



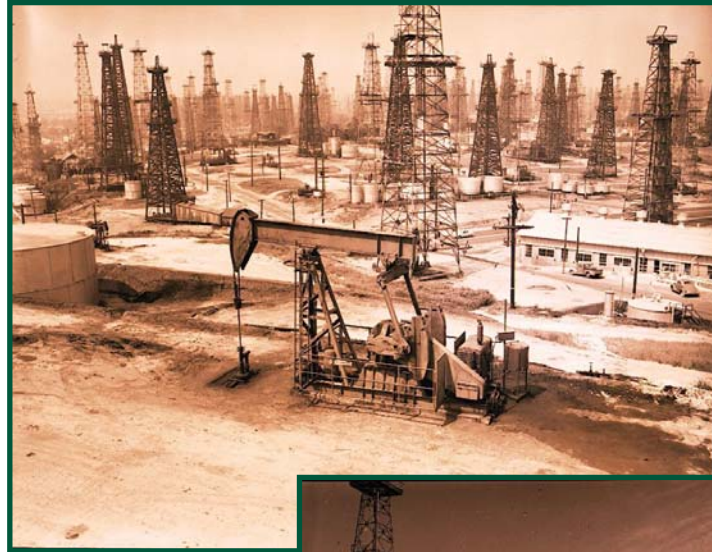
San Pedro Bay Ports Clean Air Action Plan

Low-Sulfur Marine Fuel Availability Study

CAAP Measure OGV3 & OGV4

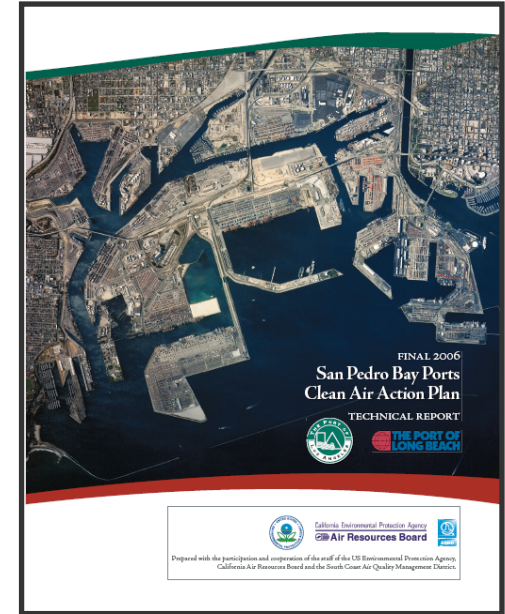
Presentation Outline

- Purpose
- Methodology
- Results
- Conclusions



Purpose

- **Vessel fuel measures in the San Pedro Bay Ports Clean Air Action Plan**
 - OGV3 (auxiliary engine)
 - OGV4 (main engine)
 - Measures will be implemented through leases and CEQA, with consideration of a tariff
- **Study Elements**
 - Anticipated fuel demand based on LB/LA activity
 - Available near-term supplies of $\leq 0.2\%$ S MGO at major bunkering ports for LB/LA bound vessels
 - Supply versus demand to assess availability
 - Cost differential between 0.2% S MGO and IFO



Methodology

- **Fuel Demand**

- Lease-based demand
 - 2008: 938 tonnes;
 - 2009: 11,104 tons
- All vessel fuel demand within breakwater: 152,610 tons
- All vessel fuel demand to 40 nm: 241,306 tons

- Vessel Fuel Incentive Program
 - 13,450 tonnes (anticipated participation)
 - 39,500 tonnes max (100% participation to 40 nm)



Methodology

- **Fuel Availability Study**
 - Provided semi-quantitative to quantitative assessments
 - Literature Reviews
 - Surveys
 - Shipping Lines
 - Bunker Port and Suppliers
 - Refineries
 - Evaluation of Vessel Call Origin
 - DNV Fuel Sulfur Analysis
 - Distribution of Low-Sulfur DMA analysis by Bunkering Ports



SURVEYED PORTS



REGIONAL DEMAND VS. SUPPLY

BASED ON OCEAN CARRIER SURVEY: **REPORTED SALES**

Region	Supply (Tonnes)	2008 Lease-based		2009 Lease-based		All Vessels to Breakwater		All Vessels to 40 nm	
		Regional Demand (Tonnes)	Demand / Supply	Regional Demand (Tonnes)	Demand / Supply	Regional Demand (Tonnes)	Demand / Supply	Regional Demand (Tonnes)	Demand / Supply
Australia and South Pacific	n.a.	15	n.a.	181	n.a.	2,481	n.a.	3,924	n.a.
China	60,000	198	0.33%	2,347	3.91%	32,259	53.77%	51,008	85.01%
Japan	60,000	107	0.18%	1,264	2.11%	17,370	28.95%	27,466	45.78%
Korea	n.a.	76	n.a.	903	n.a.	12,407	n.a.	19,618	n.a.
Singapore	n.a.	38	n.a.	451	n.a.	6,204	n.a.	9,809	n.a.
Asia - Others	n.a.	8	n.a.	90	n.a.	1,241	n.a.	1,962	n.a.
Central and South America	144,000	137	0.10%	1,625	1.13%	22,333	15.51%	35,313	24.52%
Middle East	20,000	8	0.04%	90	0.45%	1,241	6.20%	1,962	9.81%
Europe	n.a.	38	n.a.	451	n.a.	6,204	n.a.	9,809	n.a.
North America - West Coast	118,200	282	0.24%	3,340	2.83%	45,907	38.84%	72,588	61.41%
North America - Others	n.a.	31	n.a.	361	n.a.	4,963	n.a.	7,847	n.a.
Sum	402,200	938		11,104		152,610		241,306	

REGIONAL DEMAND VS. SUPPLY

BASED ON OCEAN CARRIER SURVEY : SALES FROM STEM VALUES

Region	Supply (Tonnes)	2008 Lease-based		2009 Lease-based		All Vessels to Breakwater		All Vessels to 40 nm	
		Regional Demand (Tonnes)	Demand / Supply	Regional Demand (Tonnes)	Demand / Supply	Regional Demand (Tonnes)	Demand / Supply	Regional Demand (Tonnes)	Demand / Supply
Australia and South Pacific	6,857	15	0.22%	181	2.63%	2,481	36.19%	3,924	57.22%
China	13,371	198	1.48%	2,347	17.55%	32,259	241.25%	51,008	381.47%
Japan	4,800	107	2.22%	1,264	26.33%	17,370	361.88%	27,466	572.20%
Korea	8,914	76	0.86%	903	10.13%	12,407	139.18%	19,618	220.08%
Singapore	12,686	38	0.30%	451	3.56%	6,204	48.90%	9,809	77.32%
Asia - Others	8,571	8	0.09%	90	1.05%	1,241	14.48%	1,962	22.89%
Central and South America	8,229	137	1.66%	1,625	19.75%	22,333	271.41%	35,313	429.13%
Middle East	5,486	8	0.14%	90	1.65%	1,241	22.62%	1,962	35.76%
Europe	120,686	38	0.03%	451	0.37%	6,204	5.14%	9,809	8.13%
North America - West Coast	110,057	282	0.26%	3,340	3.03%	45,907	41.71%	72,588	65.95%
North America - Others	20,914	31	0.15%	361	1.73%	4,963	23.73%	7,847	37.52%
Sum	320,571	938	-	11,104	-	152,610	-	241,306	-

REGIONAL DEMAND VS. SUPPLY

BASED ON OCEAN CARRIER SURVEY : **ESTIMATED CAPACITY**

Region	Supply (Tonnes)	2008 Lease-based		2009 Lease-based		All Vessels to Breakwater		All Vessels to 40 nm	
		Regional Demand (Tonnes)	Demand / Supply	Regional Demand (Tonnes)	Demand / Supply	Regional Demand (Tonnes)	Demand / Supply	Regional Demand (Tonnes)	Demand / Supply
Australia and South Pacific	n.a.	15	n.a.	181	n.a.	2,481	n.a.	3,924	n.a.
China	66000	198	0.30%	2,347	3.56%	32,259	48.88%	51,008	77.28%
Japan	102000	107	0.10%	1,264	1.24%	17,370	17.03%	27,466	26.93%
Korea	n.a.	76	n.a.	903	n.a.	12,407	n.a.	19,618	n.a.
Singapore	n.a.	38	n.a.	451	n.a.	6,204	n.a.	9,809	n.a.
Asia - Others	n.a.	8	n.a.	90	n.a.	1,241	n.a.	1,962	n.a.
Central and South America	144000	137	0.10%	1,625	1.13%	22,333	15.51%	35,313	24.52%
Middle East	36000	8	0.02%	90	0.25%	1,241	3.45%	1,962	5.45%
Europe	n.a.	38	n.a.	451	n.a.	6,204	n.a.	9,809	n.a.
North America - West Coast	556200	282	0.05%	3,340	0.60%	45,907	8.25%	72,588	13.05%
North America - Others	1620000	31	0.00%	361	0.02%	4,963	0.31%	7,847	0.48%
Sum	2,524,200	938	-	11,104	-	152,610	-	241,306	-

REGIONAL DEMAND VS. SUPPLY

BASED ON VESSEL CALLS: **REPORTED SALES**

Region	Supply (Tonnes)	2008 Lease-based		2009 Lease-based		All Vessels to Breakwater		All Vessels to 40 nm	
		Regional Demand (Tonnes)	Demand / Supply	Regional Demand (Tonnes)	Demand / Supply	Regional Demand (Tonnes)	Demand / Supply	Regional Demand (Tonnes)	Demand / Supply
Australia and South Pacific	n.a.	9	n.a.	110	n.a.	1,515	n.a.	2,396	n.a.
China	60,000	86	0.14%	1,015	1.69%	13,954	23.26%	22,063	36.77%
Japan	60,000	51	0.09%	605	1.01%	8,312	13.85%	13,142	21.90%
Korea	n.a.	54	n.a.	634	n.a.	8,716	n.a.	13,781	n.a.
Singapore	n.a.	5	n.a.	61	n.a.	837	n.a.	1,323	n.a.
Asia - Others	n.a.	2	n.a.	18	n.a.	245	n.a.	388	n.a.
Central and South America	144,000	57	0.04%	672	0.47%	9,235	6.41%	14,602	10.14%
Middle East	20,000	1	0.01%	17	0.08%	231	1.15%	365	1.83%
Europe	n.a.	3	n.a.	38	n.a.	519	n.a.	821	n.a.
North America - West Coast	118,200	648	0.55%	7,672	6.49%	105,468	89.23%	166,719	141.05%
North America - Others	n.a.	22	n.a.	262	n.a.	3,579	n.a.	5,704	n.a.
Sum	402,200	938	-	11,104	-	152,610		241,306	-

REGIONAL DEMAND VS. SUPPLY

BASED ON VESSEL CALLS: SALES FROM STEM VALUES

Region	Supply (Tonnes)	2008 Lease-based		2009 Lease-based		All Vessels to Breakwater		All Vessels to 40 nm	
		Regional Demand (Tonnes)	Demand / Supply	Regional Demand (Tonnes)	Demand / Supply	Regional Demand (Tonnes)	Demand / Supply	Regional Demand (Tonnes)	Demand / Supply
Australia and South Pacific	6,857	9	0.14%	110	1.61%	1,515	22.10%	2,396	34.94%
China	13,371	86	0.64%	1,015	7.59%	13,954	104.35%	22,063	165.00%
Japan	4,800	51	1.06%	605	12.60%	8,312	173.16%	13,142	273.80%
Korea	8,914	54	0.60%	634	7.11%	8,716	97.77%	13,781	154.60%
Singapore	12,686	5	0.04%	61	0.48%	837	6.60%	1,323	10.43%
Asia - Others	8,571	2	0.02%	18	0.21%	245	2.86%	388	4.53%
Central and South America	8,229	57	0.69%	672	8.17%	9,235	112.23%	14,602	177.45%
Middle East	5,486	1	0.03%	17	0.31%	231	4.21%	365	6.65%
Europe	120,686	3	0.00%	38	0.03%	519	0.43%	821	0.68%
North America - West Coast	110,057	648	0.59%	7,672	6.97%	105,468	95.83%	166,719	151.48%
North America - Others	20,914	22	0.11%	262	1.26%	3,579	17.11%	5,704	27.27%
Sum	320,571	938	-	11,104	-	152,610	-	241,306	-

REGIONAL DEMAND VS. SUPPLY


BASED ON VESSEL CALLS: **ESTIMATED CAPACITY**

Region	Supply (Tonnes)	2008 Lease-based		2009 Lease-based		All Vessels to Breakwater		All Vessels to 40 nm	
		Regional Demand (Tonnes)	Demand / Supply	Regional Demand (Tonnes)	Demand / Supply	Regional Demand (Tonnes)	Demand / Supply	Regional Demand (Tonnes)	Demand / Supply
Australia and South Pacific	n.a.	9	n.a.	110	n.a.	1,515	n.a.	2,396	n.a.
China	66,000	86	0.13%	1,015	1.54%	13,954	21.14%	22,063	33.43%
Japan	102,000	51	0.05%	605	0.59%	8,312	8.15%	13,142	12.88%
Korea	n.a.	54	n.a.	634	n.a.	8,716	n.a.	13,781	n.a.
Singapore	n.a.	5	n.a.	61	n.a.	837	n.a.	1,323	n.a.
Asia - Others	n.a.	2	n.a.	18	n.a.	245	n.a.	388	n.a.
Central and South America	144,000	57	0.04%	672	0.47%	9,235	6.41%	14,602	10.14%
Middle East	36,000	1	0.00%	17	0.05%	231	0.64%	365	1.01%
Europe	n.a.	3	n.a.	38	n.a.	519	n.a.	821	n.a.
North America - West Coast	556,200	648	0.12%	7,672	1.38%	105,468	18.96%	166,719	29.97%
North America - Others	1,620,000	22	0.00%	262	0.02%	3,579	0.22%	5,704	0.35%
Sum	2,524,200	938	-	11,104	-	152,610	-	241,306	-

SUMMARY OF LOW-SULFUR DMA REGIONAL DEMAND AND SUPPLY ANALYSES

Region	Projected Supplies*	2008 lease-based			2009 lease-based			All Vessels to Breakwater			All Vessels to 40 nm		
		Reported Sales	DNV Sales Volume	Capacity Based	Reported Sales	DNV Sales Volume	Capacity Based	Reported Sales	DNV Sales Volume	Capacity Based	Reported Sales	DNV Sales Volume	Capacity Based
Australia & South Pacific	A	n.a.	3	n.a.	n.a.	3	n.a.	n.a.	3	n.a.	n.a.	2	n.a.
	B	n.a.	3	n.a.	n.a.	3	n.a.	n.a.	3	n.a.	n.a.	3	n.a.
China	A	3	3	3	3	3	3	2	1	3	2	1	2
	B	3	3	3	3	3	3	3	1	3	2	1	3
Japan	A	3	3	3	3	3	3	3	1	3	3	1	3
	B	3	3	3	3	3	3	3	1	3	3	1	3
Korea	A	n.a.	3	n.a.	n.a.	3	n.a.	n.a.	1	n.a.	n.a.	1	n.a.
	B	n.a.	3	n.a.	n.a.	3	n.a.	n.a.	2	n.a.	n.a.	1	n.a.
Singapore	A	n.a.	3	n.a.	n.a.	3	n.a.	n.a.	3	n.a.	n.a.	2	n.a.
	B	n.a.	3	n.a.	n.a.	3	n.a.	n.a.	3	n.a.	n.a.	3	n.a.
Asia-Others	A	n.a.	3	n.a.	n.a.	3	n.a.	n.a.	3	n.a.	n.a.	3	n.a.
	B	n.a.	3	n.a.	n.a.	3	n.a.	n.a.	3	n.a.	n.a.	3	n.a.
Central & South America	A	3	3	3	3	3	3	3	1	3	3	1	3
	B	3	3	3	3	3	3	3	1	3	3	1	3
Middle East	A	3	3	3	3	3	3	3	3	3	3	3	3
	B	3	3	3	3	3	3	3	3	3	3	3	3
Europe	A	n.a.	3	n.a.	n.a.	3	n.a.	n.a.	3	n.a.	n.a.	3	n.a.
	B	n.a.	3	n.a.	n.a.	3	n.a.	n.a.	3	n.a.	n.a.	3	n.a.
North America - West Coast	A	3	3	3	3	3	3	3	3	3	2	2	3
	B	3	3	3	3	3	3	2	2	3	1	1	3
North America - Others	A	n.a.	3	3	n.a.	3	3	n.a.	3	3	n.a.	3	3
	B	n.a.	3	3	n.a.	3	3	n.a.	3	3	n.a.	3	3

CONCLUSIONS

- **Conservative estimate of fuel supply**
 - **Adequate fuel is available for lease implementation**
 - **An immediate all vessel requirement would create supply challenges for some regions**
 - **Fuel supply is dependent on an economic response in the world fuel market**
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Contacts



Heather Tomley
Sr. Environmental Specialist
tomley@polb.com
562-590-4160



Christopher Patton
Environmental Affairs Officer
cpatton@portla.org
310-732-3677

Carter Atkins
Environmental Specialist
catkins@portla.org
310-732-7649

shipfuel@cleanairactionplan.org
www.cleanairactionplan.org