



Port Competitiveness in the New Global Economy



AAPA

***Executive Management Conference
for Latin America and the Caribbean
Conferencia sobre Administración
Ejecutiva para América Latina y el Caribe***

*February 22, 2006
Renaissance Houston Hotel*



***Port & Intermodal
Development
In the Face of The
Impending Trade "Tsunami"***

Mr. John Vickerman

Principal

TRANSYSTEMS 

Norfolk, Virginia



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**
- **Emerging Information Technologies (IT) - Example**

Global Trade: Current Course & Direction?

***Cargo Demands,
Capacity, Funding,
Port Productivity &
Environmental Challenges***

***North American
Port Gateways***



Vessel Cargo Handling Circa 1950

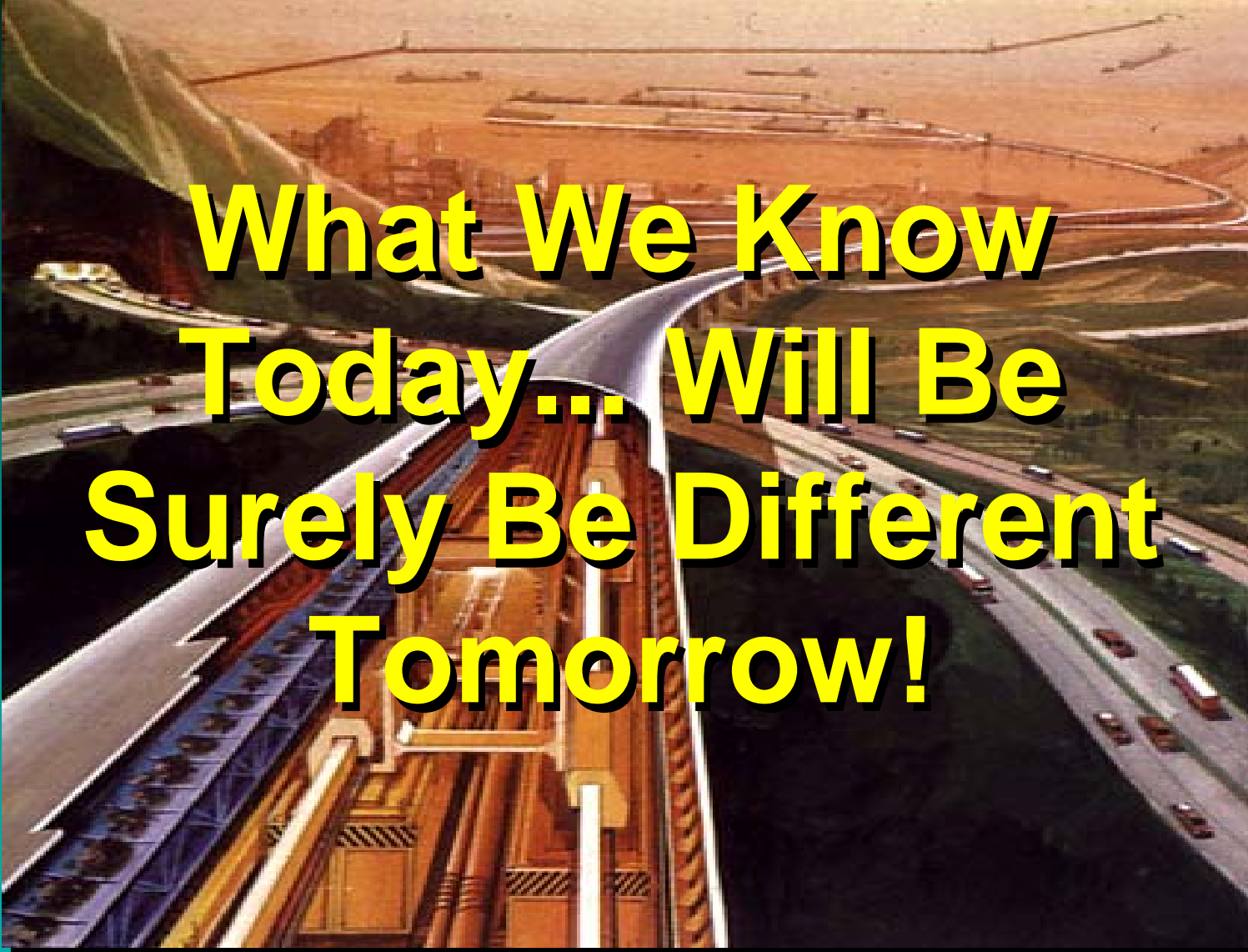





Cargo Handling Circa 2005

US Navy Fast Frigate Circa 2035



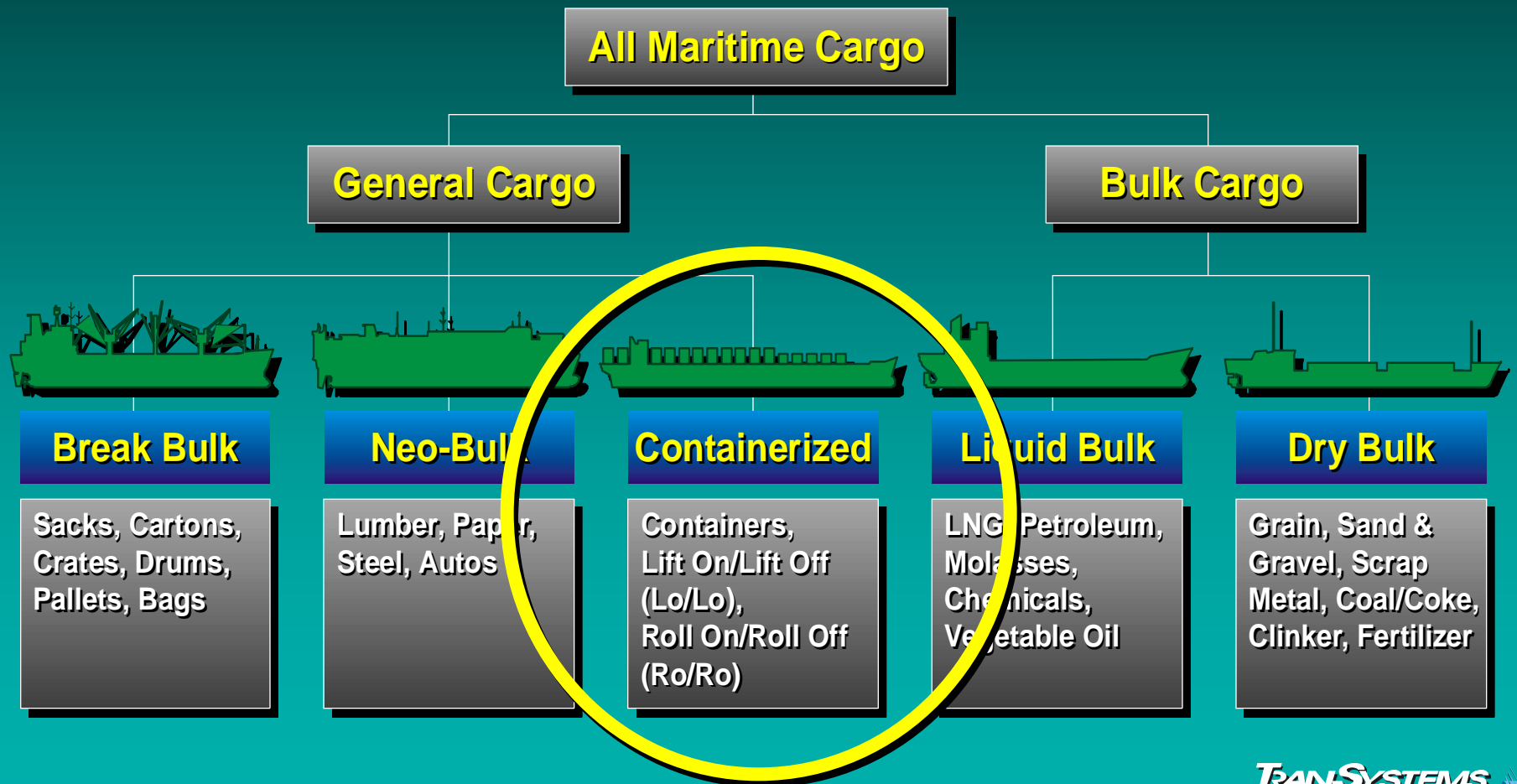


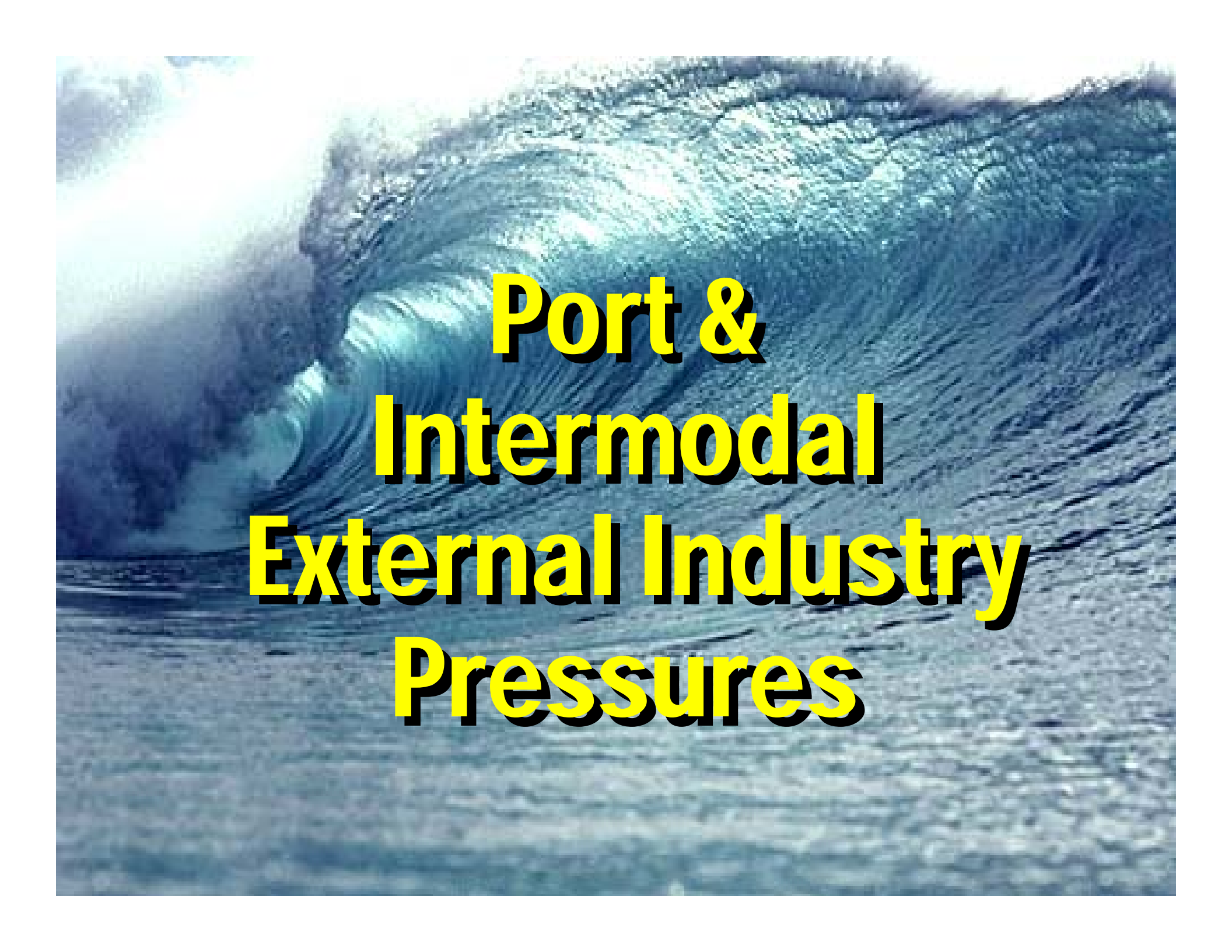
**What We Know
Today... Will Be
Surely Be Different
Tomorrow!**



To Be Competitive Today...
Marine/Intermodal
Terminals Must Reduce
Throughput Cost &
Increase Cargo Velocity
Securely and as **Stewards of**
the Environment

Functional Classification of Global Maritime Cargoes

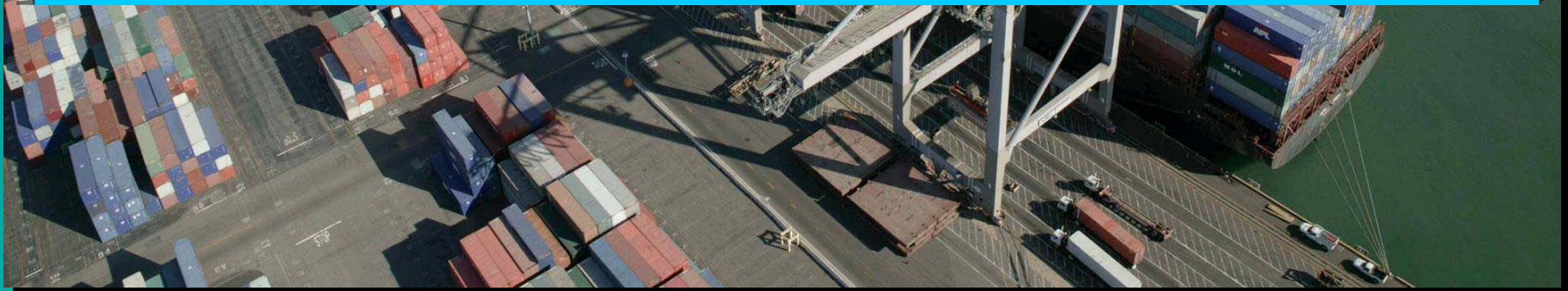


A large, powerful blue wave crashing over a rocky shore. The water is a deep, vibrant blue, and the white foam of the wave is prominent. The background shows a rocky coastline under a bright sky.

Port & Intermodal External Industry Pressures

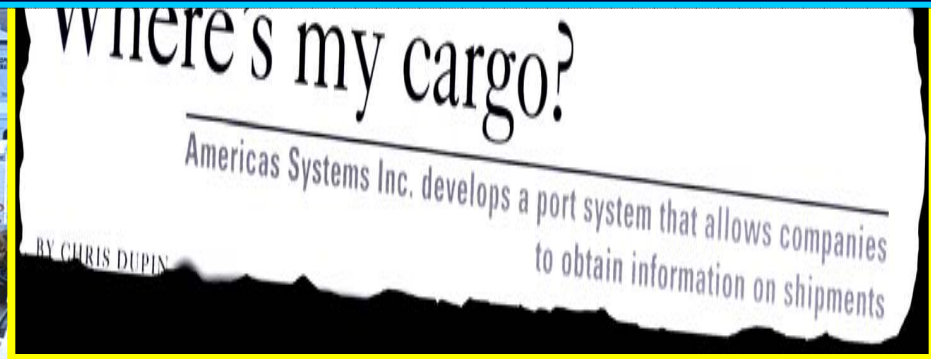


***The North American Freight Paradox:
The Nation's Ports and Their Intermodal
Linkages are Experiencing the
"Best of Times and the Worst of Times"
in Terms of Growth and Demands on Capacity***



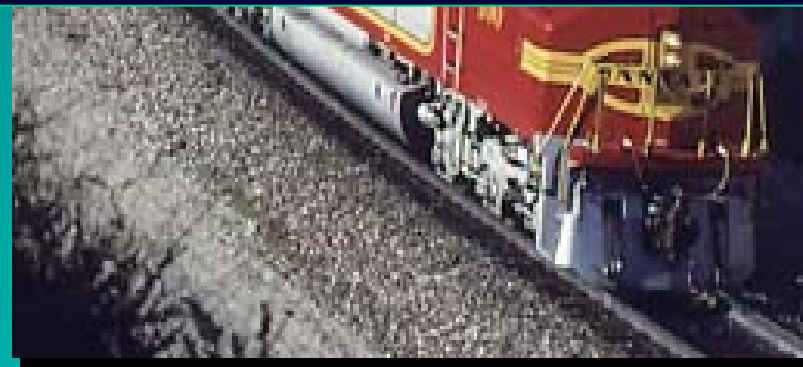
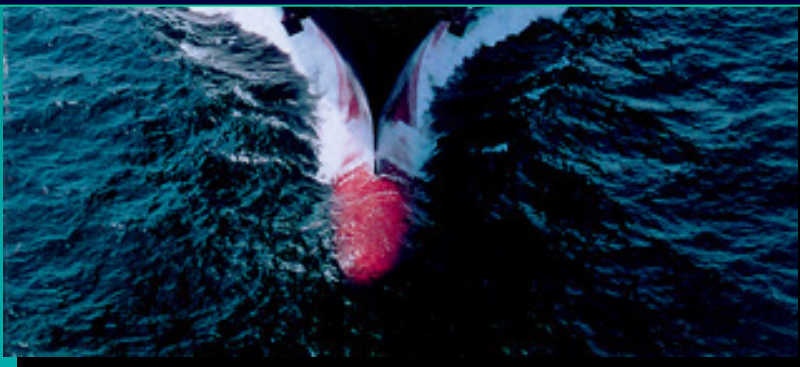


**At Current Productivity and Growth Levels by 2020
North American Ports & Their Associated
Intermodal Systems Will Be Severely Congested**

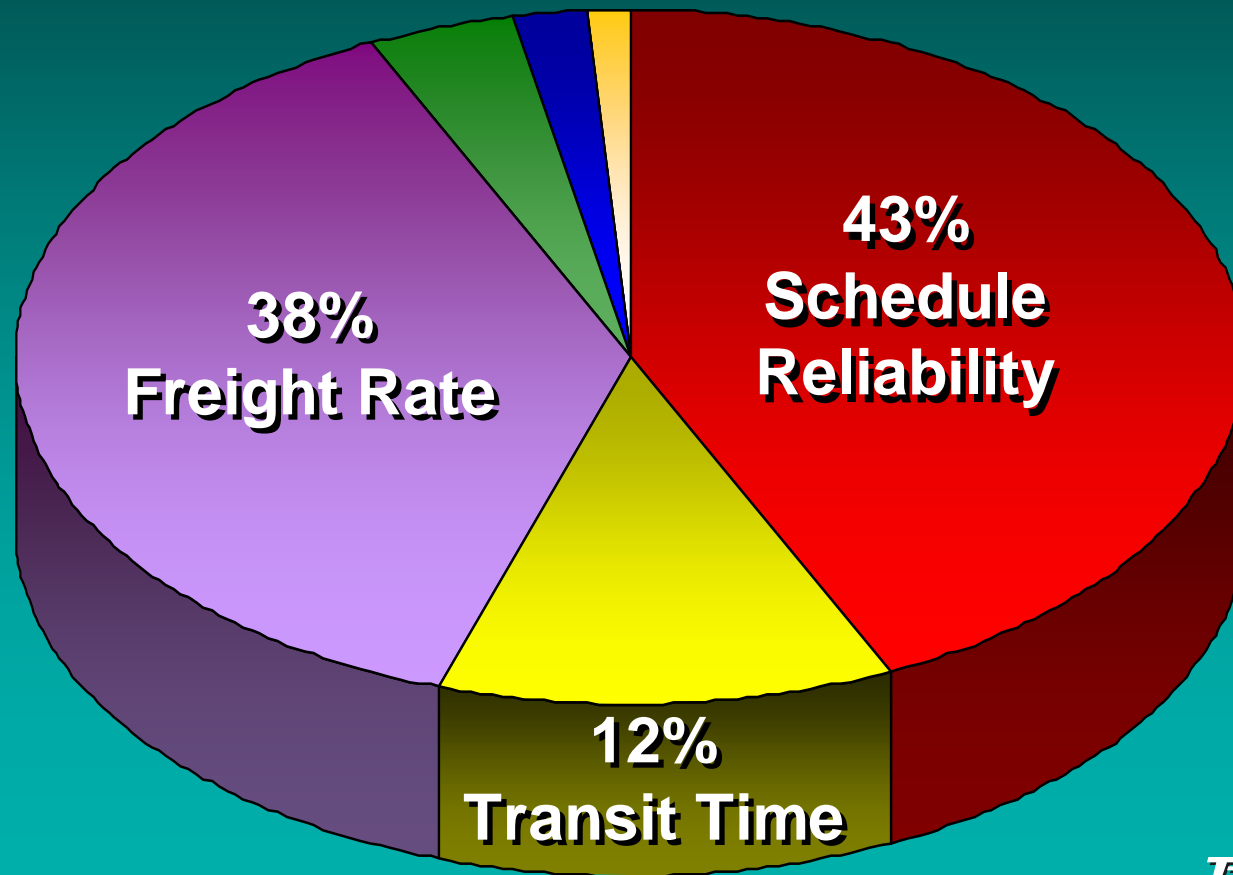




We do not have an “intermodal system” as such. Rather we have an aggregation of multiple, private and public modes, each of which are “stove-piped” within their own individual areas of interest with little or no true cross communication and collaboration.



Poll of the Top 1000 “Blue Chip” Multinational Shipper Priorities

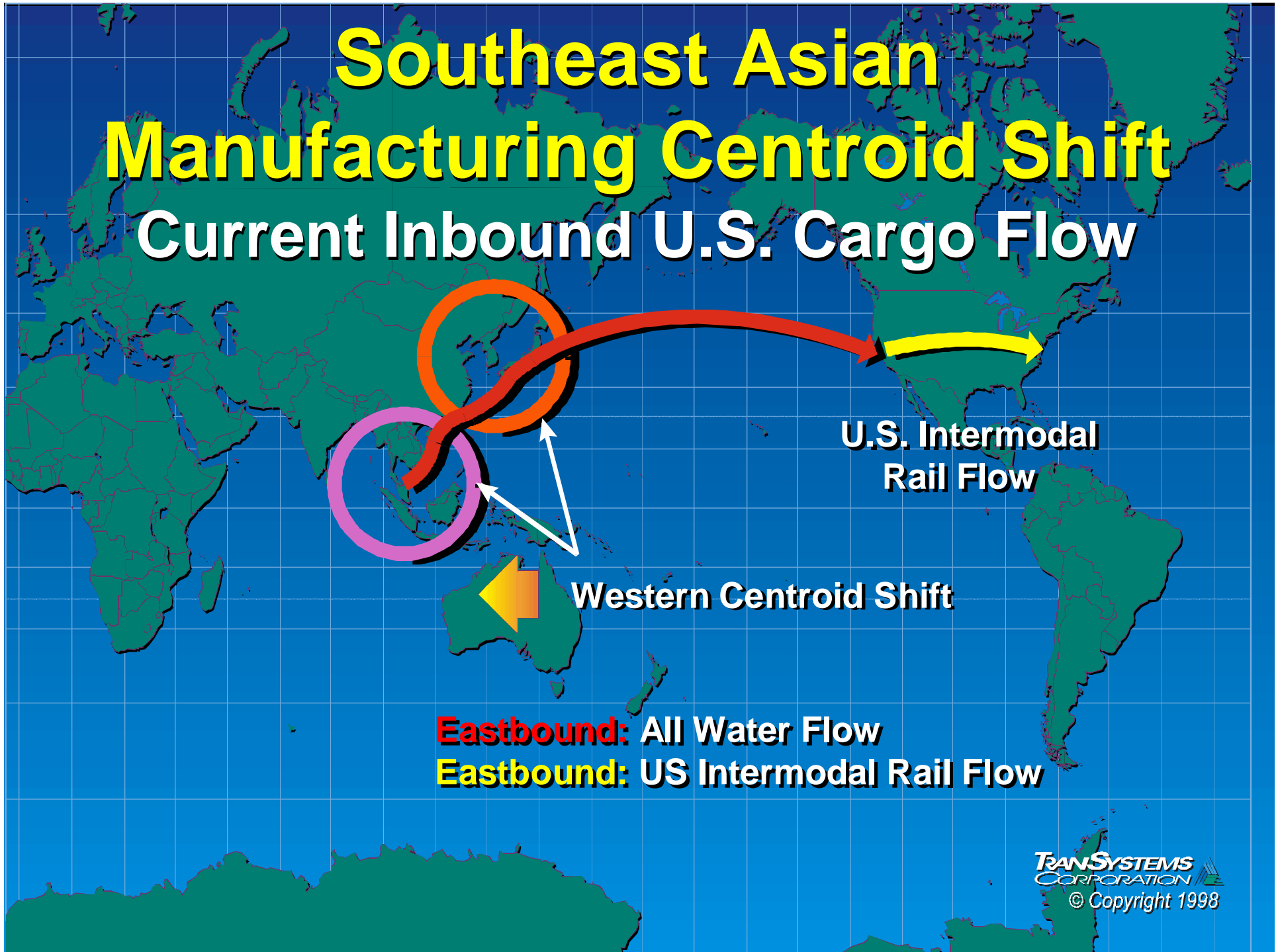


Today's Logistics Truth:

*“The customer
wants **more** and
is willing to pay
less for it.”*

Southeast Asian Manufacturing Centroid Shift

Current Inbound U.S. Cargo Flow



U.S. Intermodal
Rail Flow

Western Centroid Shift

Eastbound: All Water Flow

Eastbound: US Intermodal Rail Flow

Southeast Asian Manufacturing Centroid Shift

Current Inbound U.S. Cargo Flow



U.S. Intermodal
Rail Flow

Western
Centroid
Shift

Westbound All Water/Suez Flow
Westbound Intermodal U.S. Flow

Ports are Experiencing Dramatic Surges in Seaport Security Costs

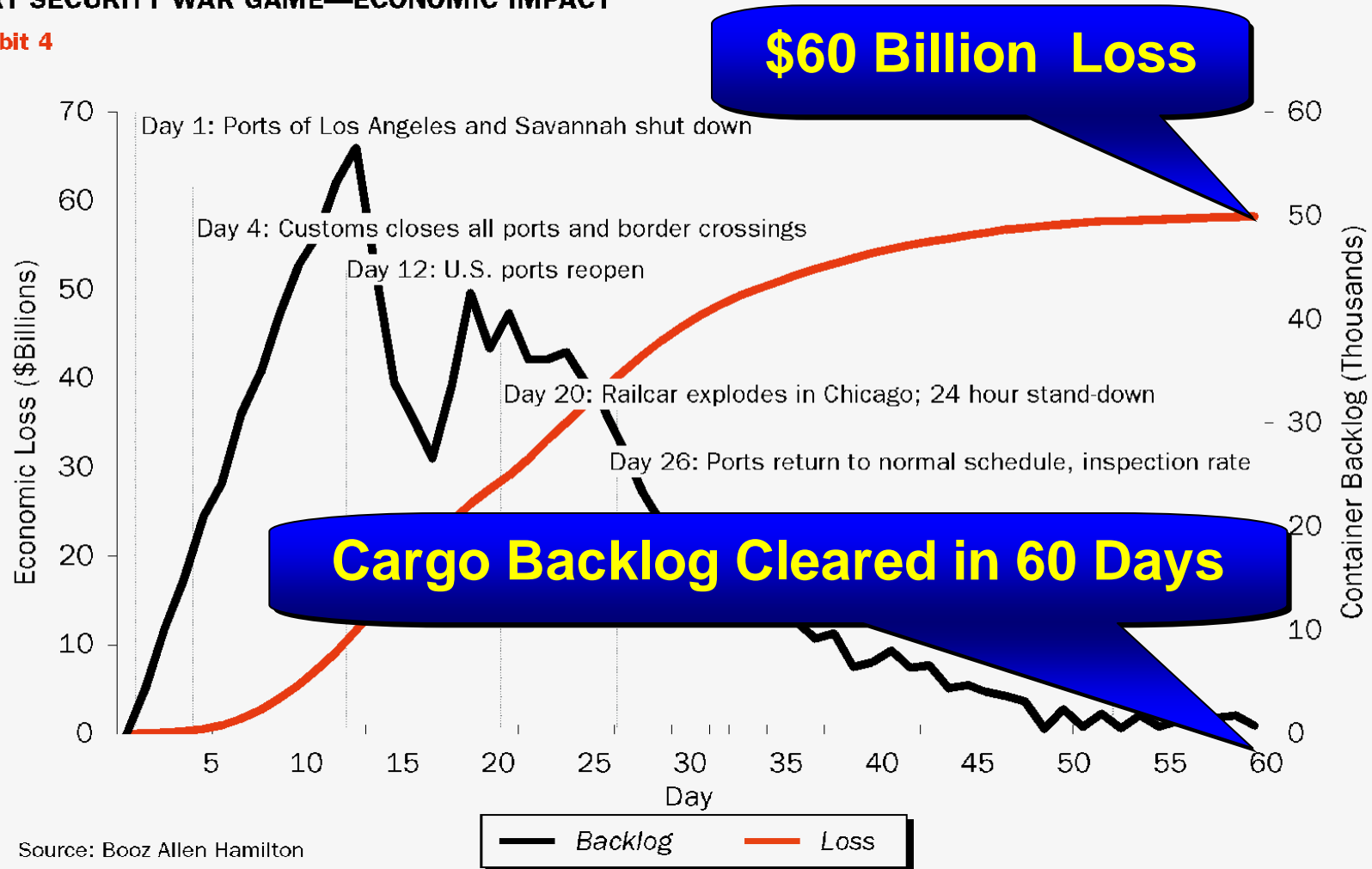
Port of Miami's Security Costs Today are 600% Higher Than that of 2001



US Port Security Breach: Supply Chain Disruption

PORT SECURITY WAR GAME—ECONOMIC IMPACT

Exhibit 4



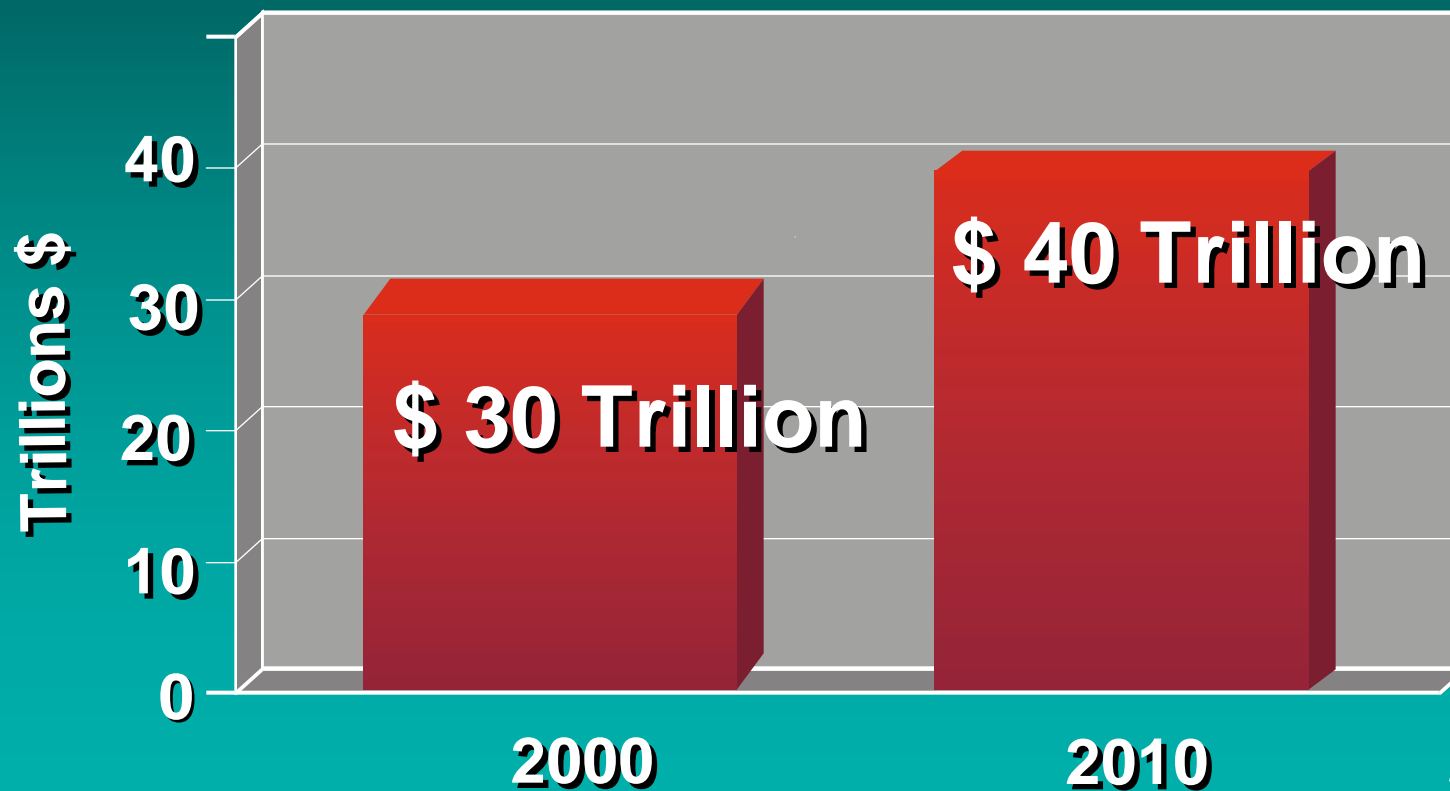
Source: Booz Allen Hamilton



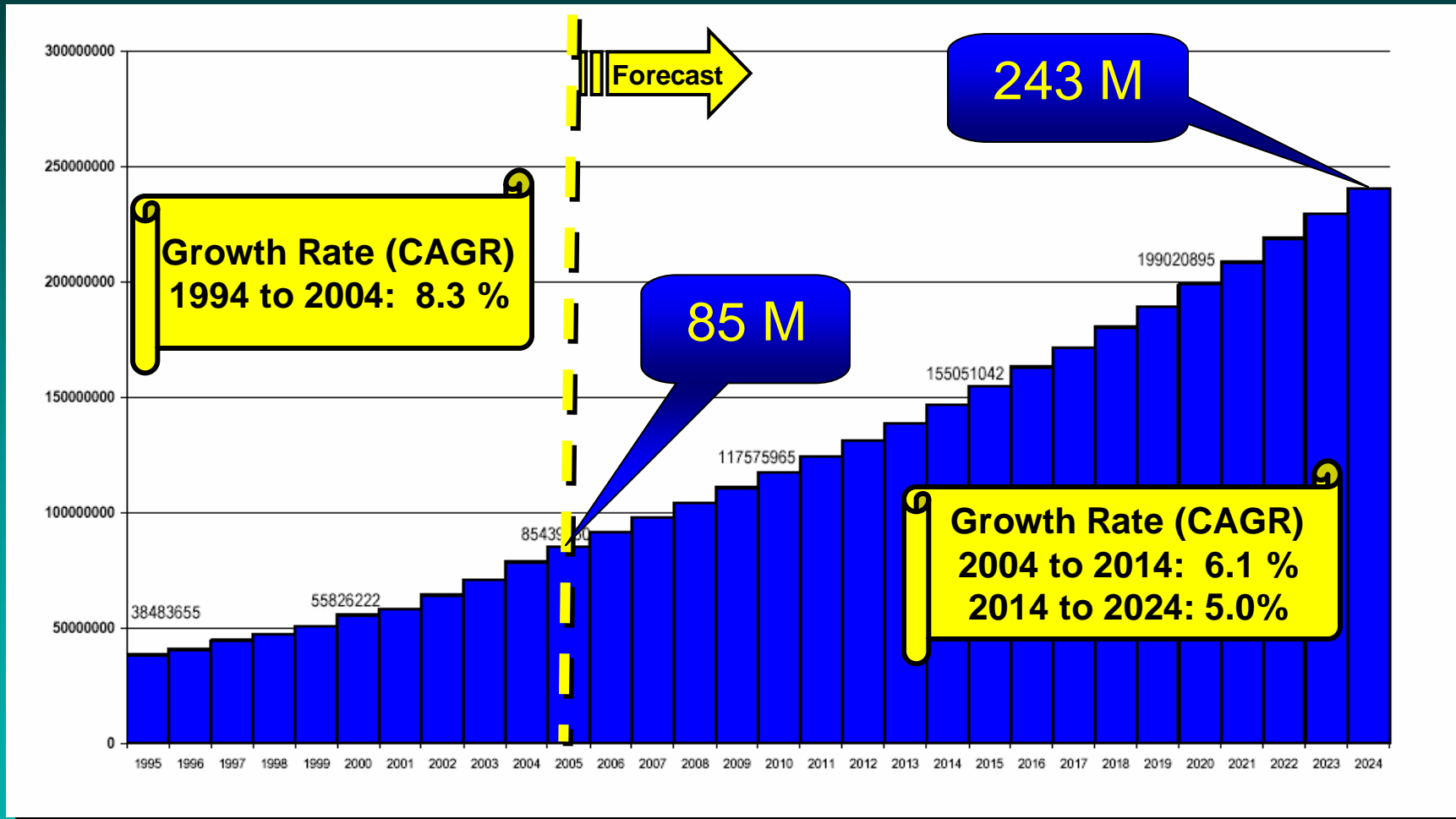
**International
Maritime
Cargo Demand
Trends**

World Bank's 2010 "Global Economic Prospects"

World Output will Increase 33% in 10 years

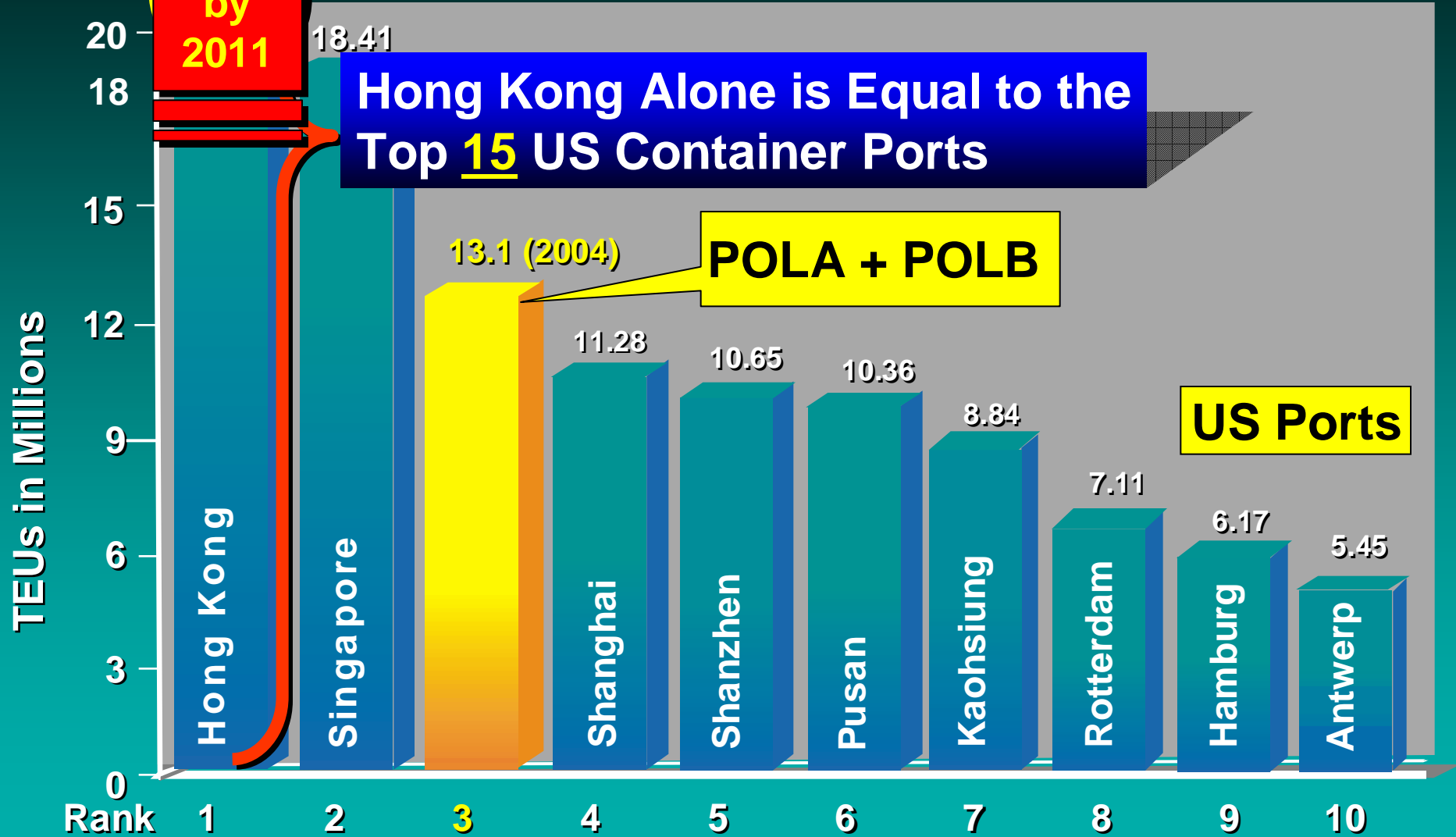


World Container Forecast to 2024 in TEUs (186% Increase in Next 20 Years)



Source: Global Insight, 2004

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



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

Global Market Economic Shifts (Country GDP Rank)

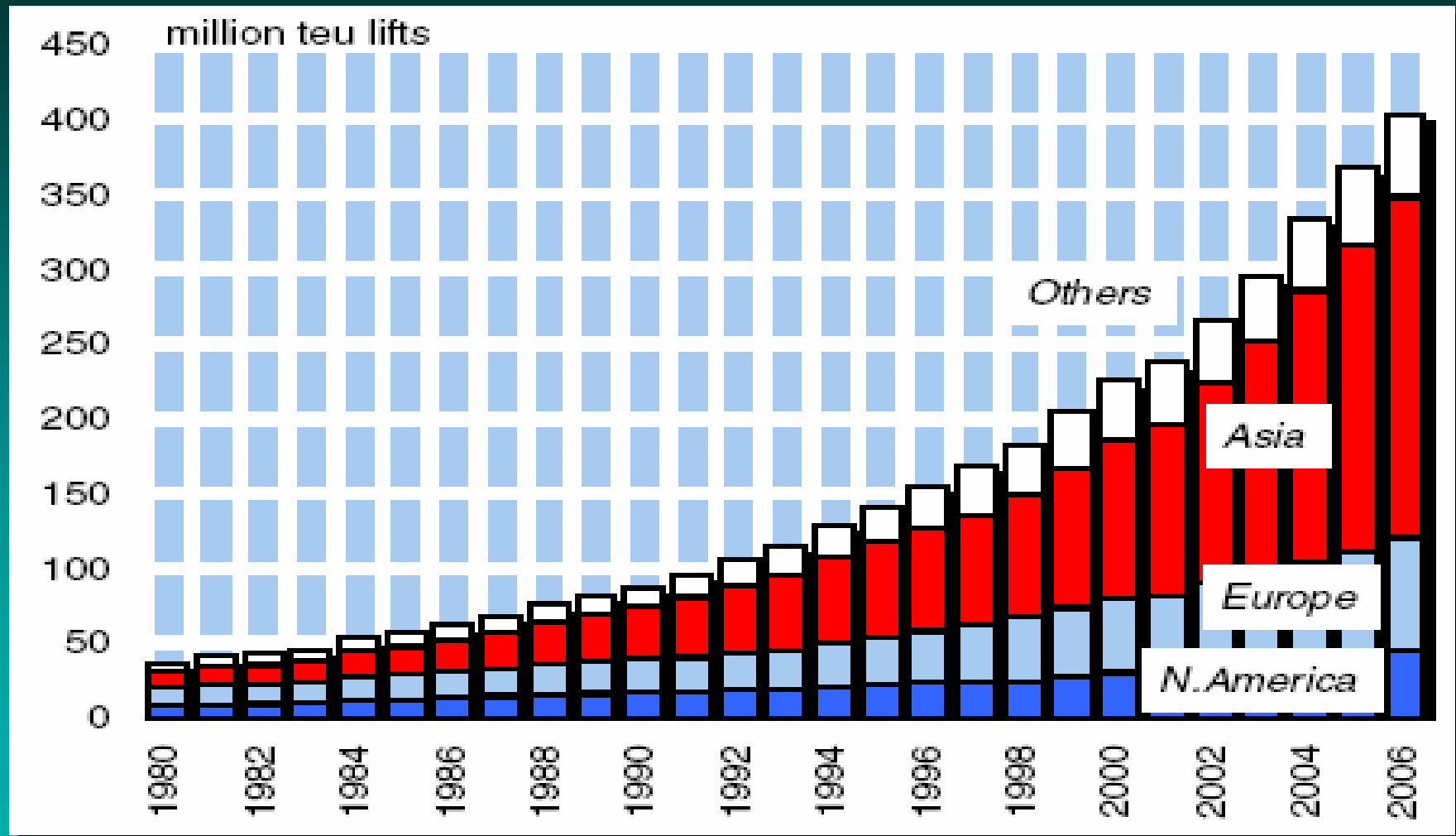
	2000	2010	2020	2030	2040	2050
#1	USA	USA	USA	USA	USA	CHINA #1
	Japan	Japan	CHINA	CHINA	CHINA	USA #2
	Germany	Germany	Japan	Japan	INDIA	INDIA #3
	UK	UK	Germany	INDIA	Japan	Japan
	France	CHINA	UK	Russia	Russia	Brazil #5
	Italy	France	INDIA	UK	Brazil	Russia
#7	CHINA	Italy	France	Germany	UK	UK
#8	Brazil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

Source: Global Insight, 2005



**The Growing Asian
Import
Trade Challenge**

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

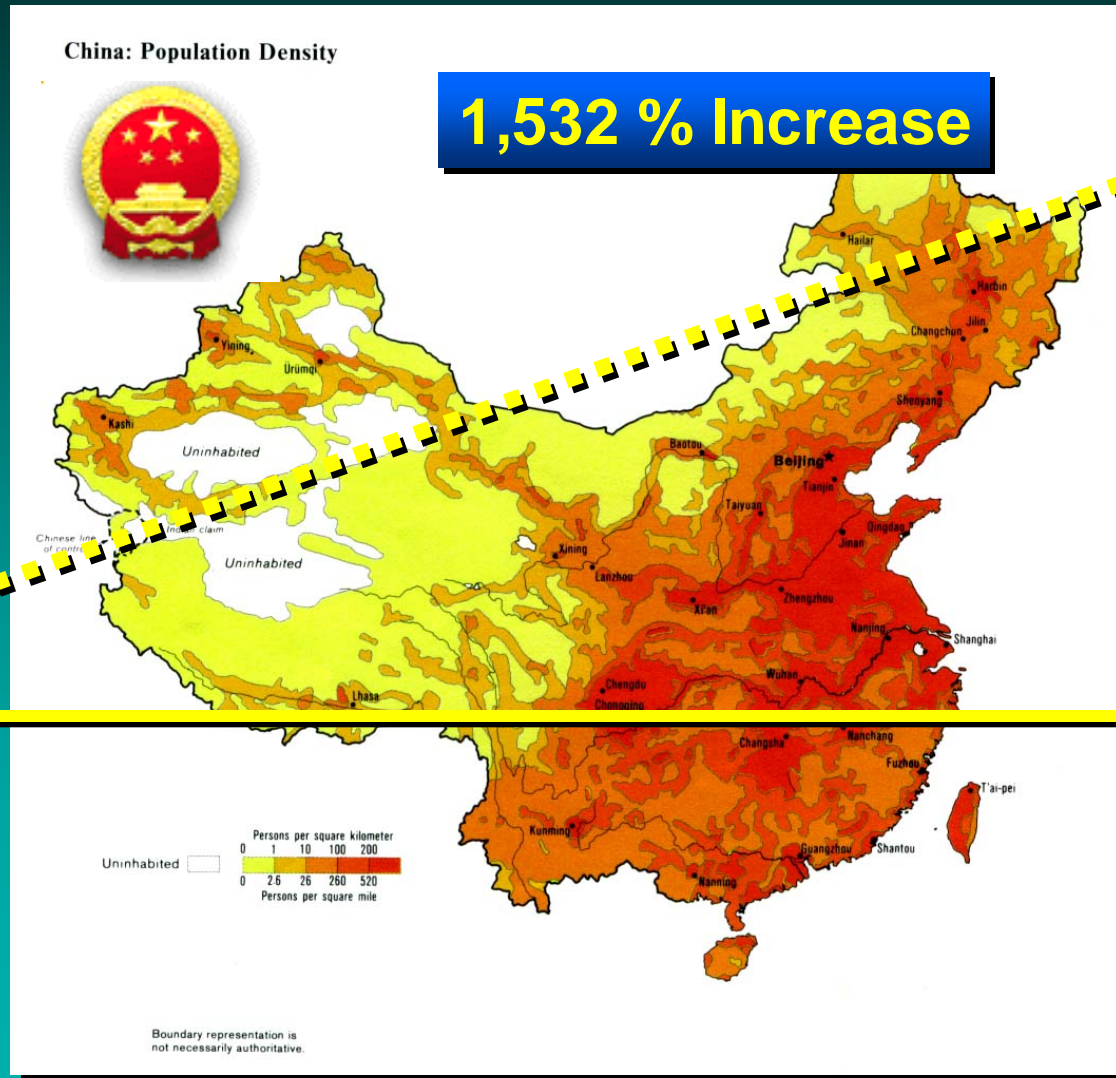


Source: Clarkson Research Studies

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



\$40.8 B

\$2.5 B

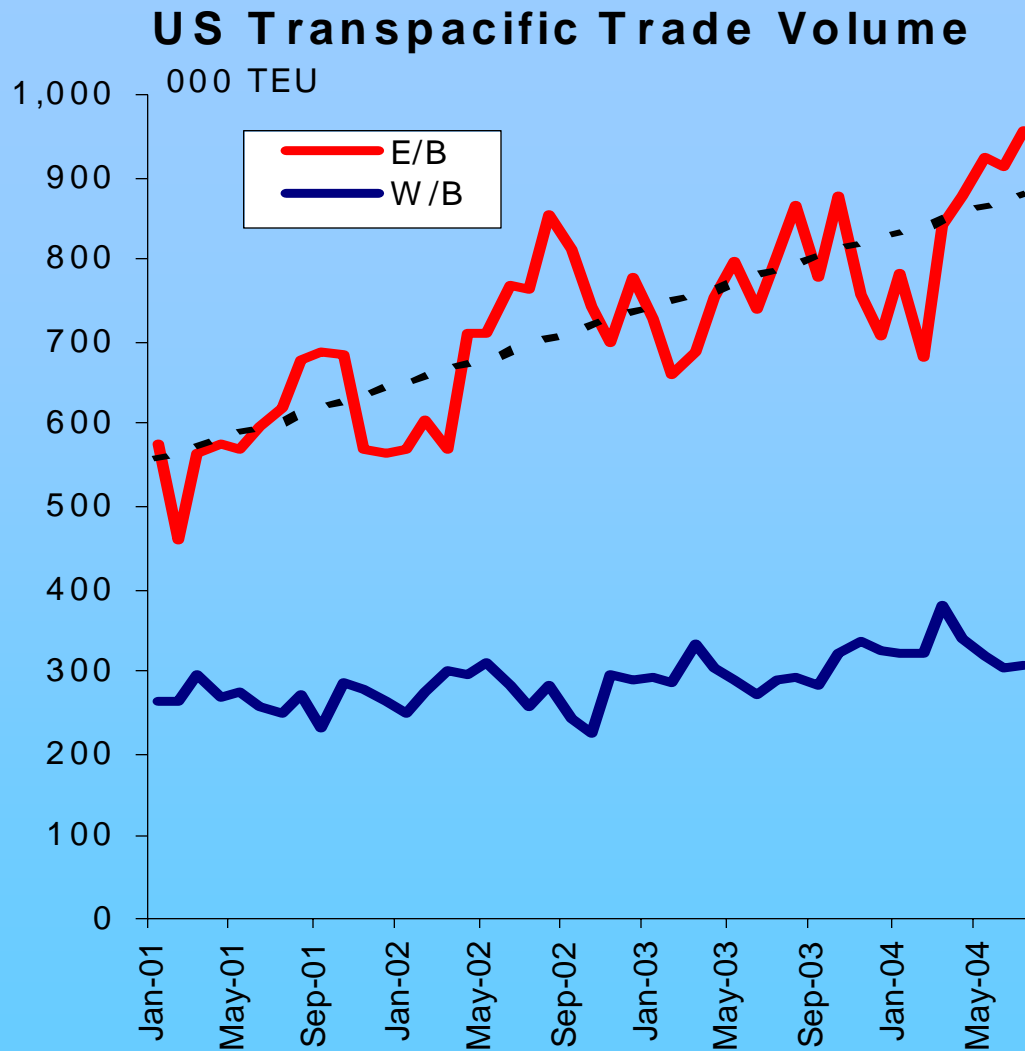
1979

2004

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Asia-US Trade Growth



Source: Clarkson Research Studies

Trans-Pacific box volumes from Asia to the US have continued to expand rapidly, largely on the back of exports from mainland China

Westbound volumes have remained fairly static

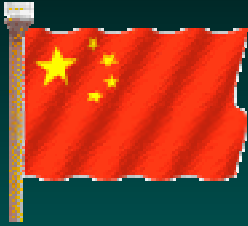
China-US: Twin Engines of the World



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

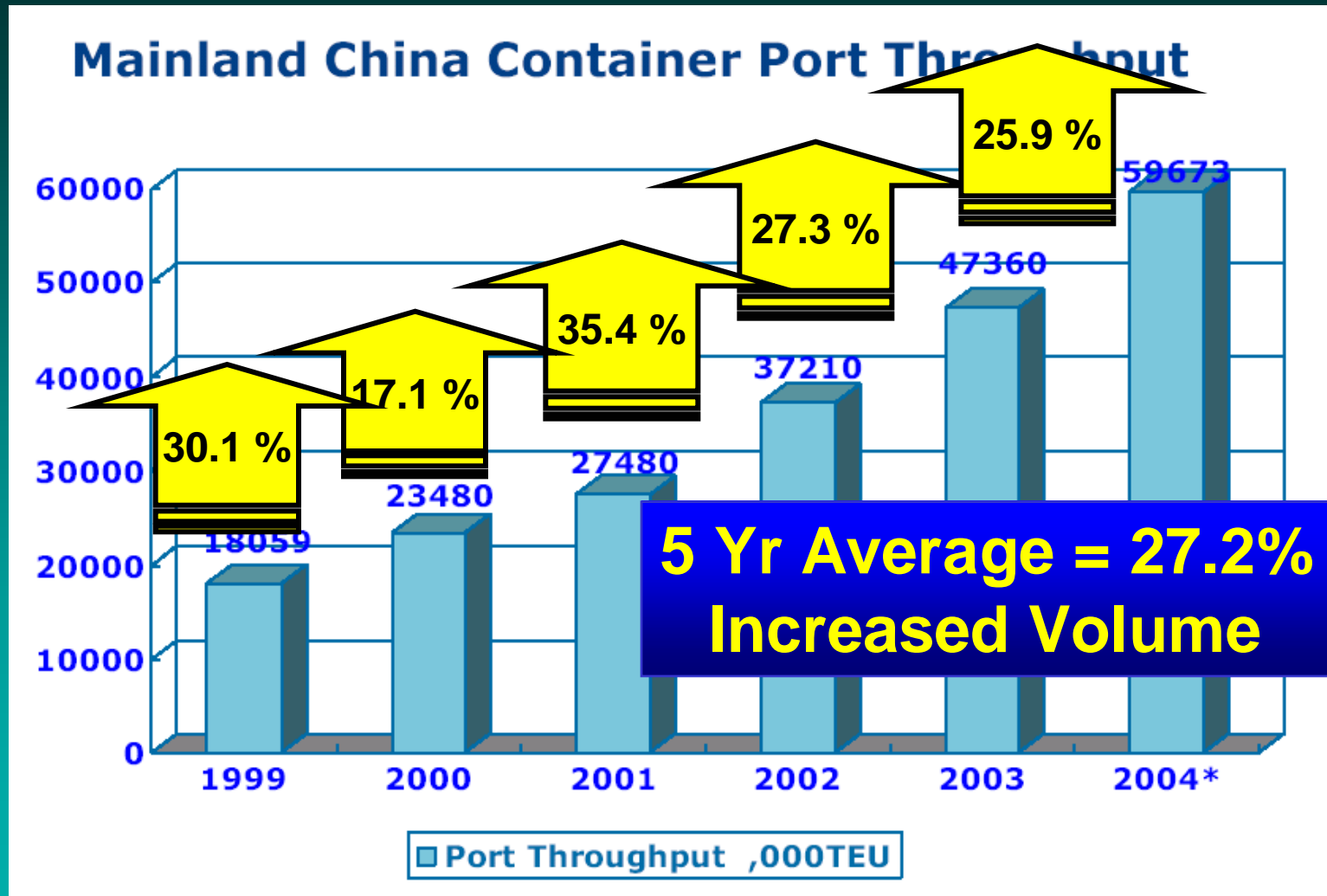
The number of Chinese children in elementary school is equivalent to the total US population.

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.**

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



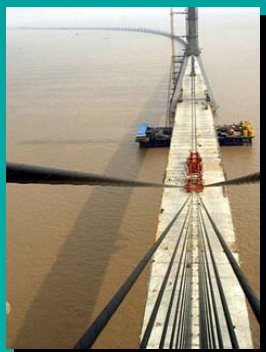
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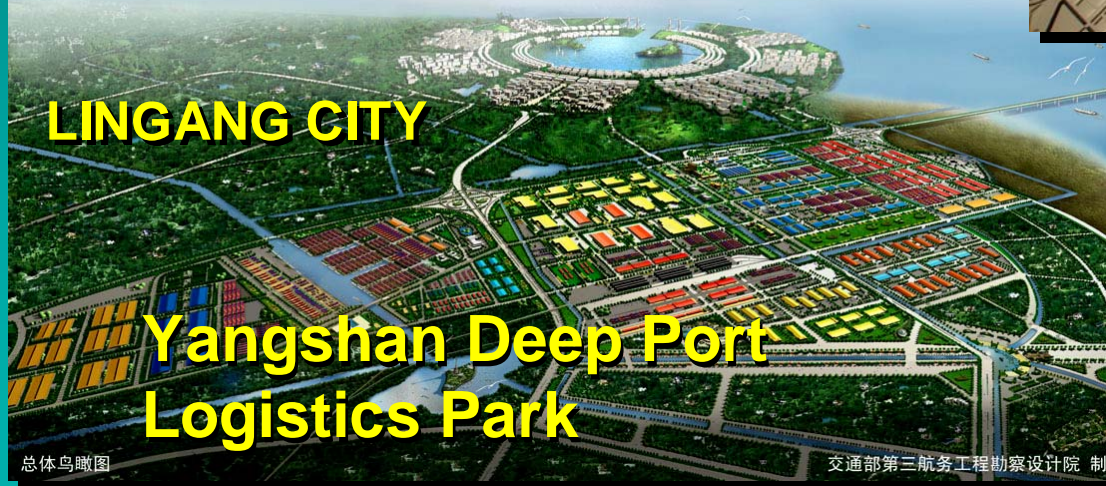
Shanghai International Shipping Center Yangshan Deep Port & Logistics Park



**20 Mile New Port Access
Bridge Constructed in 3 yrs**



Shanghai International Shipping Center Shanghai Close-Port New City



**A new city
Integrating global
freight logistics**

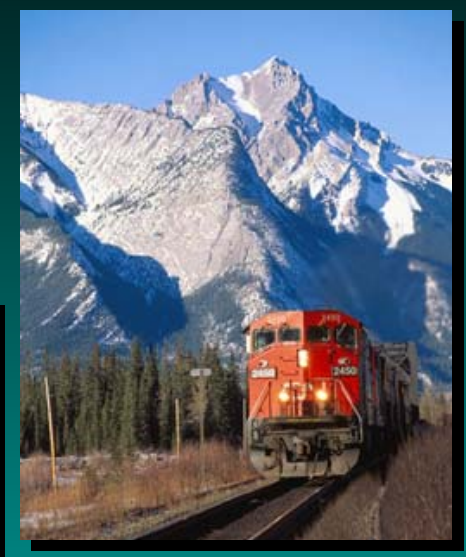
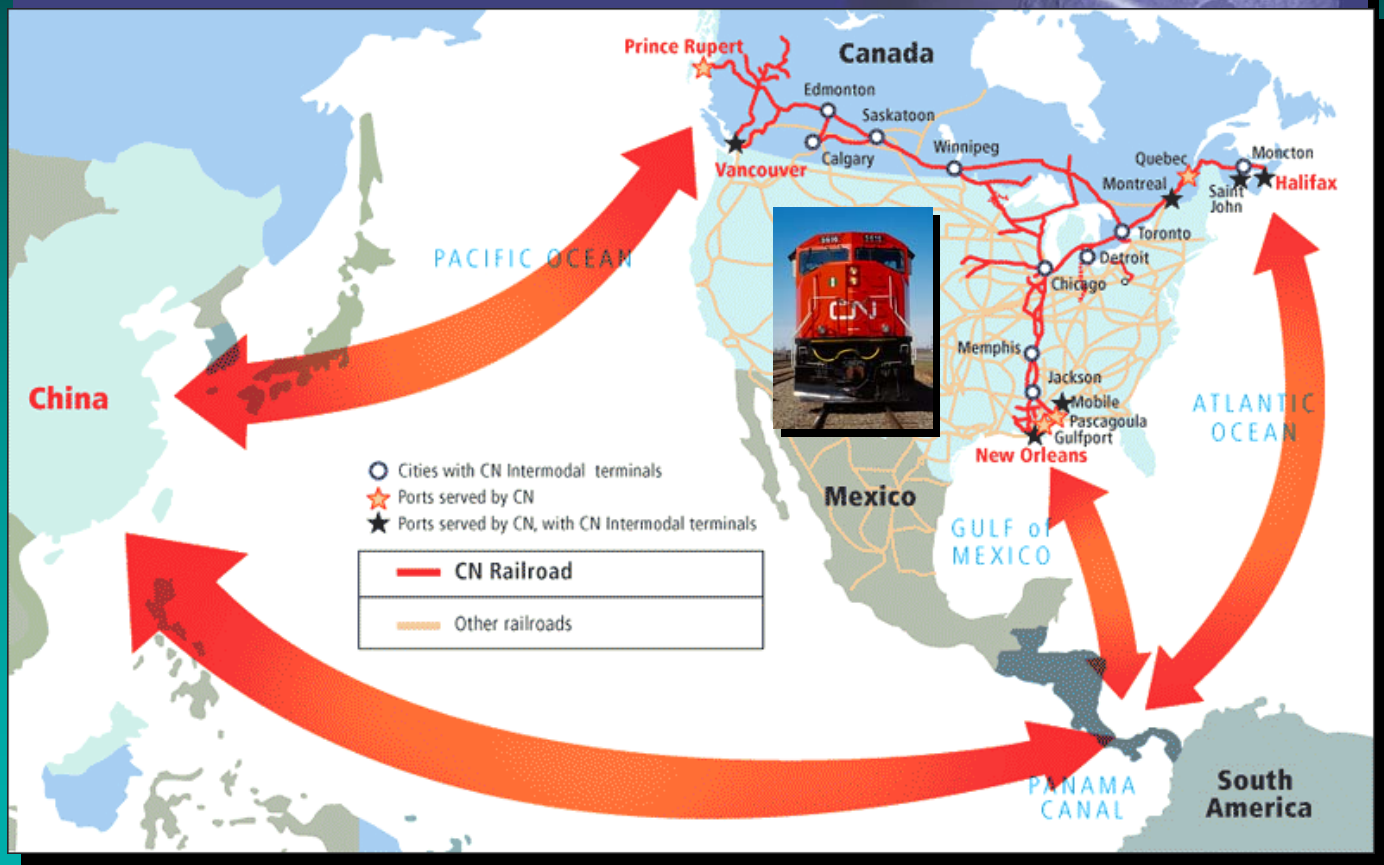
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Prince Rupert Port Authority

the new world port

opening a new world of opportunity



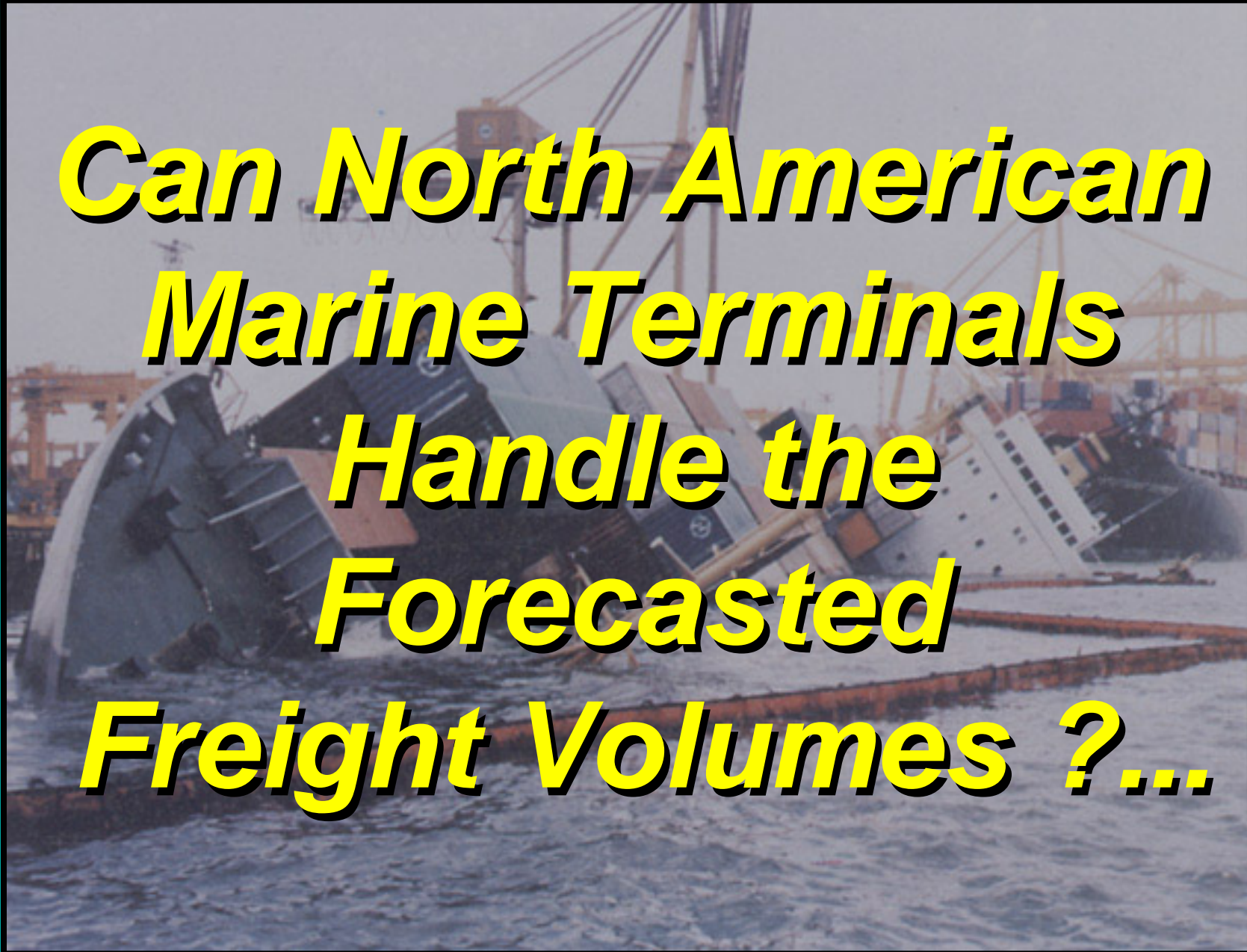
Major West Coast Mexican Port Developments Planned To Avoid Port of LA/LB Congestion



\$1.2 Billion in Port Infrastructure

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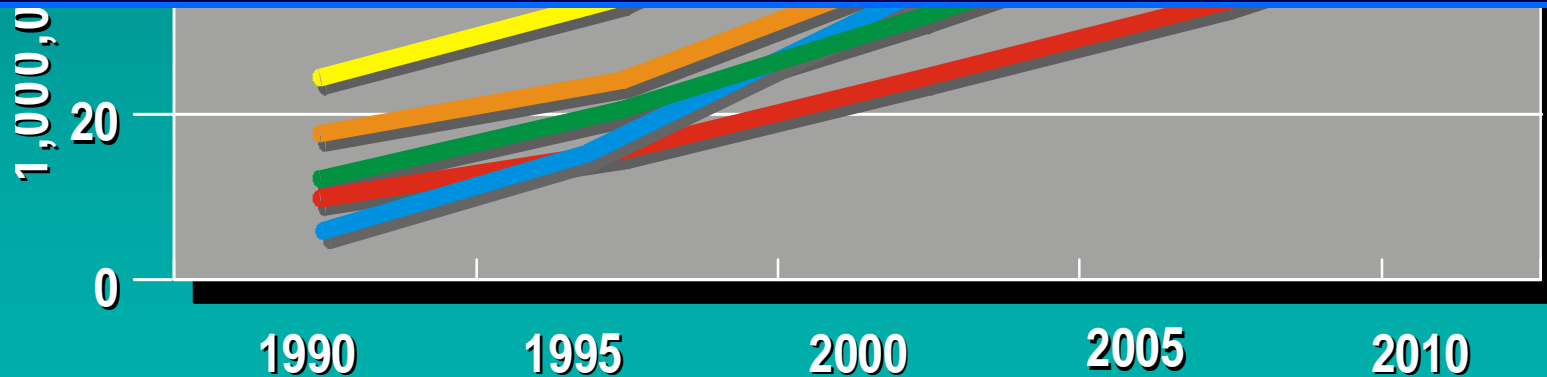


***Can North American
Marine Terminals
Handle the
Forecasted
Freight Volumes ?...***

U.S. Containerized Tonnage Forecast



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



Source: DRI/McGraw Hill

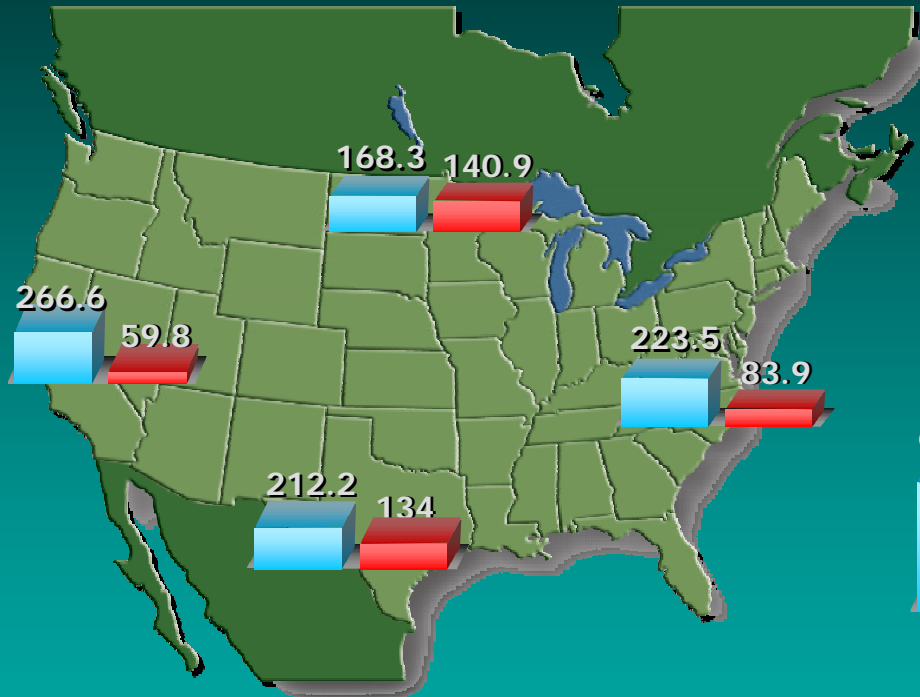
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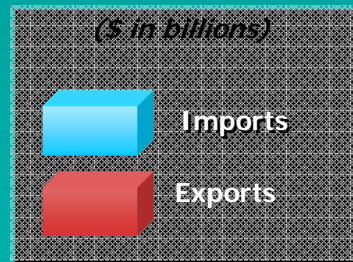
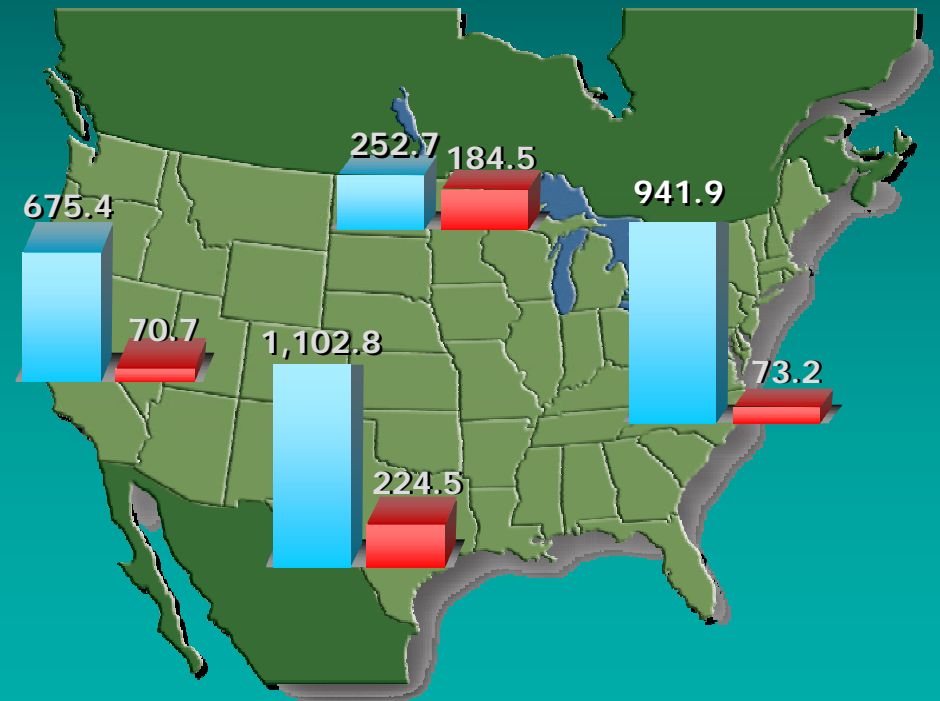
U.S. International Trade Growth

Current and Future

Today



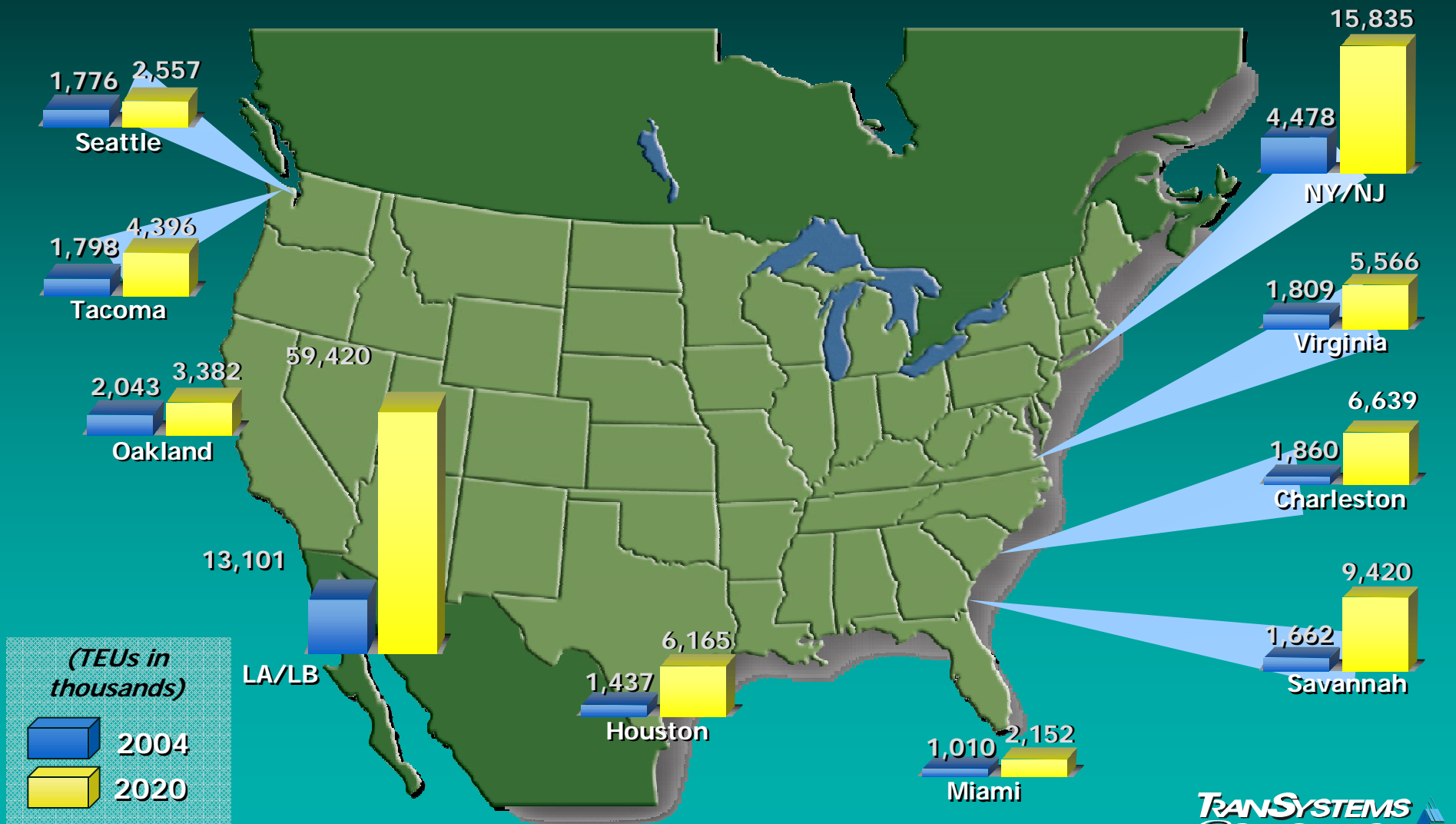
2020



Source: USDOT Forecast figures based on 6year linear regression

U.S. Maritime Container Trade Growth

Current and Future

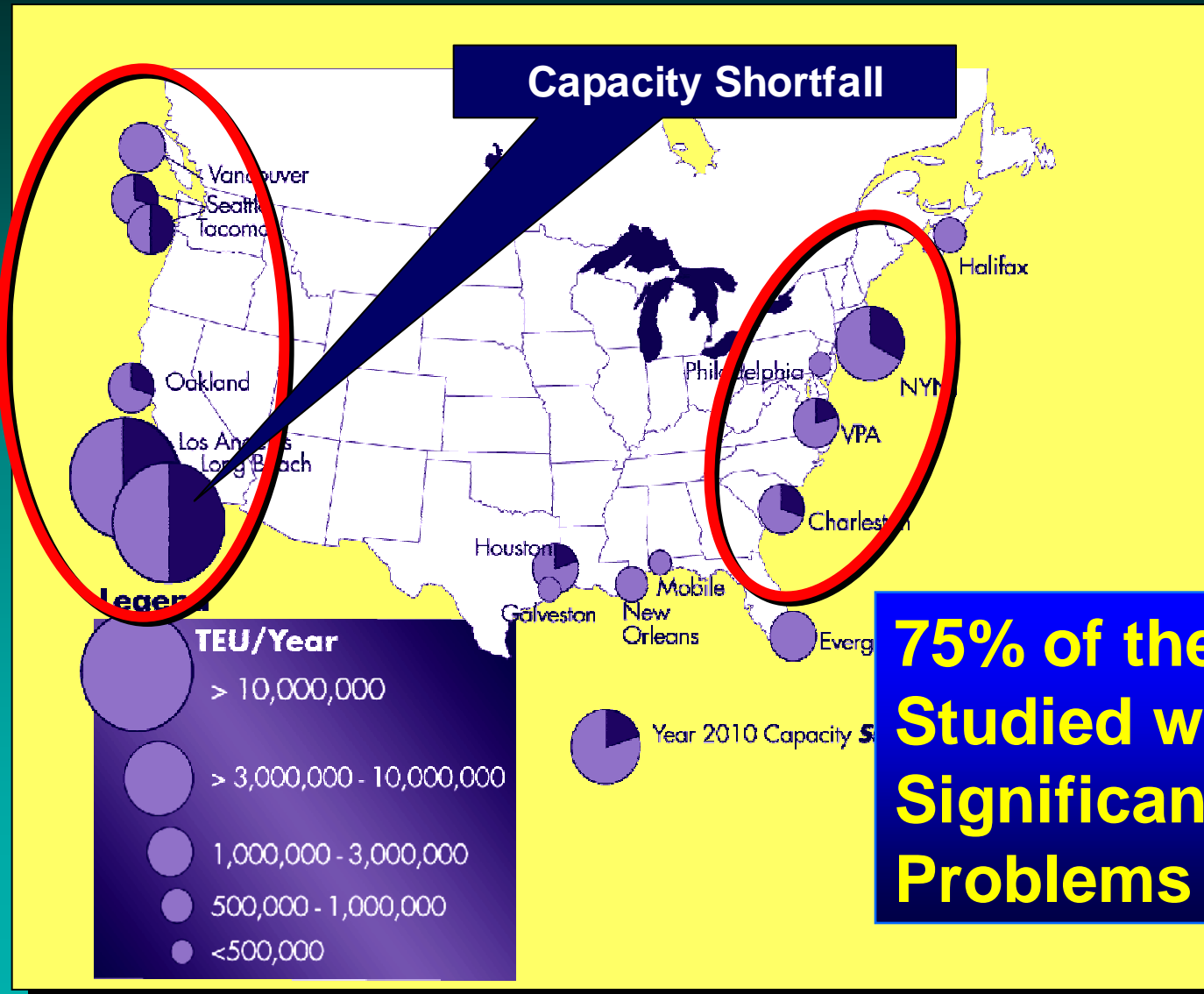


Source: USDOT (Forecast figures based on 6 year linear regression)

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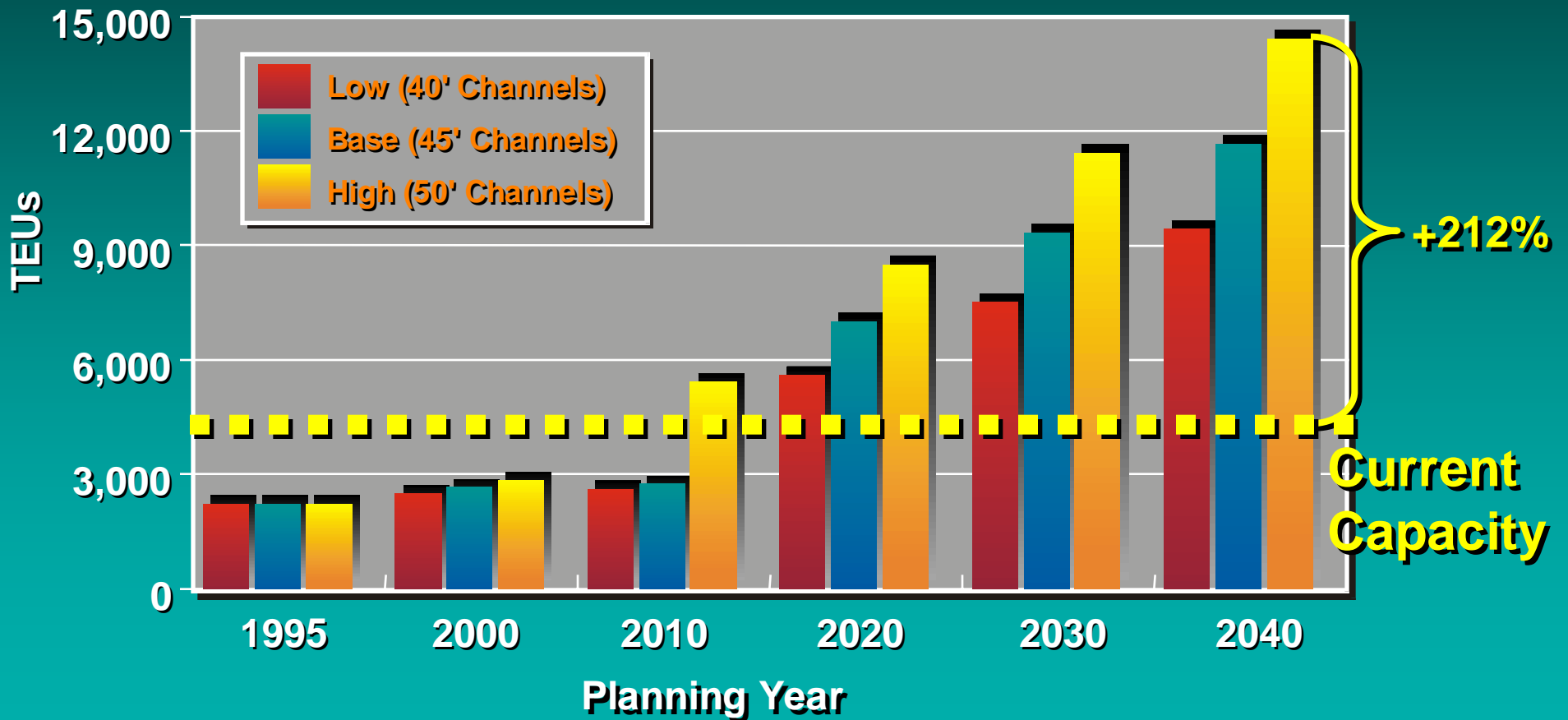
2010 Projected Public Port Capacity Shortfall



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

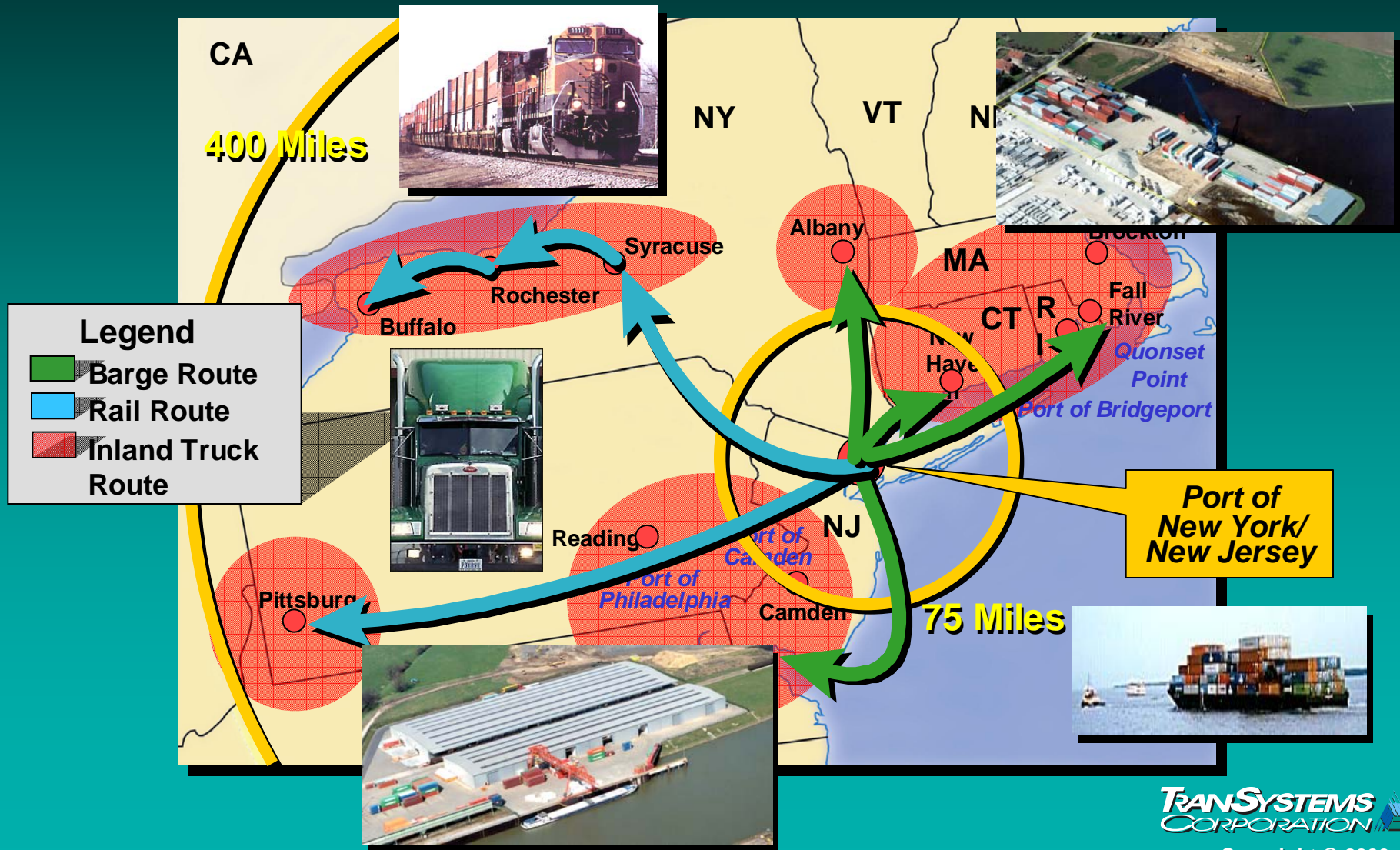


Port Authority NY/NJ Long Range Regional Container Forecast (TEUs)



Source: PANY/NJ - TranSystems Data

Port Authority of New York/New Jersey Port Inland Distribution Network (PIDN)





+

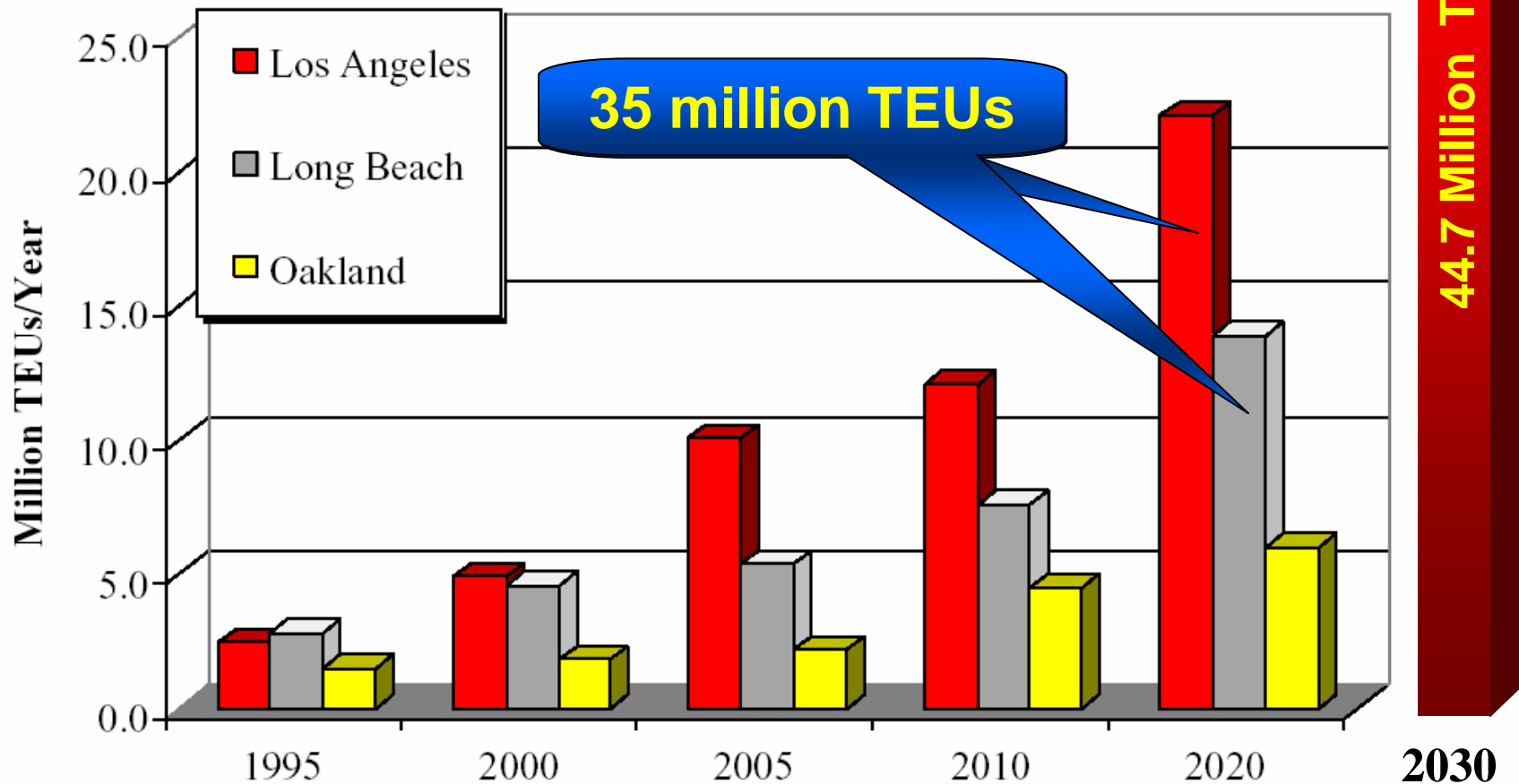


**San Pedro Bay Ports of
Ports of Los Angeles and Long Beach
Container Growth Implications:**

“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



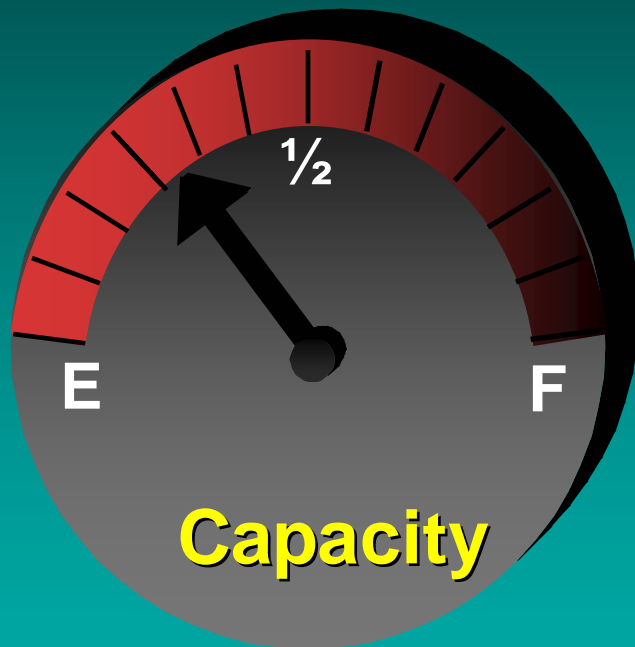
Source: California Goods Movement Action Plan – Jan 2005 Draft

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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.



International Port Productivity Comparisons



Global Port Terminal Productivity

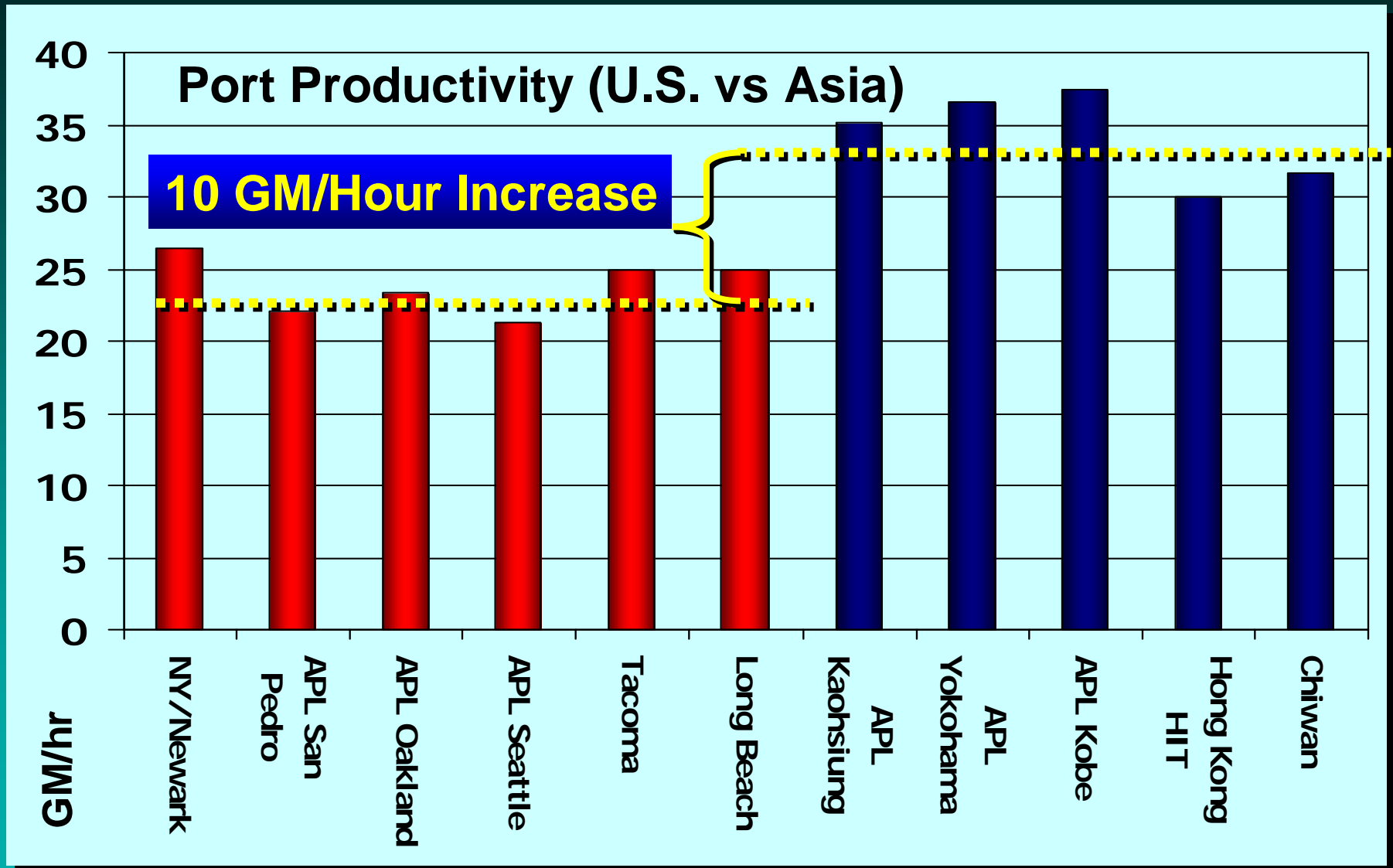
**North American Ports Are Not As Productive
As The Most Productive International Ports
By a Factor Of More Than 4 To 1**

Source: TranSystems Data

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US Port Productivity Is A Concern



Source: APL, Transportation Research Board

Global Marine Terminal Productivity Growth

(Circa 1995 to 2003)

(Throughput measured in TEUs/Acre/Year)

	1995	2003	5YR CAGR
Asian Ports	8,834	18,500	19.9%
European Ports	2,974	6,800	9.2%
United States Ports	2,144	3,900	9.0%
US West Coast Ports	3,567	4,300	10.9%
US Gulf Coast Ports	2,816	4,000	3.7%
US East Coast Ports	1,281	3,300	10.3%

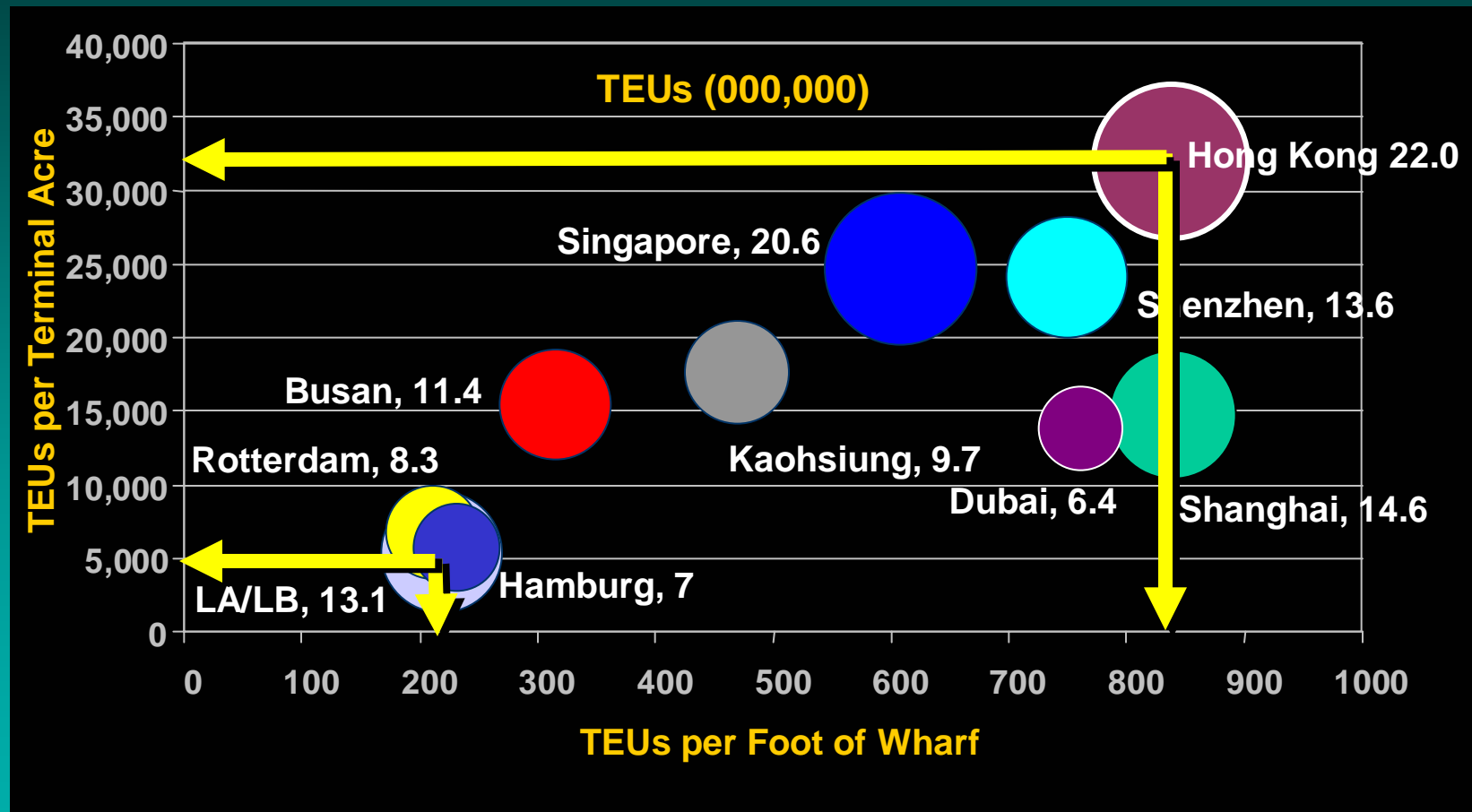
Source: 1995 & 2003 CI Yearbooks, Seaports of the Americas, Port Data

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2005 International Port Productivity Top 10 Ports

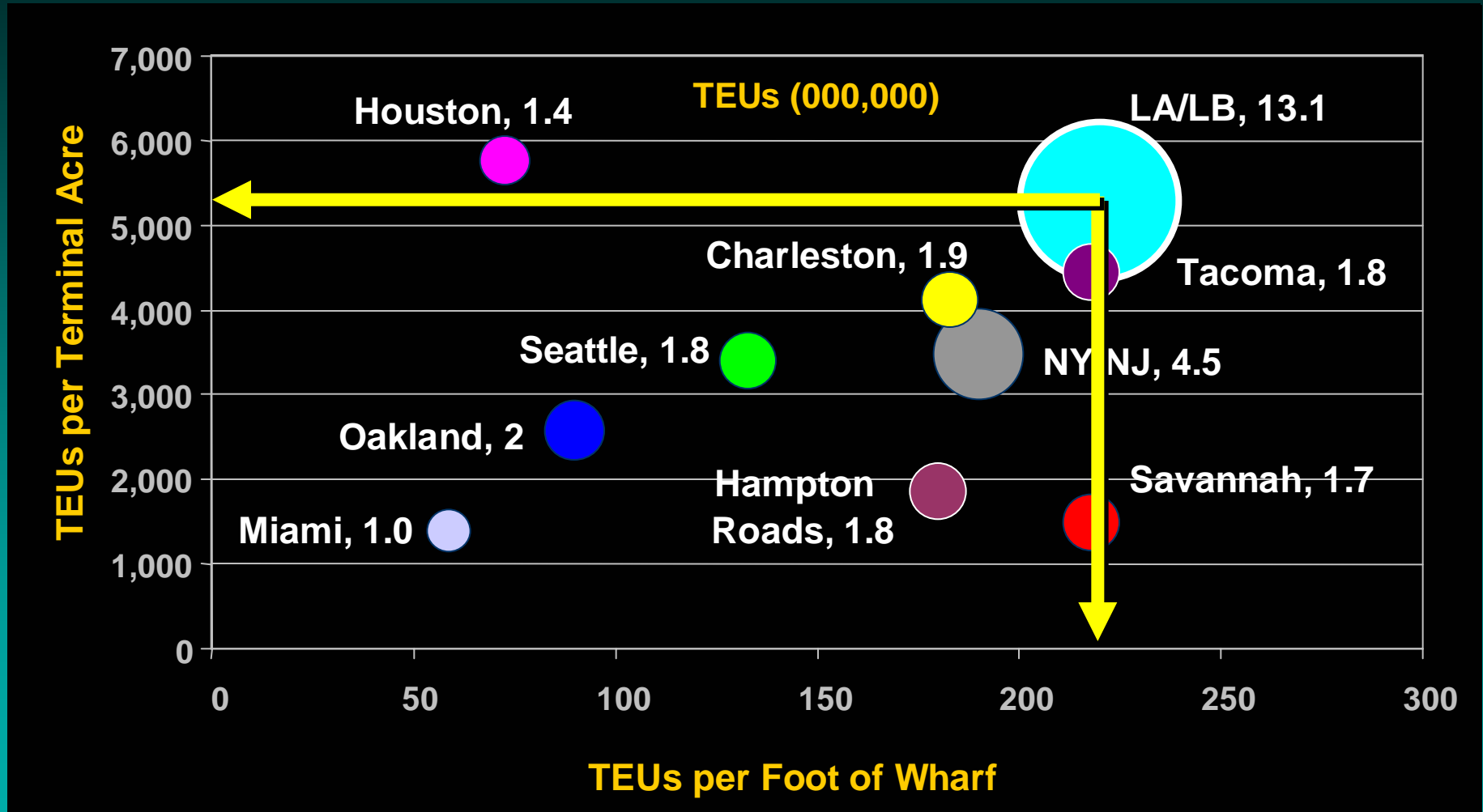
(in Millions of TEU Throughput)



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

2005 US Port Productivity Top 10 Ports

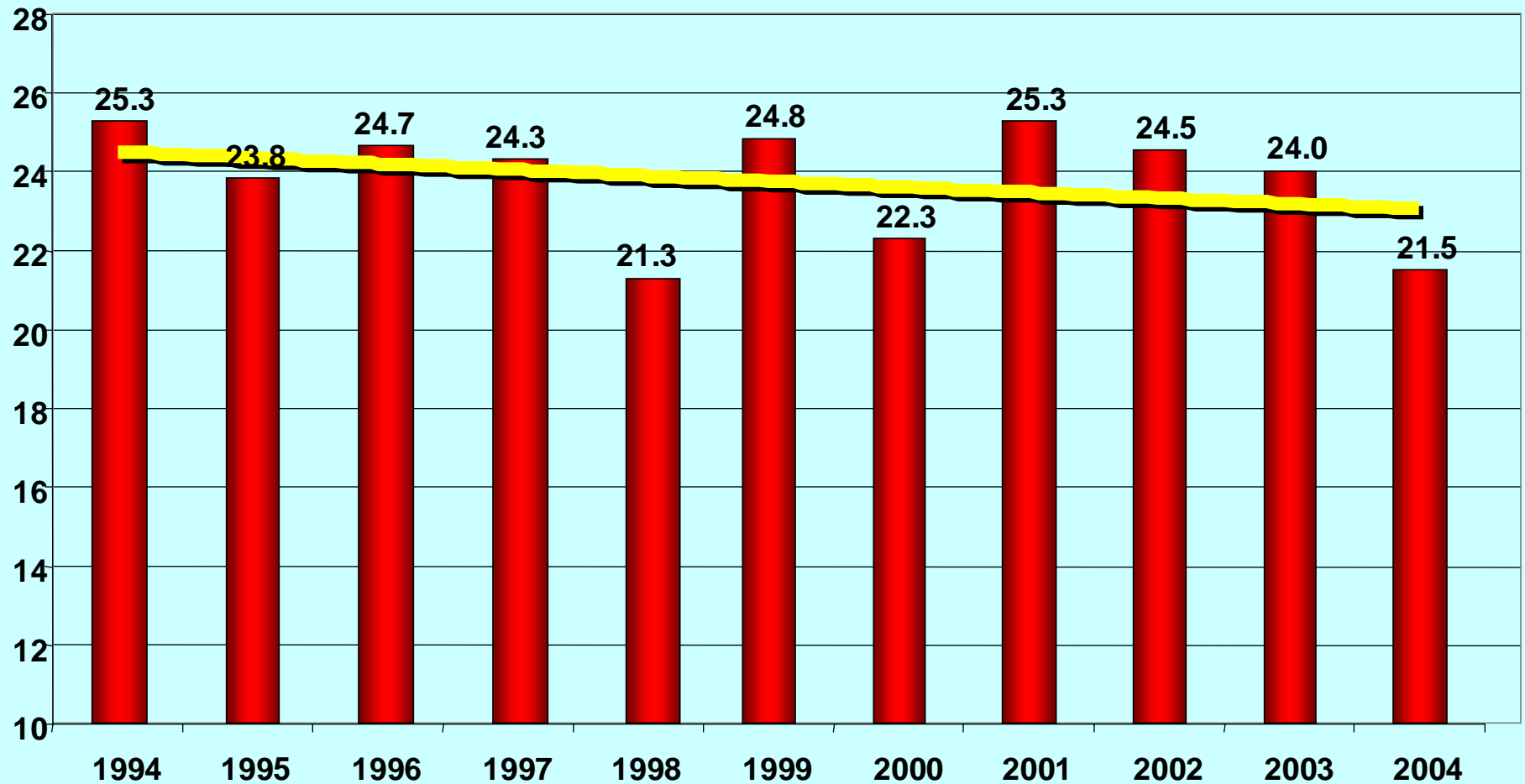
(in Millions of TEU Throughput)



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

West Coast Port Productivity Is A Major Concern

San Pedro Bay Productivity (lifts/gang hr)



Source: APL, Transportation Research Board

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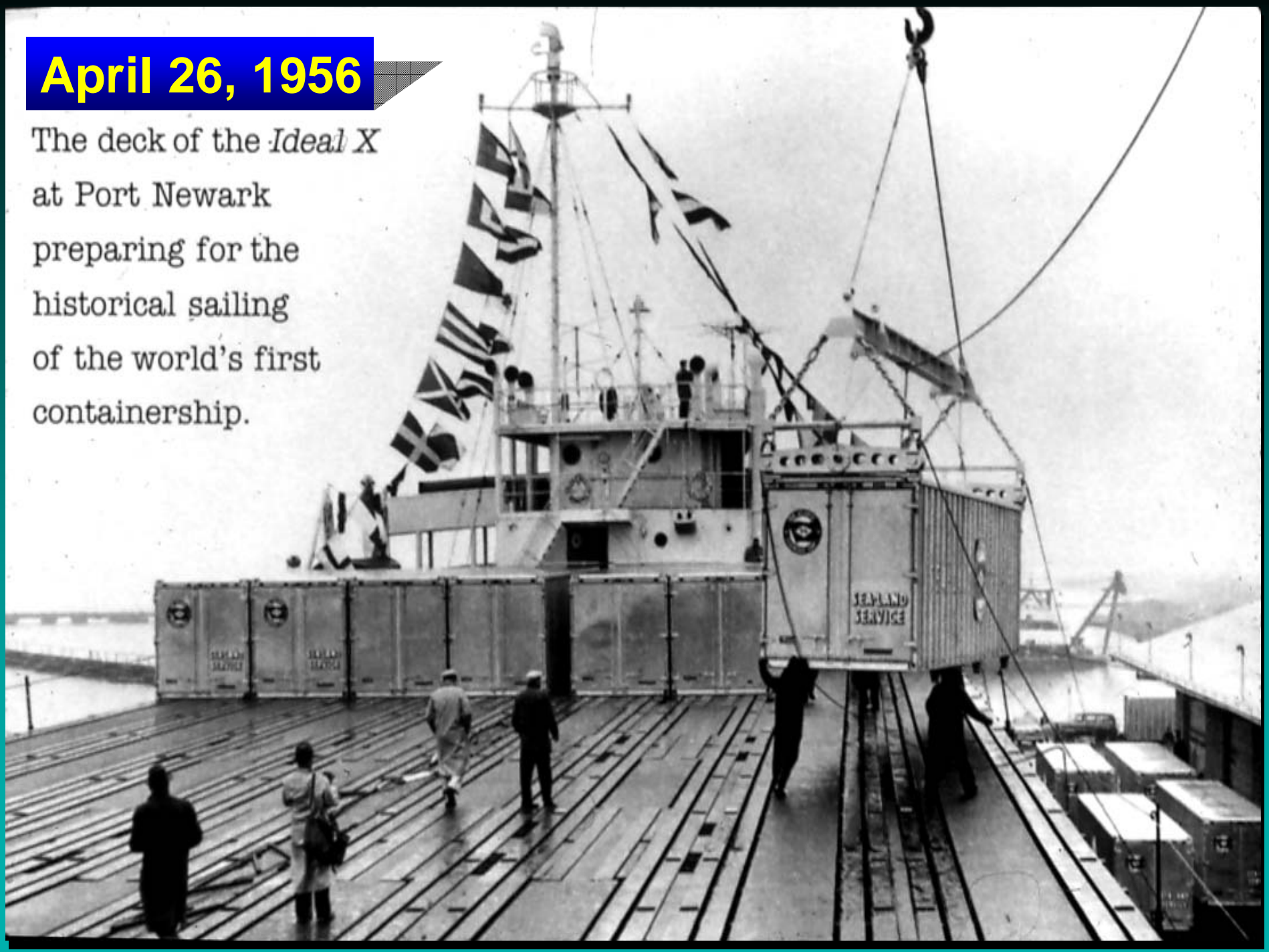
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Maritime Vessel Technology Trends

April 26, 1956

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



World Container Ship Evolution



1st Generation (Pre-1960 - 1970)



2nd Generation (1970 - 1980)



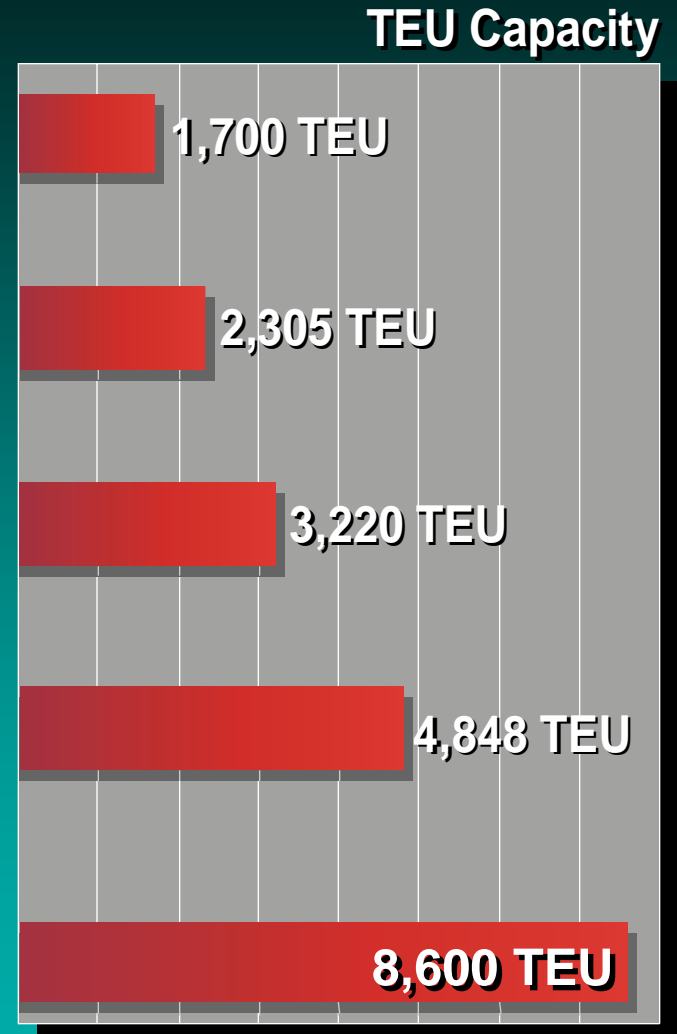
3rd Generation (1985)



4th Generation (1986 - 2000)



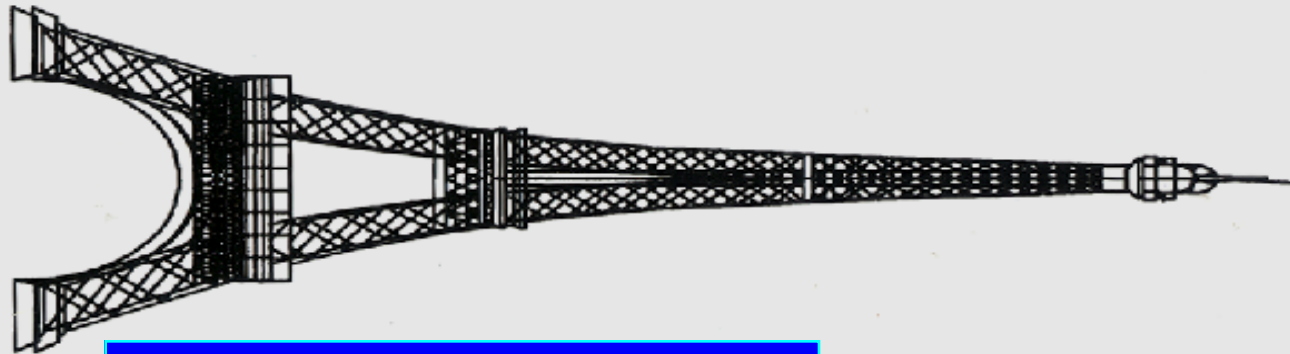
5th Generation (2000 - 2005)



Madison Maersk (3,928 TEUs) in the Panama Canal (Current Max Panamax = 5000 TEUs)



Today's Mega Ships - Measuring Up



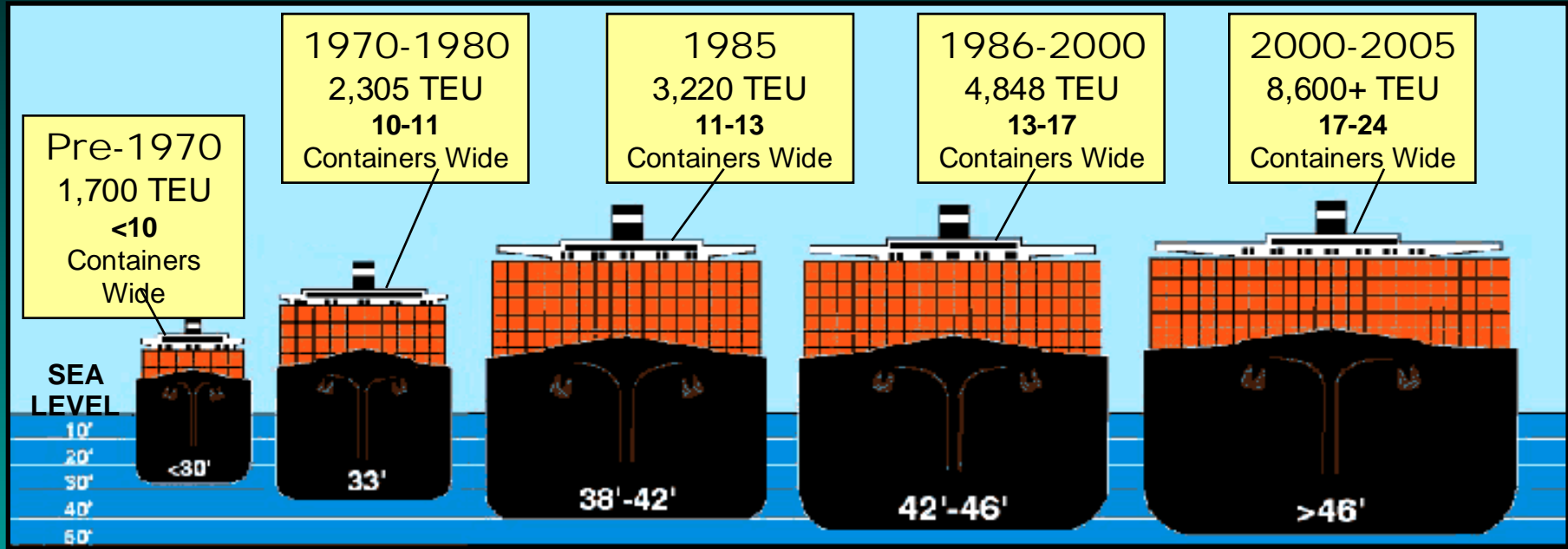
Eiffel Tower – 990 feet



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

Today's Mega Ships - Measuring Up

How Wide, How Deep?



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

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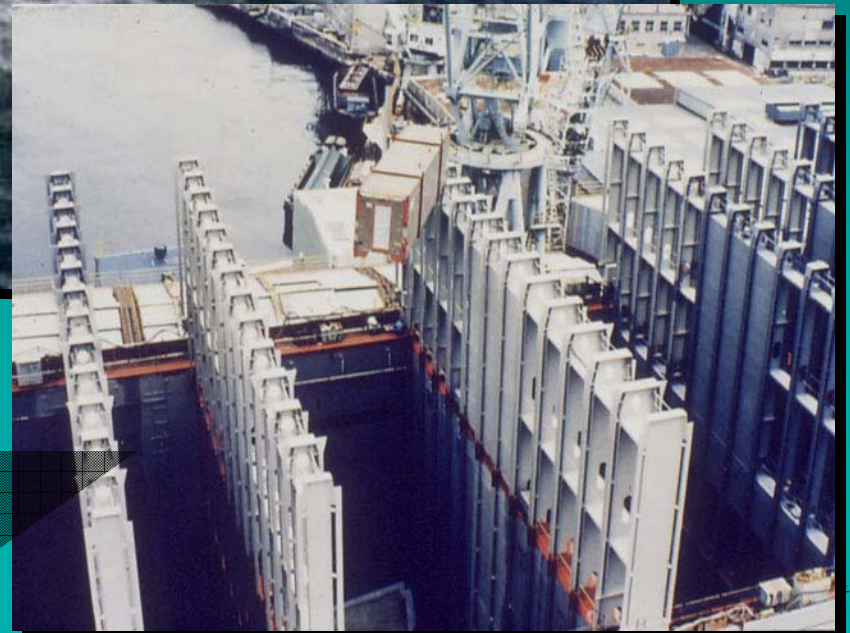
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The Hatch-Less Container Vessel

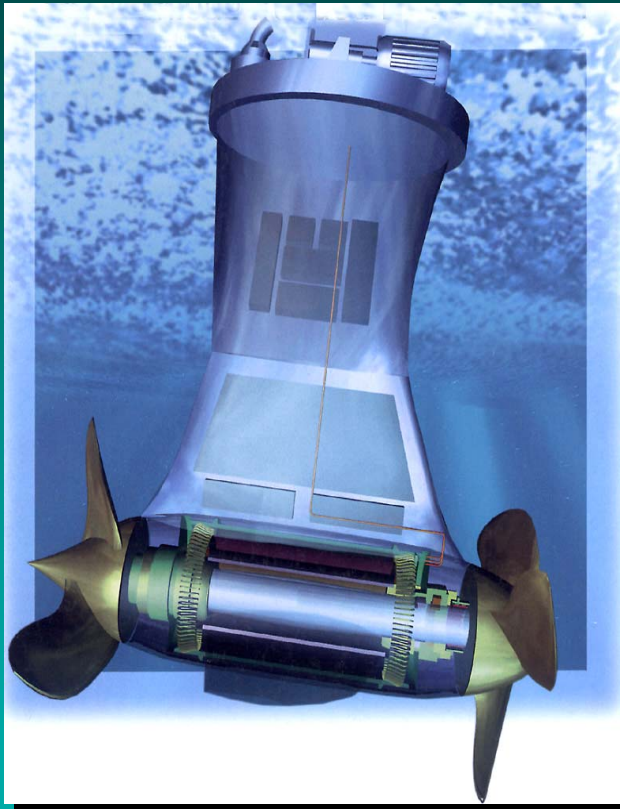


Per P&O Nedlloyd:

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



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

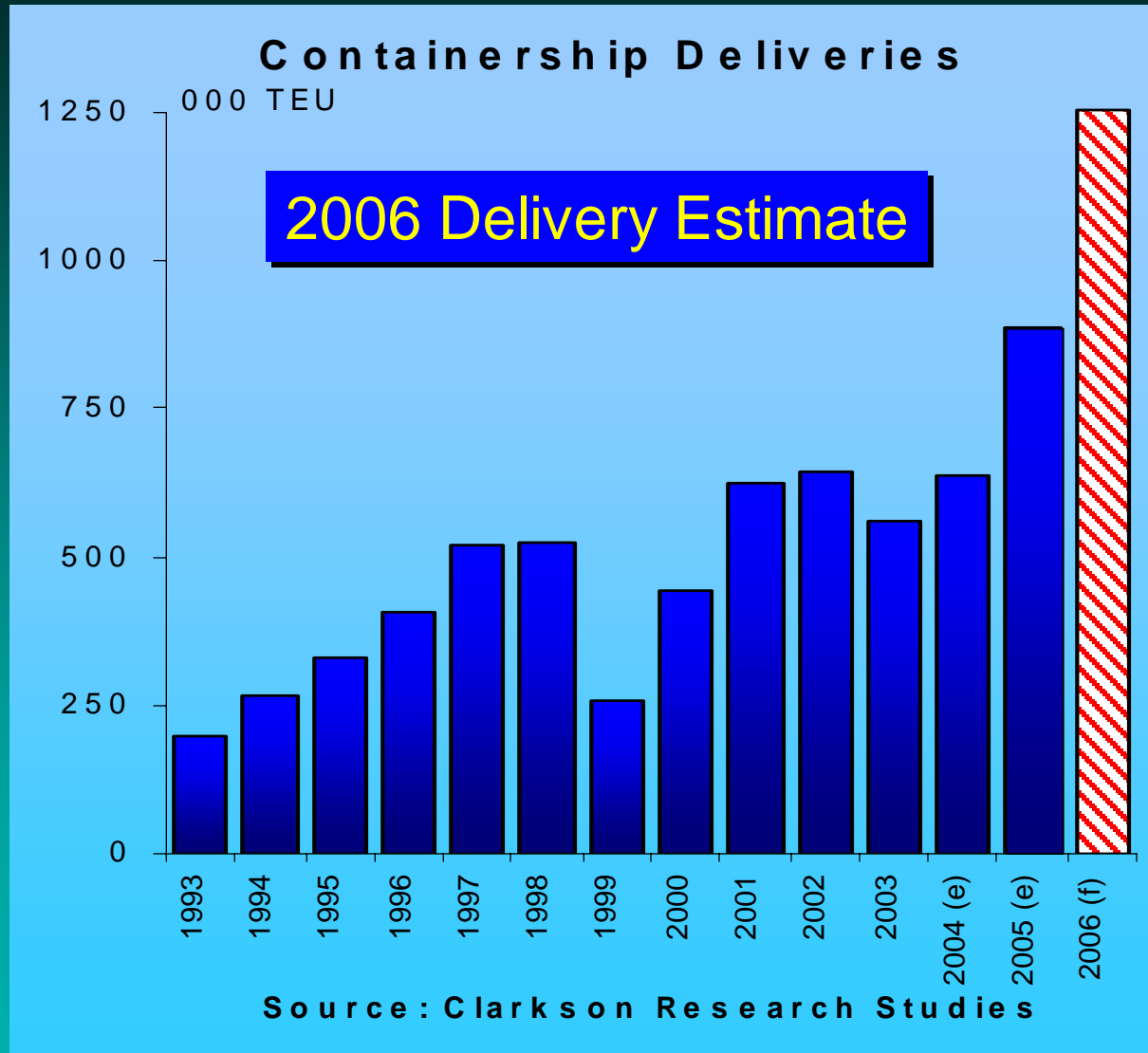


SSP Propulsor
Schottel / Siemens



Azipod
**Eagle Class Cruise
Vessel**

2006 Containership Order-Book



2001 and 2002
saw large
amounts of
container capacity
delivered,
matched by 2004
additions to fleet

**A significant jump
in vessel
deliveries is
expected in 2006**

Source: APL, Transportation Research Board

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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...”

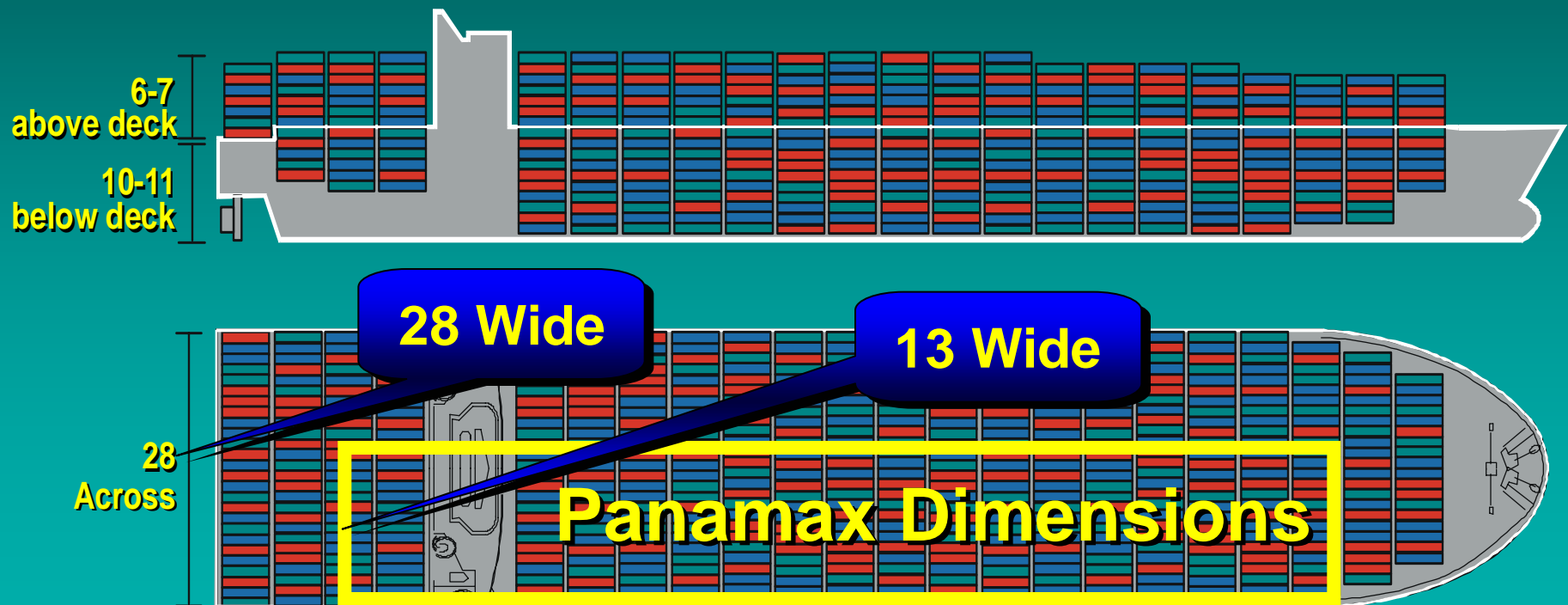
R. G. McLellan, P&O Containers

The 15,000 TEU Containership

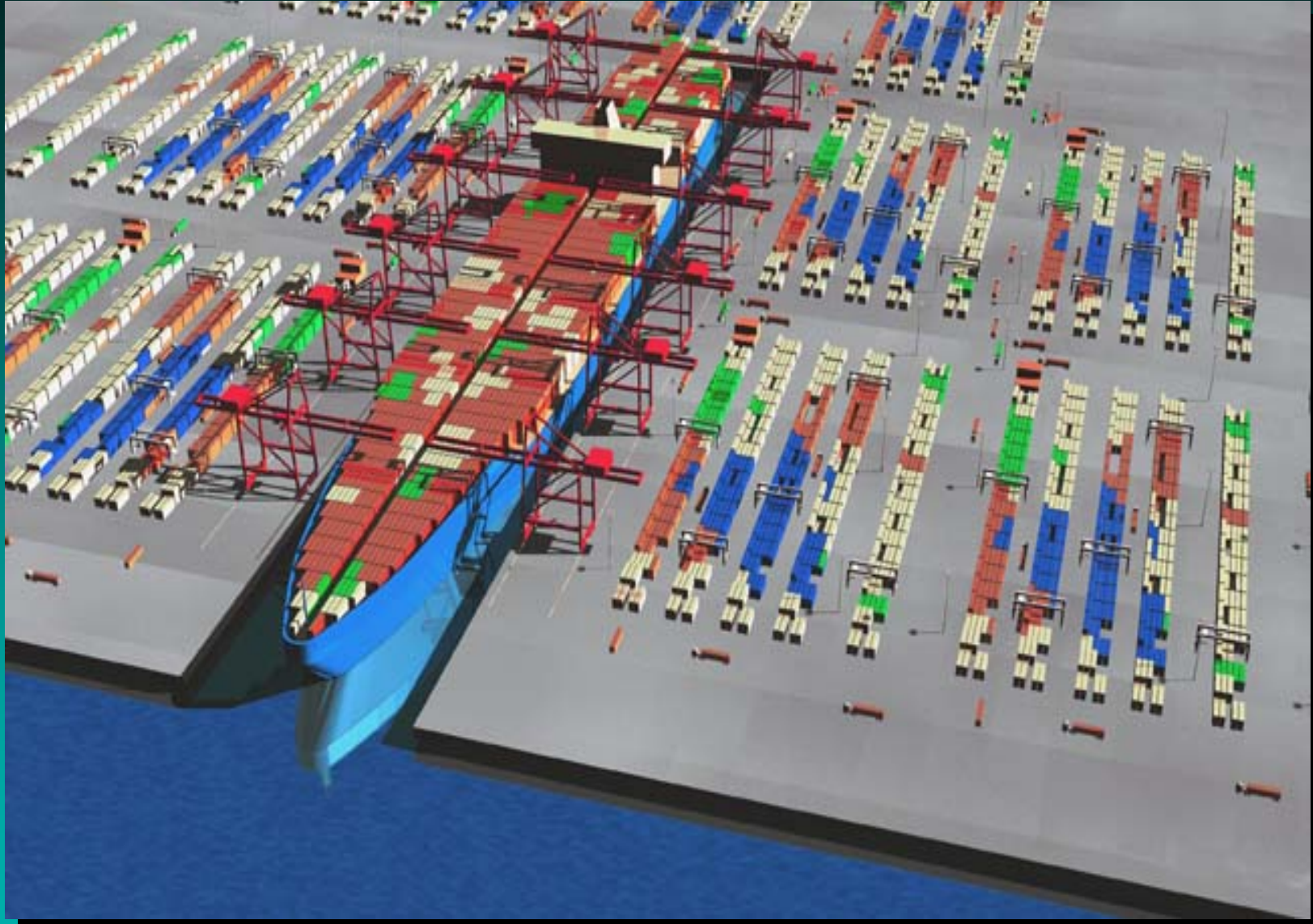
LOA. = 400 m (1,312 ft.)

Draft = 14 m (46 ft.)

BEAM = 69 m (226 ft.)



Container Ship-in-a-Slip Concept



Emergence of North American Fast Feeder Short-Sea Coastal Vessels



**The New Frontier:
Transshipment and Short Sea**




3,000 TEU Feeder Ship

10,000 to 15,000 TEU Mega Ship

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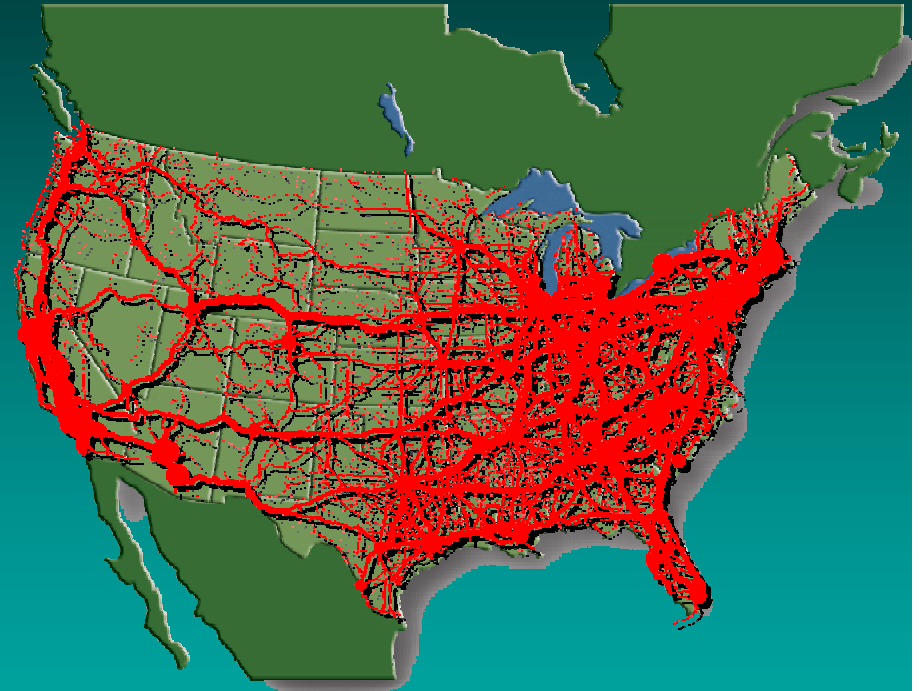
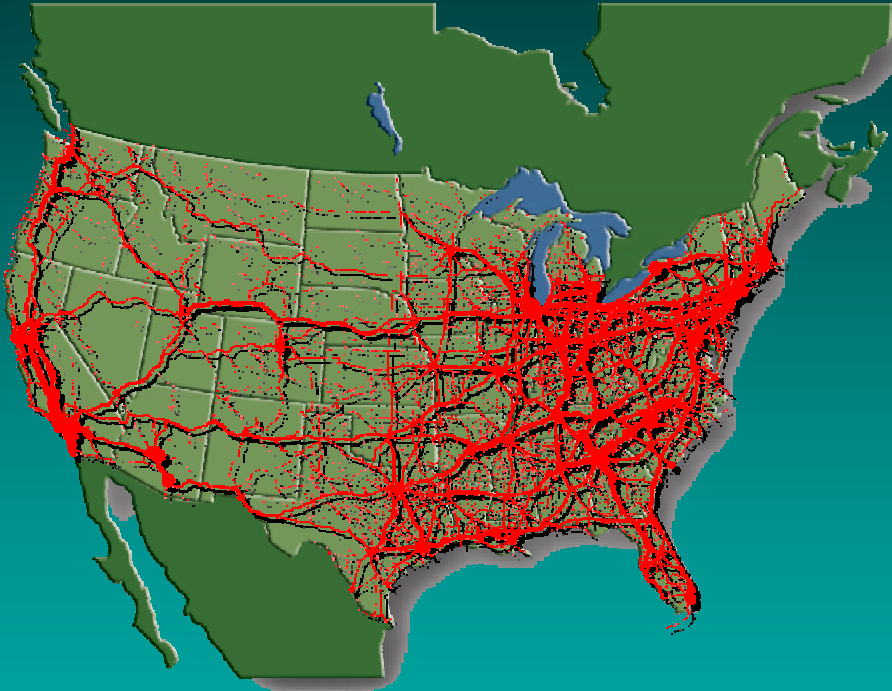


North American Domestic Truck Growth and Congestion

Future US Truck Traffic Growth

Today

2020



Truck Volume Scale



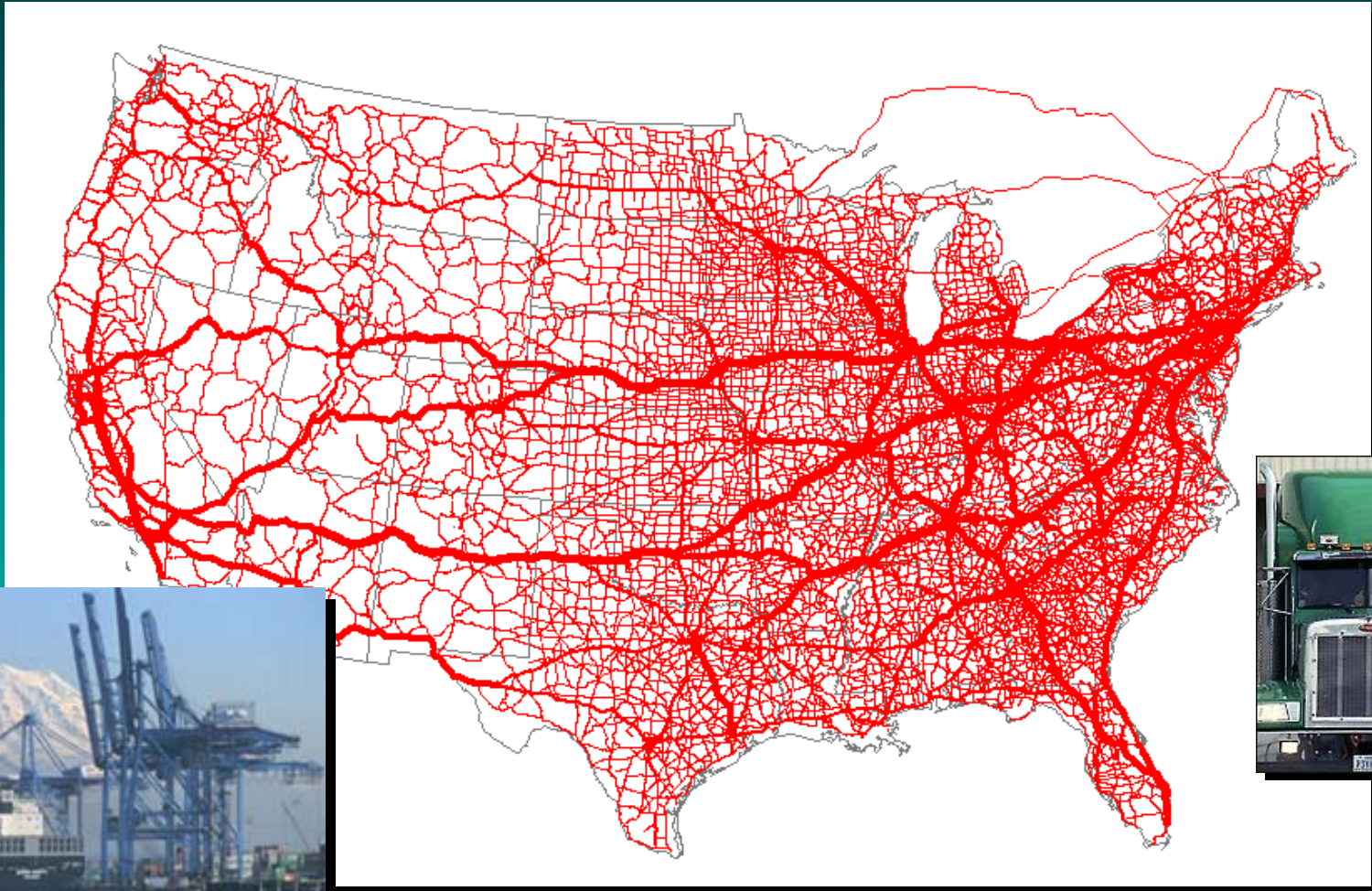
Source: USDOT FHWA Freight Analysis Framework

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2020 Truck Freight Flows

High-Value & Time Sensitive Products



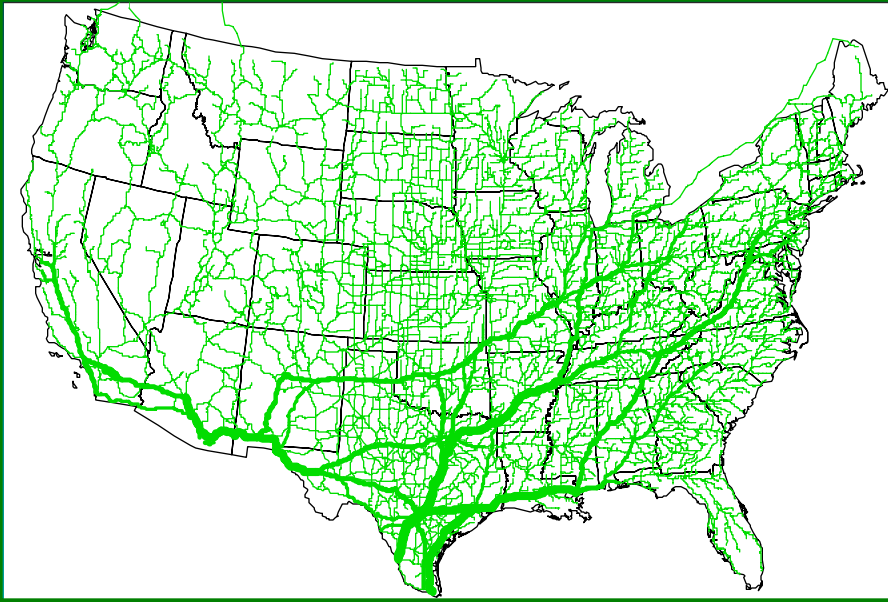
Source: USDOT FHWA Freight Analysis Framework

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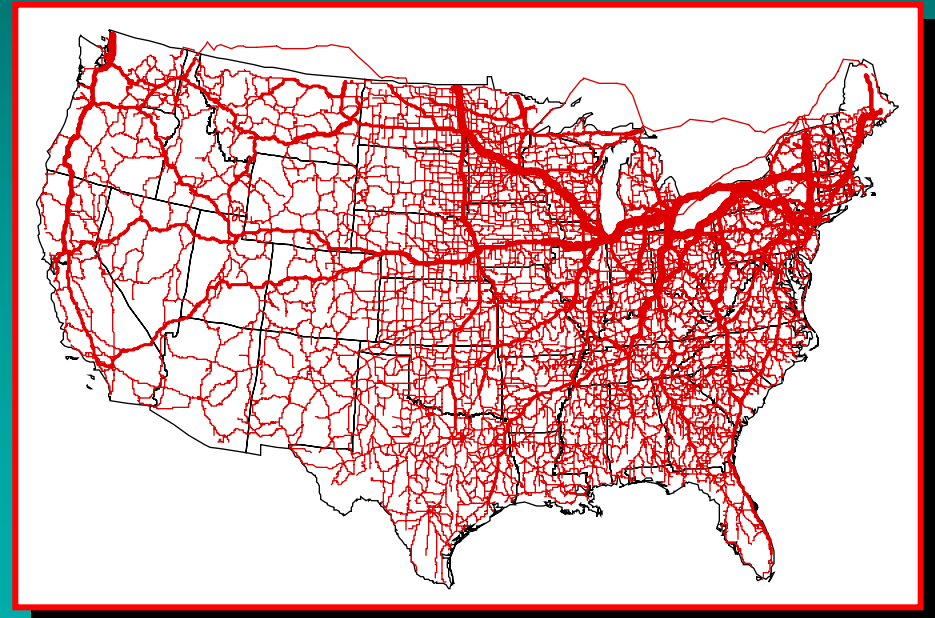
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2020 NAFTA US Truck Traffic Flows

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

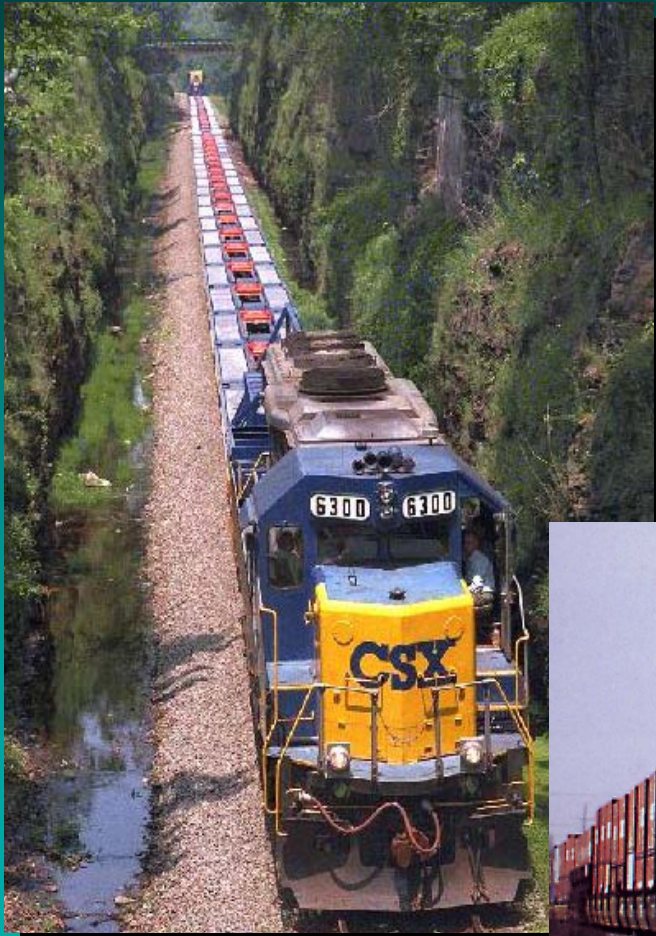
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**North American
Class I Rail &
Intermodal Growth**

North American Intermodal Rail Freight Movement Trends



A scenic view of a stone arch bridge over a river. A train is crossing the bridge. The background shows a forested hillside.

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)

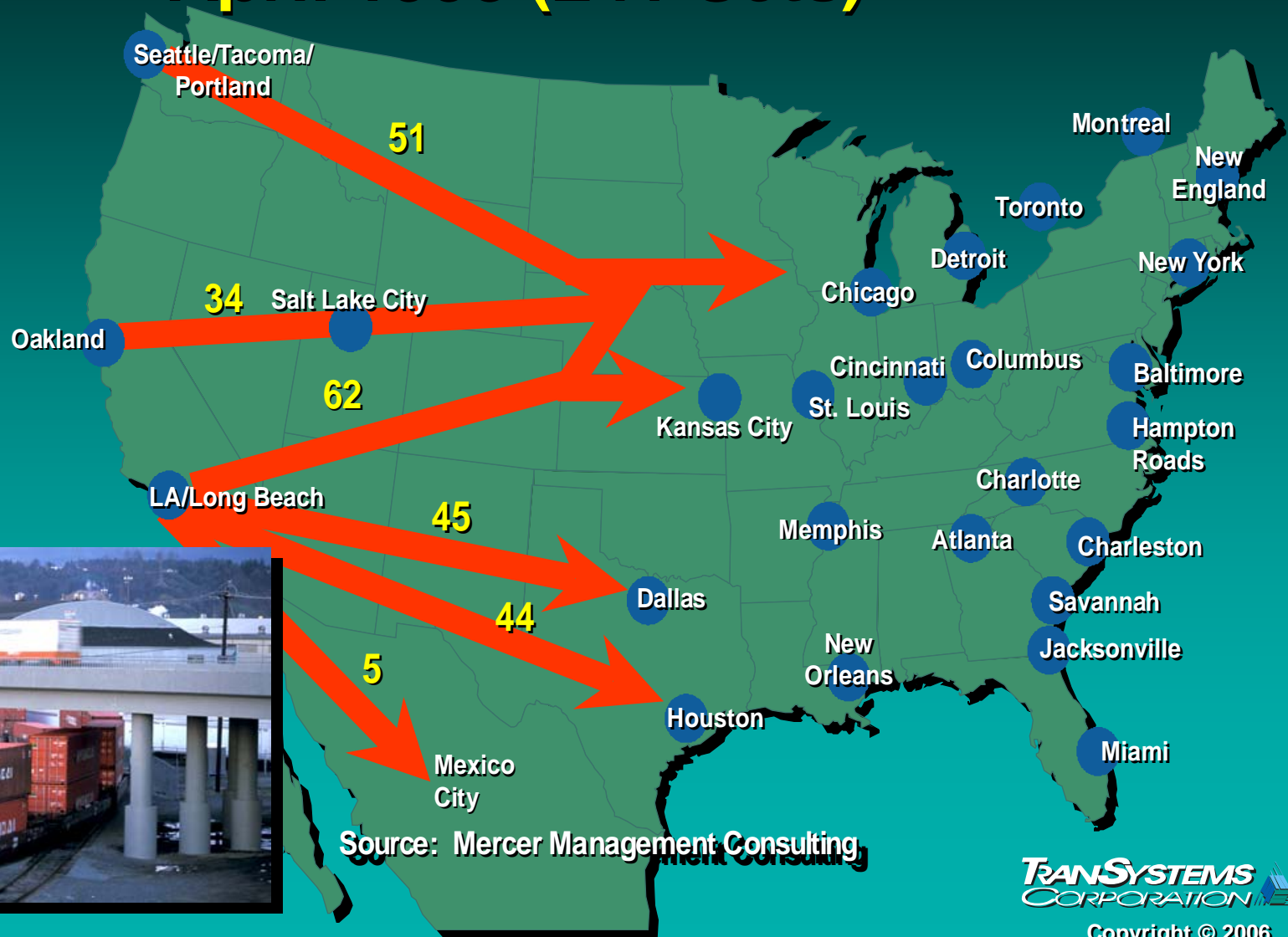


Source: Mercer Management Consulting

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



Source: Mercer Management Consulting

U.S. Double-Stacked Train System

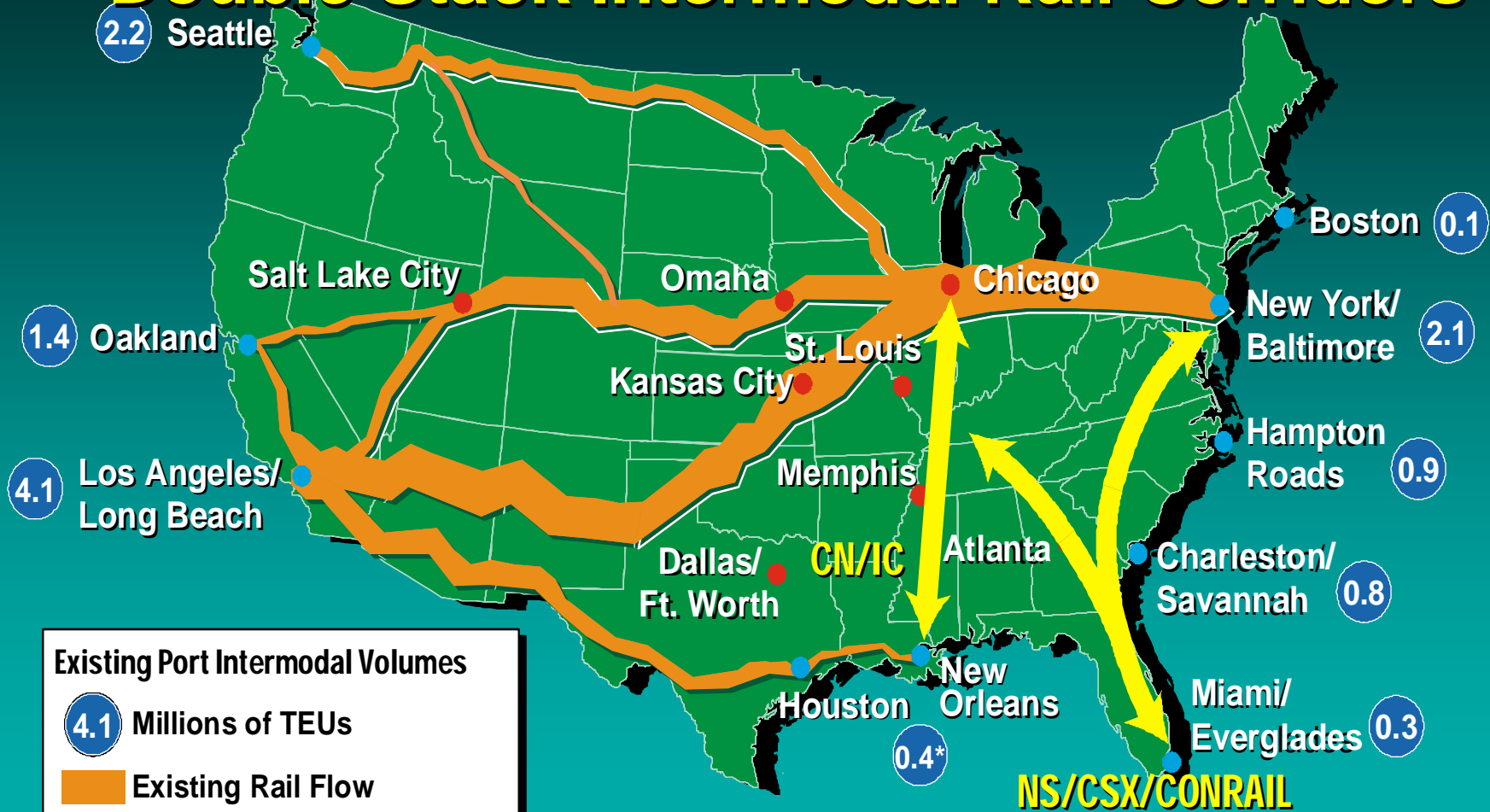


East-West 10,000 ft Train Bypass

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Emerging New North-South Double Stack Intermodal Rail Corridors



* for the region

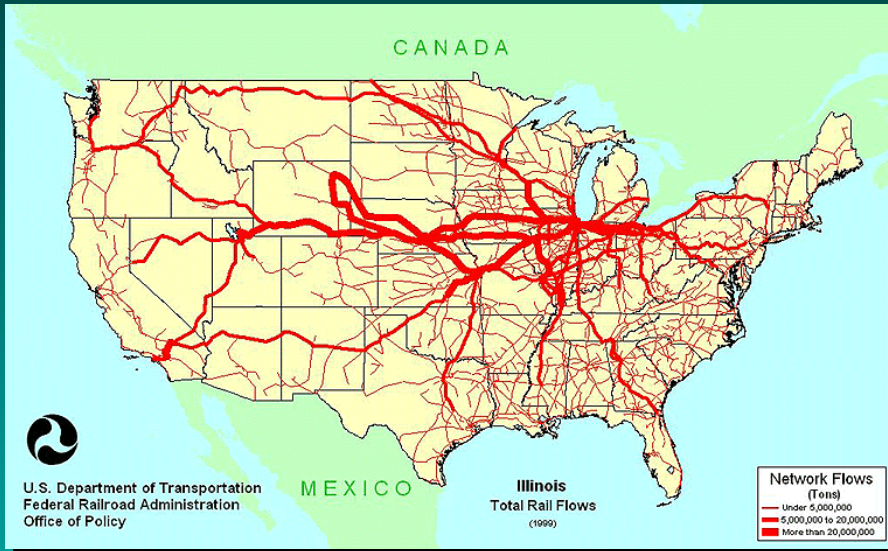
Source: Double-Stack Container Systems:
Implications for U.S. Railroads
and Ports, U.S. DOT/VZM/TranSystems

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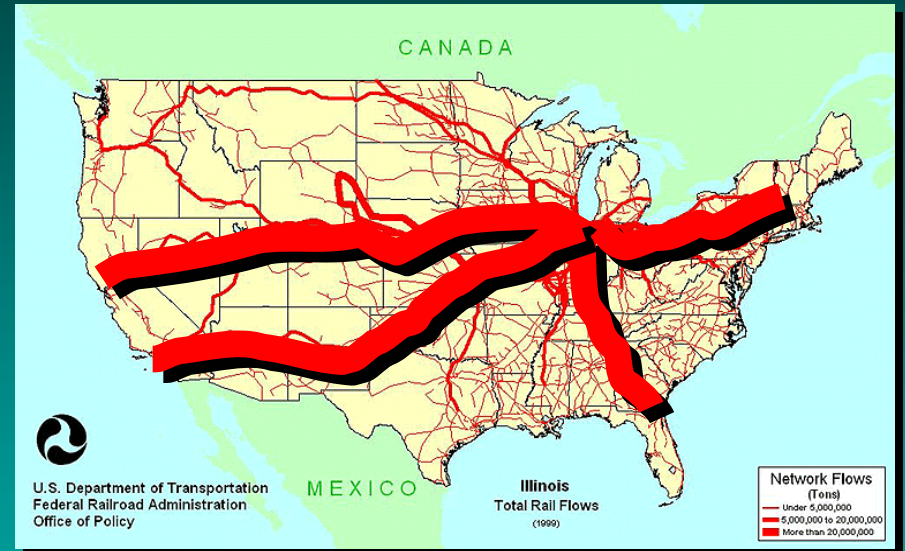
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Future US Rail Traffic Flows

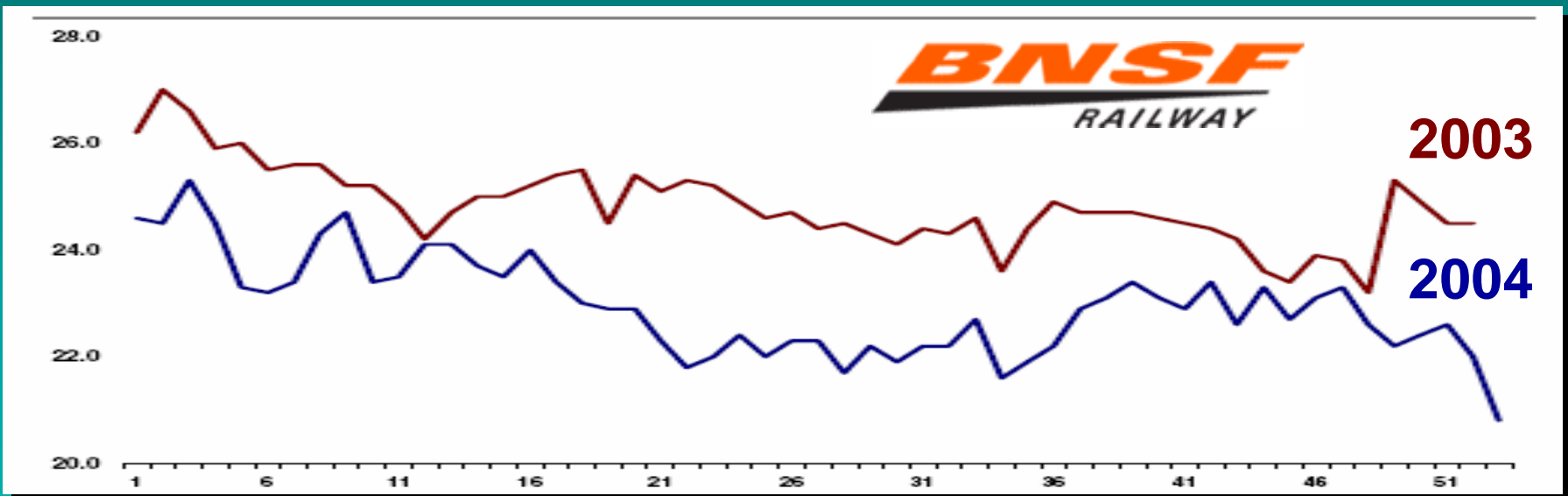
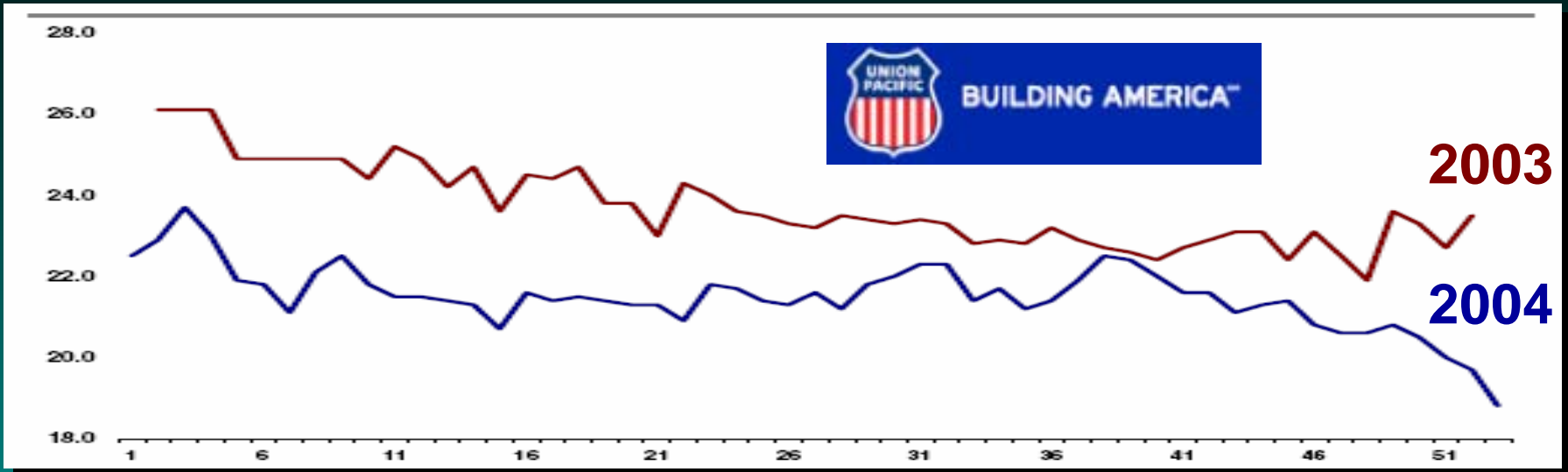
Today



2020



Deteriorating West Coast Rail Performance



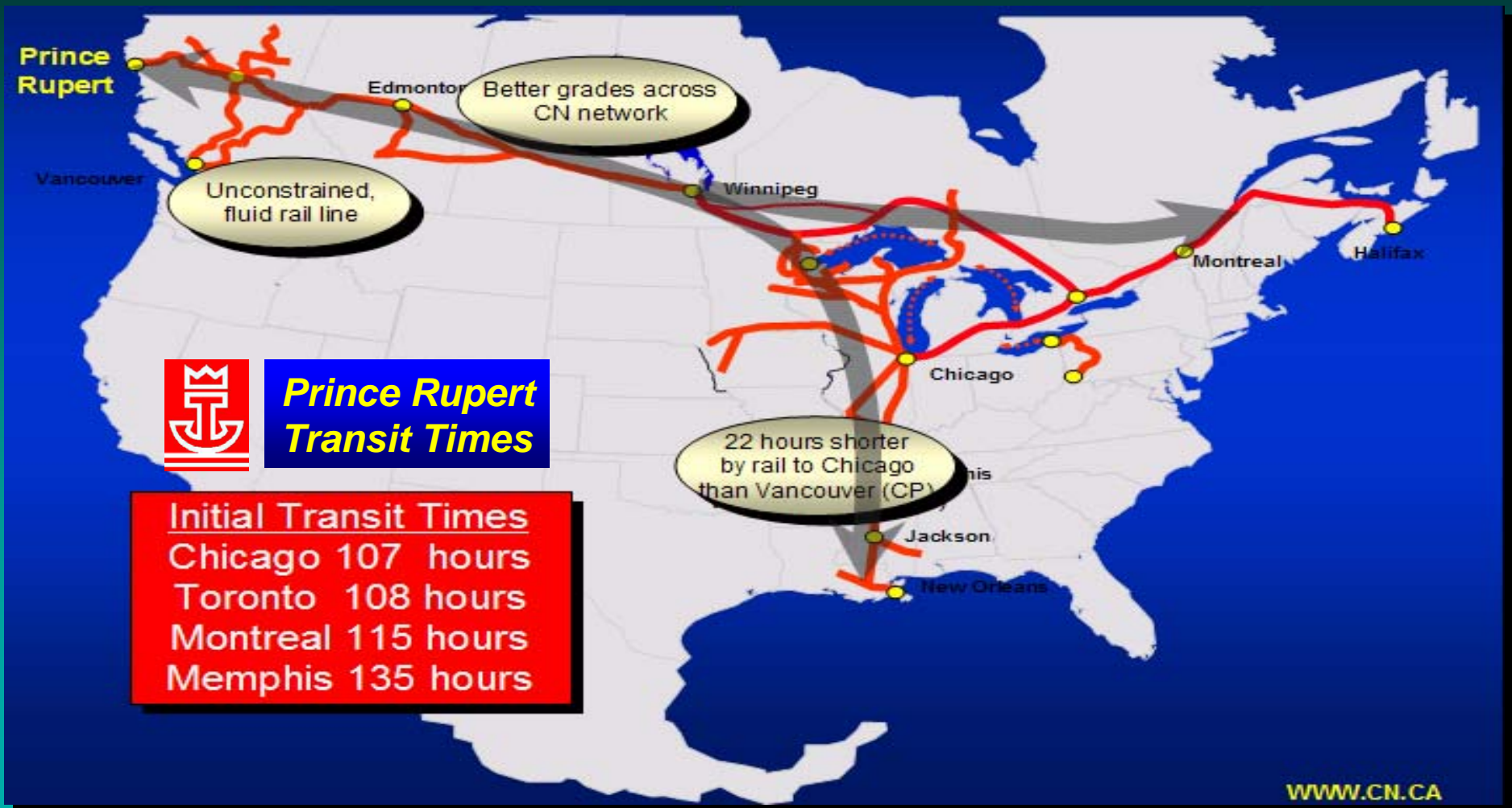
(Average Velocity - MPH)

Source: Credit Suisse First Boston

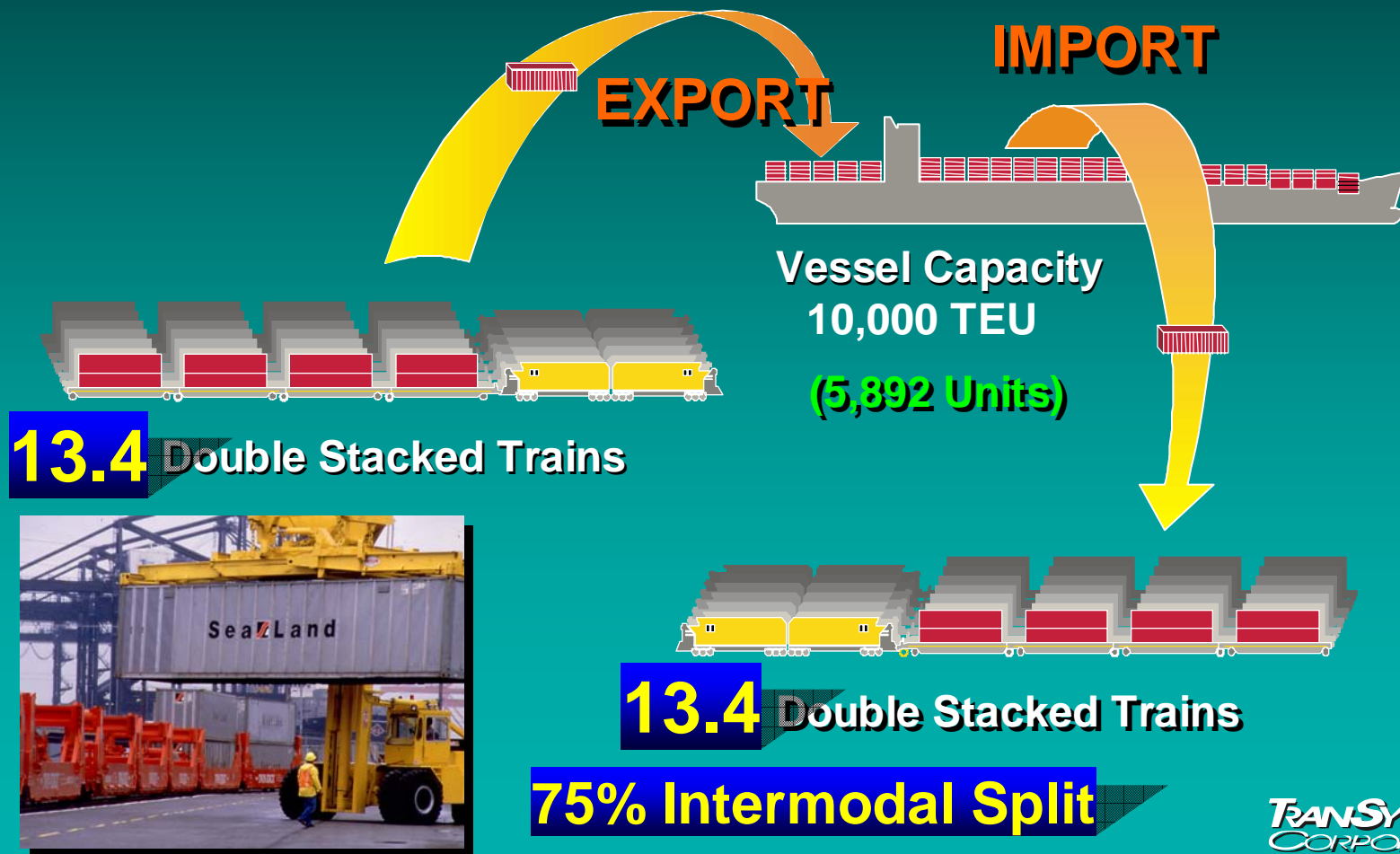
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The Emerging CN Transcontinental Land Bridge



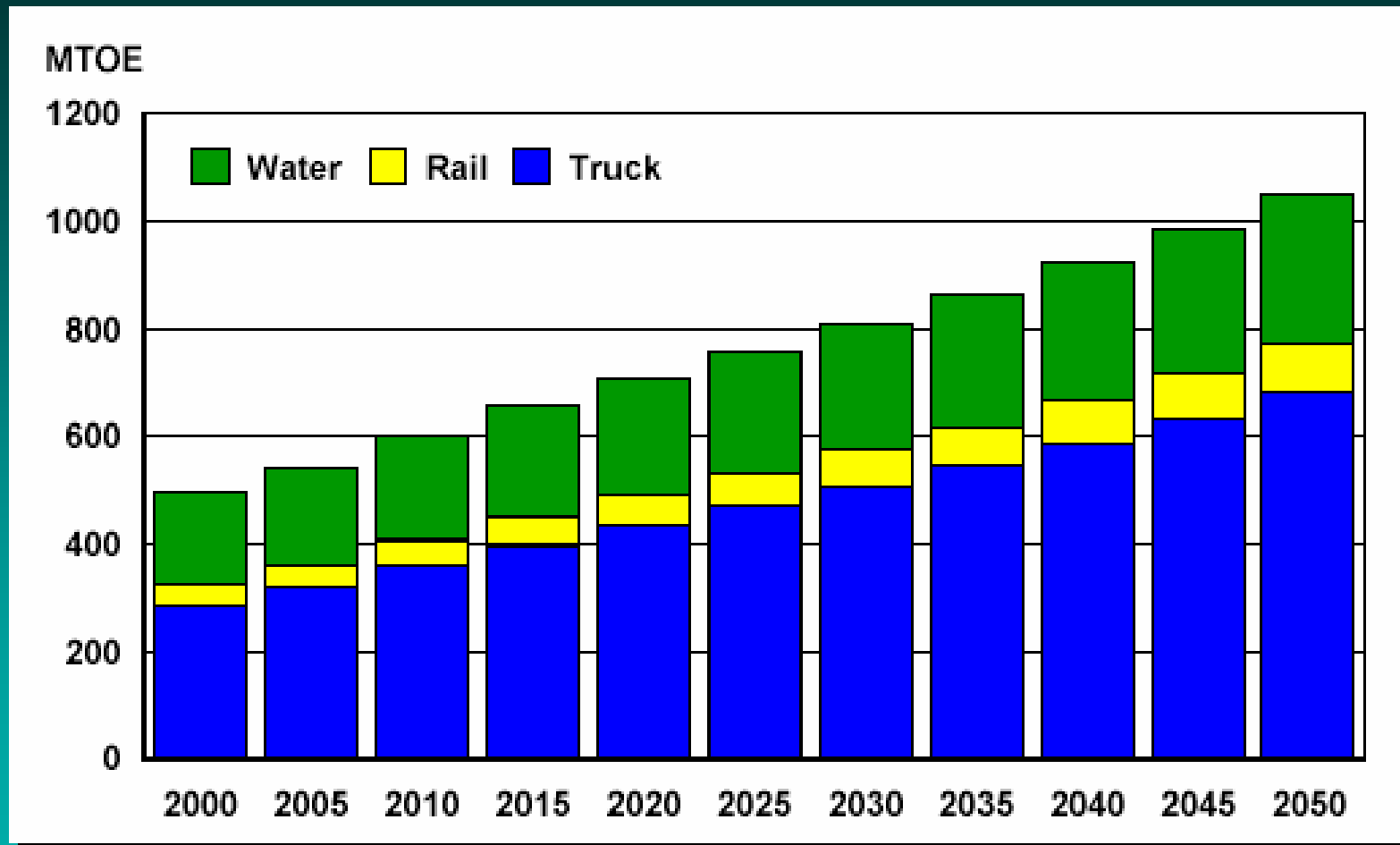
A 10,000 TEU Mega-Container Vessel Can Produce High Intermodal Rail Volumes (One Weekly Vessel Call)





**Growing
Environmental
Concerns for Marine
Vessel Emissions**

Global Freight Energy Use is on the Rise



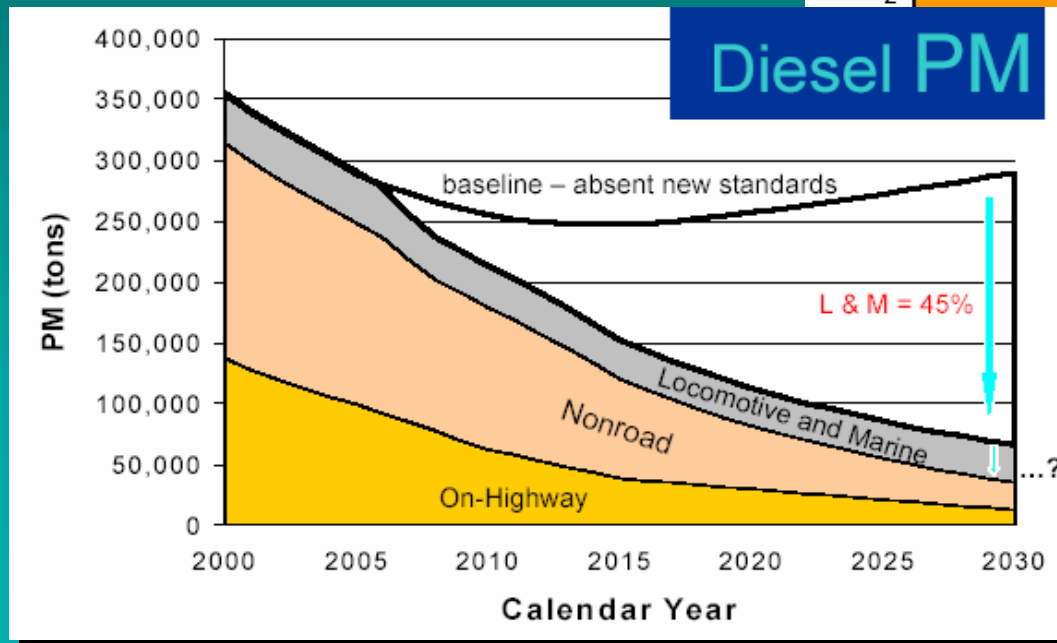
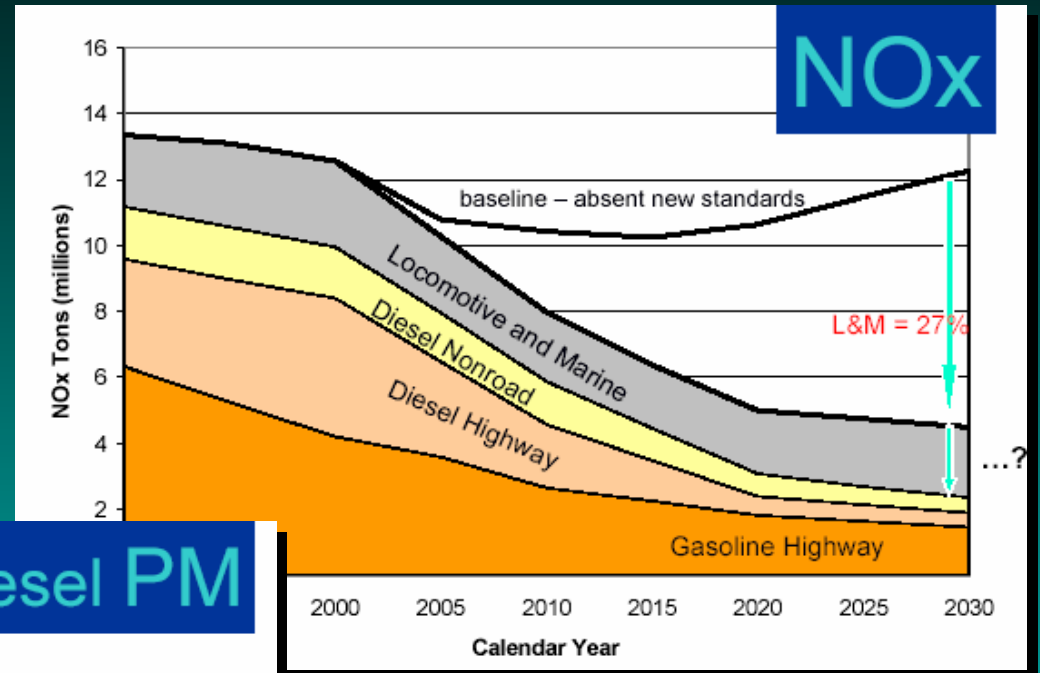
Source: 2005 Haagen Smit Worldwide Emissions Overview & NRDC "Harboring Pollution"

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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

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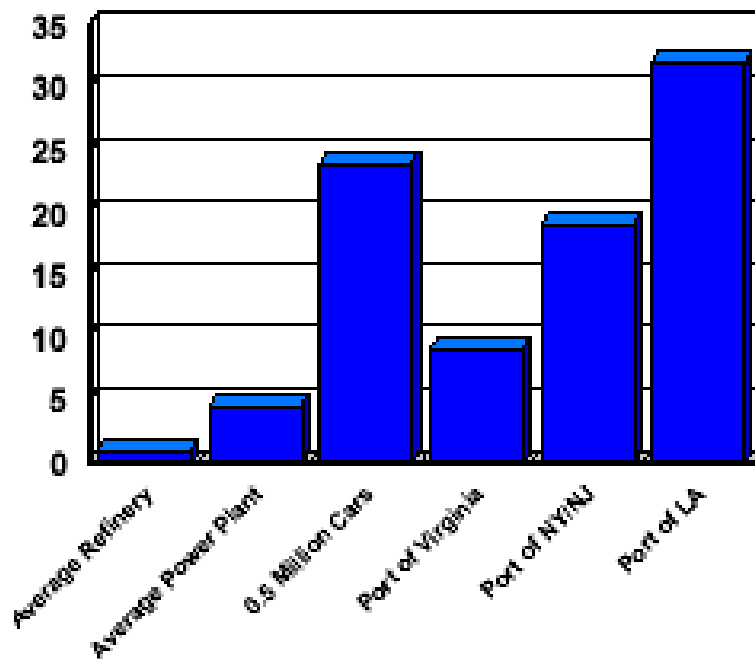
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Pollution Sources

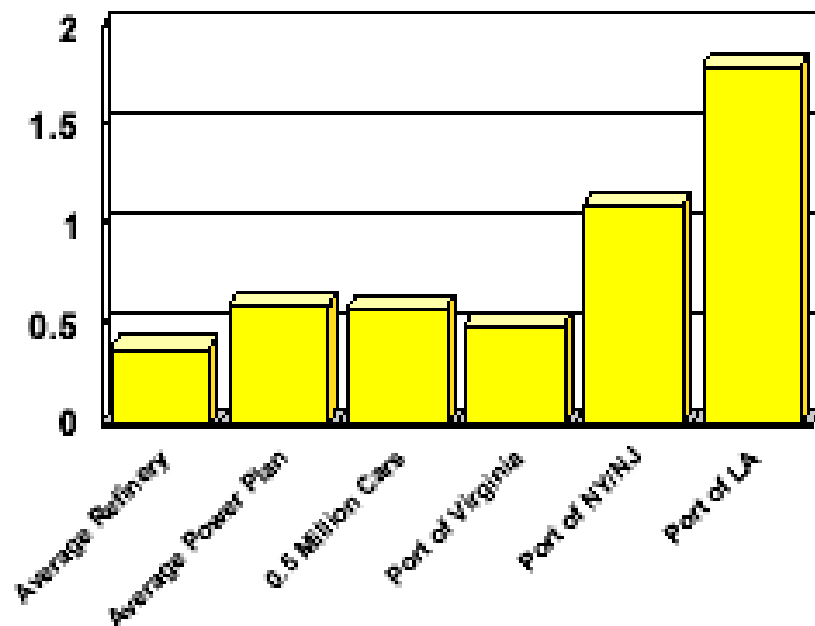
US Ports vs Other Industries...

We Need To Do Better

NOx Emissions
Tons per day



PM10 Emissions
Tons per day



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

Transportation Diesel Pollutants are Putting Our Health in Jeopardy



Diesel PM



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

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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)**



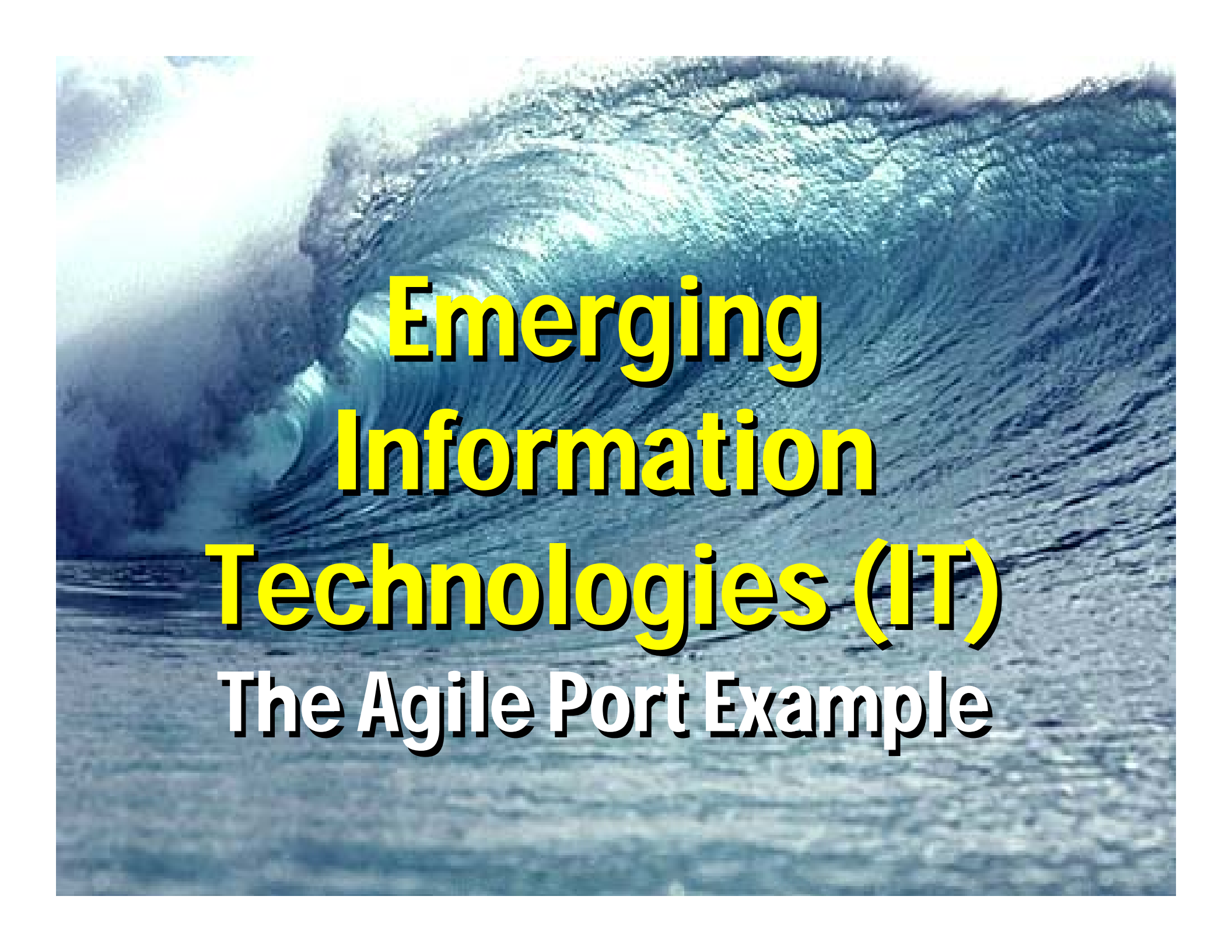
Replace locomotives with cleaner technologies, fuels, and explore rail electrification



Source: Southern California Association of Governments

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**Emerging
Information
Technologies (IT)**
The Agile Port Example

The Burden of Paper...

*“Loading and discharging a 5,000 TEU ship involves close to **40,000 documents** and some 6,000 to 7,000 customs transactions...”*

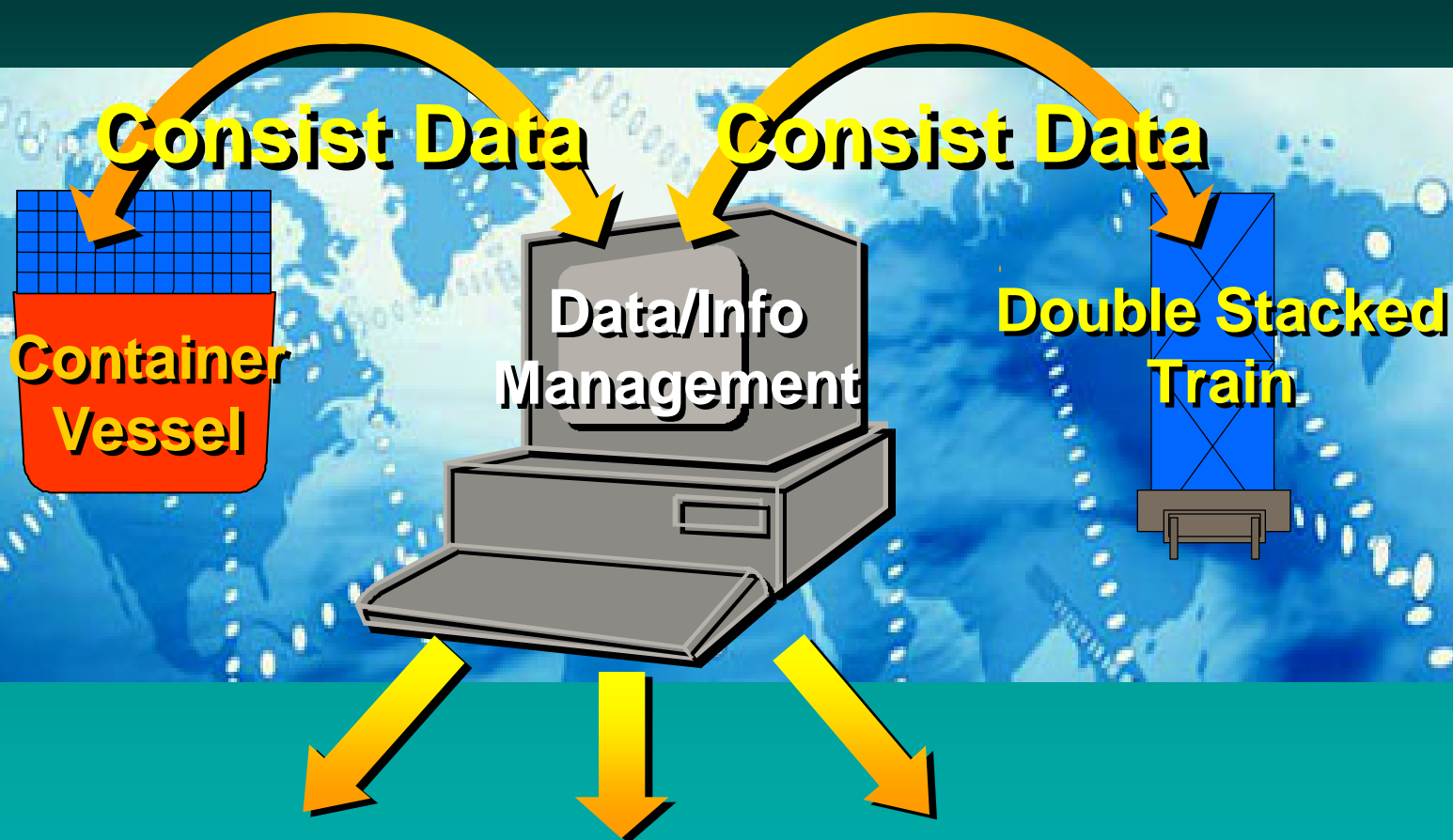
*“The average F.O.B. value is **U.S. \$60,000 per TEU**”*

C. C. Tung
Chairman and CEO
Orient Overseas Ltd. (OOCL)



USDOD Agile Port Information Technology (IT) Developments

IT Data/Information Integration



Major Terminal & Systems Benefits

The Agile Port Concept is not a new technology...

...It is a way of managing and organizing information to reduce container port terminal dwell time & increase terminal capacity.

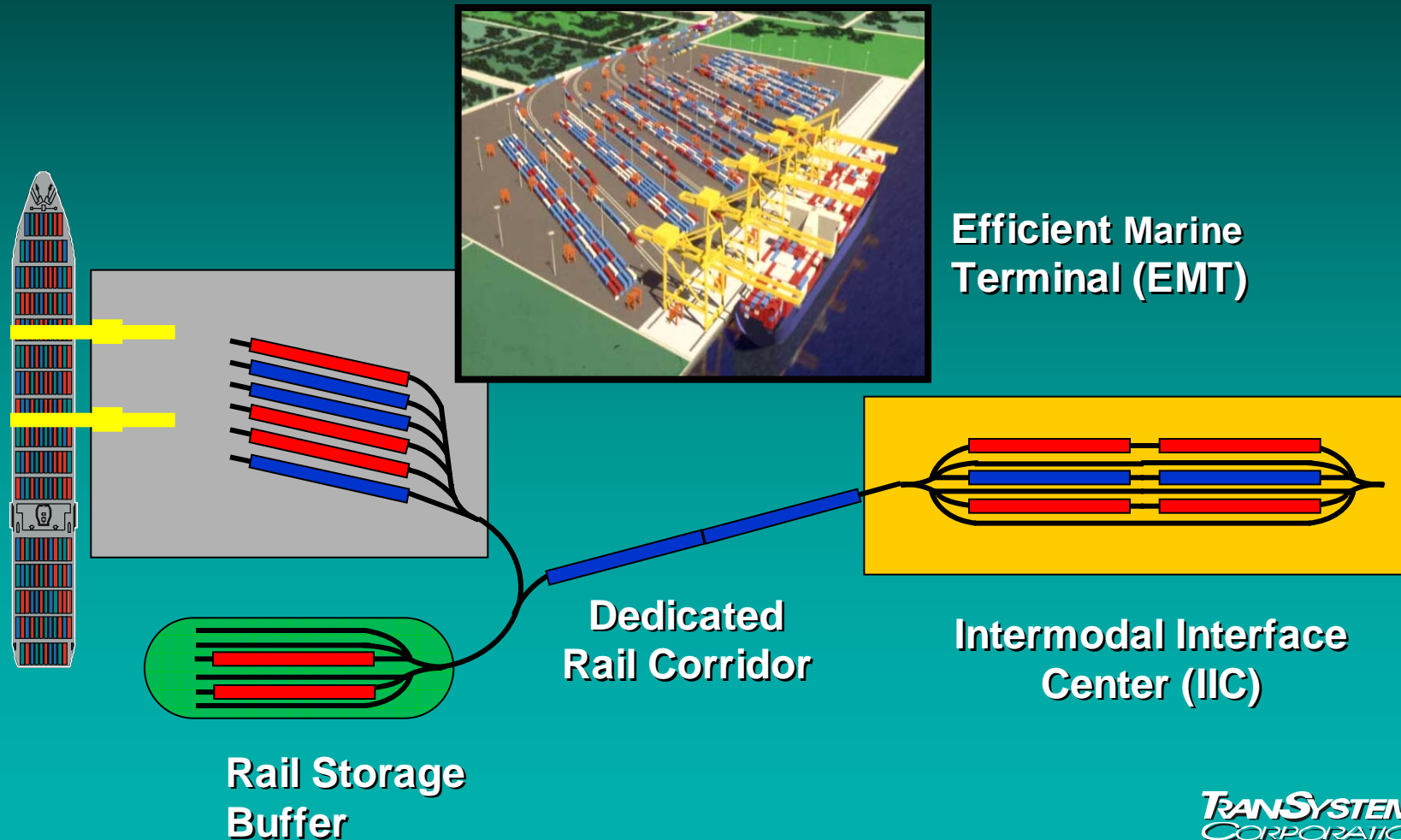


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Agile Port Concepts

Integrating Vessel and Rail Information Systems



USDOD Agile Port Technology Full Scale IT Demonstration Project



**Hyundai Terminal
Washington United Terminals
Port of Tacoma
July 2003**

**Potential: Doubling the
Terminal Capacity without
Building Anything**



Container Dwell:

The Average Length of Time an Average Container Remains on the Terminal

U.S. Marine Container Terminal Dwell:

**6 to 8 Days
(Average)**



**U.S. Intermodal Rail
Terminal Dwell:**

1 1/2 - 2 Day (Average)

**When You Reduce Terminal
Dwell by One Half**

**You Double the Terminal
Throughput...without Building!**

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.**



***Port Competitiveness
in the
New Global Economy***



AAPA

***Executive Management Conference
for Latin America and the Caribbean
Conferencia sobre Administración
Ejecutiva para América Latina y el Caribe***

Thank You