



Intermodal Logistics & Ports of Los Angeles/Port of Long Beach Rail Infrastructure

**Port of Los Angeles Public Rail
Workshop**

October 22, 2009



POLA Rail Workshop Introduction

Welcome

- **Welcome and Introductions**
- **Agenda**
 - Powerpoint Presentation: Rail Overview
 - Presented by Kerry Cartwright, *Director Goods Movement*
 - Q & A Discussion
 - Moderated by Ralph Appy, Ph.D., *Director Environmental Management*



Introduction to Cargo and Rail Movement at the Ports



POLA Rail Workshop Introduction

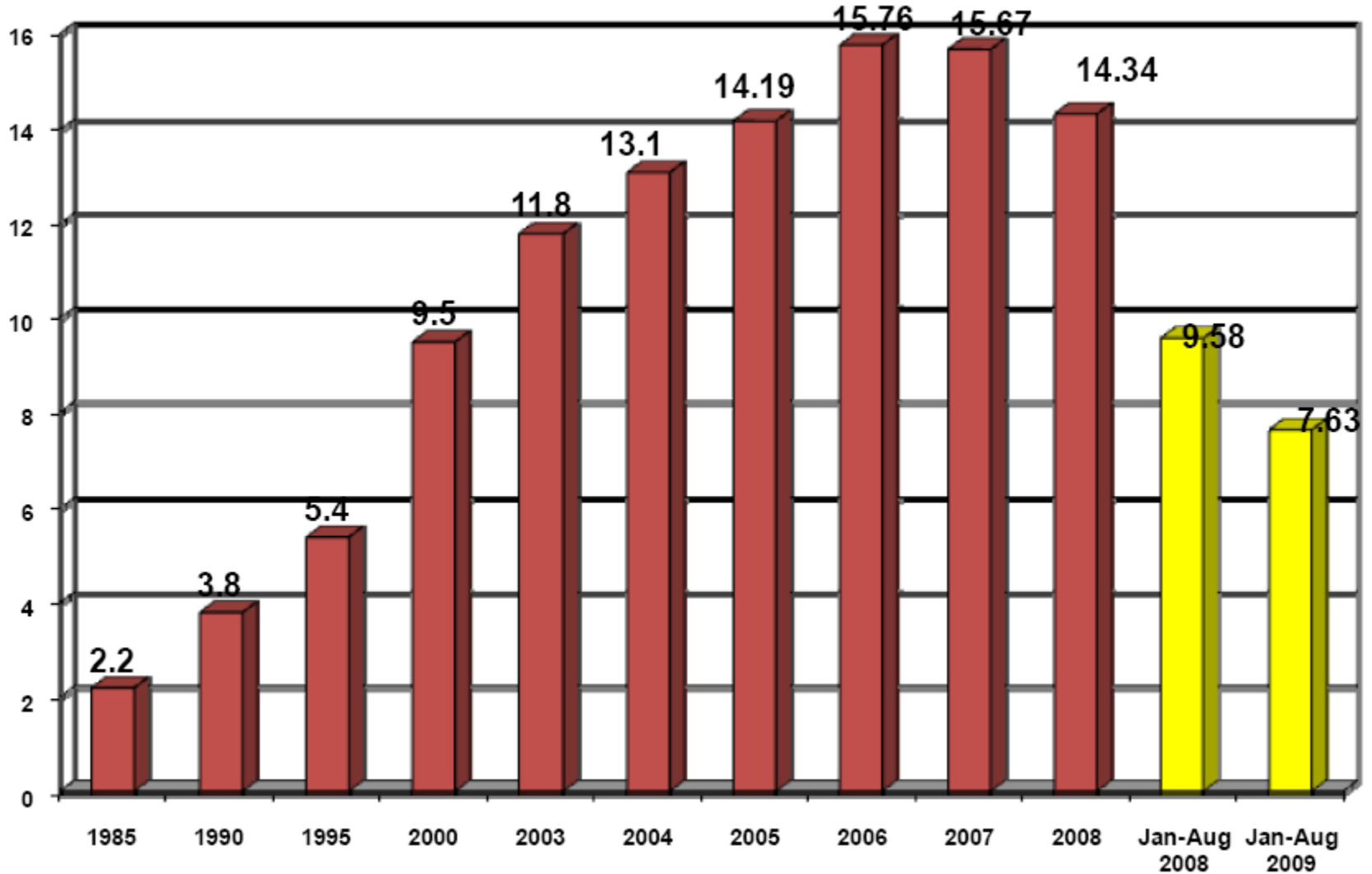
San Pedro Bay Ports (SPBP) Complex





SPBP Cargo Throughput

POLA/POLB Container Volumes (millions TEUs)





SPBP Cargo Throughput

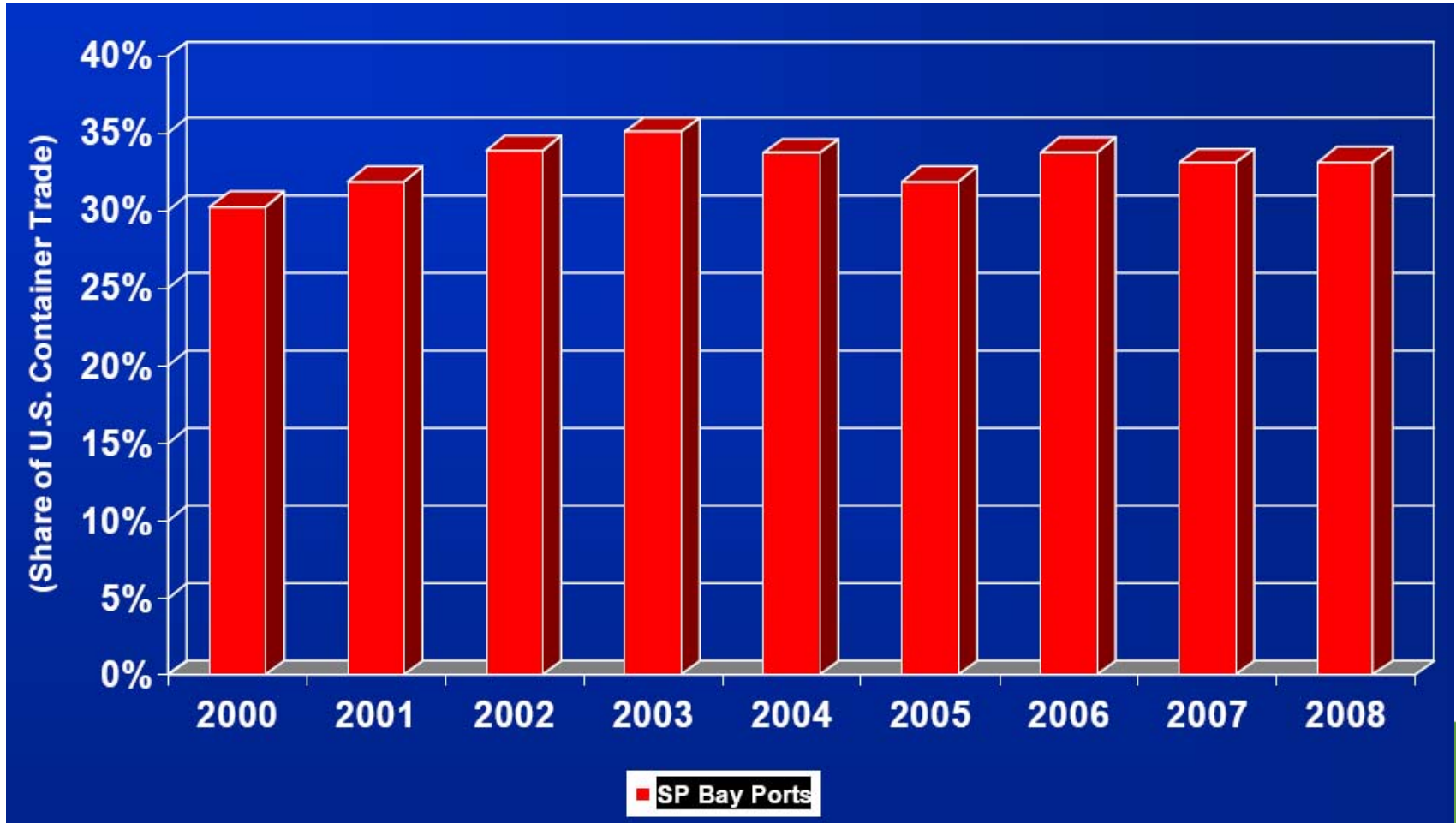
U.S. West Coast Market Share

	2009 1 st Quarter	2008 1 st Quarter	Change
Los Angeles	35.45%	34.03%	+1.42%
Long Beach	25.33%	28.49%	-3.16%
Oakland	10.10%	9.74%	+0.35%
Vancouver	10.67%	10.04%	+0.63%
Tacoma	8.80%	8.17%	+0.63%
Seattle	7.64%	7.93%	-0.29%
Portland	1.06%	1.21%	-0.15%
Prince Rupert	0.95%	0.39%	+0.57%
Total	100.00%	100.00%	



SPBP Cargo Throughput

POLA/POLB Market Share





Cargo Movement

Rail 101: Definitions

- **Local Cargo:** cargo shipped in marine containers and trucked to local destination for consumption in so./mid CA area and parts of NV & AZ.
- **Intermodal Cargo:** Intermodal is the conveyance of freight by more than one carrier or mode of transportation in a single journey. Often meant to mean non-local cargo
 - ***Direct Intermodal:*** cargo shipped in marine containers moved via on-dock & off-dock rail accounted for in cargo forecasts
 - ***Transloaded Intermodal:*** cargo shipped in marine containers then transferred to domestic (53') containers at transload facilities, then trucked to railyard
- **Mode Split:** Breakdown of cargo moving by mode (rail or truck) and between On-dock vs. Off-dock (includes near-dock)

Cargo Movement

Rail 101: Definitions

- **Local Cargo** Moves by Truck only
- **Intermodal Cargo:** Moves by both truck and rail depending on destination and transloading
- **Drayage:** Commonly used to mean the transportation of containerized cargo by specialized trucking companies between ocean ports or rail ramps and shipping docks in Intermodal freight transport





Cargo Movement

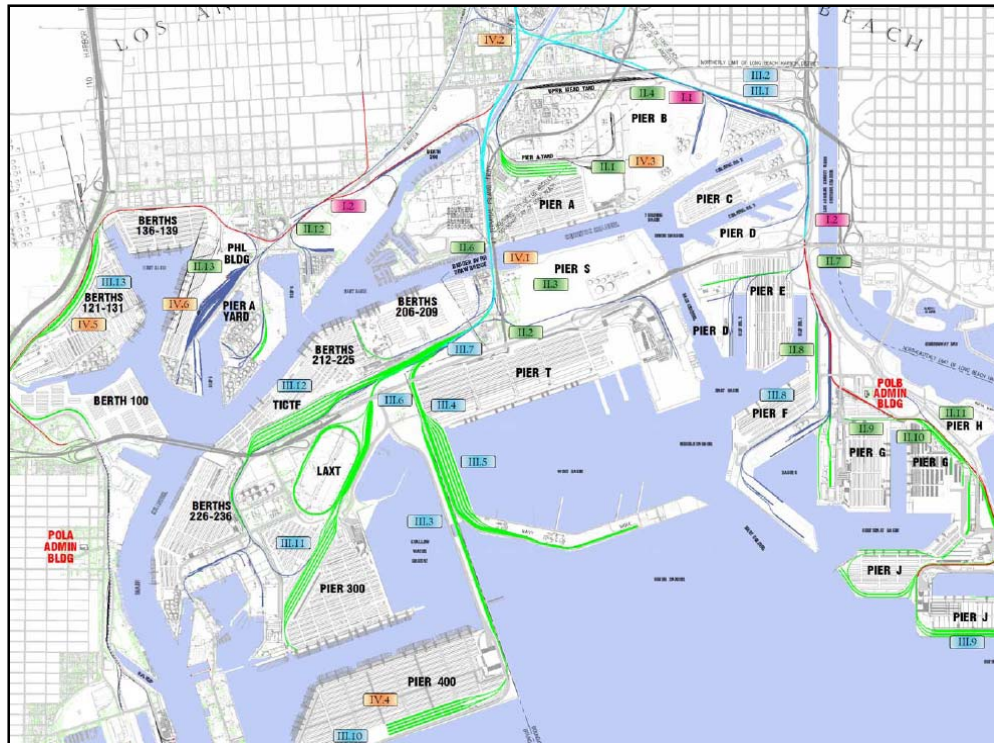
Rail 101: Definitions

- **On-Dock Rail:** Railyards located within the marine cargo terminal at the Port. Containers are moved from the backlands to the railyard via terminal equipment without movement through the gate or on local roadways. Typically, trains consist of a single block of rail cars all headed for the same destination.
- **Off-Dock Rail: Railyards located outside the marine terminal sometimes split into the following 2 categories:**
 - **Near Dock:** railyard located less than 5 miles from the marine terminal requiring a truck trip from the terminal to the railyard via local streets. Currently, there is one near-dock railyard in the SPBPs: UP ICTF
 - **Off-Dock** railyard located greater than 5 miles from marine terminals. 2 off- dock railyards handle significant numbers of containers from the SPBPs, the BNSF Hobart Yard in Los Angeles/Commerce/Vernon and the Union Pacific East Los Angeles Yard.



Cargo Movement

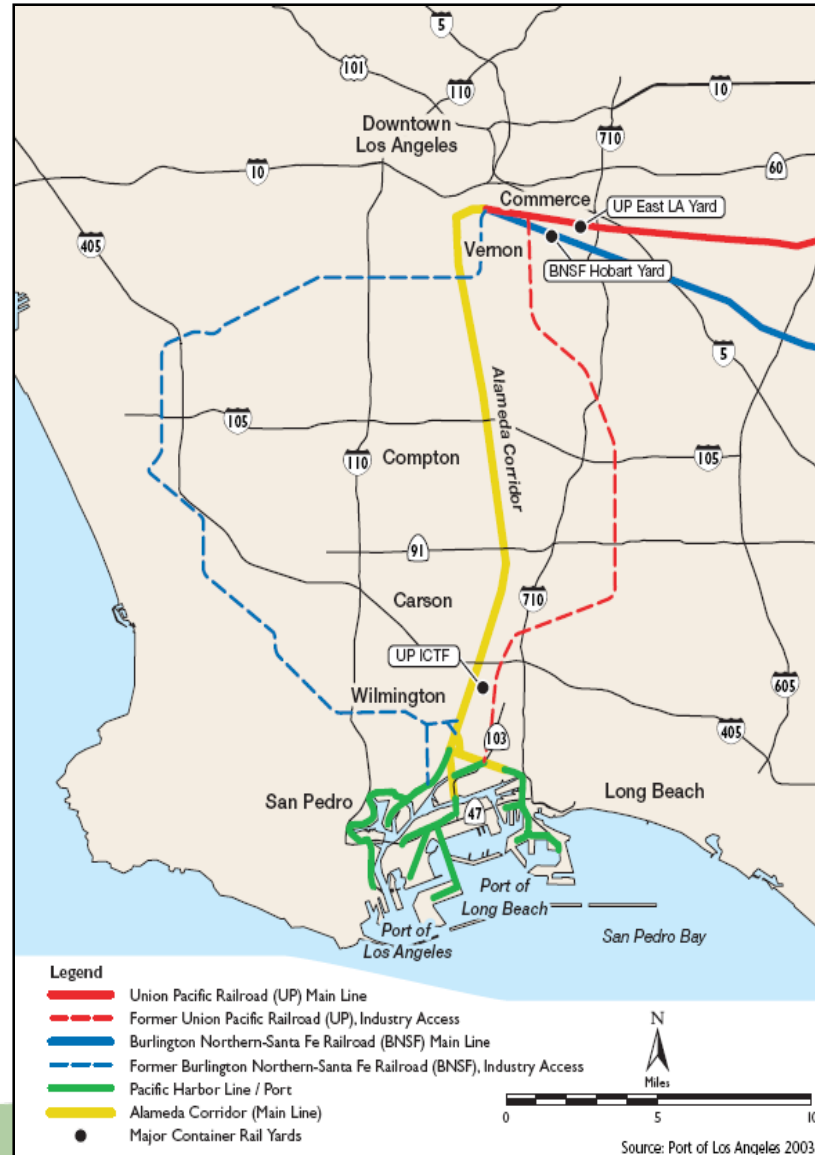
SPBP On-Dock Railyards





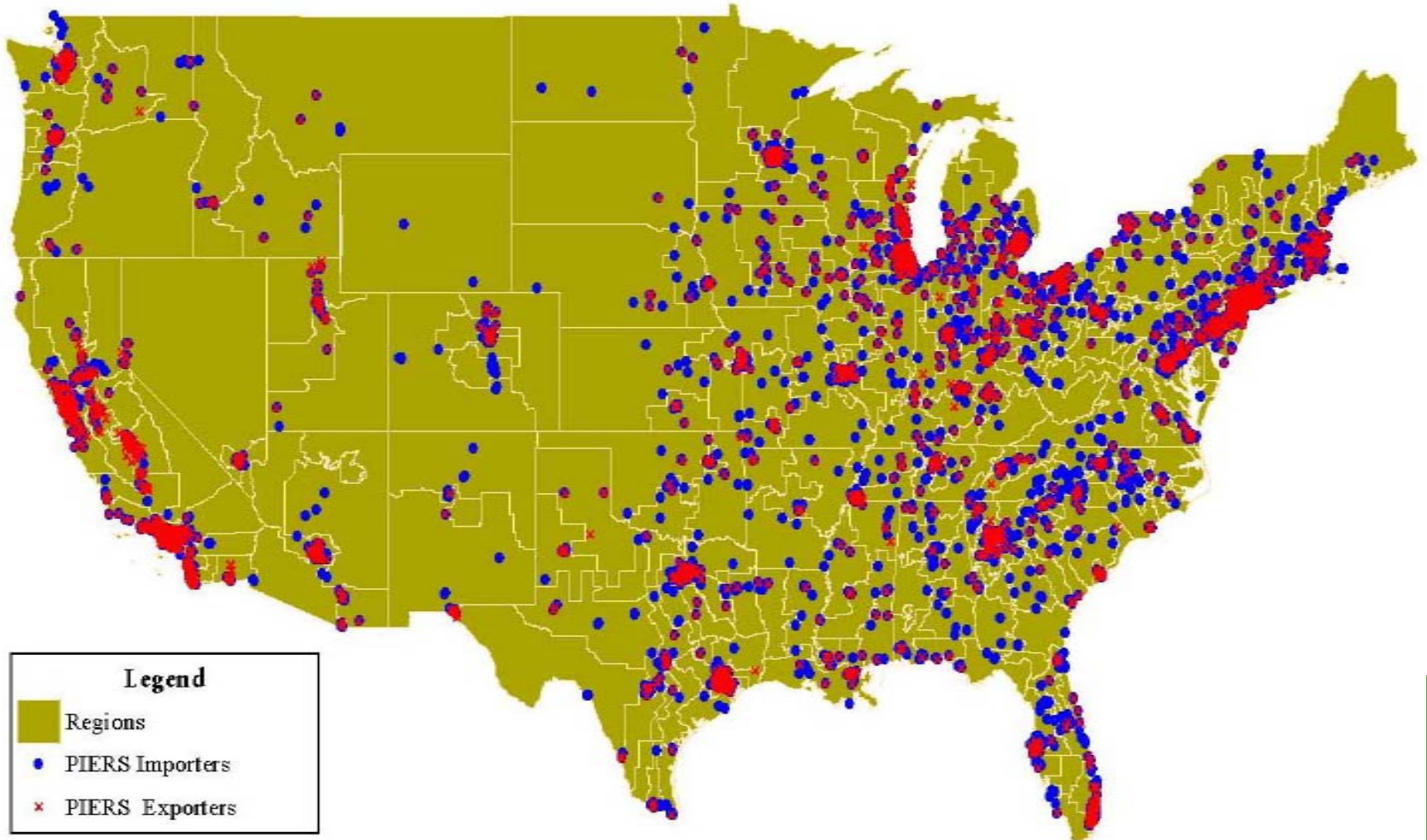
Cargo Movement

Southern CA Off-Dock Locations



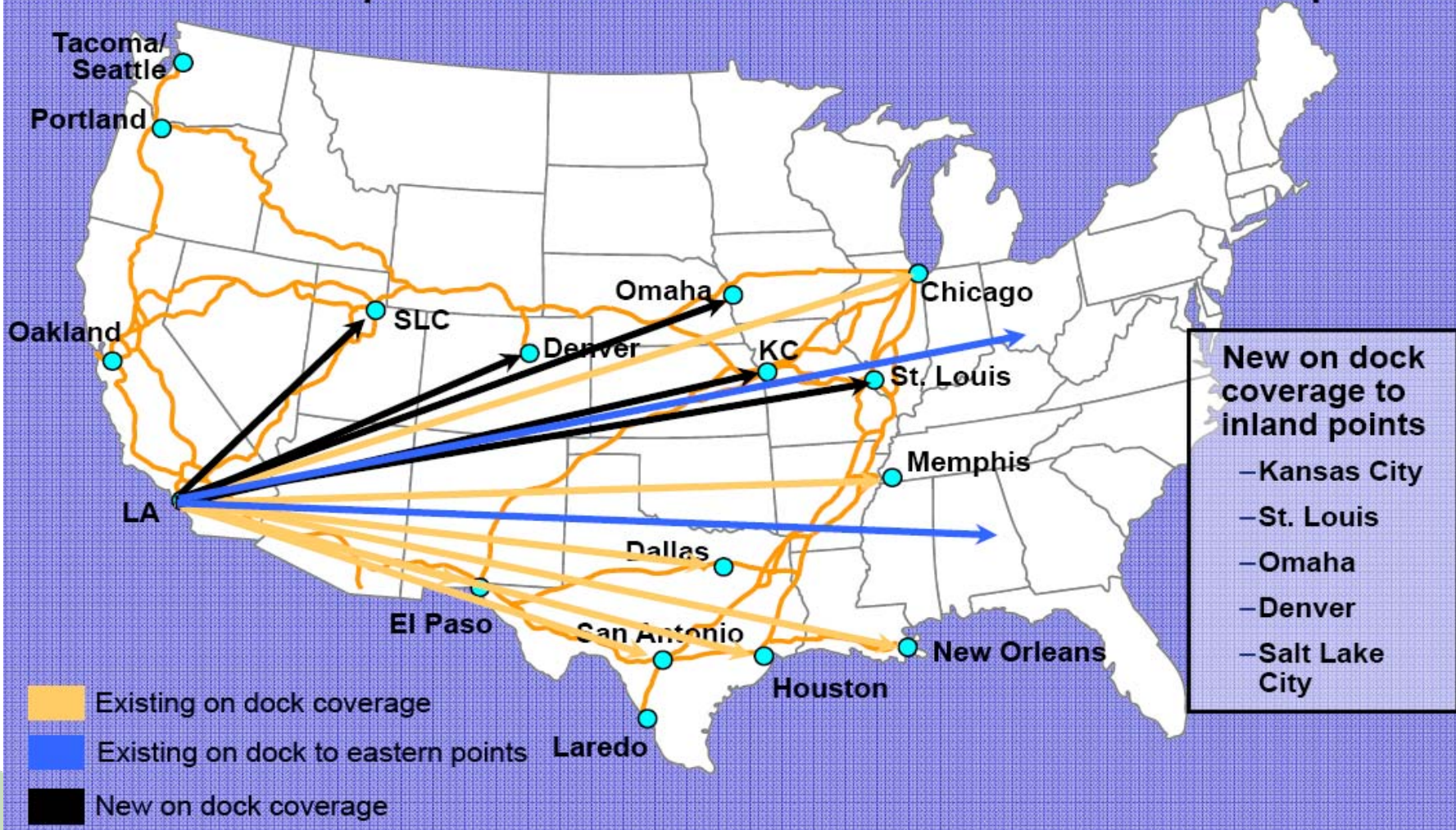
Intermodal Cargo Logistics

Locations of Importers & Exporters (trade w/SPBP)



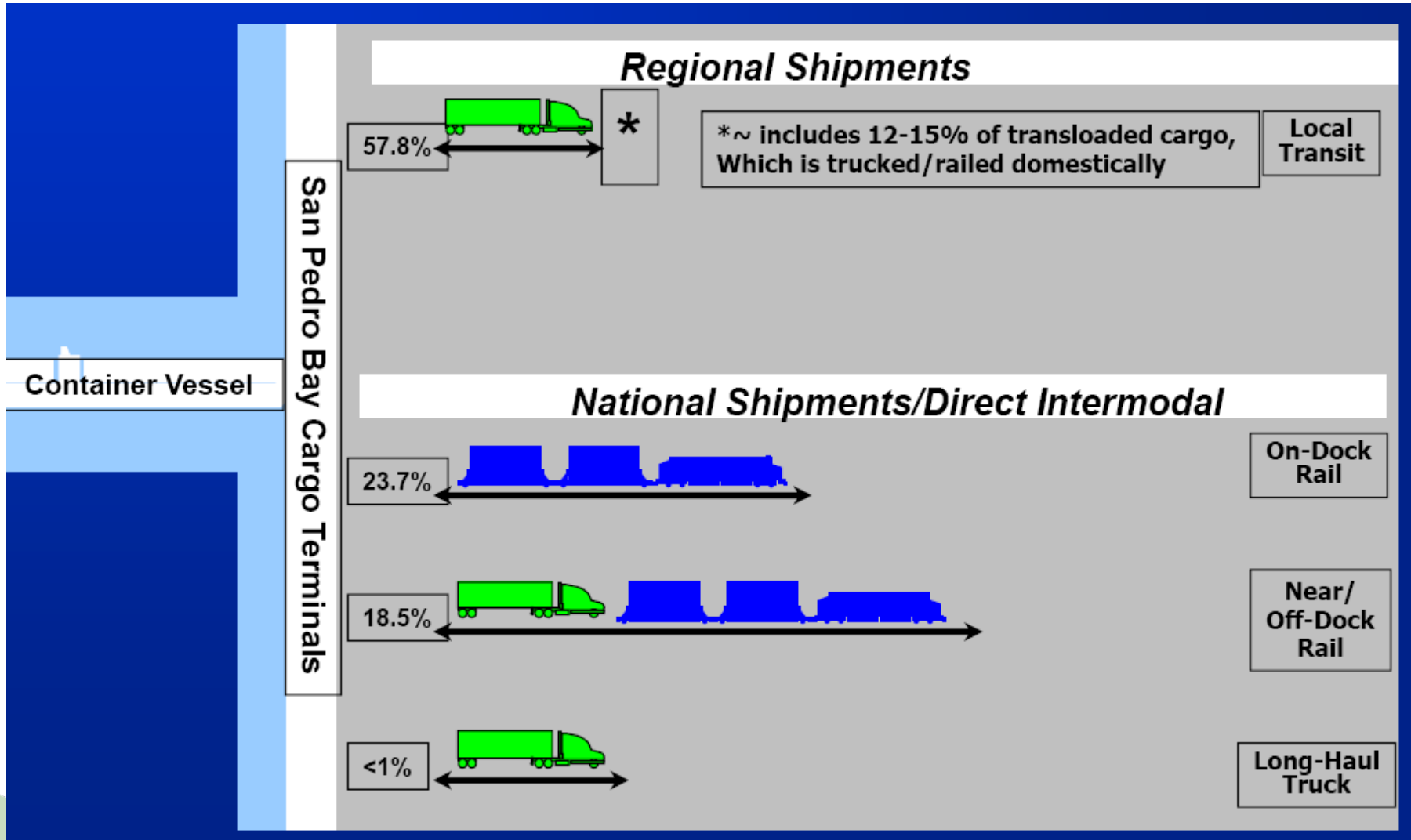
Intermodal Cargo Logistics: *Railroad Service*

Oct. 2008: UPRR expanded LA/LB On-Dock service to 5 additional inland points



Intermodal Cargo Logistics

San Pedro Bay Ports Mode Splits





On-Dock Rail & Off-dock Rail Factors



On Dock vs. Off Dock Rail

Current SPBP On-Dock and Off-Dock Rates

	2003	2004	2005	2006	2007	2008
On-Dock						
BNSF	591,280	781,715	977,945	1,285,111	1,181,911	1,115,348
UPRR	456,299	534,870	652,527	827,051	821,070	774,218
Total On-dock	1,047,579	1,316,585	1,630,472	2,112,162	2,002,981	1,889,566
% of Total	15.9%	18.1%	20.7%	24.1%	23.0%	23.7%
Off-Dock (includes ICTF)						
BNSF	760,237	774,336	781,980	808,096	789,656	798,510
UPRR	777,534	771,562	757,598	826,802	812,502	673,854
Total Off-Dock	1,537,771	1,545,898	1,539,578	1,634,898	1,602,158	1,472,364
% of Total	23.4%	21.2%	19.5%	18.7%	18.4%	18.5%
Total On & Off-dock	2,585,350	2,862,483	3,170,050	3,747,060	3,605,139	3,361,930
% of Total	39.3%	39.3%	40.2%	42.8%	41.4%	42.2%
Total Port Volume	6,576,147	7,278,496	7,885,801	8,755,677	8,704,169	7,964,100



On Dock vs. Off Dock Rail

“To On-Dock or Not to On-Dock”

- **Unit vs. Partial Trains**
 - Ports have short-line switcher (PHL)
 - Destination block volumes
- **Vessel stowage, loading/unloading**
- **Capacity**
 - Terminal Container Yard vs. Intermodal Yard
 - Railyard capacity
- **Railroad schedules, operations, Railcar availability**
- **Transloading: on the rise in Southern California**
 - Major retailers transload high %
 - Shipper preferences (value added services, distribution network, intermodal system)
- **WB MTY repositioning**



On Dock vs. Off Dock Rail

Need for Off/Near Dock Rail

- Meet existing and future demand for off and near dock rail while maximizing on dock capacity
- Provide for the sorting of low-volume destination blocks to build complete unit trains (will always be req'd)
- Reduce truck trips and emissions with moving cargo to near dock rail close to the SPB Ports



On Dock vs. Off Dock Rail

Recent Enhancements to Increase On-Dock %

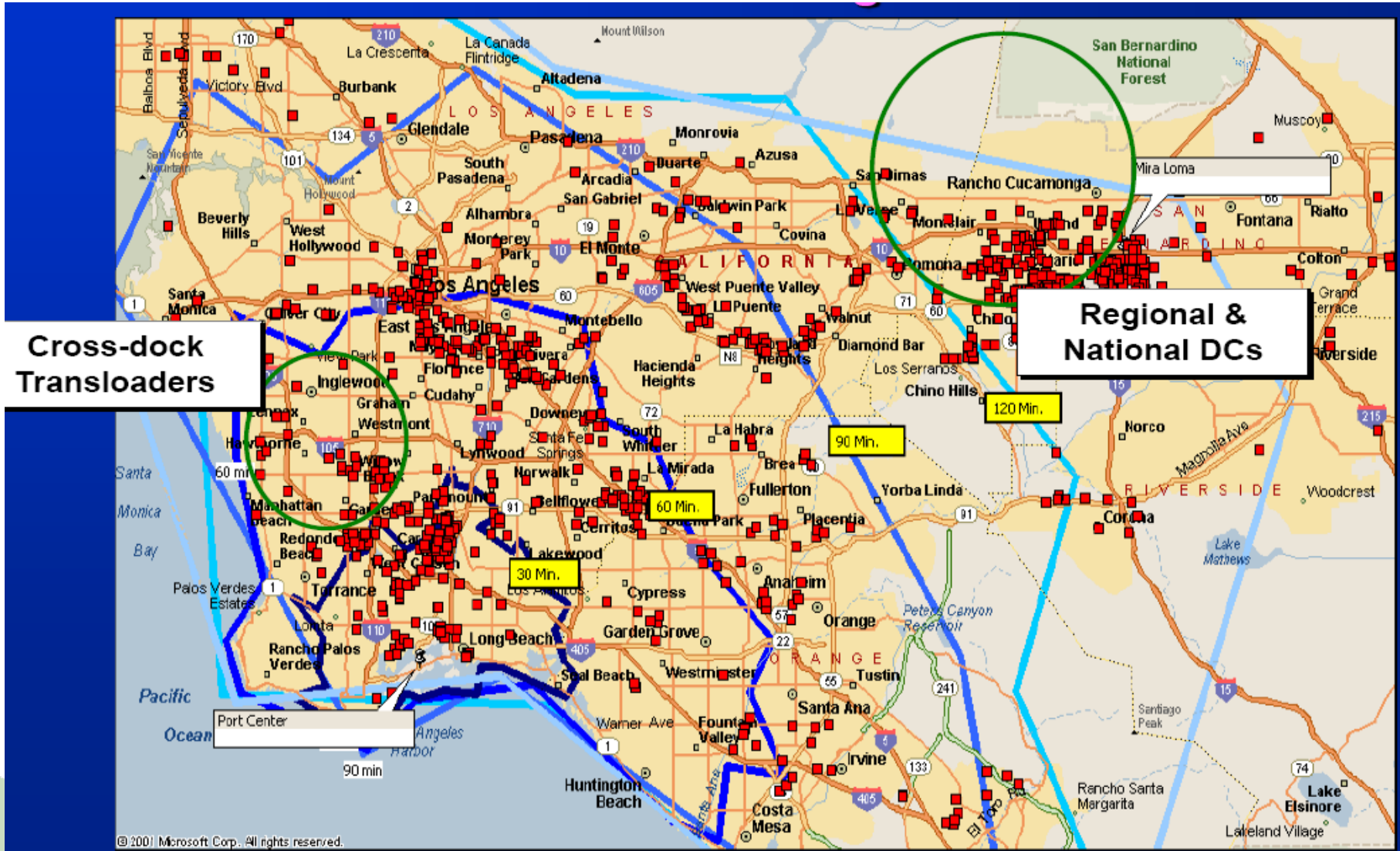
- Railroad crews report at Port
- Railroad dispatchers stationed at PHL
- Standardize rail data between terminals & railroads
- Increased railroad work force
- More equipment
- Longer trains
- Train fueling facility at T. I. (Pier 300)
- New PHL Agreement





On Dock vs. Off Dock Rail

Transloading





On Dock vs. Off Dock Rail

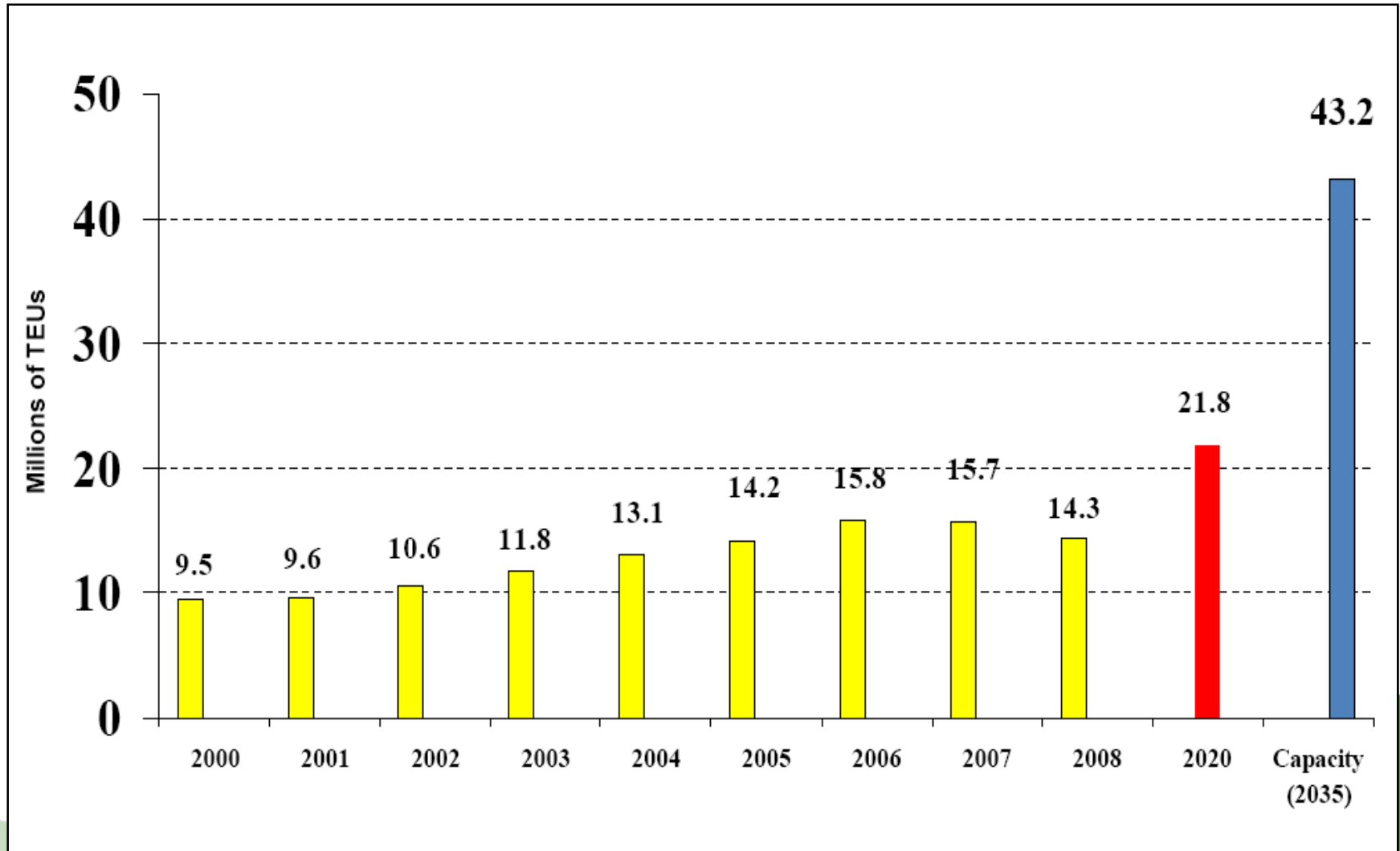
Cargo Forecast Trends/Parameters

- Coast DCs supplement West Coast DCs, not replace them
- All-water to East Coast only suitable for specific regional market segments and are price sensitive
- The level of transpacific imports (e.g. China) will continue to grow
- Neither BNSF nor UP will give up the Midwest market



SPBP Cargo Forecasts

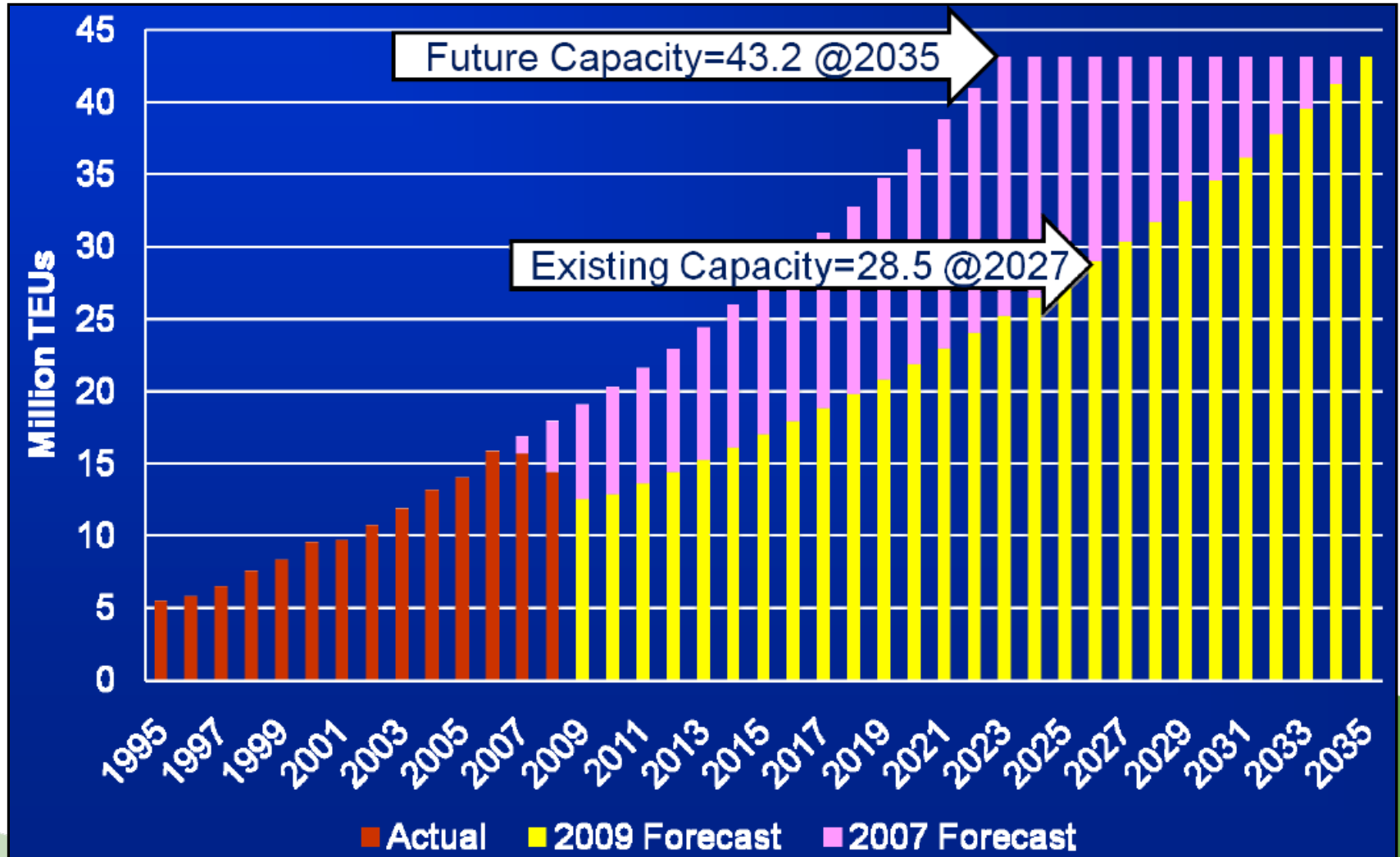
2009 Forecast





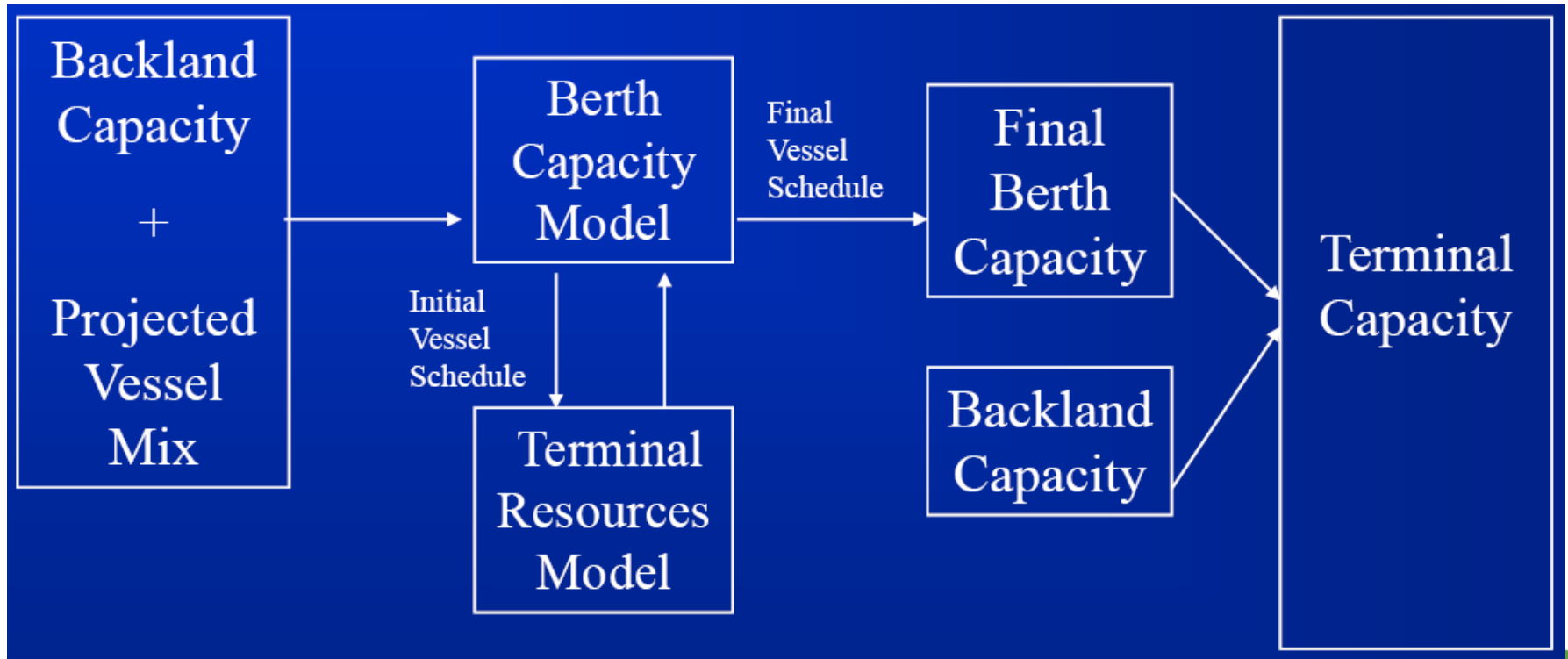
SPBP Cargo Forecasts

2009 vs. 2007 Forecasts



On Dock vs. Off Dock Rail

Container Terminal Capacity Modeling



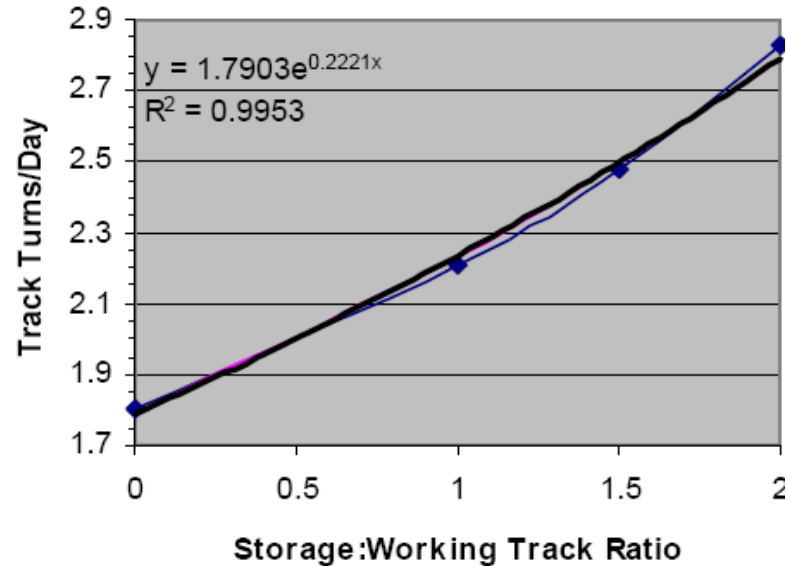


On Dock vs. Off Dock Rail

Capacity On-dock Railyard Capacity Modeling

Peak Day Eastbound MPC =

(Working Track Length in DS Cars)
(Track Utilization Factor)*(20 TEU/DS Car)*
(Railcar Utilization Factor)*
(Track Turns/Day)*
(Switching Efficiency)*



Monthly Eastbound MPC = Peak Day EB MPC *360 / 12* (Plant Utilization Factor) [includes shifts/day, labor rules]

Total Monthly MPC =(Monthly Eastbound MPC) * (2 for east + west)* (Export/Import Factor)

Total Annual MPC =(Total Monthly MPC)*12



On Dock vs. Off Dock Rail

Port Rail System Projects

Ports Rail System Projects (\$1.096 B) Essential For On-Dock Rail (\$0.75 B)

- Pier B Railyard-\$453.3m
- West Basin Railyard-\$112.94m
- New Cerritos channel rail bridge-\$155.6m
- South Wilmington Grade Separation -\$73.06m
- Reeves grade separation -\$108.8m
- Other in-port mainline -\$192.5m

Benefits:

- Additional on-dock rail capacity
- Reduces train delays and emissions
- Reduces daily Vehicle Miles of Travel (VMT) for Port trucks by about 64,500 miles.
- Reduces daily VHT for Port trucks by about 2,300 hours



On Dock vs. Off Dock Rail

Rail Simulation





On Dock vs. Off Dock Rail

POLB/POLA Intermodal Demand/Capacity

2007 Cargo Forecast Scenario

Year	2008 (1 shift)	2012 (3 shifts)	2016 (3 shifts)	2020 (3 shifts)	2023 (3 shifts)	2030 (3 shifts)	2035 (3 shifts)
Total	14,328,355	23,444,658	29,878,496	36,456,136	42,756,747	43,158,000	43,158,000
On-dock	3,401,219	5,490,000	7,910,000	10,340,000	11,710,000	12,860,000	12,860,000
	23.7%	23.4%	26.5%	28.4%	27.4%	29.8%	29.8%
Off/Near-dock	2,650,255	3,887,863	4,041,398	4,242,454	5,392,699	4,403,200	4,403,200
Total Intermodal	42.2%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%

2009 Cargo Forecast Scenario

Year	2008 (1 shift)	2012 (2 shifts)	2016 (3 shifts)	2020 (3 shifts)	2023 (3 shifts)	2030 (3 shifts)	2035 (3 shifts)
Total	14,328,355	14,334,116	17,836,885	21,827,000	25,176,816	34,563,000	43,158,000
On-dock	3,401,219	3,690,000	5,960,000	7,260,000	8,170,000	11,500,000	12,860,000
	23.7%	25.7%	33.4%	33.3%	32.5%	33.3%	29.8%
Off/Near-dock	2,650,255	2,043,647	1,174,754	1,470,800	1,900,726	2,325,200	4,403,200
Total Intermodal	42.2%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Transloaded	1,719,403	1,720,094	2,140,426	2,619,240	3,021,218	4,147,560	5,178,960



Zero Emission Container Movement Systems



Alternative Transport Systems

Zero Emission Container Movement Systems

- **Zero Emission Container Movement Systems (ZECMS)**
 - I-710 Corridor EIR/EIS: includes evaluation of alternative technologies for moving containers from ports to Hobart/East L.A. railyards
 - Ports Request for concepts initiative for potential demo project of moving containers from ports to near-dock railyards



Alternative Transport Systems

I-710 Corridor ZECMS Market Analysis

- **Assumptions**

- An alternative technology could serve **part of** the projected 2035 **near-dock** and **off-dock** intermodal container markets
- An alternative technology could also serve **parts of other geographic markets**
- The on-dock market will continue to be served by rail
- An alternative technology in the I-710 Corridor could be considered an initial segment of a **regional network**
- **No intermediate stops** for the Automated Fixed Guideway system



Alternative Transport Systems

I-710 Corridor ZECMS Technologies: Trucks

- **Zero Emission Trucks: Are able to operate on a truckway and on a conventional highway**
 - Electric Motor / Wayside Power
 - Electric Motor / Battery Power
 - Electric Motor / Wayside and/or Battery Power
 - Hybrid Electric/Diesel
 - Hybrid Electric/LNG
 - Linear Induction / Diesel
 - Linear Induction / Electric Motor / Battery Power
 - Linear Induction / LNG Power



Alternative Transport Systems

I-710 Corridor ZECMS Technologies: Trucks

- Lowest Cost
- Maximum flexibility
- Utilizes a combination of existing technologies
- Utilizes existing roadway system
- Does not require additional intermodal yards
- Open to a range of propulsion technologies
 - Electrified motor
 - Linear induction
 - Hybrid



Alternative Transport Systems

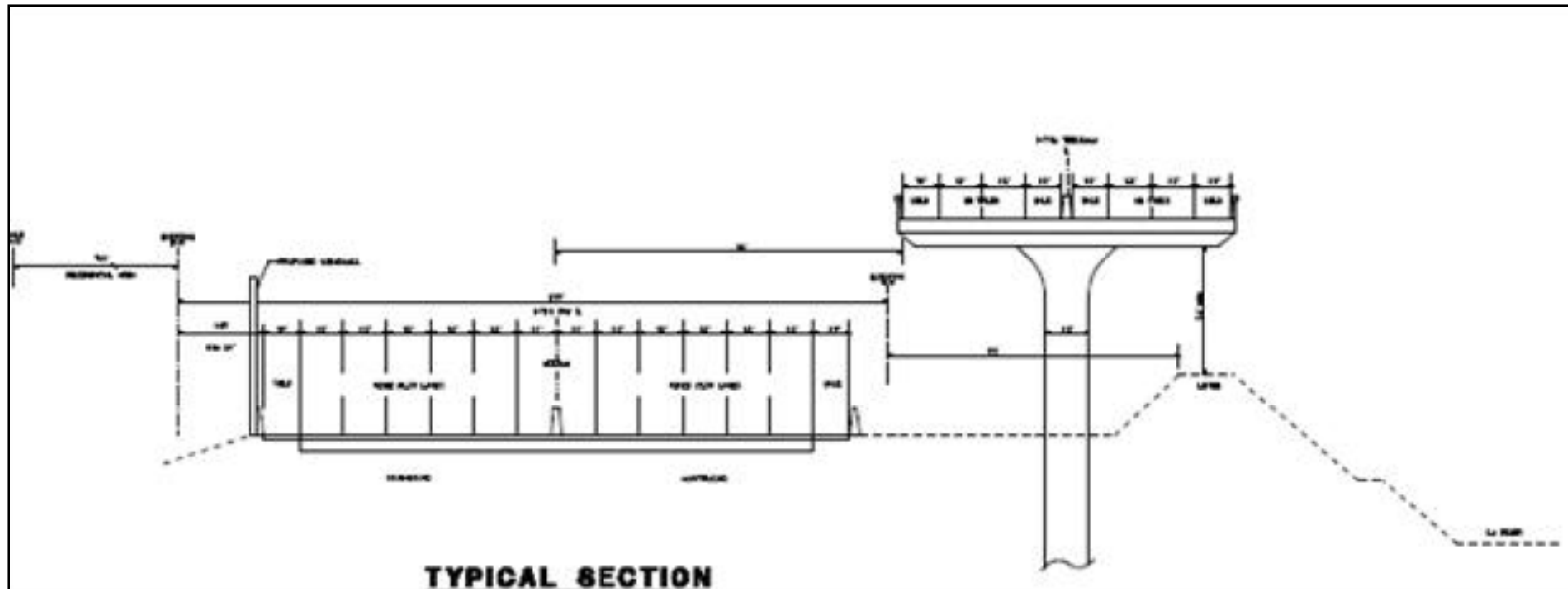
I-710 Corridor ZECMS Technologies: Trucks

- **Design/Construction Management:** \$38-\$39 million per mile
- **Capital:** \$192 million to \$196 million per mile
- **Operations:** \$1.8 -\$2.0 million per mile for the 1st year of operations based on a cost of \$.20 per mile to operate electric/battery truck
- **Maintenance:** cannot be determined at this time
- **Estimate:**
 - \$3.8 –\$3.9 billion to construct
 - \$36 -\$41 million for the 1st year to operate

Alternative Transport Systems

I-710 Corridor ZECMS Technologies: Trucks

Conceptual Freight Corridor Cross Section



Fits within the available I-710 freeway right-of-way
Both at-grade and elevated

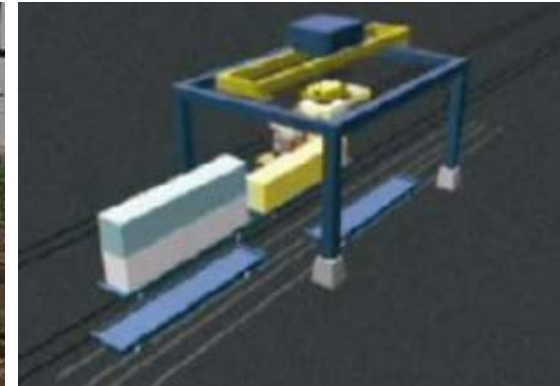
Alternative Transport Systems

I-710 Corridor ZECMS Technologies

**Automated Fixed Guideway
Maglev**



**Electrified Conventional Rail
Exclusive Contact Guideway**



Alternative Transport Systems

Electric Cargo Conveyor System





Alternative Transport Systems

I-710 Corridor ZECMS Tech: Automated Fixed Guideways

- Many companies are promoting this technology family
 - Currently unproven
- Not flexible
 - Limited markets
- Requires expanded on-dock and near-dock intermodal yards
- Requires extensive network of collection and distribution guideways
- High cost
- May become feasible as the technology advances



Alternative Transport Systems

I-710 Corridor ZECMS Tech: Automated Fixed Guideways

- **Potential Fatal Flaws**
 - **Fixed Guideway Family Cost**
 - Serves limited market
 - Expansion limitations
 - Loading/unloading space requirements
 - Level of research and development required
 - **Zero Emission Truck Family**
 - Reliance on developing battery and/or hybrid technology



Alternative Transport Systems

I-710 Corridor ZECMS Implementation Phasing

- 1. Truck Lanes**
- 2. Low Emission Diesel Trucks**
- 3. Zero Emission Trucks**
- 4. Fixed Guideway**



QUESTIONS?