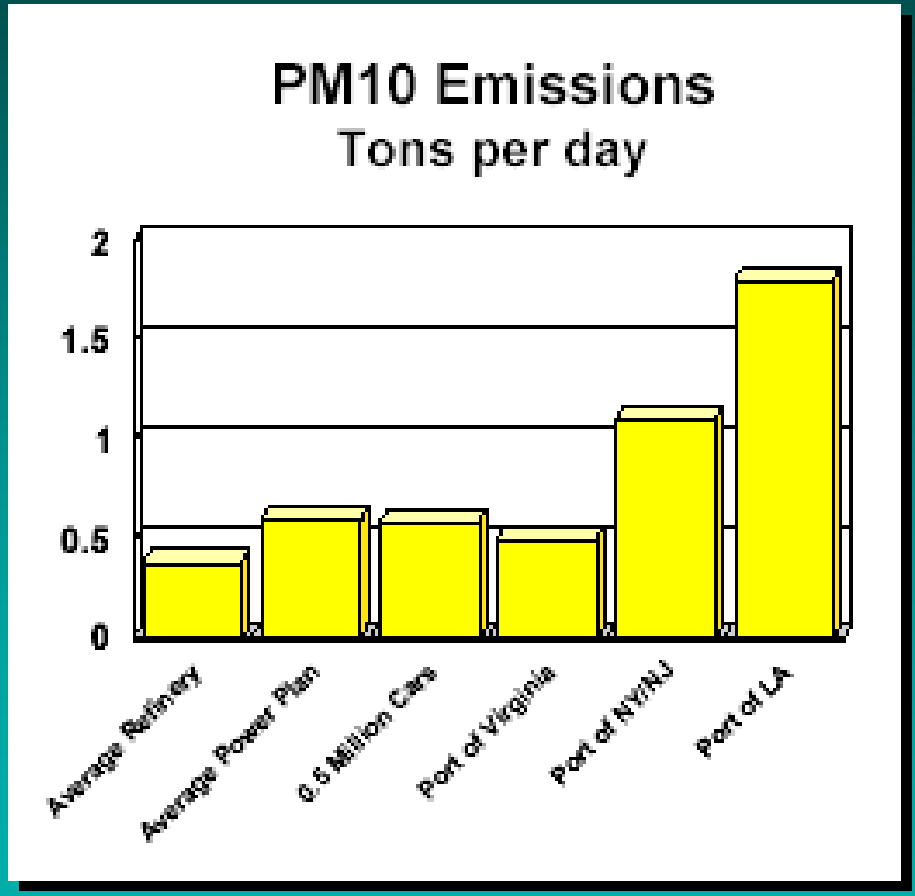


Absent New Standards and Regulations the Pollutant Baselines Are Forecast to Rise

Source: 2005 Haagen Smit Worldwide Emissions Overview

Pollution Sources
US Ports vs Other Industries…
We Need To Do Better





Source: 2005 Haagen Smit Worldwide Emissions Overview & NRDC " Harboring Pollution"

Transportation Diesel Pollutants are Putting Our Health in Jeopardy

Progress has stalled and diesel emissions from ships, locomotives and port complex are projected to increase.

Source: SCAQMD, Multiple Air Toxics Exposure Study II, March 2000

Cost-Effective Air Quality Emission Reduction Improvement Measures

Modernize truck fleet: Scrap dirty old trucks Retrofit all other pre-2007 trucks

Upgrade all cargo handling equipment with electric equipment or clean fuels

Use clean marine fuels Provide onshore electric power for ships at berth (Cold Iron)

Replace locomotives with cleaner technologies, fuels, and explore rail electrification

Source: Southern California Association of Governments

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POLA/POLB PierPass

Use of Peak Traffic Period Pricing to Better Align Freight System Costs and Benefits

Photo courtesy of PierPass

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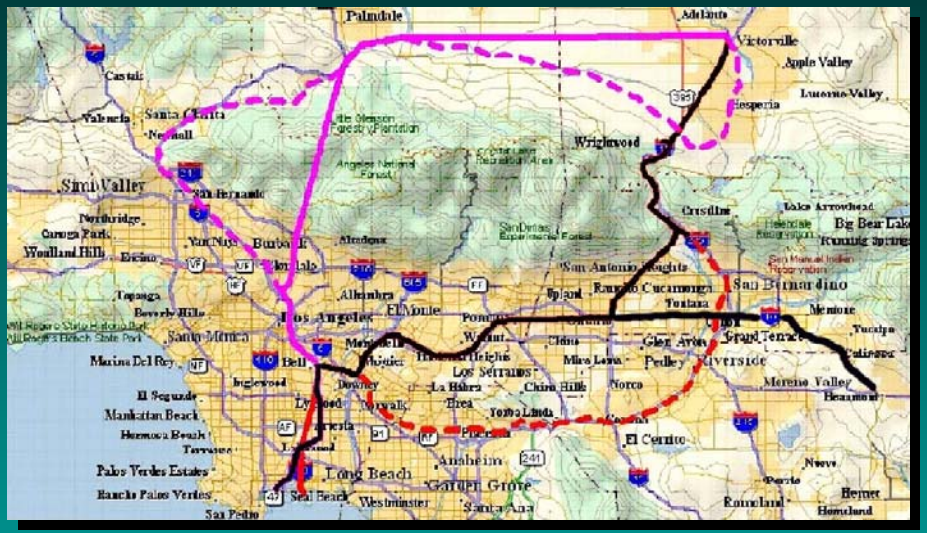
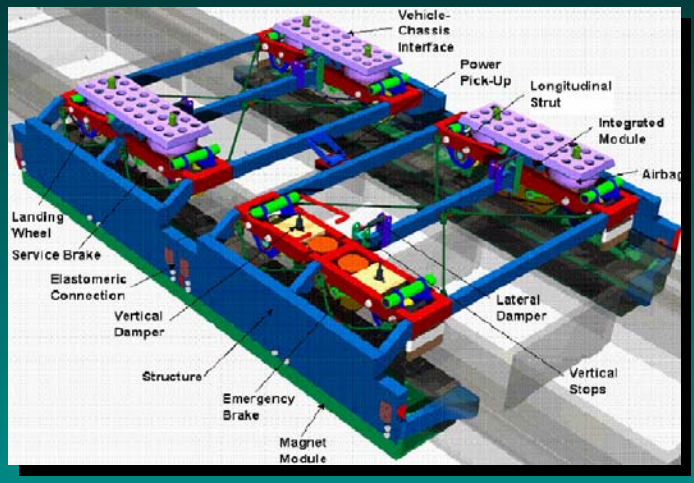
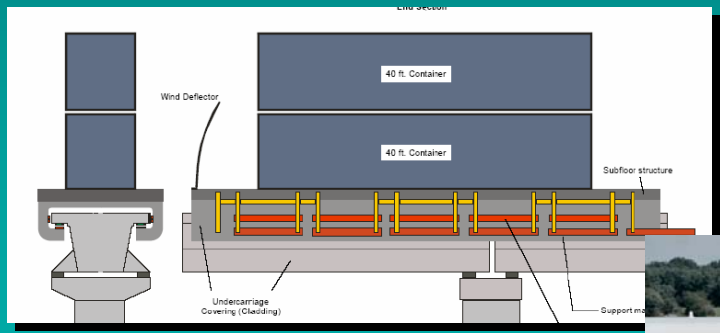
MAGLEV Cargo Conveyor Demonstration Project





GENERAL ATOMICS



Transrapid Freight Vehicle Concept

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Port Competitive Mandates

- Ports & intermodal linkages must change the current **cost** versus **value** relationship in the logistics chain. **Become Value Added Multipliers...**
- Successful ports & intermodal terminals in the next decade must **invest in and leverage technology** to improve terminal productivity, cost, effectiveness and reliability for all modes of transportation…**securely as environmental stewards.**

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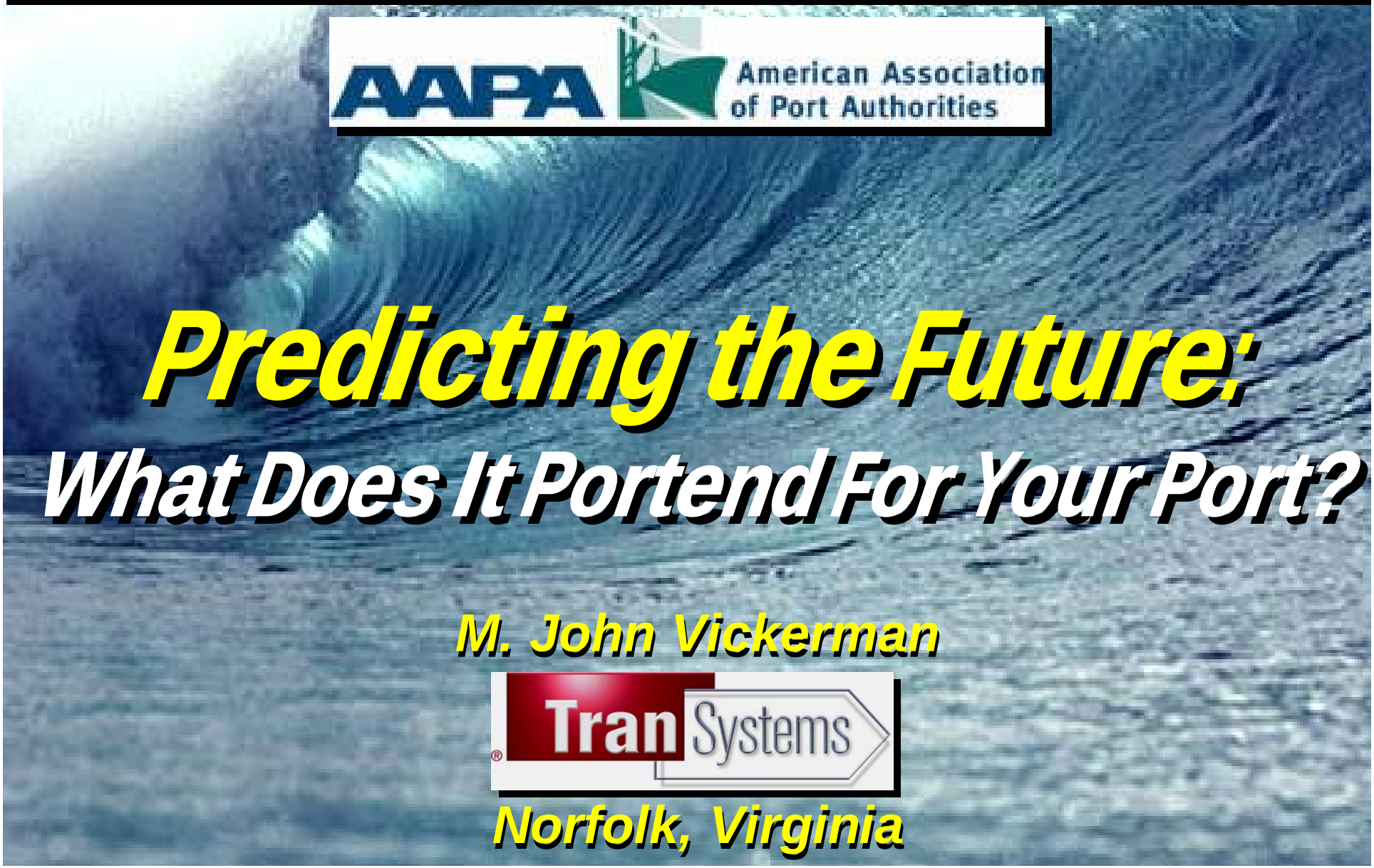
2006 AAPA Commissioners Seminar
Montréal, Québec, Canada



Predicting the Future:
What Does It Portend For Your Port?

M. John Vickerman

TranSystems

Norfolk, Virginia