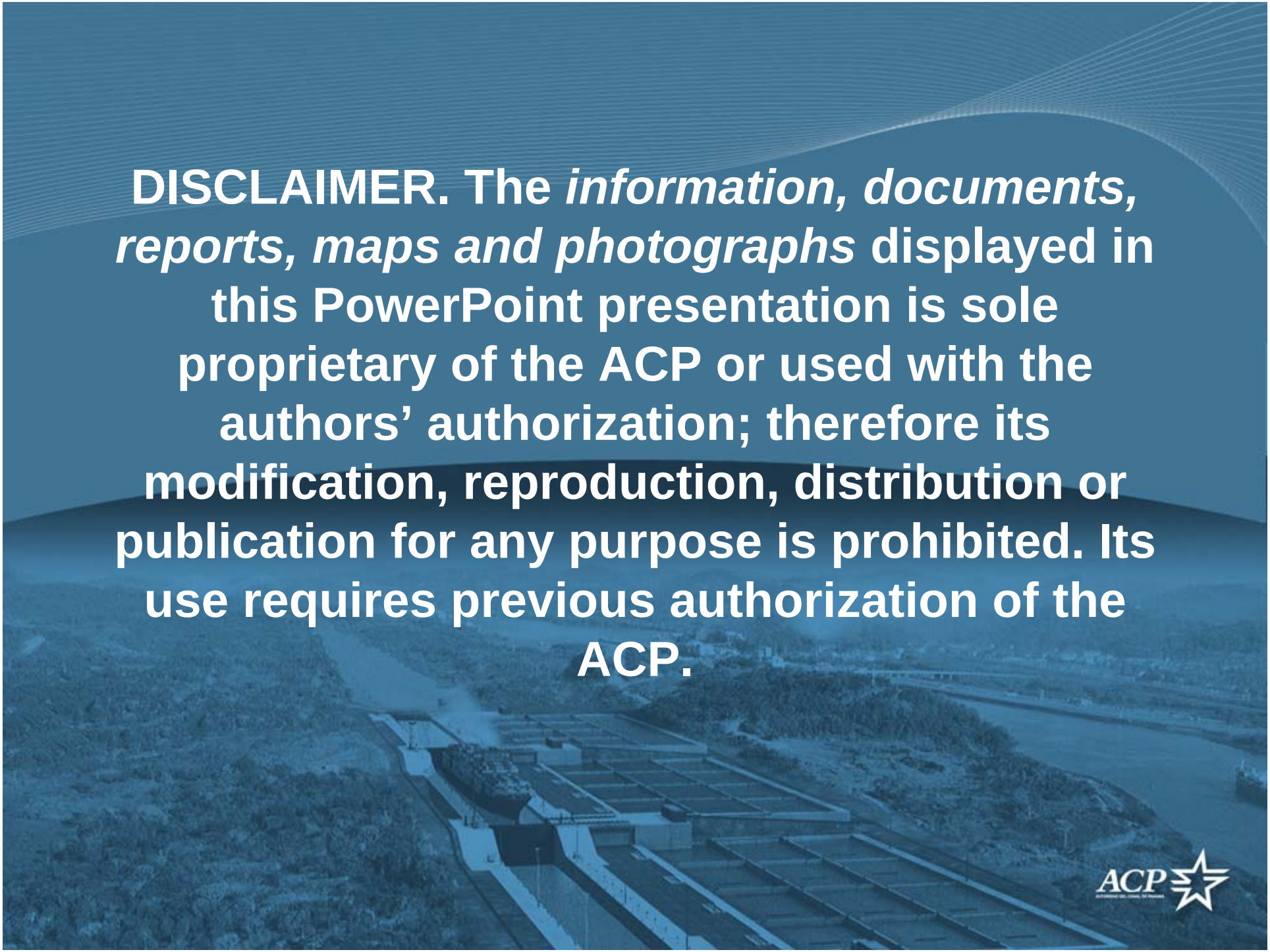
Expansion of the Panama Canal
Potential Impact on Asia – East Coast/Golf Trade

Rodolfo Sabonge
Vice-President, Market Research and Analysis Office
Panama Canal Authority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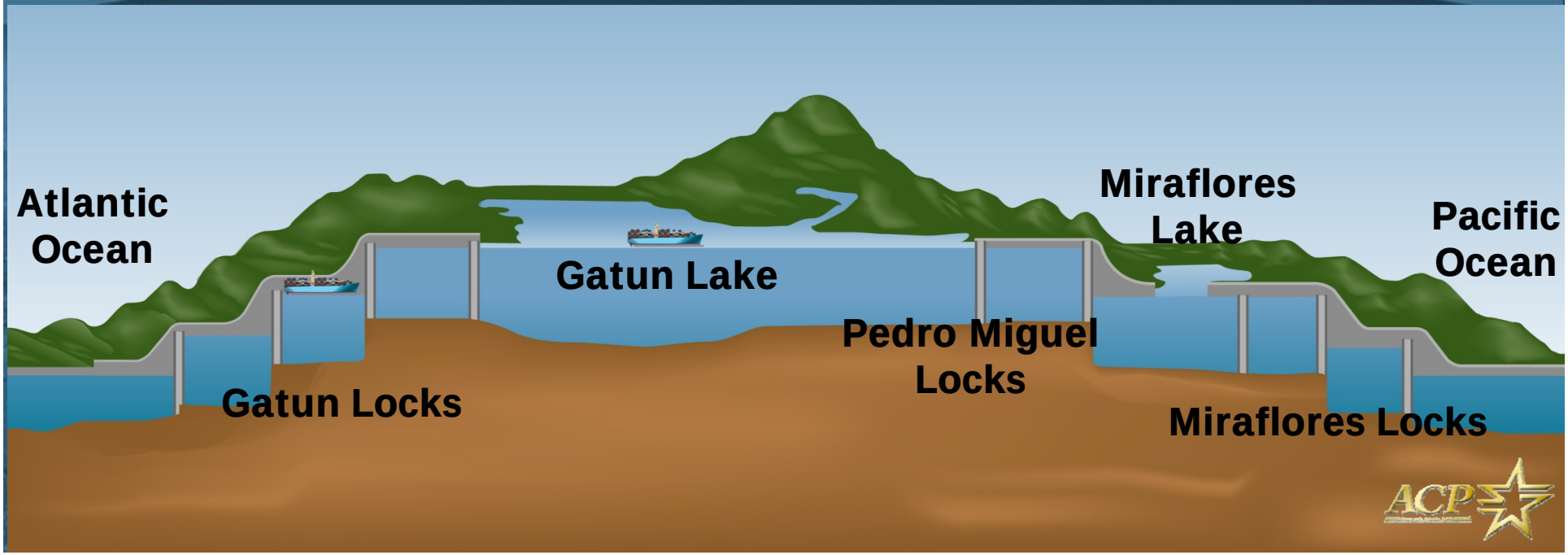
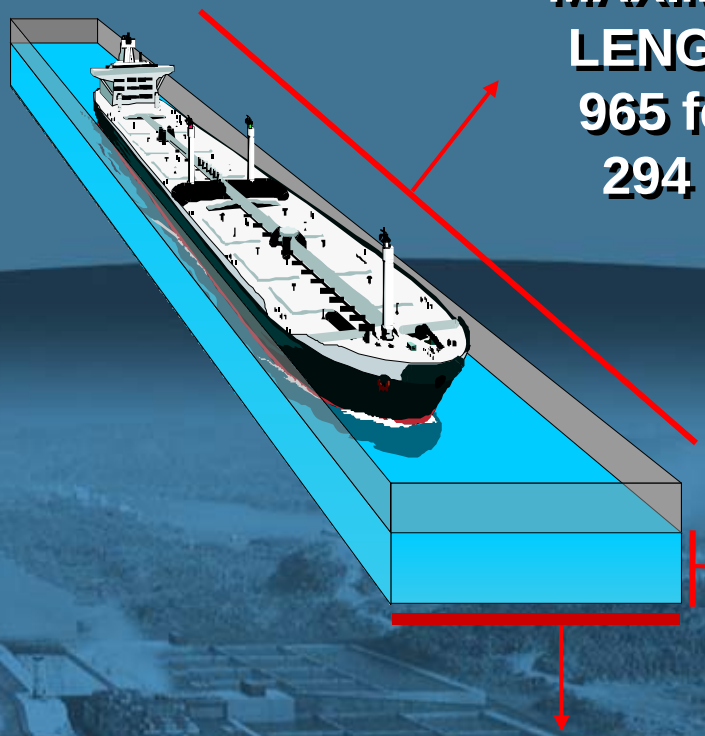
- Introduction
- World Trade and Canal Traffic
- Update on the Panama Canal Expansion Program
- Potential Changes in Trade Patterns

The Panama Canal

- Approx. 50 miles (80 km) long between the Atlantic and Pacific Oceans
- Gatun Lake is 85 feet (26 m) above sea level
- The water used to raise and lower vessels in each set of locks comes from Gatun Lake by gravity (approx. 52 million of gallons per transit)
- Transferred to the Republic of Panama at noon, Dec. 31, 1999.



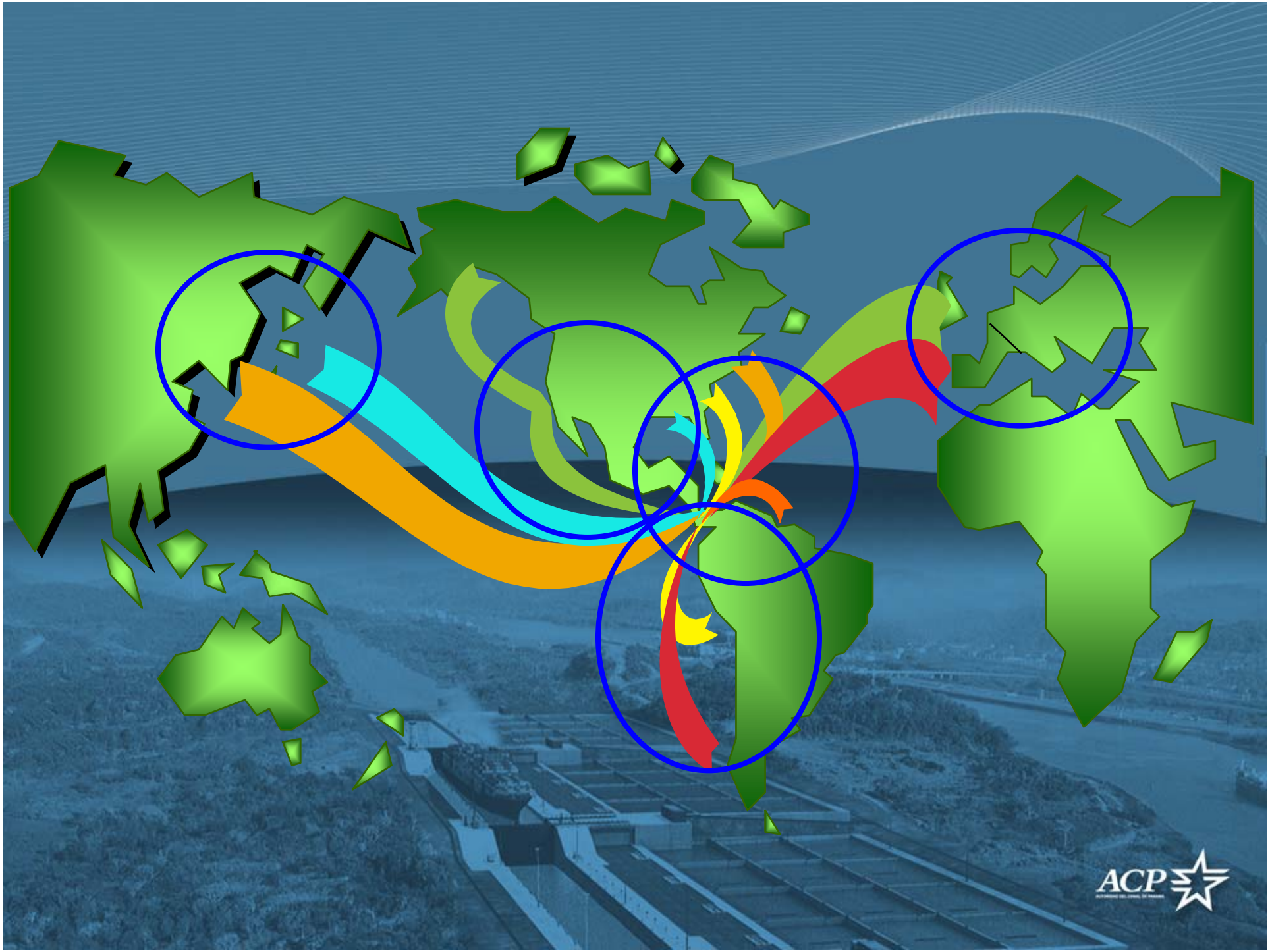
EXISTING PANAMAX VESSEL



MAXIMUM
LENGTH
965 feet
294 m

MAXIMUM DRAFT
39.5 feet
12 m

MAXIMUM BEAM
106 feet
32.5 m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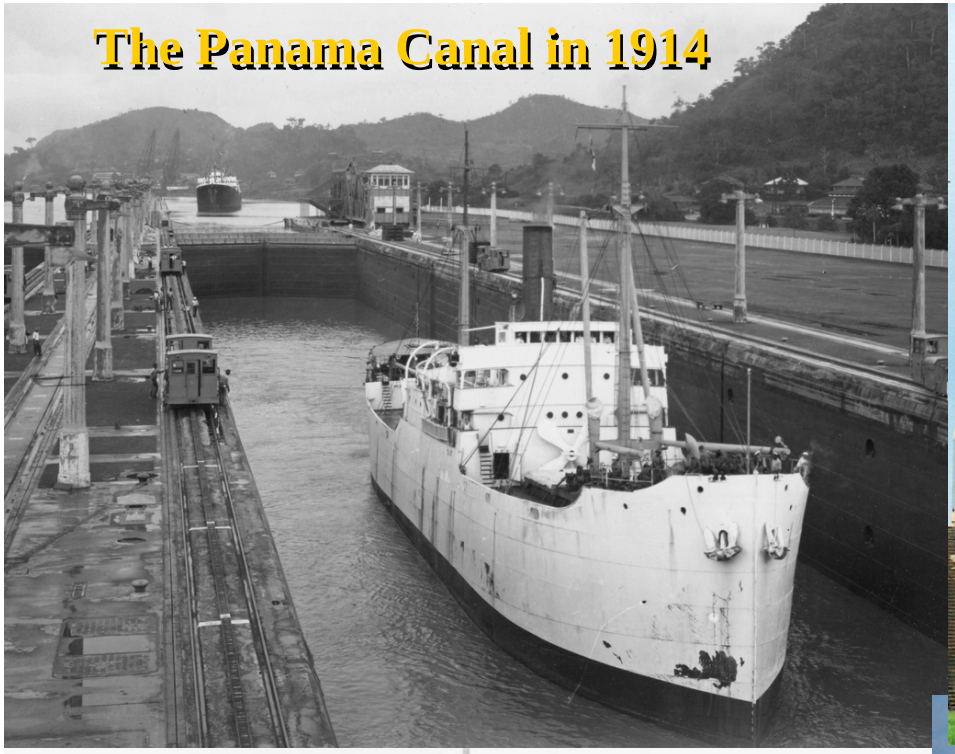
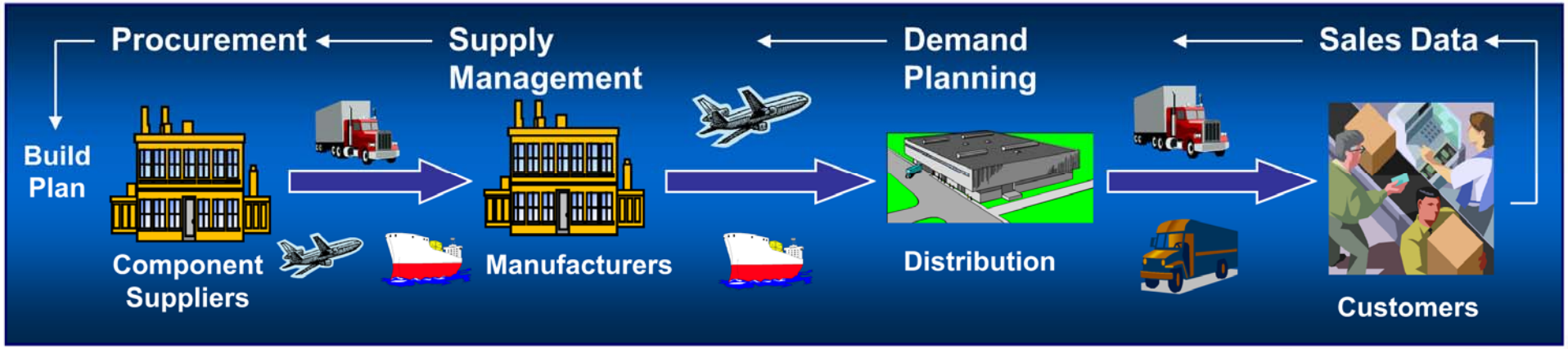

The Panama Canal in 1914


The Panama Canal today
NIPPON HIGHWAY
A CANAL FOR THE NEW MILLENIUM


NASHABA

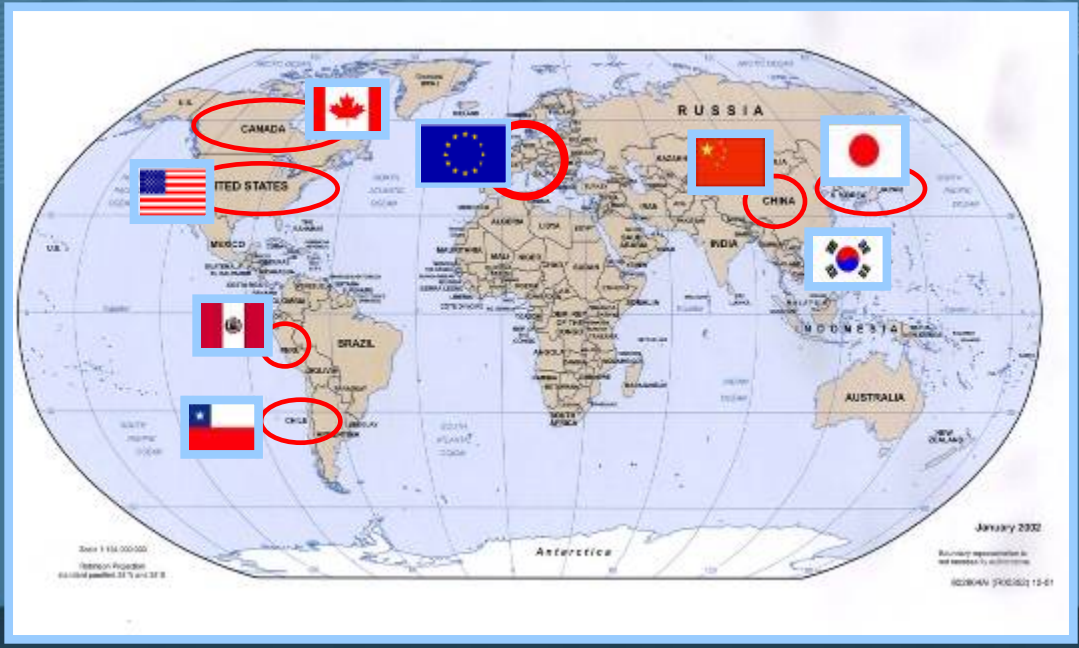

ALLIGATOR LIBERTY OSAKA

EVOLUTION OF SUPPLY CHAIN MANAGEMENT AND LOGISTICS



The Panama Canal Trade and Main Users

In the relevant routes (Asia-east coast of the United States) the Panama Canal transported 43.0% of the Panama Canal trade cargo in 2008.



64% of Canal cargo traffic originates in or is destined to the United States

Total Cargo Movement FY 2008 ** Measured in Million of Long Tons*

USERS	FY 2007*	FY 2008*	2008 (%)
United States	136.8	133.7	64
China	43.7	43.7	21
Chile	22.0	26.7	13
European Union	26.5	26.1	12
Japan	29.2	24.7	12
South Korea	17.3	17.3	8
Peru	13.1	14.1	7


VANCOUVER
SEATTLE
PORTLAND
OAKLAND
LOS ANGELES
LONG BEACH
SAN DIEGO
SAINT JOHN
HALIFAX
BOSTON
NEW YORK / NEW JERSEY
PHILADELPHIA
BALTIMORE
NEWPORT NEWS
NORFOLK
CHARLESTON
SAVANNAH
BRUNSWICK
JACKSONVILLE
WILMINGTON
MOBILE
SOUTH LOUISIANA
PORT ARTHUR
HOUSTON
GALVESTON
NEW ORLEANS
CORPUS CHRISTI
TAMPA
PORT EVERGLADES
FREEPORT
MIAMI
COLON CONTAINER TERMINAL
MAZATLAN
ALTAMIRA
TAMPICO
HAVANA
KINGSTON
SAN JUAN
VERACRUZ
MANZANILLO CRISTOBAL
PUERTO PLATA
MANZANILLO
LAZARO CARDENAS
RIO HAINA
BELIZE
SANTO TOMAS DE CASTILLO
PUERTO BOLIVAR
AMUAY
CARDON
PUERTO QUETZAL
PUERTO CORTES
PUERTO CABELLO
CORINTO
PORT OF SPAIN
PUERTO LIMON
EL PALITO
LA GUAIRA
MARACAIBO
EL GUAMACHE
PUERTO SUCRE
PUERTO CALDERA
GUANTA
SANTA MARTA
BARRANQUILLA
CARTAGENA
PANAMA CANAL
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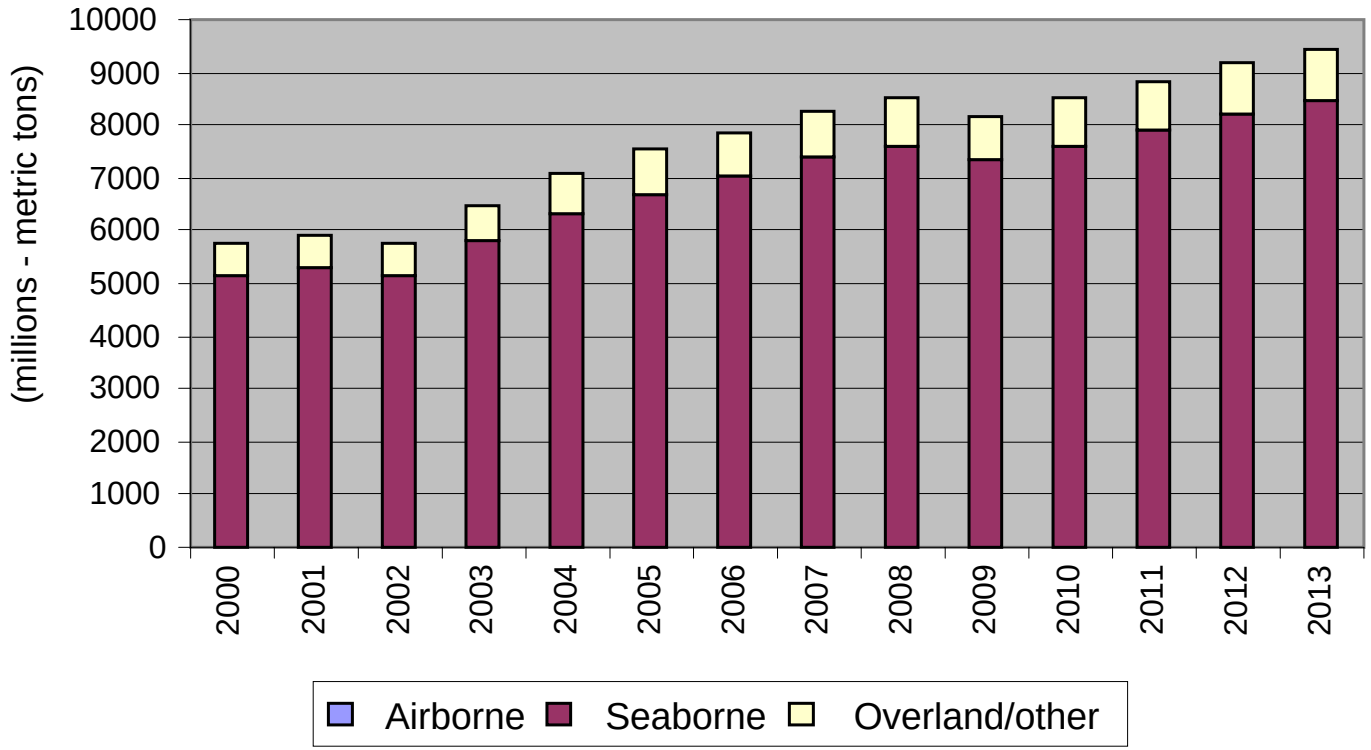
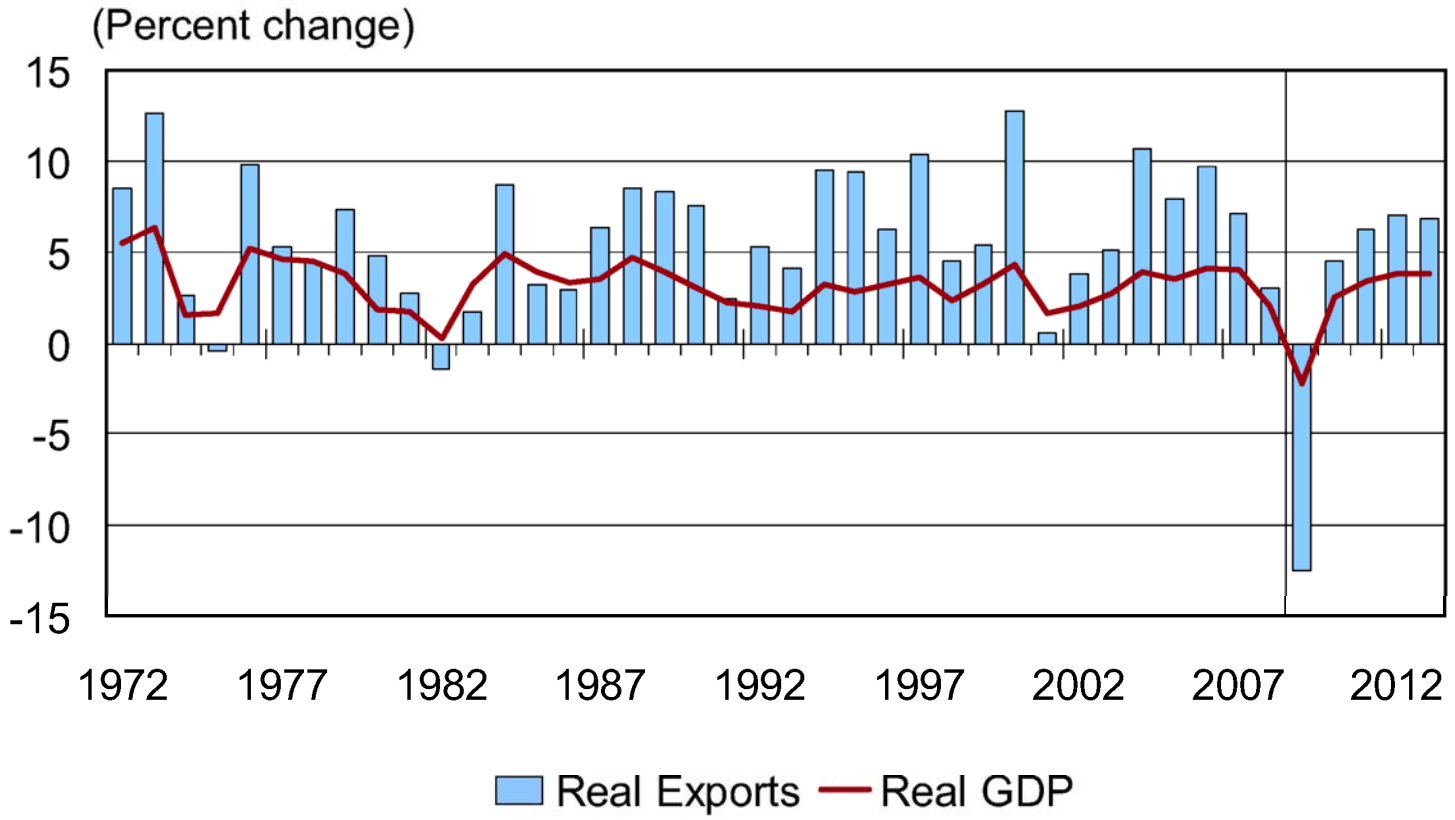
Total World Trade by Mode



Tonnage growth	2006	2007	2008	2009	2010
Airborne	7.9%	9.5%	-4.6%	-18.6%	6.6%
Seaborne	5.1%	4.6%	3.4%	-3.8%	3.9%
Overland/other	-1.3%	8.2%	3.0%	-6.3%	4.0%

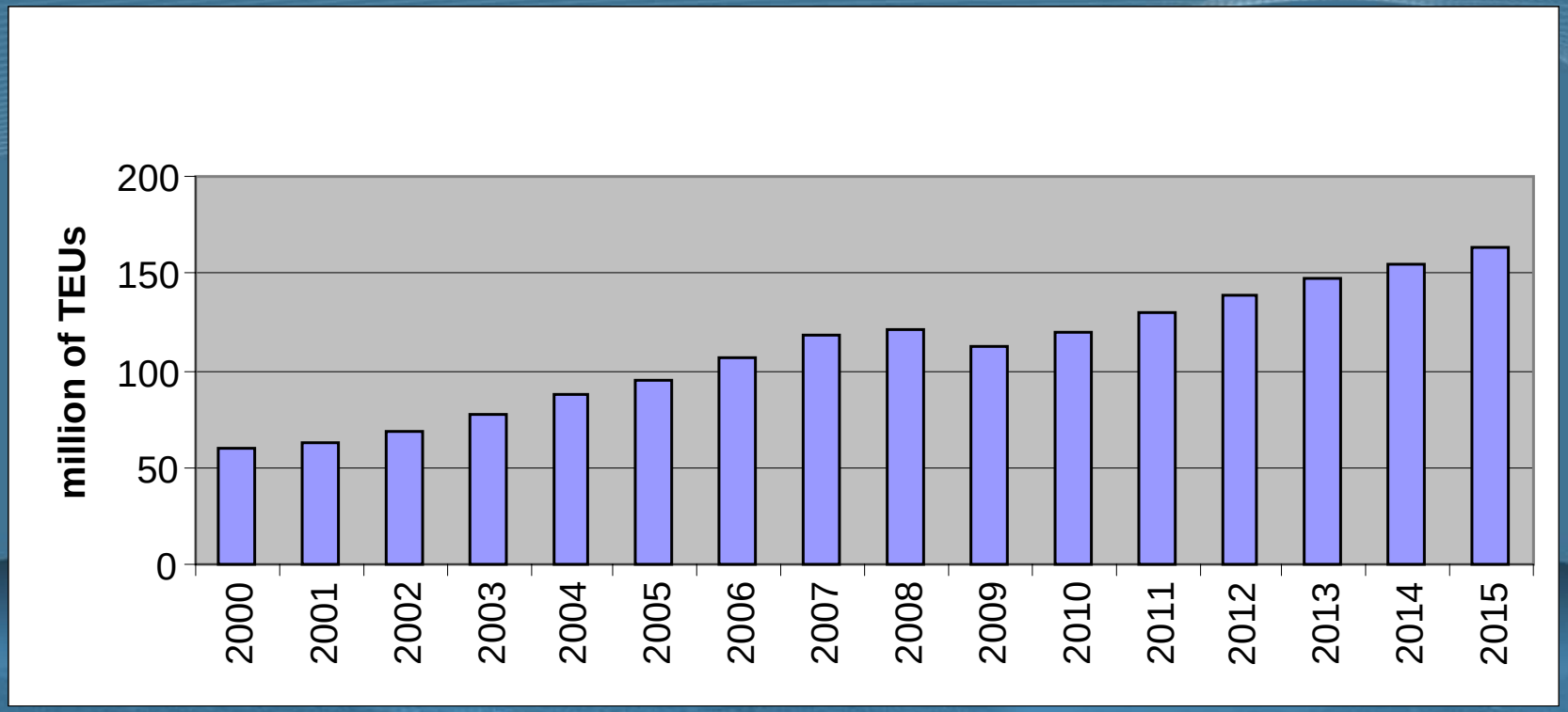
Source: Global Navigator IHS Global Insight, June 09

World Trade Outlook: Export / Import Volumes Recover in 2010 from Dramatic Decline in 2009



Source: IHS Global Insight

Total Container Trade



Containerized trade (million TEUs)

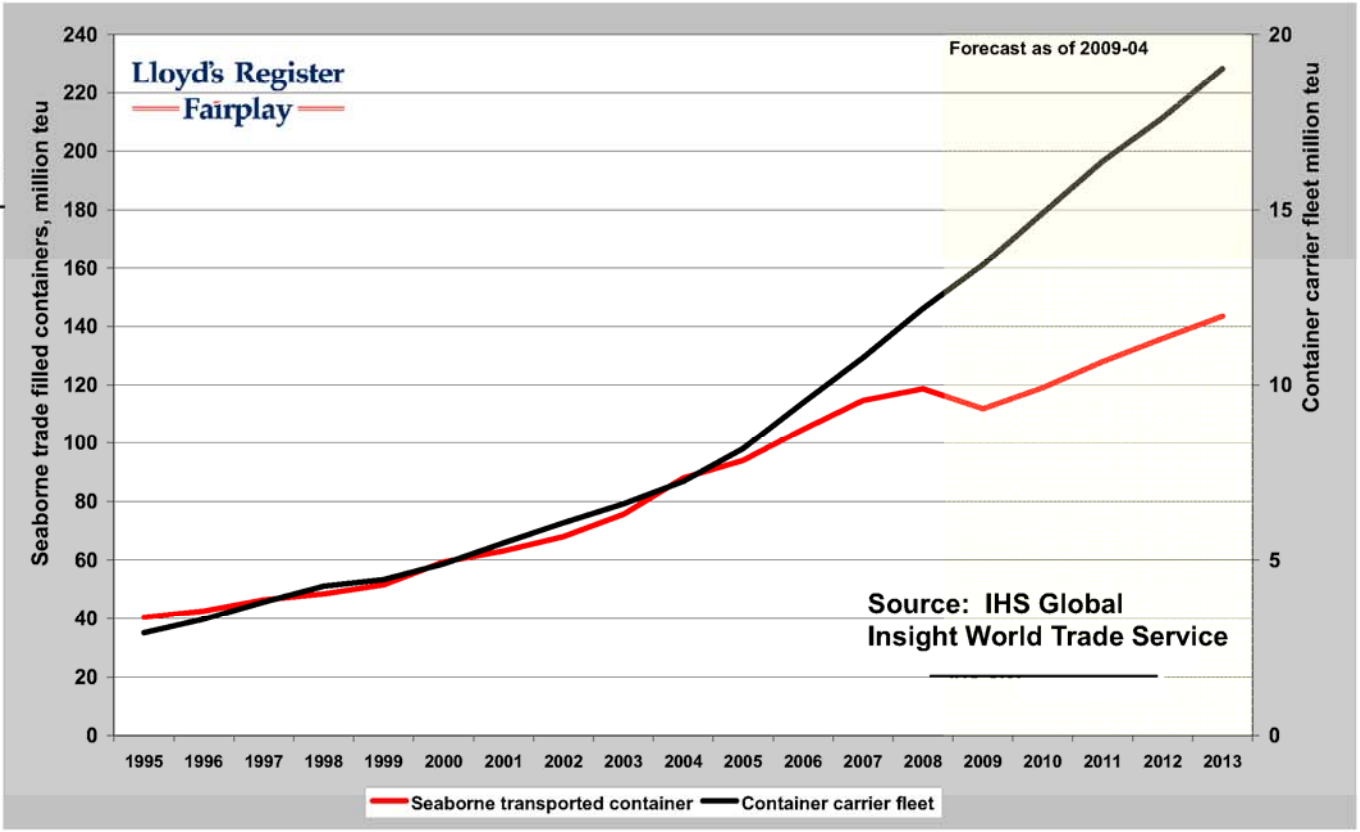
Exporter	2007	2008	2009	2010	growth rate 2010-2024
China	31.2	31.5	28.5	31.6	7.1%
Japan	7.1	7.1	6.4	6.7	4.3%
South Korea	5.5	5.7	5.5	5.7	5.5%
Taiwan	4.3	4.4	4.1	4.3	4.2%
USA	9.7	11.2	9.3	9.7	3.8%

Source: Global Trade Navigator, Global Insight, June 09

Panama Suez

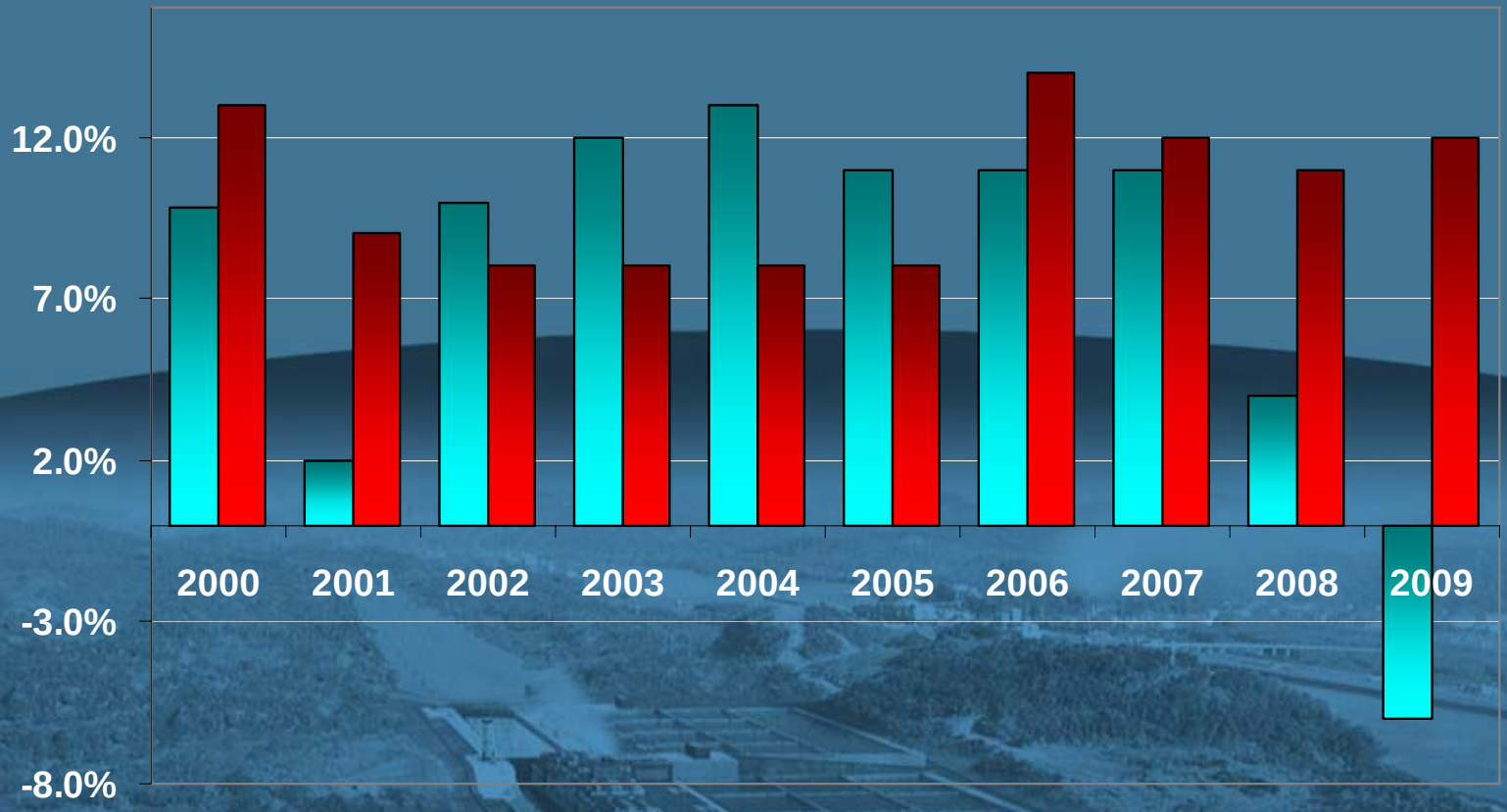
Containership Supply / Demand Has Huge Imbalance

Even with recovery in the economy, slow-steaming, new routes, and transport of empties the extra capacity is evident



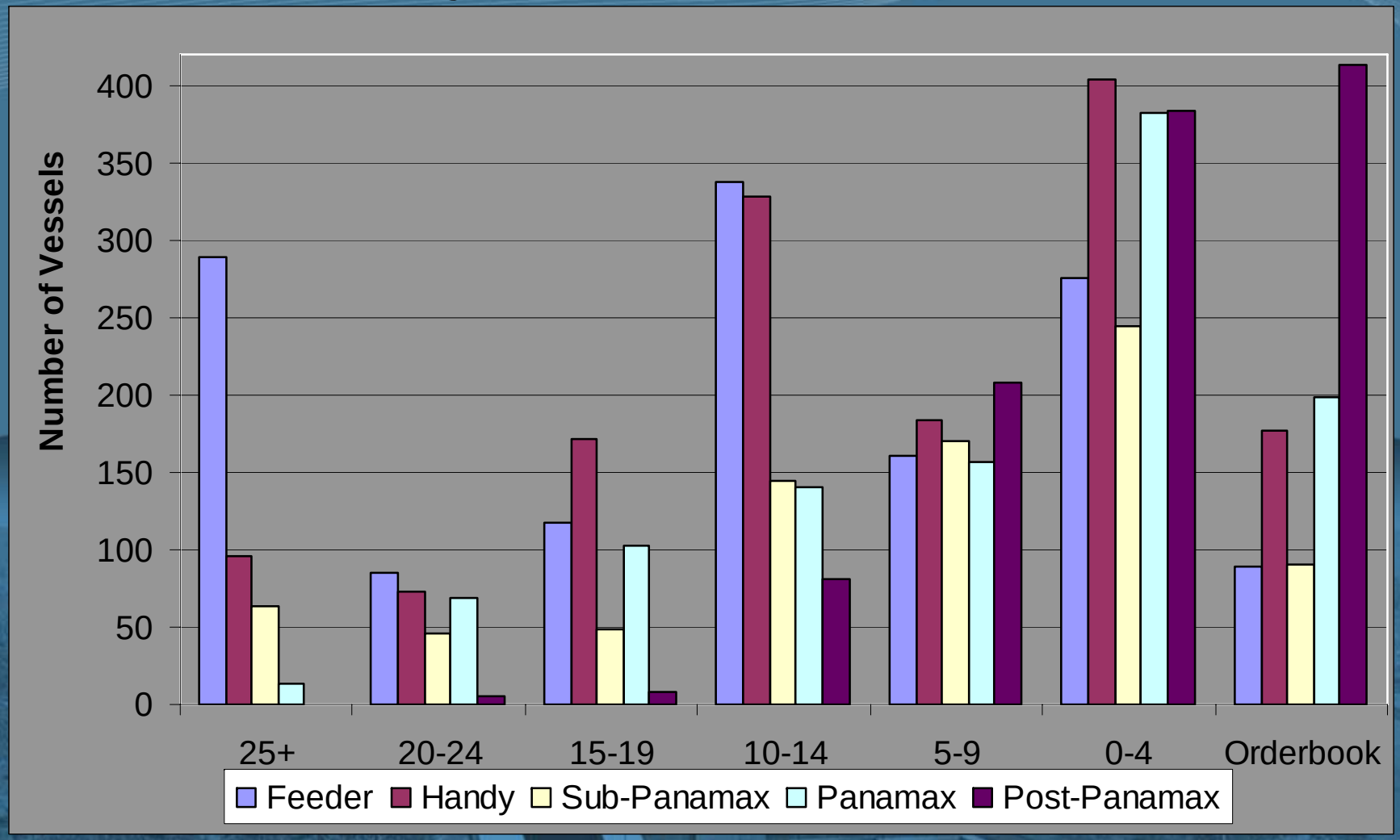
Sustained financial pressures on carriers affect services

Container Trade & Capacity Supply/Demand Balance



Source: Clarkson's Research Studies (June 2009)

Age of Full Container Fleet by Size and Orderbook



Source: Clarkson's Reaserch Studies – August 2009

Post-Panamax Fleet
Full Container Vessels

Shipping Line	Post-Panamax Existing Fleet Full Container Vessels (Sept. 2009)			Orderbook - Post-Panamax Full Container Vessels			Total Fleet - 2012	
	TEU Capacity	TEU Range	Existing Post-Panamax	TEU Capacity in order	TEU Range	In order Post-Panamax Vessels	Total Post-Panamax	Total TEU Capacity
Maersk Line 1/	727,724	3,700-13,500	94	218,200	4,500-7,450	38	132	945,924
Mediterranean Shipping (MSC)	404,308	4,469 - 13,800	47	133,400	12,400-13,800	10	57	537,708
CMA-CMG	213,702	5,700 - 11,356	27	331,553	3,600-13,300	37	64	545,255
Evergreen	200,478	5,364 - 7,024	33	N/A	N/A	N/A	33	200,478
Hapag Lloyd Cont.	97,613	7,719 - 8,750	12	122,500	8,750	14	26	220,113
China Shipping	143,522	5,618 - 9,580	21	106,368	13,296	8	29	249,890
Hanjin Shipping Co.	90,366	5,302 - 6,655	15	92,900	8,580-10,000	10	25	183,266
Coscon	165,238	5250 - 10,050	24	108,000	13,500	8	32	273,238
Nippon Yusen Kaisha (NYK)	171,348	6,148 - 9,012	24	46,500	9,300	5	29	217,848
Mitsui O.S.K.	172,698	4,708 -9,100	26	53,600	6,700	8	34	226,298
OOCL	152,467	4,583 -8,063	23	83,852	8,063-8,600	10	33	236,319
K"Line"	157,632	5,500 -8,120	25	61,870	4,400-8,120	11	36	219,502
Yang Ming	140,144	5,500 -8,236	21	90,700	4,500-8,200	15	36	230,844
Hamburg Sud	84,712	5,550 - 5,905	15	37,405	5,905-6,300	6	21	122,117
CSAV	32,705	6541	5	58,948	6,316 - 8,000	8	13	91,653
Zim Integrated Shpg.	18270	8,200 - 10,070	2	198,420	8,200-12,600	18	20	210,440
Otros	1,919,204	3700 -13,800	285	2,016,823	3,600 -14,000	203	488	3,936,027
Total	**4,892,131**		**699**	**3,761,039**		**409**	**1,108**	**8,653,170**

Source: Shipping Intelligence Network, September 2009, Clarkson Research Services

4,892,131

3,761,039

8,653,170

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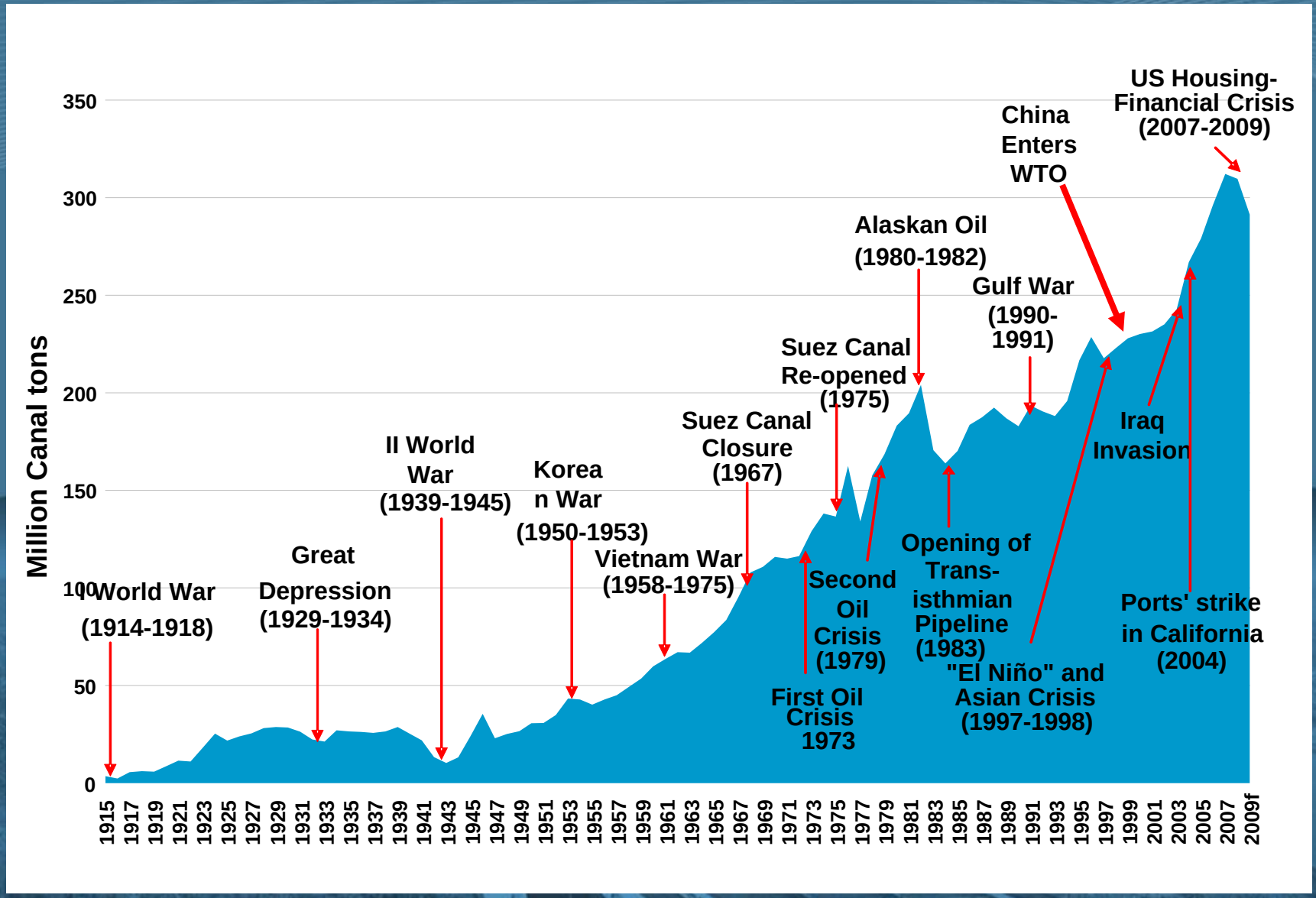
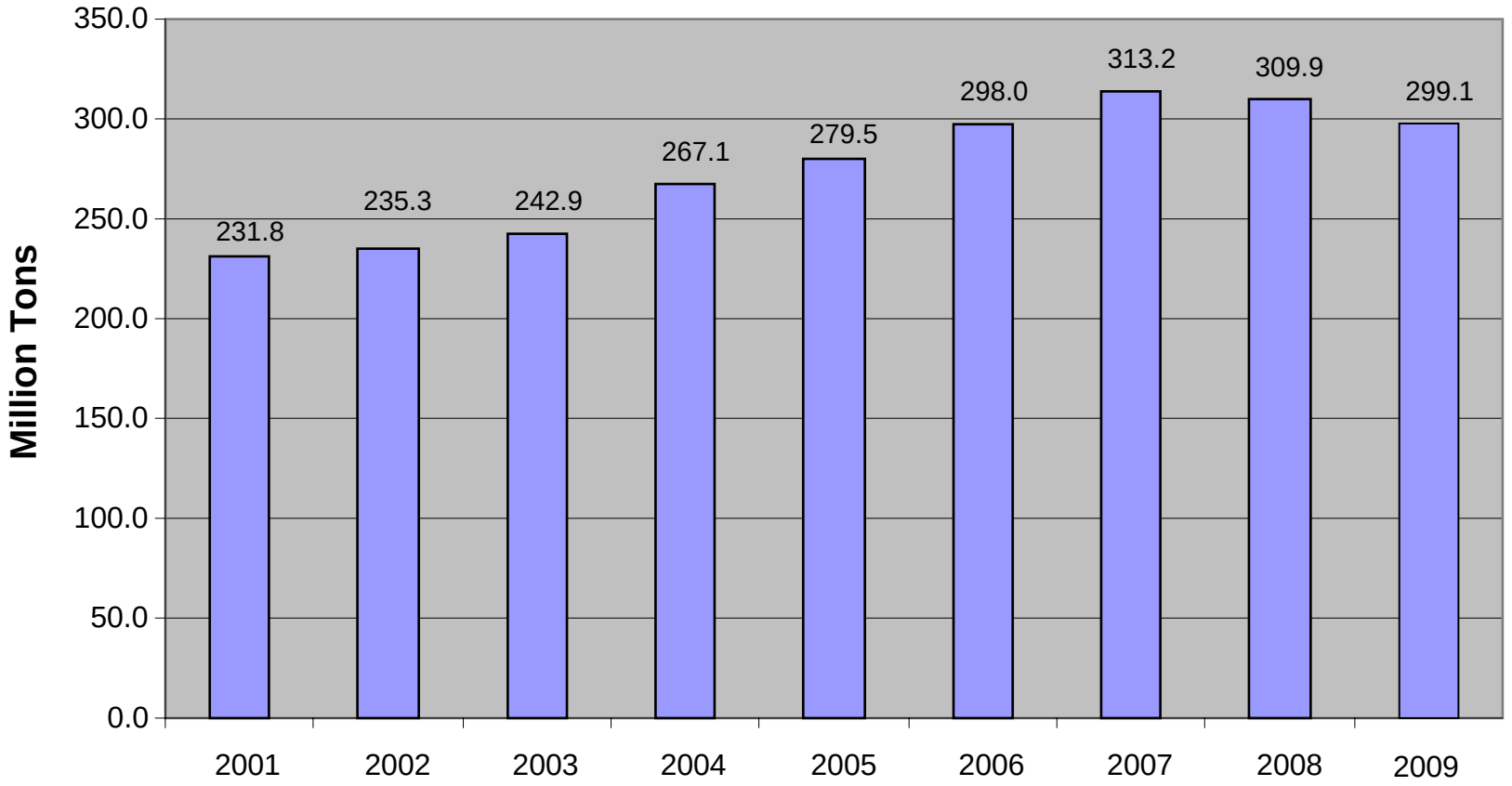
Panama Canal Traffic and World Events

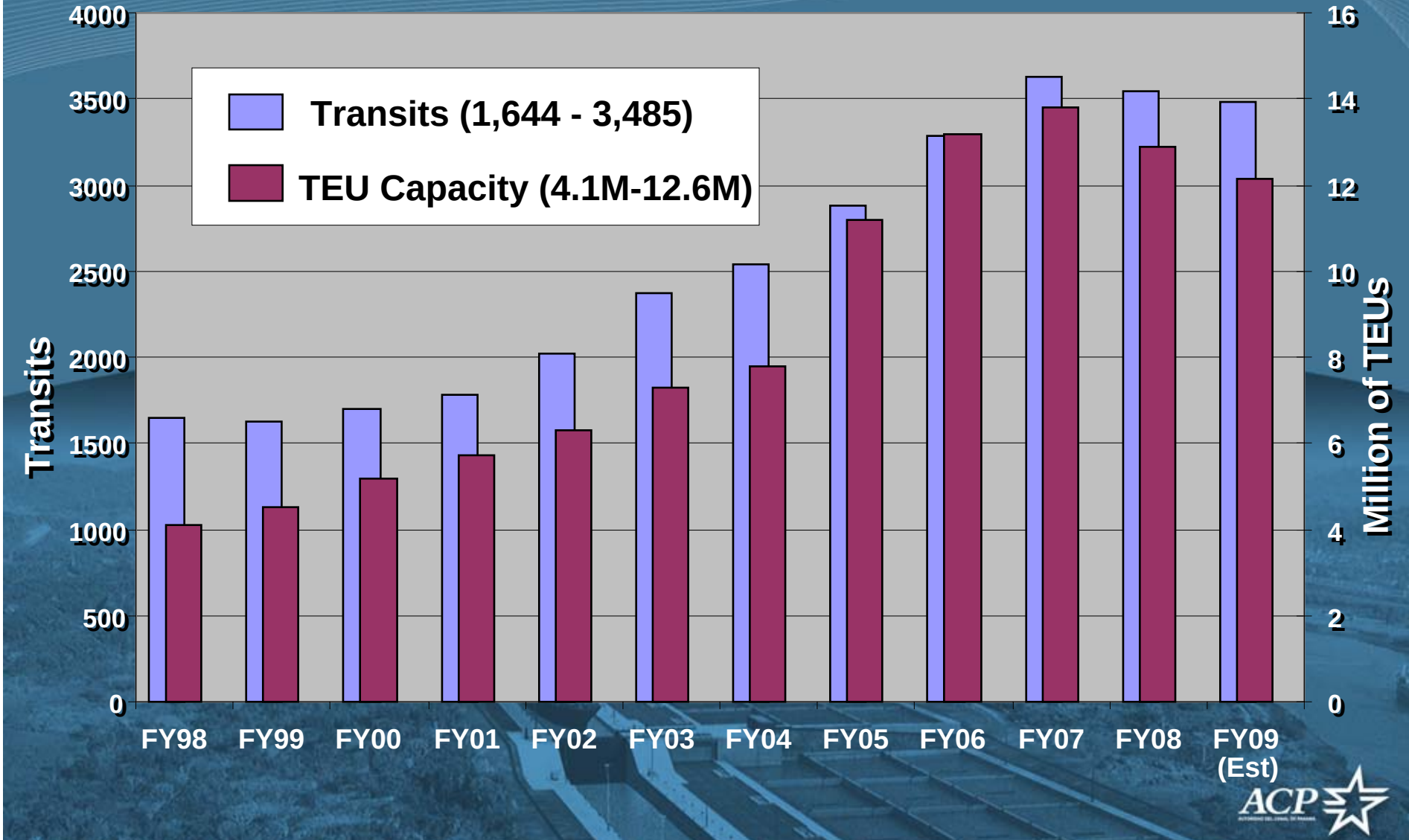


Source: Panama Canal Authority.

Total PCUMS Vessel Tonnage
Fiscal Years 2001-2009

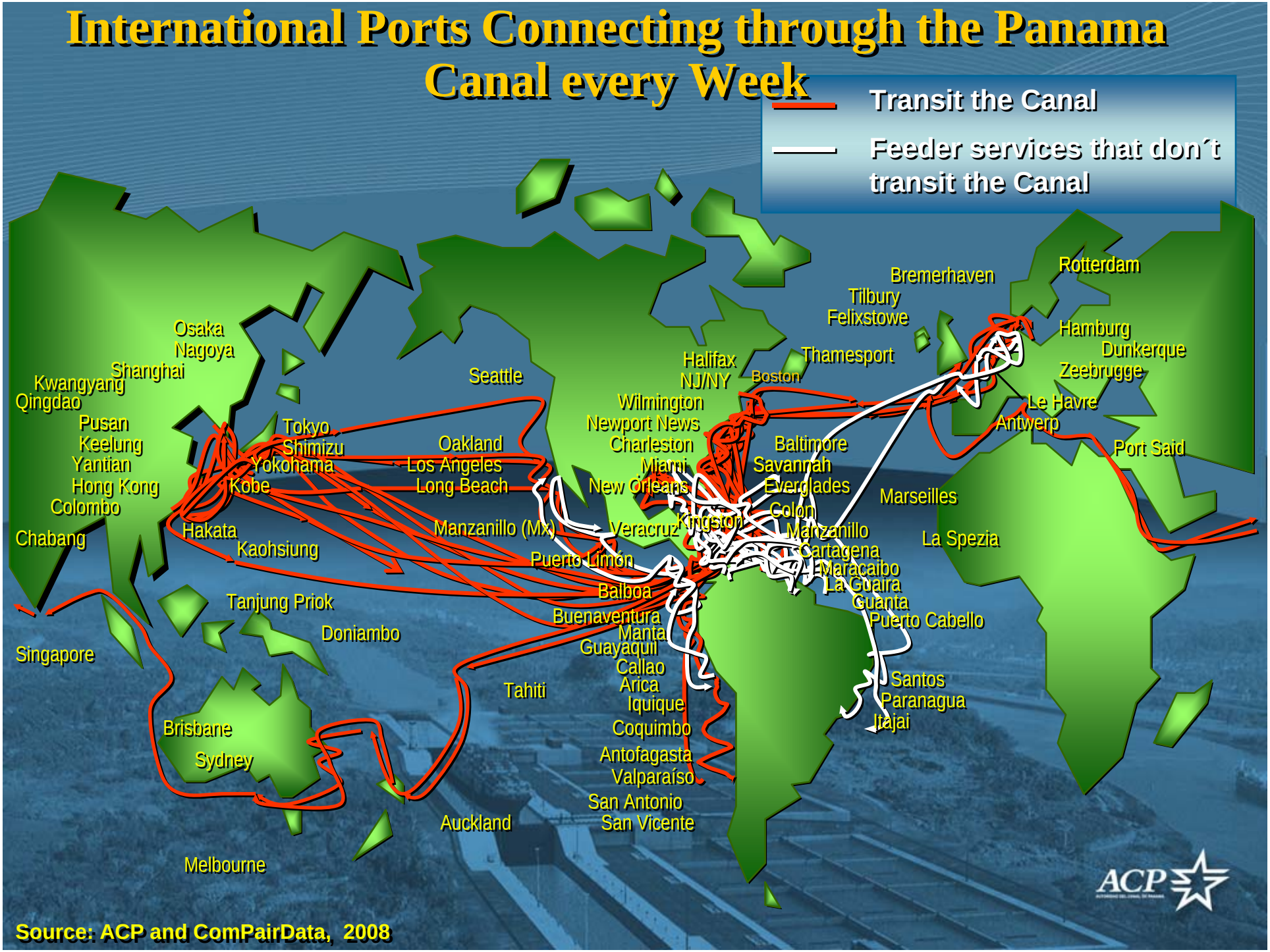


Growth of container traffic through the Panama Canal (1998 – 2009 Est.)



Based on the capacity of transiting vessels – Source: ComPair Data - April 2009.

International Ports Connecting through the Panama Canal every Week



World Ports Connected through Liner Services that transit the Panama Canal and/or call Panamanian Ports

Algeciras
Altamira, MEX
Antofagasta
Antwerp
Arica
Auckland
Balboa
Baltimore MD
Barcelona
Barranquilla
Bilbao
Boston MA
Bremerhaven
Brisbane
Buenaventura
Busan
Callao
Cartagena,
Caucedo, Dom Rep
Charleston SC
Chiwan
Colombo
Cristobal, Panama
Curacao
Damietta, Egypt
Dubai, Jebel Ali
Dunkirk
Ensenada, MEX
Felixstowe
Freeport, Bahamas
Genoa
Guayaquil
Haifa
Halifax, Nova Scotia
Hamburg
Havana
Hong Kong
Houston TX
Iquique
Jacksonville FL
Kaohsiung
Keelung
Kingston
Kobe
Kwangyang
La Guaira
Lazaro Cardenas,
Le Havre
Leghorn
Long Beach CA
Los Angeles CA
Manzanillo, Dom Rep
Manzanillo, MEX
Manzanillo, Panama
Maracaibo
Matarani
Mejillones
Melbourne
Miami FL
Mobile AL
Mumbai (Nhava Sheva)
Mundra
Nagoya
Napier
Naples
New York NY/NJ
Ningbo
Norfolk VA
Noumea, New
Oakland CA
Oakland CA
Osaka
Paita
Papeete, Tahiti
Philadelphia PA
Port Chalmers
Port Everglades FL
Port Kelang
Port of Spain,
Port Said, Egypt
Port-au-Prince
Portland OR
Puerto Cabello
Puerto Limon
Puerto Quetzal
Qingdao
Rio Haina
Rotterdam
Salerno
San Antonio
Santo Tomas de
San Juan PR
San Vicente
Savannah GA
Shanghai
Shekou
Shimizu
Southampton
Sydney
Tampa FL
Tauranga
Thamesport
Tilbury
Timaru
Tokyo
Tuticorin, India
Valencia
Valparaiso
Vancouver, B.C.
Veracruz, MEX
Vigo
Wilmington NC
Xiamen
Xingang/Tianjin
Yantian
Yokohama
Zeebrugge


1996: 235 Thousands TEUs
2008: 4.6 Millions TEUs
Source: Panama Maritime Authority (AMP).

Inventory of Full-Container Services through the Panama Canal

Route	Number of Services	Service Capacity /1	Number of Vessels	Average Size
Asia-East Coast USA	15	3,386,269	132	4,331
Pendulum	2	497,443	27	4,773
West Coast South America-Europe	10	1,256,125	72	2,803
Asia-Caribbean	3	422,502	21	3,025
West Coast South America-Caribbean	1	105,798	3	2,029
West Coast South America-East Coast USA	1	132,652	6	2,544
Australia-East Coast USA-Europe	2	207,086	15	2,612
West Coast USA-Europe	1	78,011	6	2,351
Total	35	6,085,886	282	3,690

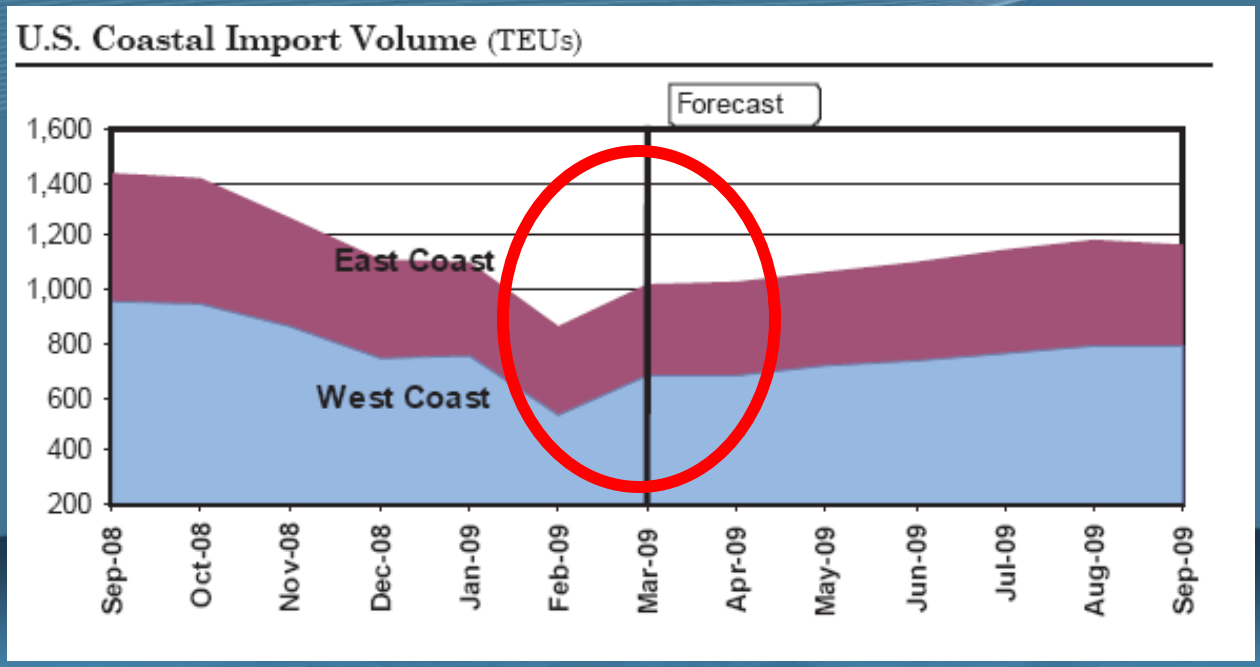
Evolution of Full Container Services through the Panama Canal

	July 2003	July 2004	July 2005	July 2006	July 2007	July 2008	July 2009
Number of Services through the Canal		30	36	40	43	38	35
Capacity (M. TEU) 1/		4.5	5.5	6.3	6.9	6.6	6.1
Vessels deployed		238	278	313	330	307	282
Average Vessel Size (TEU)		3,401	3,424	3,517	3,600	3,657	3,690

1/ TEU Capacity in one direction.

Source: ComPair Data - July 2009.

United States Ports
Imports from Northeast Asia (TEU)



Source: ACP with information of IHS Global Insight, June 2009.

	2007 Q1	2008 Q1	2009 Q1	% 07-08	% 08-09
East Coast	610,427	627,015	525,780	2.7%	-16.1%
Gulf	40,831	44,744	37,756	9.6%	-15.6%
West Coast	1,952,482	1,766,833	1,351,785	-9.5%	-23.5%

Source: PIERS, Global Container Report 1Q 2009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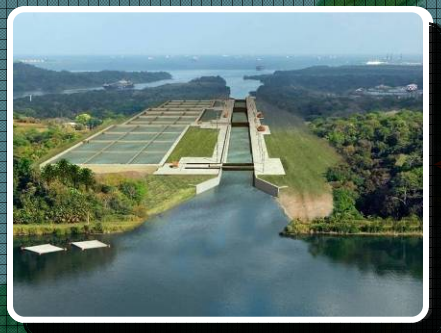
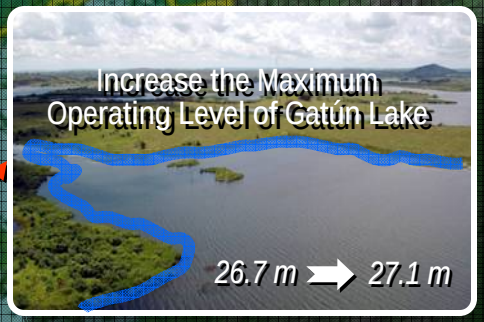
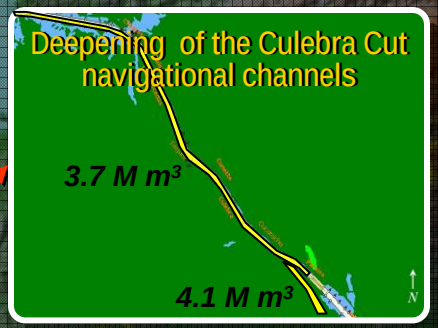
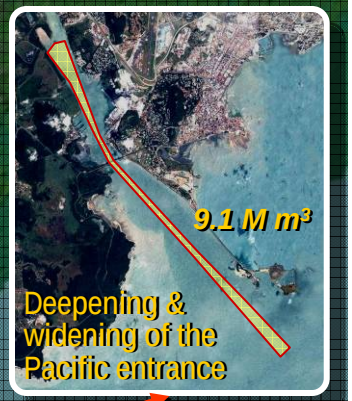
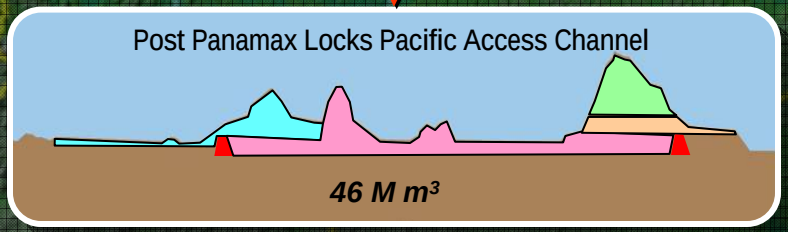
Expansion Program Components











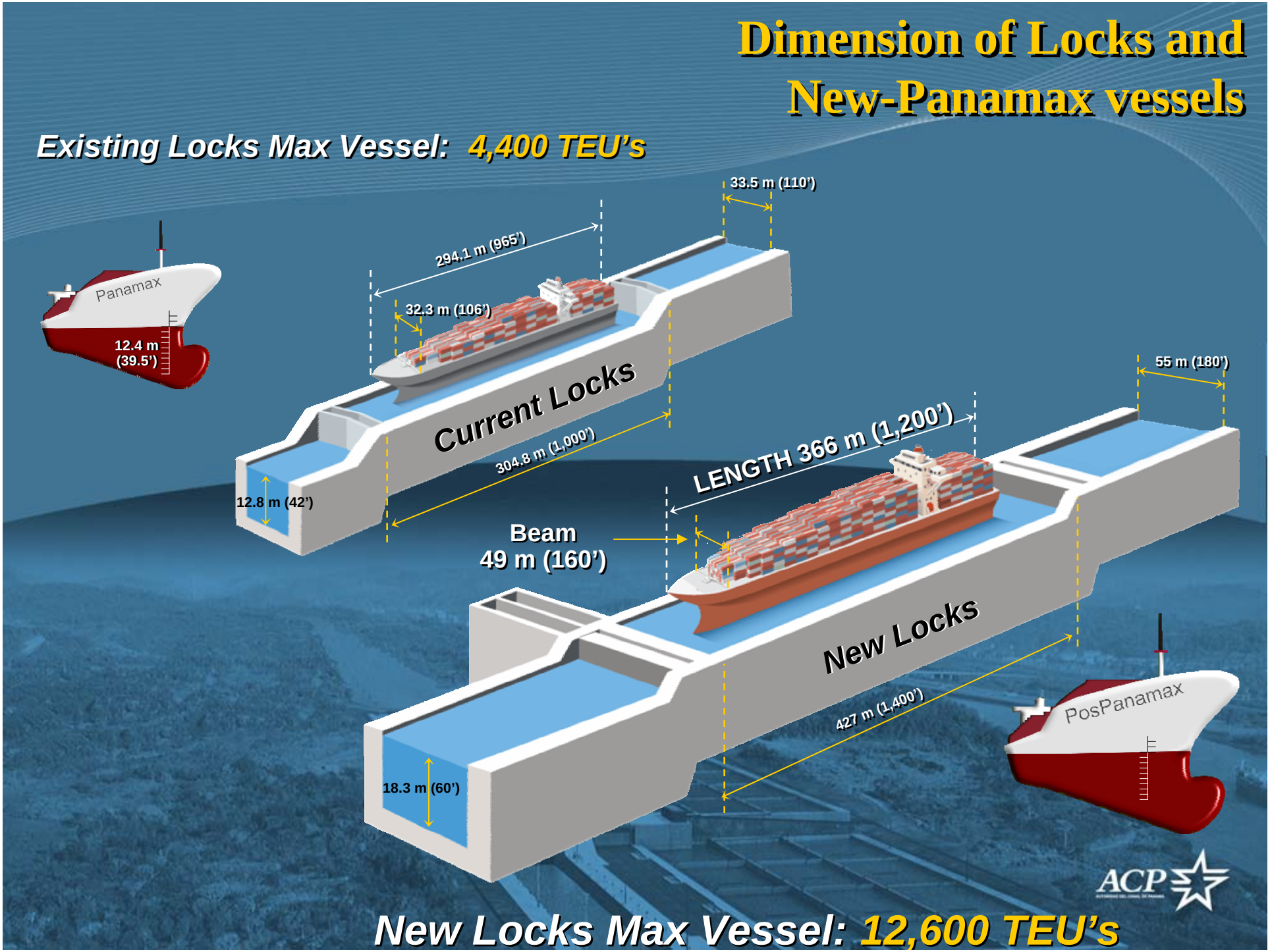
Secured Financing for Program – December 9, 2008

The $2.3 billion financing package will cover a portion of the $5.25 billion total cost of the project and will be allocated as follows:

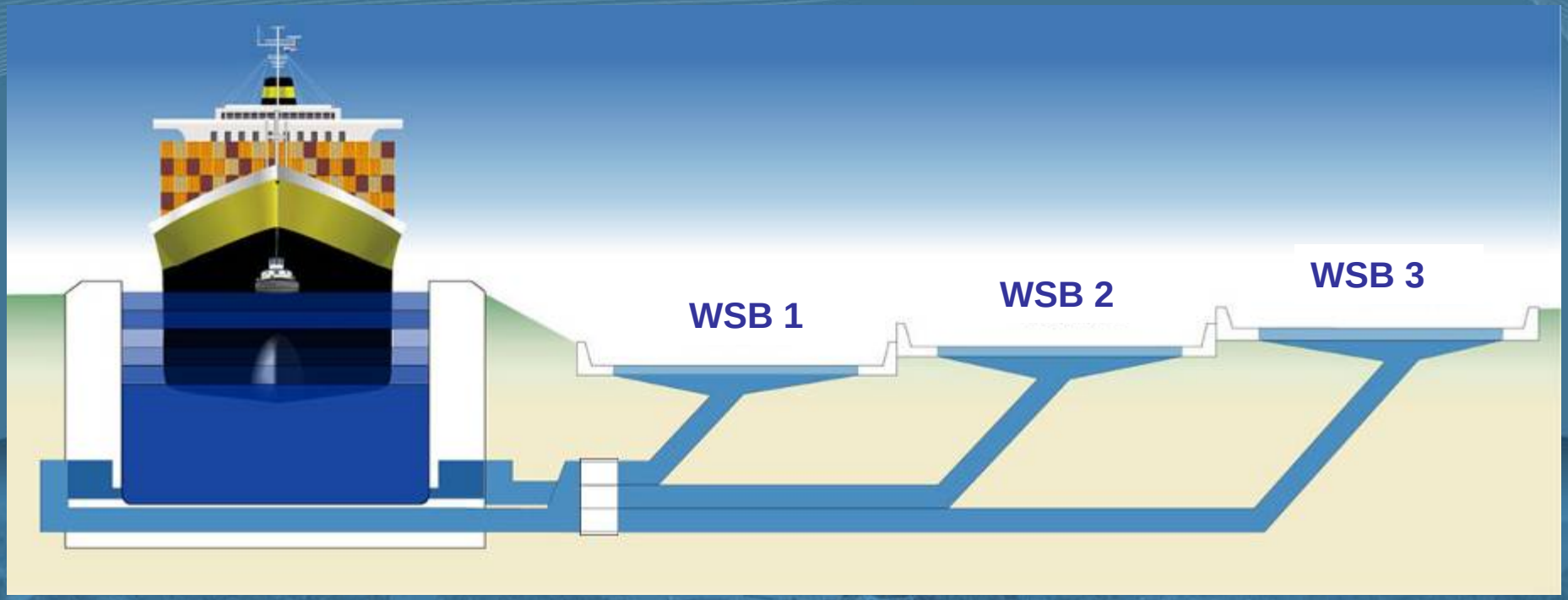
FINANCING:	European Investment Bank (EIB)	$ 500 M
	Japan Bank for International Cooperation (JBIC)	$ 800 M
	Inter-American Development Bank (IDB)	$ 400 M
	International Finance Corporation (IFC)	$ 300 M
	Corporación Andina de Fomento (CAF)	$ 300 M
	Subtotal:	$2,300 M
	ACP:	$ 2,950 M
	Total:	$ 5,250 M

The negotiated financing structure includes favorable provisions for the ACP including a 20-year amortizing period with a 10-year grace period.

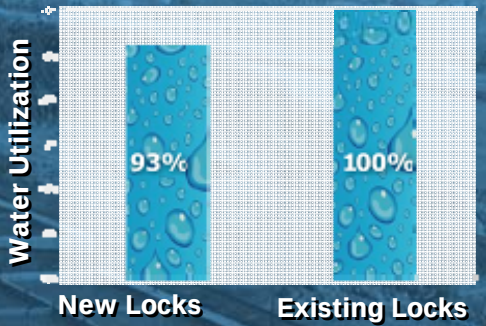
Dimension of Locks and New-Panamax vessels



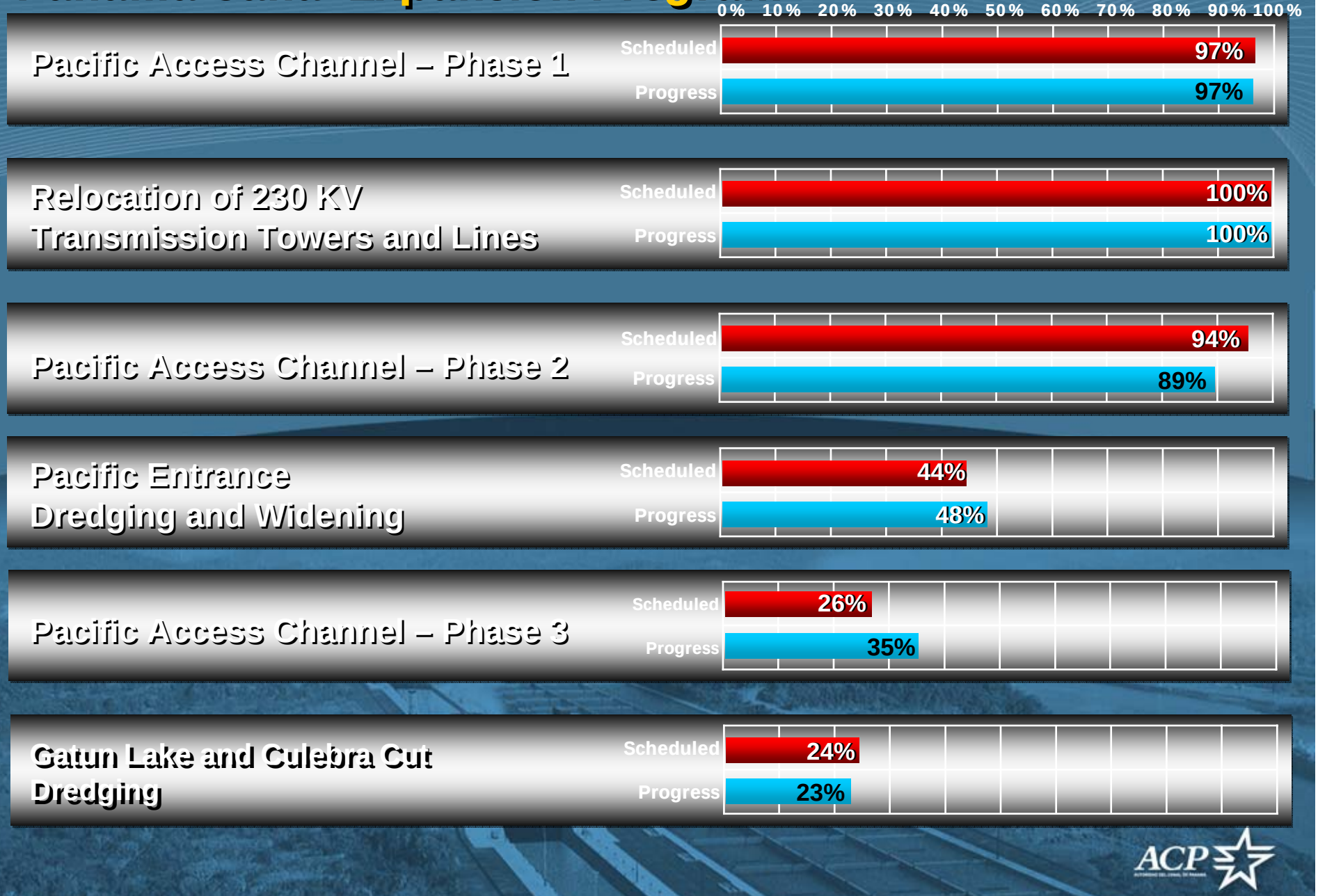
Post-Panamax Locks Operation



With the water saving basins the new locks will use 7% less water than the existing locks



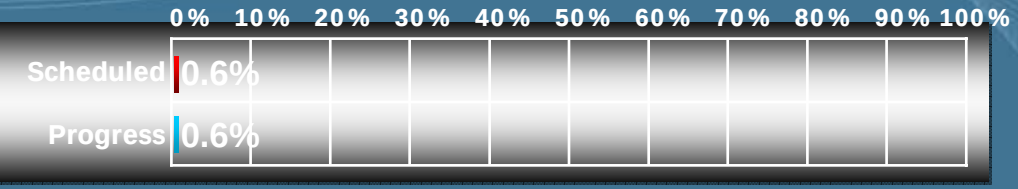
Panama Canal Expansion Program



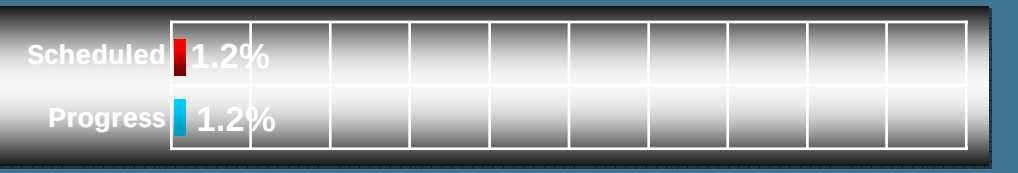
Panama Canal Expansion Program

Recently Awarded Projects

Locks Design - Build

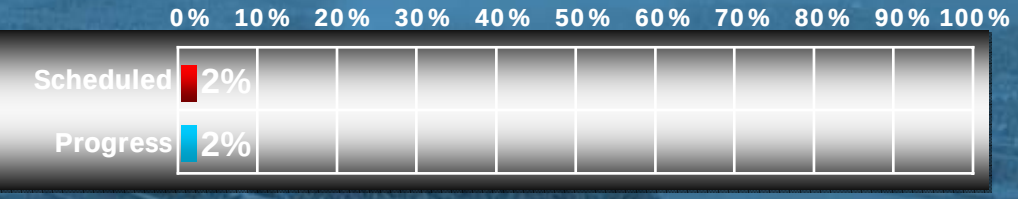


Atlantic Entrance Deepening and Widening

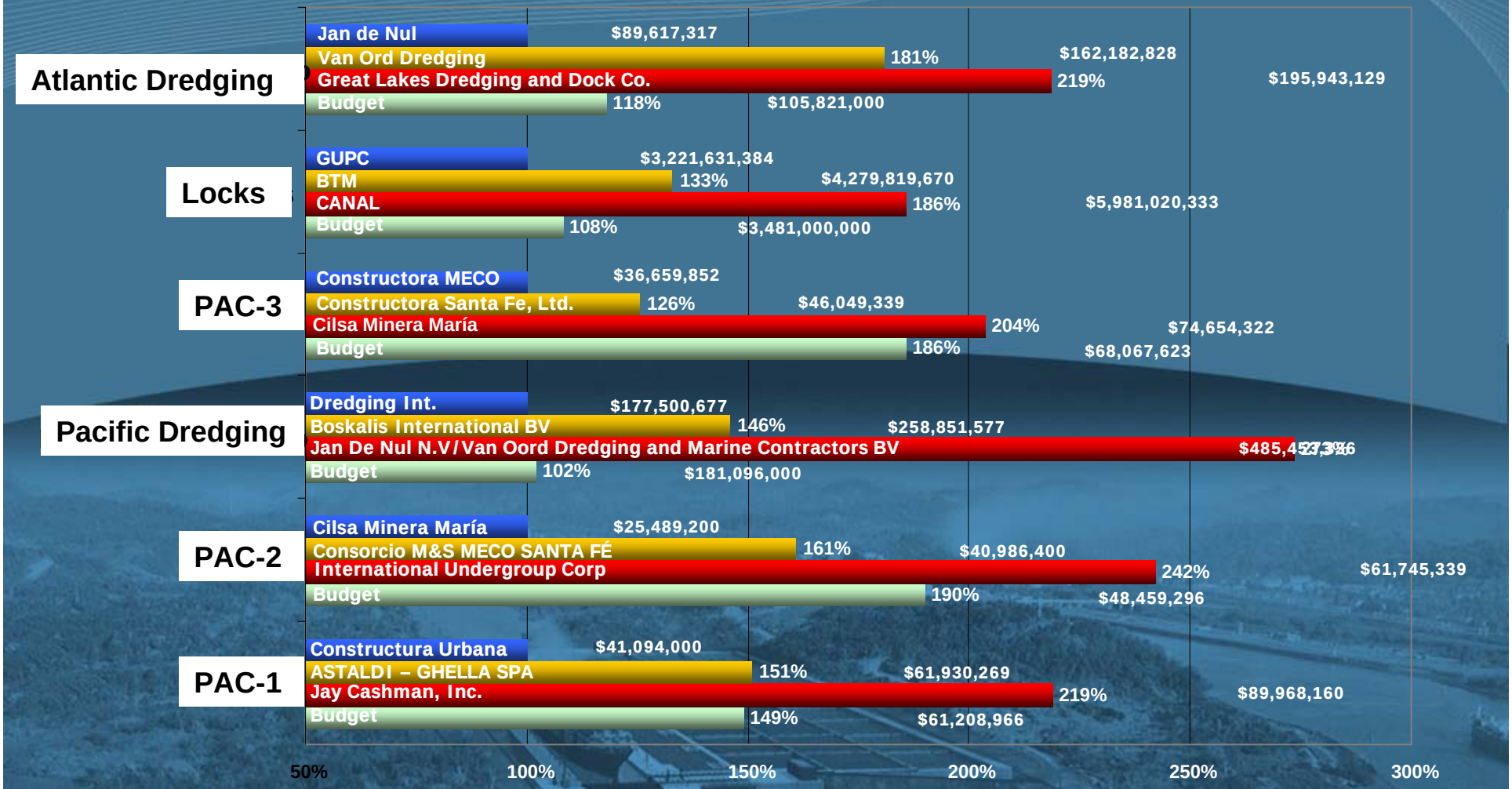


Major Contracts Under Bid

Pacific Access Channel – Phase 4



Prices for Canal Expansion Program
Major Projects
Lowest, Average and Highest Prices and Alloted Sums

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+++ Container Trade **Potential Game Changer**

\+ Dry Bulk Carriers

\+ Liquid Bulks

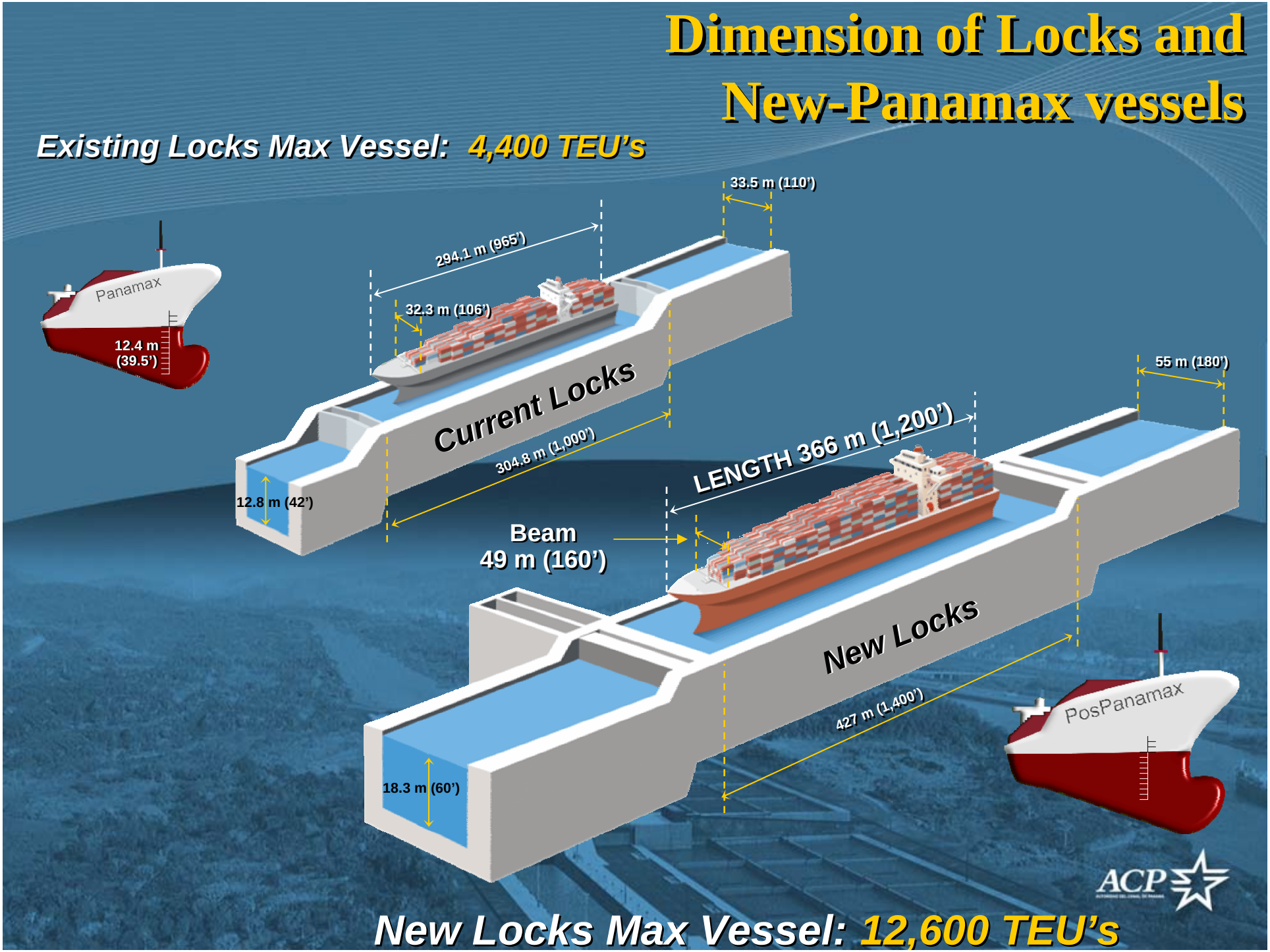
+/- Vehicle Carriers

+/- Refrigerated Vessels

\+ Cruise

+/- Others

Dimension of Locks and New-Panamax vessels



U.S. Port Depths

Depths at Mean Low Water (MLW)

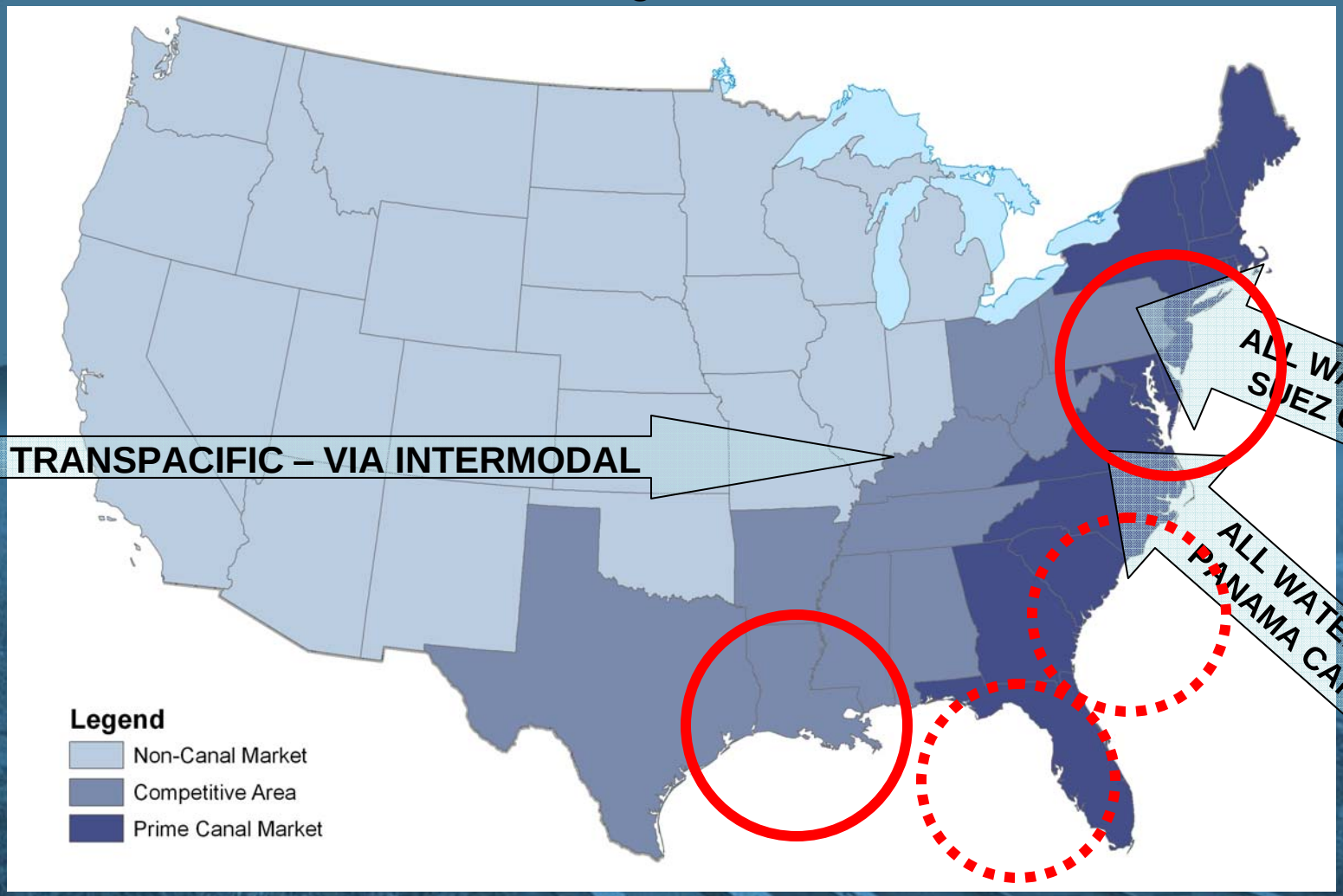
U.S. East Coast	MLW
Boston	38’
New York / New Jersey	43’
Philadelphia	38’
Baltimore	40’
Norfolk	48’
Wilmington	42’
Charleston	47’
Savannah	42’
Jacksonville	38’
Miami	39’

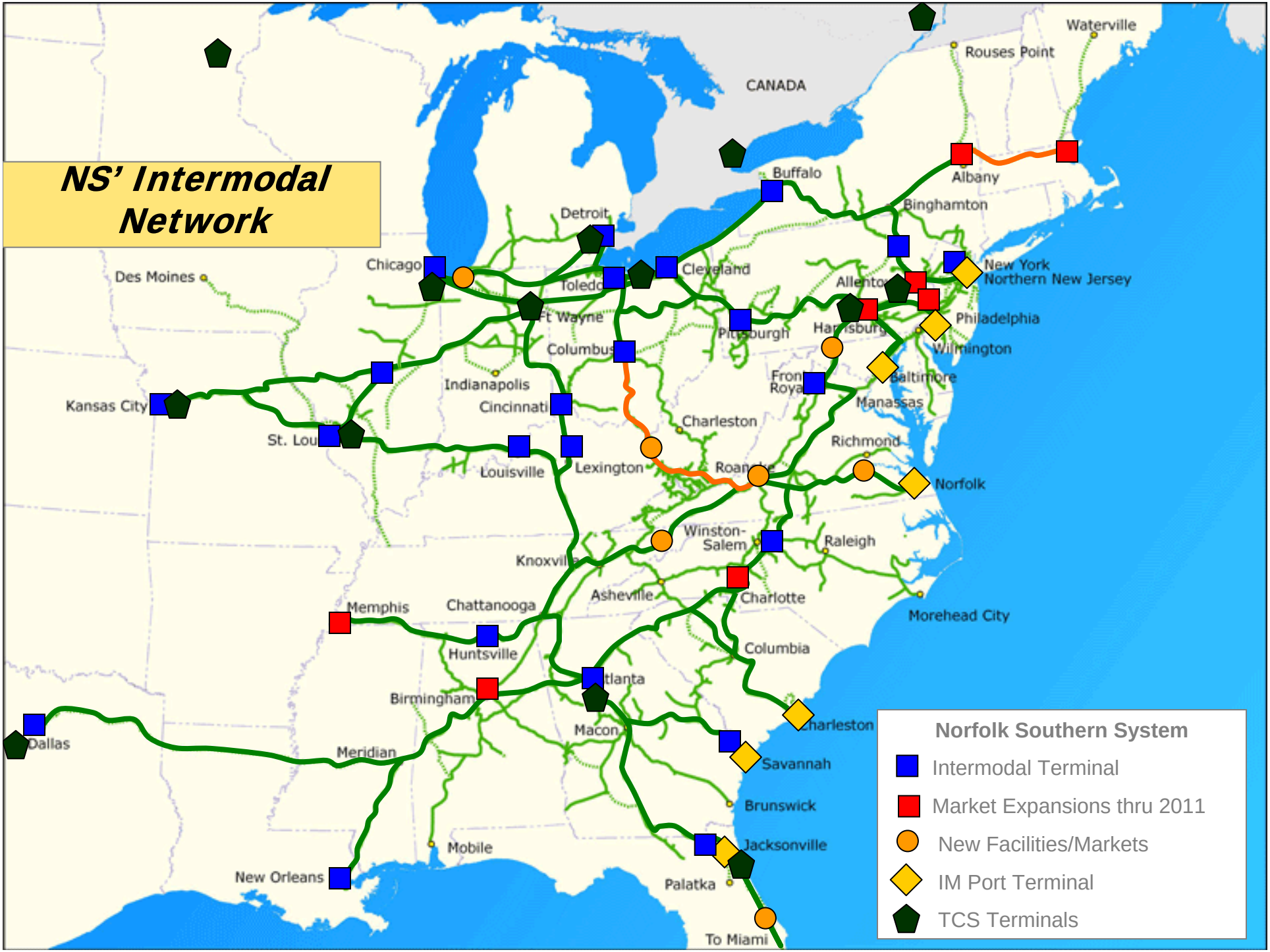
U.S. Gulf	MLW
Houston	40’
New Orleans	45’

U.S. West Coast	MLW
Los Angeles / Long Beach	50’
Oakland	50’
Portland	35’
Seattle / Tacoma	50’

Canal and West Coast routings are most competitive in the US heartland

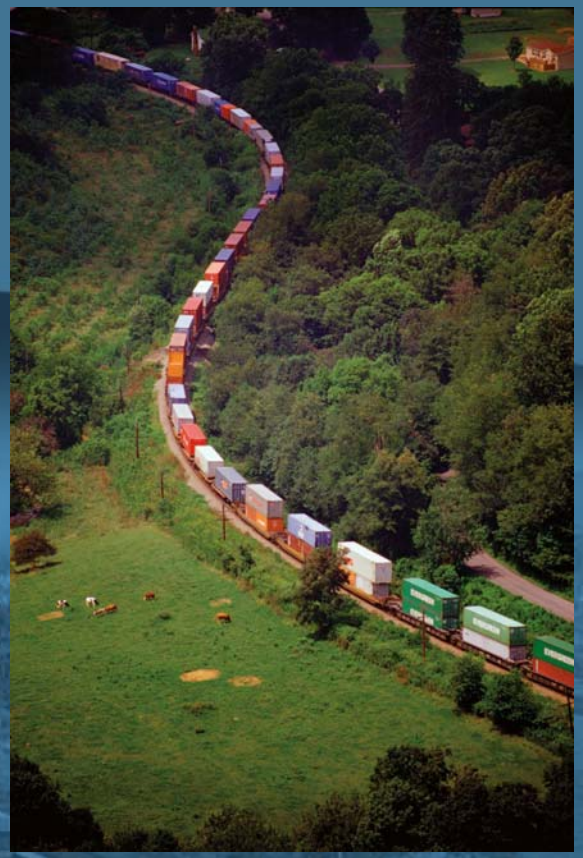
Canal market share for Chinese imports of finished goods to the US ranges from 1% in the West region to 81% in the Northeast




NS' Intermodal Network
CANADA
Waterville
Rouses Point
Albany
Buffalo
Binghamton
Detroit
Chicago
Cleveland
New York
Northern New Jersey
Des Moines
Toledo
Ft Wayne
Pittsburgh
Philadelphia
Columbus
Wilmington
Indianapolis
Baltimore
Kansas City
Cincinnati
Manassas
Charleston
Richmond
Louisville
Lexington
Norfolk
Winston-Salem
Raleigh
Knoxville
Asheville
Charlotte
Memphis
Chattanooga
Morehead City
Huntsville
Columbia
Birmingham
Macon
Savannah
Dallas
Meridian
Brunswick
Mobile
Jacksonville
New Orleans
Palatka
To Miami
Norfolk Southern System
Intermodal Terminal
Market Expansions thru 2011
New Facilities/Markets
IM Port Terminal
TCS Terminals

NS Is Currently Engaged in Over $3 billion in Network improvements Targeting Intermodal

- Meridian Speedway: $300mm
  - Complete 2010
- Heartland Corridor: $250mm
  - Complete 2010
- Patriot Corridor: $140mm
  - Complete 2010*
- Crescent Corridor: $2.4bb
  - Completion tbd



*Still under review by STB


NS' Core Intermodal Network
4 Corridor Strategy
CANADA
Waterville
Rouses Point
Albany
Buffalo
Binghamton
Detroit
Chicago
Des Moines
Cleveland
Toledo
Allentown
New York
Northern New Jersey
Philadelphia
Ft Wayne
Pittsburgh
Harrisburg
Wilmington
Columbus
Indianapolis
Front Royal
Baltimore
Kansas City
Cincinnati
Manassas
Charleston
St. Louis
Richmond
Louisville
Lexington
Roanoke
Norfolk
Winston-Salem
Raleigh
Knoxville
Asheville
Charlotte
Memphis
Chattanooga
Morehead City
Huntsville
Columbia
Atlanta
Birmingham
Charleston
Macon
Dallas
Meridian
Savannah
Brunswick
Jacksonville
Mobile
New Orleans
Palatka
To Miami
Norfolk Southern System
NS Intermodal Routes
Clearance Restrictions

Trade route cross-roads

POPULATION	
Caribbean	34.3
Central America	43.1
South America	387.8
North America	445.1
Total	910.3

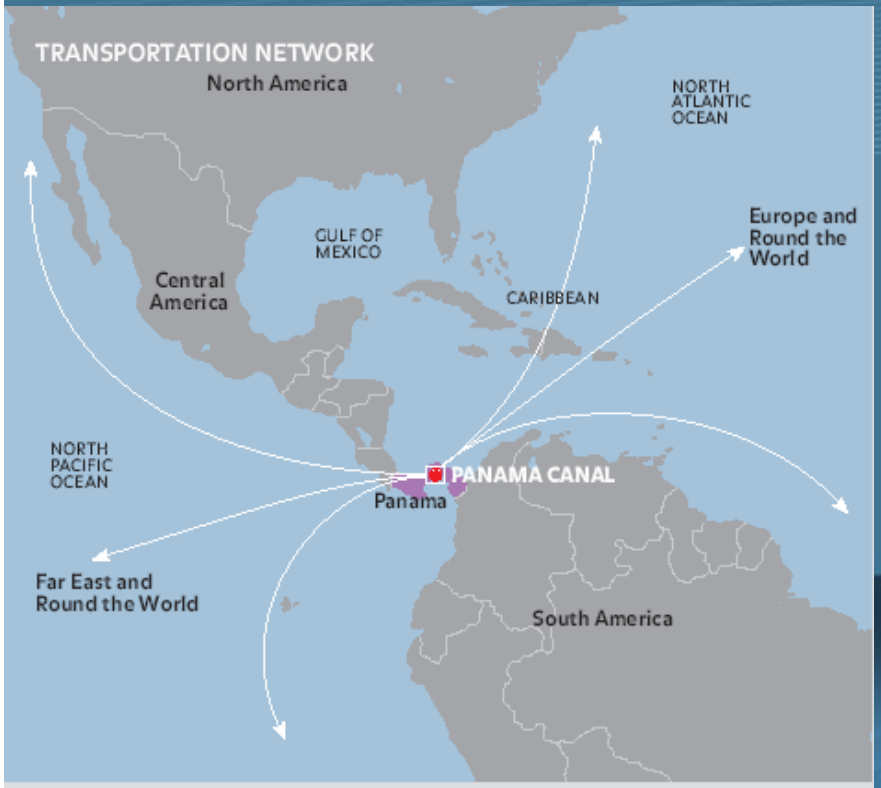
A major advantage for developing relay traffic, as it provides the possibility of linkages between multiple services on both east-west and north-south routes.

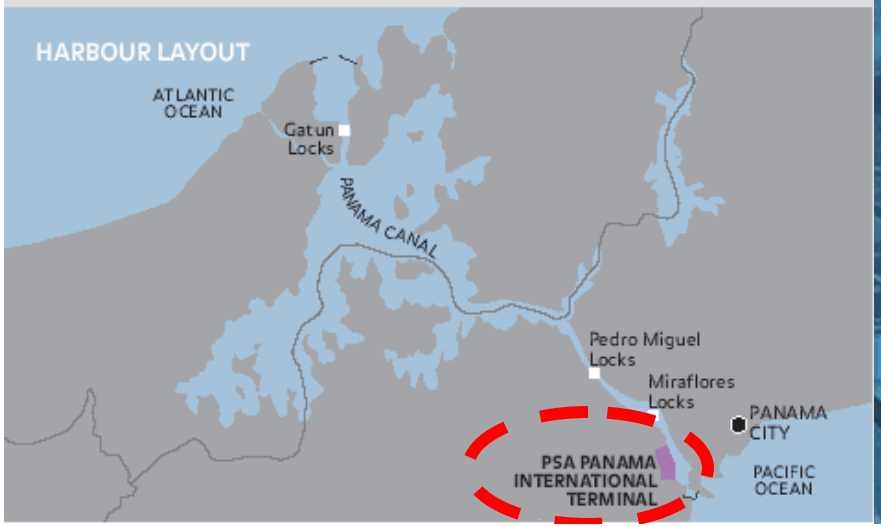
Drewry

Short Sea Shipping Network


Forecast
2010: 6.6 millions TEUs
2015: 8.4 millions TEUs
Source: Panama Maritime Authority (AMP).

PSA Panama International Terminal





- ½ million TEUs capacity
- USD$ 70 million investment
- 20 yr concession agreement

Facilities*	
Container berths	1
Quay length (m)	330
Area (ha)	12
Max depth at Chart Datum (m)	14
Quay cranes	3
Designed capacity ('000 TEUs)	450

** Terminal will commence operations in 2010*

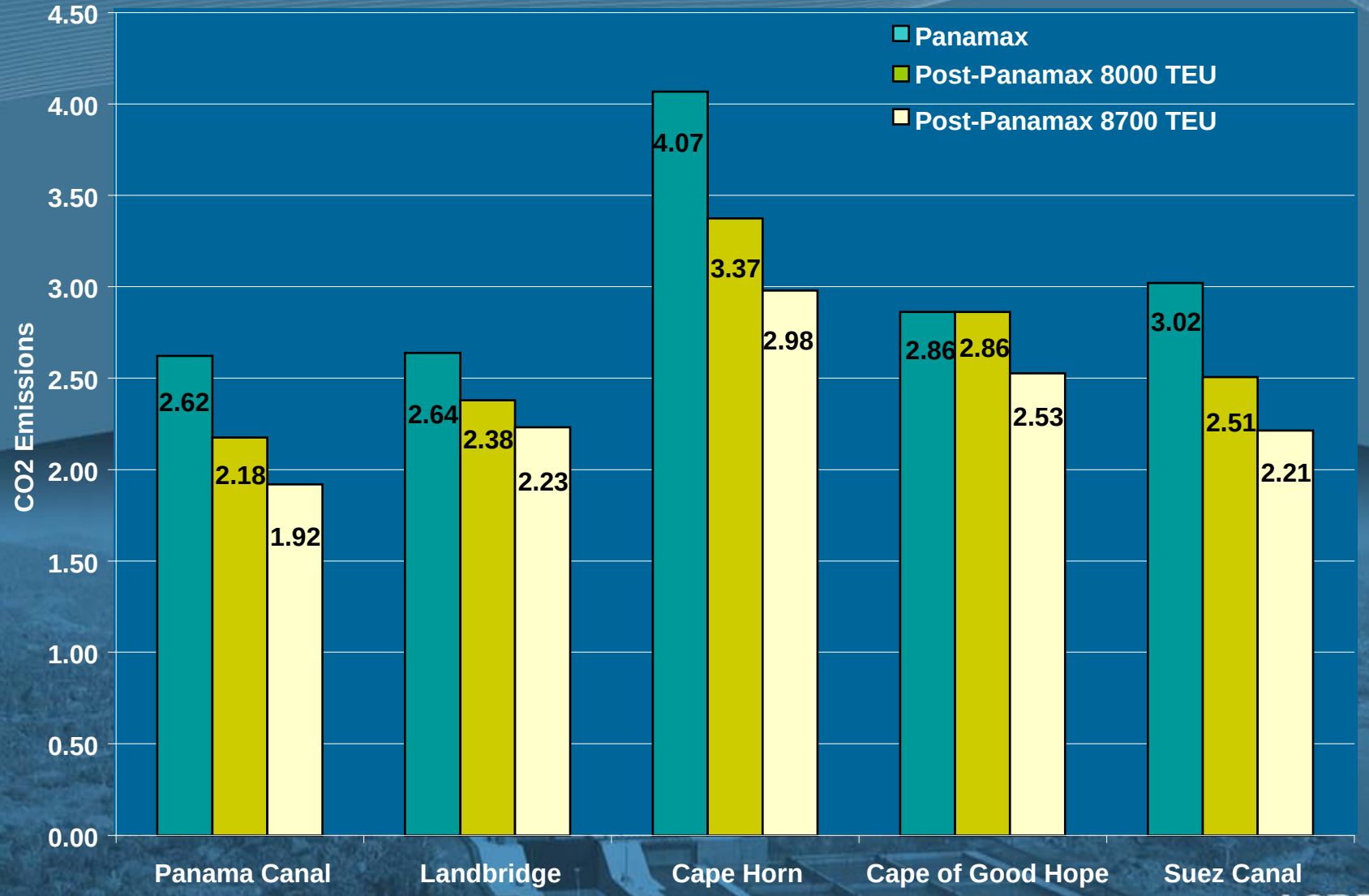
Dry Bulk Carriers Additional Cargo Capacity in the Expanded Panama Canal

Concept	Existing Canal	Expanded Canal			
	Typical Panamax vessel Maximum size	Size Range for Dry Bulkers carrying Coal in the expanded canal			
Vessel data:					
Cargo carrying Capacity (tons)	**80,238**	**100,000 - 119,000**	**120,000 – 150,000**	**151,000 – 169,000**	**170,000 – 200,000**
Utilization rate via the Panama Canal	**78%**	**98%**	**78%**	**76%**	**74%**
Cargo (Metric Tons)	62,430	107,310	105,300	121,600	136,900
Length (meters)	272.5	260.5	273	289	292
Beam (meters)	32.3	43.9	43	43.1	48
Salt Water Draft (meters)	14.1	13.8	17.5	17.4	18
Panama Canal Restrictions:					
Length (meters)	294.1	365.8	365.8	365.8	365.8
Beam (meters)	32.3	48.8	48.8	48.8	48.8
Tropical Fresh Water Draft (meters)	12	15.3	15.3	15.3	15.3
Utilization rate via the Panama Canal without restrictions	100%	100%	100%	100%	100%
Cargo without restrictions (Metric Tons)	80,238	107,310	132,300	156,800	181,300

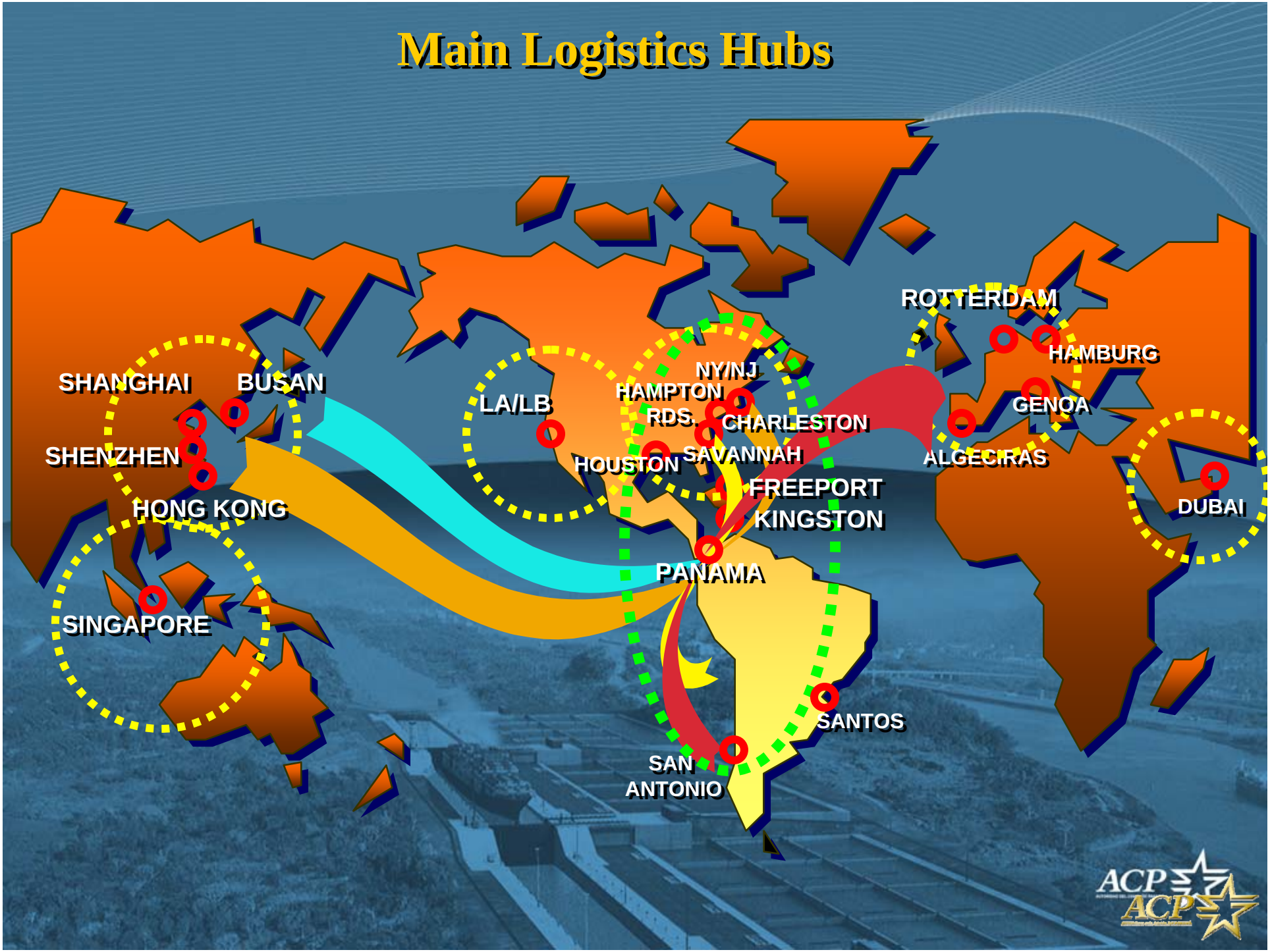
Tankers Additional Cargo Capacity in the Expanded Panama Canal

	Existing Canal	Expanded Canal		
	Tanker Vessel with Maximum Dimensions	Size Range for Tanker Vessels in Expanded Canal		
Vessel Data		Aframax	Suezmax	VLCC
Total Cargo Capacity of vessel	88,170	100 - 119,999	120 - 199,999	> 200,000
Utilization percentage of vessel through the Canal	**70.0%**	**94.7%**	**89.6%**	**73.9%**
Cargo in metric tons	64,257	107,520	146,316	226,205
LOA (m)	272.5	269	267	326
Beam (m)	32.2	39.3	46.3	49
Fresh water draft (m)	15.5	16.0	17.02	20.64
Dimensions allowed by the Panama Canal				
LOA (m)	294.2	366	366	366
Beam (m)	32.2	49	49	49
Fresh water draft (m)	12	15.2	15.2	15.2
Unrestricted vessel utilization percentage	100%	100%	100%	100%
Cargo carrying capacity with maximum draft of 15.2 m	88,170	101,818	131,107	167,064
Additional cargo allowed with expanded Canal (in MT)	**23,913**			

CO2 Footprints per TEU: Container Route Shanghai - New York



Main Logistics Hubs



Expansion of the Panama Canal
Potential Impact on Asia – East Coast/Golf Trade

Rodolfo Sabonge
Vice-President, Market Research and Analysis Office
Panama Canal Authority