



Final 2006

San Pedro Bay Ports Clean Air Action Plan Technical Report

APPENDIX A – Supporting Technical Details

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Appendix A

Technical Details Related to Clean Air Action Plan Measures' Emissions Reduction Calculations

Page Number	Description
1	Draft SCAQMD 2007 AQMP for South Coast Air Basin; Table A-1
2	SPBP-HDV1 Scenarios for Policy Discussion
4	SPBP-HDV1 Scenarios Overview
7	SPBP-HDV1 Scenario 1
10	SPBP-HDV1 Scenario 2
13	SPBP-HDV1 Scenario 3
16	SPBP-HDV1 Scenario 4
19	SPBP-HDV1 Scenario 5
22	SPBP-HDV1 Scenario 6
26	SPBP-HDV1 Scenario 7
30	SPBP-HDV1 Scenario 8
34	SPBP-HDV1 Scenario 9
38	SPBP-HDV1 Scenario 10
42	SPBP-HDV1 Scenario 11
46	SPBP-HDV1 Scenario 12
49	Implementation Schedule for SPBP Clean Air Action Plan
50	2001 OGV Baseline Emissions POLA
51	2002 OGV Baseline Emissions POLB
52	Emissions Reductions Achieved by Fuel Substitutions
53	CARB's Adopted Marine Auxiliary Engines Regulation Reductions for POLA
54	CARB's Adopted Marine Auxiliary Engines Regulation Reductions for POLB
55	SPBP-OGV1 POLA
56	SPBP-OGV1 POLB
57	SPBP-OGV2 POLA
58	SPBP-OGV2 POLB
59	SPBP-OGV3 POLA
60	SPBP-OGV3 POLB
61	SPBP-OGV4 POLA
62	SPBP-OGV4 POLB
63	SPBP-OGV5 POLA
64	SPBP-OGV5 POLB
65	CARB's CHE Regulation Implementation Schedules
66	CARB's CHE Regulation Reductions POLA
67	CARB's CHE Regulation Reductions POLB
68	SPBP-CHE1 POLA
69	SPBP-CHE1 POLB
70	SPBP-RL1 POLA
71	SPBP-RL1 POLB

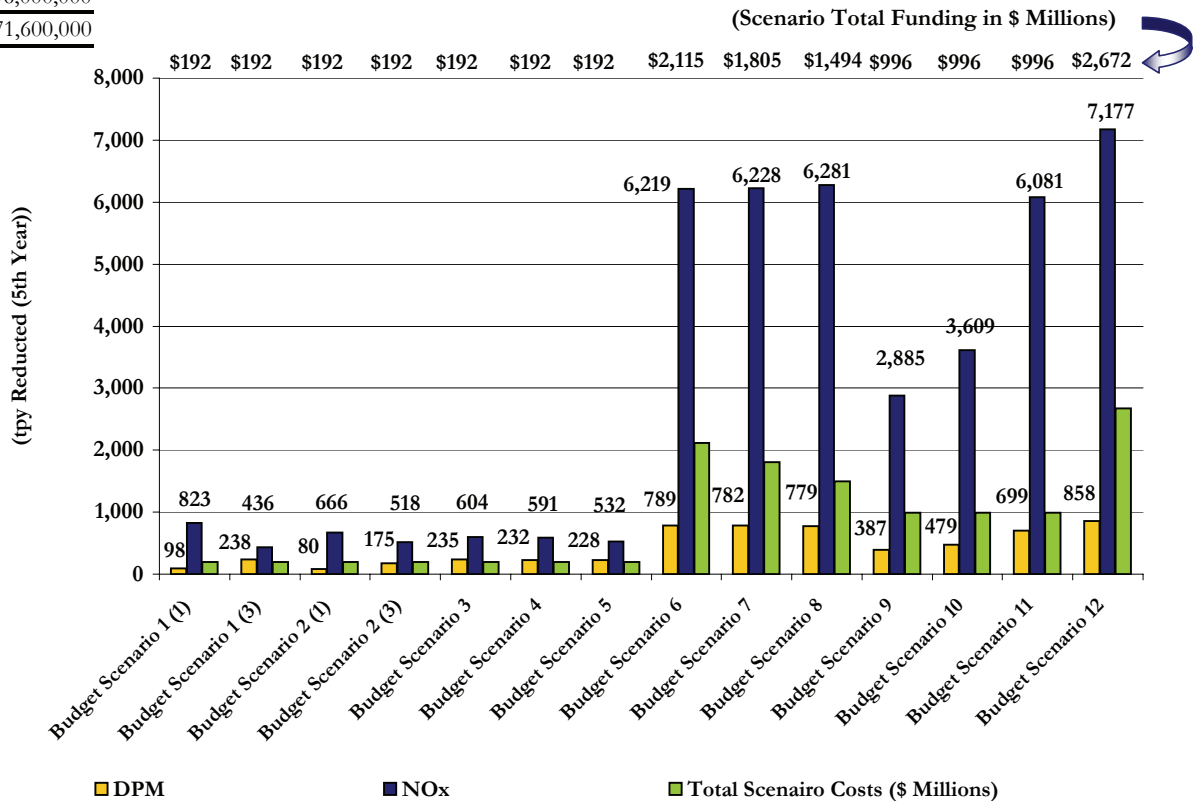
Source Category	2002 Baseline Emissions		
	DPM (tpd)	NOx (tpd)	SOx (tpd)
Stationary Sources			
Fuel Combustion	6.40	34.74	2.25
Waste Disposal	N/A	1.76	0.41
Cleaning & Surface Coating	N/A	0.12	0.02
Petroleum Production & Mrkting	N/A	0.42	6.96
Industrial Processes	N/A	0.18	0.04
Solvent Evap	N/A	0.00	0.00
Misc Processes	N/A	55.38	12.06
Totals	6.40	92.60	21.74
On-Road Mobile Sources			
LDA-Passenger	N/A	173.97	1.27
LDT-T1	N/A	36.10	0.26
LDT-T2	N/A	93.91	0.52
MDT-T3	N/A	46.51	0.30
LHDGT1-T4	N/A	27.13	0.07
LHDGT2-T5	N/A	4.73	0.01
MHDGT-T6	N/A	7.87	0.01
HHDGT	N/A	6.18	0.00
LHDDT1-T4	0.02	1.45	0.01
LHDDT2-T5	0.11	10.46	0.05
MHDDT-T6	1.39	64.11	0.52
HHDDT	9.11	139.45	0.98
Motorcycls	0.09	2.03	0.00
Diesel Urban Buses	0.25	13.91	0.14
Gas Urban Buses	N/A	1.11	0.00
School Buses	0.15	4.47	0.04
Other Buses	0.07	4.10	0.02
Motor Homes	N/A	4.77	0.02
Totals	11.19	642.26	4.22
Other Mobile Sources			
Aircraft	0.78	13.58	1.34
Trains	0.92	37.91	1.24
Ships & Commerical Boats	4.45	64.29	23.45
Recreational Boats	5.57	12.93	0.03
Off-Road Vehicles	N/A	0.48	0.20
Off-Road Equipment	13.66	231.46	1.25
Farm Equipment	0.52	8.52	0.06
Fuel Storage & Handling	0.00	0.00	0.00
Truck Stops	0.00	0.00	0.00
Totals	25.90	369.17	27.57
	DPM (tpd)	NOx (tpd)	SOx (tpd)
Total Stationary & Area	6.40	92.60	21.74
Total On-Road	11.19	642.26	4.22
Total Other Mobile	25.90	369.17	27.57
Total Anthropogenic	43.49	1,104.03	53.53
POLA+POLB Baseline Emissions	5.24	97.17	24.24
% SPBP of 2002 SoCAB Baseline Emis	12.0%	8.8%	45.3%
	DPM (tpd)	NOx (tpd)	SOx (tpd)
Total Stationary & Area	6.40	92.60	21.74
Total On-Road	10.68	616.88	3.89
<i>Total On-Road PORTS RELATED</i>	<i>0.51</i>	<i>25.38</i>	<i>0.33</i>
Total Other Mobile (w/o Ports)	21.18	297.38	3.66
<i>Total Other Mobile PORTS RELATED</i>	<i>4.72</i>	<i>71.79</i>	<i>23.91</i>
Totals	43.49	1,104.03	53.53
	DPM (tpd)	NOx (tpd)	SOx (tpd)
Total Stationary & Area	6.40	92.60	21.74
Total On-Road	10.68	616.88	3.89
Total Other Mobile	21.18	297.38	3.66
<i>Total San Pedro Bay Ports Related</i>	<i>5.24</i>	<i>97.17</i>	<i>24.24</i>
Totals	43.49	1,104.03	53.53

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Scenarios for Policy Discussion

Heavy-Duty Vehicles (Trucks)

	Reductions (5th Year)		Total Scenario Costs (US\$)
	DPM (tpy)	NOx (tpy)	
Budget Scenario 1 (1)	98	823	\$192,000,000
Budget Scenario 1 (3)	238	436	\$192,000,000
Budget Scenario 2 (1)	80	666	\$192,000,000
Budget Scenario 2 (3)	175	518	\$192,000,000
Budget Scenario 3	235	604	\$192,000,000
Budget Scenario 4	232	591	\$192,000,000
Budget Scenario 5	228	532	\$192,000,000
Budget Scenario 6	789	6,219	\$2,115,200,000
Budget Scenario 7	782	6,228	\$1,804,900,000
Budget Scenario 8	779	6,281	\$1,494,100,000
Budget Scenario 9	387	2,885	\$996,000,000
Budget Scenario 10	479	3,609	\$996,000,000
Budget Scenario 11	699	6,081	\$996,000,000
Budget Scenario 12	858	7,177	\$2,672,000,000

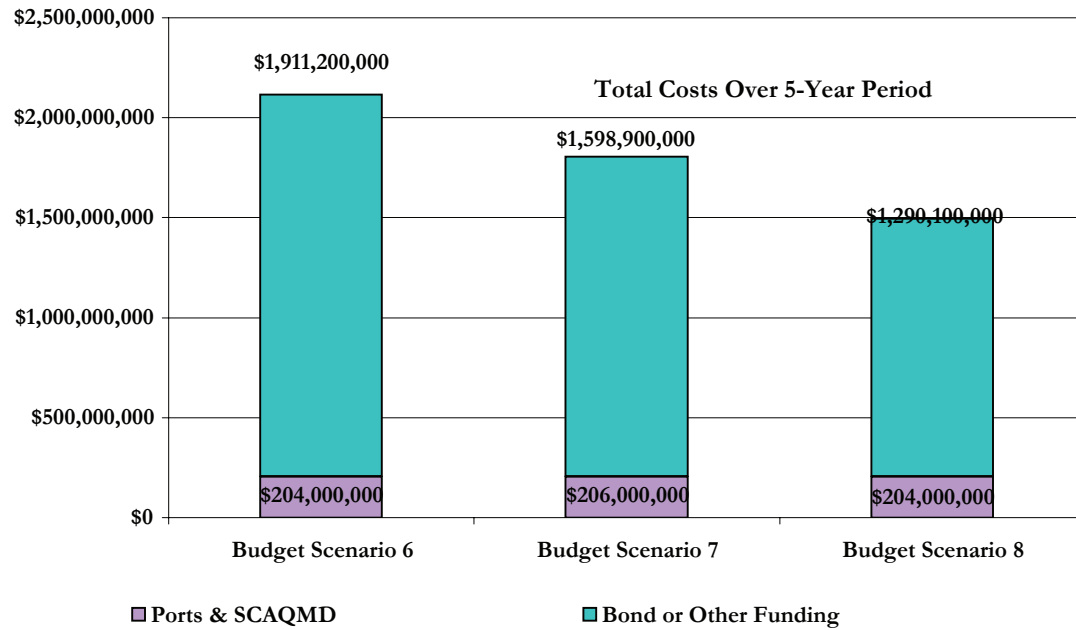


2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Scenarios for Policy Discussion

Heavy-Duty Vehicles (Trucks)

	Reductions (5th Year)		Total Scenario Costs (US\$)	Ports & SCAQMD (US\$)	Bond or Other Funding (US\$)
	DPM (tpy)	NOx (tpy)			
Budget Scenario 6	789	6,219	\$2,115,200,000	\$204,000,000	\$1,911,200,000
Budget Scenario 7	782	6,228	\$1,804,900,000	\$206,000,000	\$1,598,900,000
Budget Scenario 8	779	6,281	\$1,494,100,000	\$204,000,000	\$1,290,100,000



2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Scenarios for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario	Totals Over 5 FY		
	Total Clean Air Action Plan Clean Diesel (CD) Incentives	Total Clean Air Action Plan Alt Fuel Spending	Total 5 Fiscal Year Incentives
Budget Scenario 1	\$140,000,000	\$52,000,000	\$192,000,000
Budget Scenario 2	\$36,000,000	\$156,000,000	\$192,000,000
Budget Scenario 3	\$152,000,000	\$40,000,000	\$192,000,000
Budget Scenario 4	\$142,000,000	\$50,000,000	\$192,000,000
Budget Scenario 5	\$104,000,000	\$88,000,000	\$192,000,000
Budget Scenario 6	\$121,900,000	\$1,993,300,000	\$2,115,200,000
Budget Scenario 7	\$803,700,000	\$1,001,200,000	\$1,804,900,000
Budget Scenario 8	\$1,464,100,000	\$30,000,000	\$1,494,100,000
Budget Scenario 9	\$6,000,000	\$990,000,000	\$996,000,000
Budget Scenario 10	\$486,000,000	\$510,000,000	\$996,000,000
Budget Scenario 11	\$966,000,000	\$30,000,000	\$996,000,000
Budget Scenario 12	\$1,088,000,000	\$1,583,600,000	\$2,671,600,000

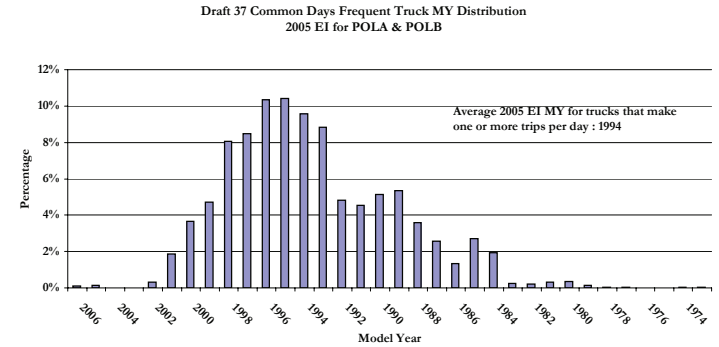
< PRELIMINARY DRAFT RESULTS >

HDV Fleet Truck Characteristic (from work on 2005 EI Update)
 ~40,000+ Individual Trucks Serving San Pedro Bay Ports

Of Those,

- ~7,000 Frequent Callers (7 trips/wk or more) = 50% of All Calls
- ~9,800 Semi-Frequent Callers (3.5 to <7 trips/wk) = 30% of All Calls
- ~16,800 Frequent/Semi-Frequent Callers Make 80% of All Calls

Note: \$1M/year is included in Tech Adv Program for electric/hybrid trucks (not shown)



Budget Scenario	Funding	Deployment Combination	#'s	Reductions (tpy) - 5th Year & Total Reductions			#'s	Reductions (tpy) - 5th Year & Total Reductions		
				DPM	NOx	Total		DPM	NOx	Total
Budget Scenario 1	Funding Mostly CD New Trucks	Deployment Combination 1		1,081 trucks	77	653	1,081 trucks	77	653	
		100% CD Funding New Trucks		276 trucks	20	170	307 trucks	22	206	
		100% Alt Fuel Funding New LNG		1,357 trucks	98	298 Total	823	2,378 Total		
		Deployment Combination 2		1,388 trucks	100	304 Total	859	2,477 Total		
Budget Scenario 1	Funding Mostly CD DPFs	Deployment Combination 3		5,700 DPFs	186	0	5,700 DPFs	186	0	
		100% CD Funding DPFs		707 trucks	52	436	786 trucks	57	528	
		100% Alt Fuel Funding New LNG		238	807 Total	436	1,153 Total			
		Deployment Combination 4		786 trucks	244	822 Total	528	1,408 Total		
Budget Scenario 2	Funding Mostly Alt Fuel New Trucks	Deployment Combination 1		278 trucks	20	148	278 trucks	20	148	
		100% CD Funding New Trucks		828 trucks	61	518	920 trucks	67	623	
		100% Alt Fuel Funding New LNG		1,106 trucks	80	254 Total	666	2,057 Total		
		Deployment Combination 2		1,198 trucks	87	271 Total	771	2,332 Total		
Budget Scenario 2	Funding Mostly CD DPFs	Deployment Combination 3		3,495 DPFs	114	0	3,495 DPFs	114	0	
		100% CD Funding DPFs		828 trucks	61	518	920 trucks	67	623	
		100% Alt Fuel Funding New LNG		175	716 Total	518	1,332 Total			
		Deployment Combination 4		920 trucks	181	733 Total	623	1,607 Total		
Budget Scenario 3	Funding Mostly CD	Deployment Combination 1		66% 775 trucks	56	473	66% 775 trucks	56	473	
		CD Funding New Trucks		34% 5,017 DPFs	164	0	34% 5,017 DPFs	164	0	
		CD Funding DPFs		212 trucks	16	130	236 trucks	17	158	
		Alt Fuel Funding New LNG		987 trucks	235	711 Total	604	1,724 Total		
Budget Scenario 3	Funding Mostly CD	Deployment Combination 2		1,011 trucks	237	716 Total	631	1,810 Total		
		100% CD Funding New Trucks		5,017 DPFs	5,017 DPFs	5,017 DPFs	5,017 DPFs			
		CD Funding DPFs		236 trucks	17	158	236 trucks	17	158	
		Alt Fuel Funding Westport LNG		1,011 trucks	237	716 Total	631	1,810 Total		
Budget Scenario 4	Funding Mostly CD	Deployment Combination 1		702 trucks	50	429	702 trucks	50	429	
		100% CD Funding New Trucks		4,963 DPFs	162	0	4,963 DPFs	162	0	
		CD Funding DPFs		265 trucks	19	163	265 trucks	19	163	
		Alt Fuel Funding New LNG		967 trucks	232	702 Total	591	1,694 Total		
Budget Scenario 4	Funding Mostly CD	Deployment Combination 2		702 trucks	234	708 Total	626	1,802 Total		
		100% CD Funding New Trucks		4,963 DPFs	4,963 DPFs	4,963 DPFs	4,963 DPFs			
		CD Funding DPFs		162	0	162	0			
		Alt Fuel Funding Westport LNG		0 trucks	22	197	22	197		
Budget Scenario 5	Funding Mostly Alt Fuels	Deployment Combination 1		467 trucks	34	287	467 trucks	38	348	
		Alt Fuel Funding New LNG		402 trucks	29	245	402 trucks	29	245	
		CD Funding New Trucks		5,049 DPFs	165	0	5,049 DPFs	165	0	
		CD Funding DPFs		868 trucks	228	698 Total	532	1,538 Total		
Budget Scenario 5	Funding Mostly Alt Fuels	Deployment Combination 2		519 trucks	29	348	519 trucks	38	348	
		Alt Fuel Funding Westport LNG		402 trucks	29	245	402 trucks	29	245	
		CD Funding New Trucks		5,049 DPFs	165	0	5,049 DPFs	165	0	
		CD Funding DPFs		921 trucks	232	708 Total	593	1,723 Total		

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Scenarios for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Totals Over 5 FY			
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Budget Scenario 1	\$140,000,000	\$52,000,000	\$192,000,000
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Budget Scenario 6	\$121,900,000	\$1,993,300,000	\$2,115,200,000
Budget Scenario 7	\$803,700,000	\$1,001,200,000	\$1,804,900,000
Budget Scenario 8	\$1,464,100,000	\$30,000,000	\$1,494,100,000
Budget Scenario 9	\$6,000,000	\$990,000,000	\$996,000,000
Budget Scenario 10	\$486,000,000	\$510,000,000	\$996,000,000
Budget Scenario 11	\$966,000,000	\$30,000,000	\$996,000,000
Budget Scenario 12	\$1,088,000,000	\$1,583,600,000	\$2,671,600,000

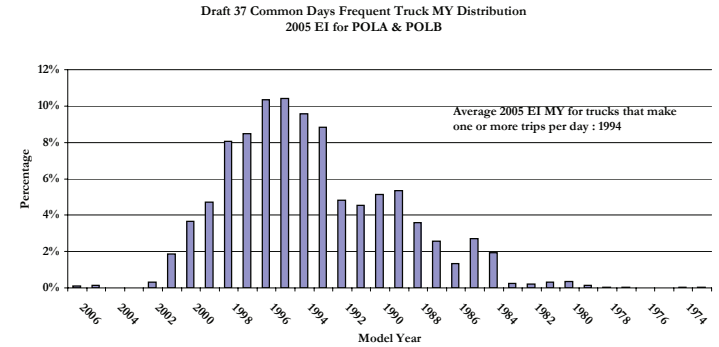
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HDV Fleet Truck Characteristic (from work on 2005 EI Update)
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Of Those,

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 ~16,800 Frequent/Semi-Frequent Callers Make 80% of All Calls

Note: \$1M/year is included in Tech Adv Program for electric/hybrid trucks (not shown)



Budget Scenario	Deployment Combination	#'s	Reductions (tpy) - 5th Year & Total Reductions			#'s	Reductions (tpy) - 5th Year & Total Reductions			
			DPM	NOx	Total		DPM	NOx	Total	
Budget Scenario 6 Funding Targets 80% of All Truck Calls. Mostly Alt Fuel Replacements + Retrofits	Alt Fuel Funding New LNG	10,575 trucks	697	5,444		Alt Fuel Funding Westport LNG	10,575 trucks	696	5,874	
	CD Funding New Trucks	46 trucks	3	25		CD Funding New Trucks	46 trucks	3	25	
	CD Funding Claire + Chip Reflash	5,112 DPFs	82	705		CD Funding Claire + Chip Reflash	5,112 DPFs	82	705	
	CD Funding Claire	844 DPFs	7	45		CD Funding Claire	844 DPFs	7	45	
		10,622 trucks 5,956 DPFs	789	2,112 Total	6,219	16,644 Total	10,622 trucks 5,956 DPFs	788	2,108 Total	6,649
Budget Scenario 7 Funding Targets 80% of All Truck Calls. 50/50 Alt Fuel & CD Replacements + Retrofits	Alt Fuel Funding New LNG	5,311 trucks	350	2,728		Alt Fuel Funding Westport LNG	5,311 trucks	350	3,148	
	CD Funding New Trucks	5,311 trucks	344	2,750		CD Funding New Trucks	5,311 trucks	344	2,750	
	CD Funding Claire + Chip Reflash	5,112 DPFs	82	705		CD Funding Claire + Chip Reflash	5,112 DPFs	82	705	
	CD Funding Claire	844 DPFs	7	45		CD Funding Claire	844 DPFs	7	45	
		10,622 trucks 5,956 DPFs	782	2,095 Total	6,228	16,273 Total	10,622 trucks 5,956 DPFs	782	2,095 Total	6,648
Budget Scenario 8 Funding Targets 80% of All Truck Calls. Mostly CD Replacements + Retrofits	Alt Fuel Funding New LNG	159 trucks	11	80		Alt Fuel Funding Westport LNG	177 trucks	12	97	
	CD Funding New Trucks	10,463 trucks	679	5,450		CD Funding New Trucks	10,463 trucks	679	5,450	
	CD Funding Claire + Chip Reflash	5,112 DPFs	82	705		CD Funding Claire + Chip Reflash	5,112 DPFs	82	705	
	CD Funding Claire	844 DPFs	7	45		CD Funding Claire	844 DPFs	7	45	
		10,622 trucks 5,956 DPFs	779	2,100 Total	6,281	16,120 Total	10,640 trucks 5,956 DPFs	780	2,103 Total	6,298
Budget Scenario 9 Funding Targets 80% of All Truck Calls. Mostly Alt Fuel Replacements	Alt Fuel Funding New LNG	5,252 trucks	384	2,860		Alt Fuel Funding Westport LNG	5,841 trucks	425	3,681	
	CD Funding New Trucks	46 trucks	3	25		CD Funding New Trucks	46 trucks	3	25	
	CD Funding Claire + Chip Reflash	0 DPFs	0	0		CD Funding Claire + Chip Reflash	0 DPFs	0	0	
	CD Funding Claire	0 DPFs	0	0		CD Funding Claire	0 DPFs	0	0	
		5,298 trucks 0 DPFs	387	1,013 Total	2,885	7,548 Total	5,887 trucks 0 DPFs	428	1,120 Total	3,706

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Scenarios for Policy Discussion

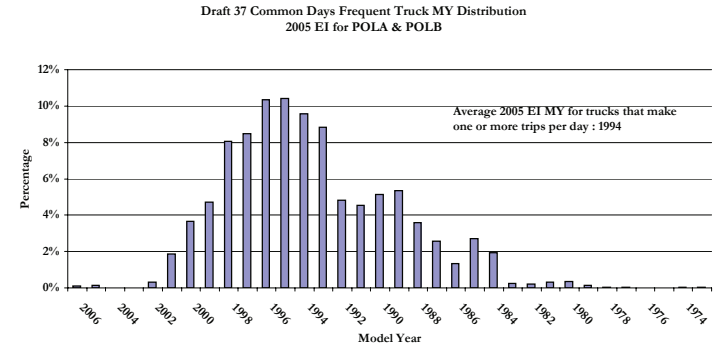
Heavy-Duty Vehicles (Trucks)

Totals Over 5 FY			
	Total Clean Air Action Plan Clean Diesel (CD) Incentives	Total Clean Air Action Plan Alt Fuel Spending	Total 5 Fiscal Year Incentives
Budget Scenario 1	\$140,000,000	\$52,000,000	\$192,000,000
Budget Scenario 2	\$36,000,000	\$156,000,000	\$192,000,000
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Budget Scenario 6	\$121,900,000	\$1,993,300,000	\$2,115,200,000
Budget Scenario 7	\$803,700,000	\$1,001,200,000	\$1,804,900,000
Budget Scenario 8	\$1,464,100,000	\$30,000,000	\$1,494,100,000
Budget Scenario 9	\$6,000,000	\$990,000,000	\$996,000,000
Budget Scenario 10	\$486,000,000	\$510,000,000	\$996,000,000
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Budget Scenario 12	\$1,088,000,000	\$1,583,600,000	\$2,671,600,000

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Note: \$1M/year is included in Tech Adv Program for electric/hybrid trucks (not shown)



Budget Scenario 10	Deployment Combination 1	Reductions (tpy) - 5th Year & Total Reductions				Deployment Combination 2	Reductions (tpy) - 5th Year & Total Reductions			
		#'s	DPM	NOx			#'s	DPM	NOx	
Funding Targets 80% of All Truck Calls.	Alt Fuel Funding New LNG	2,706 trucks	198	1,473	Alt Fuel Funding Westport LNG	3,009 trucks	219	1,896		
	CD Funding New Trucks	3,273 trucks	234	1,746	CD Funding New Trucks	3,273 trucks	234	1,746		
	CD Funding Cleaire + Chip Reflash	2,492 DPFS	40	344	CD Funding Cleaire + Chip Reflash	2,492 DPFS	40	344		
50/50 Alt Fuel & CD Replacements + Retrofits	CD Funding Cleaire	844 DPFS	7	45	CD Funding Cleaire	844 DPFS	7	45		
		5,979 trucks	479	1,251 Total		6,282 trucks	501	1,307 Total	4,031	
		3,336 DPFS		3,609		3,336 DPFS		9,408 Total	10,511 Total	

Budget Scenario 11	Deployment Combination 1	Reductions (tpy) - 5th Year & Total Reductions				Deployment Combination 2	Reductions (tpy) - 5th Year & Total Reductions			
		#'s	DPM	NOx			#'s	DPM	NOx	
Funding Targets 80% of All Truck Calls.	Alt Fuel Funding New LNG	159 trucks	11	86	Alt Fuel Funding Westport LNG	177 trucks	12	105		
	CD Funding New Trucks	8,900 trucks	599	5,244	CD Funding New Trucks	8,900 trucks	599	5,244		
	CD Funding Cleaire + Chip Reflash	5,112 DPFS	82	705	CD Funding Cleaire + Chip Reflash	5,112 DPFS	82	705		
Mostly CD Replacements + Retrofits	CD Funding Cleaire	844 DPFS	7	45	CD Funding Cleaire	844 DPFS	7	45		
		9,059 trucks	699	1,607 Total		9,077 trucks	700	1,610 Total	6,100	
		5,956 DPFS		6,081		5,956 DPFS		13,157 Total	13,214 Total	

Budget Scenario 12	Deployment Combination 1	Reductions (tpy) - 5th Year & Total Reductions				Deployment Combination 2	Reductions (tpy) - 5th Year & Total Reductions			
		#'s	DPM	NOx			#'s	DPM	NOx	
Funding Targets 80% of All Truck Calls.	Alt Fuel Funding New LNG	8,400 trucks	433.49	3,723	Alt Fuel Funding Westport LNG	362 trucks	12	105		
	Bond CD Funding New Trucks	8,400 trucks	424.89	3,455	CD Funding New Trucks	8,400 trucks	425	3,455		
	Bond CD Funding Cleaire + Chip Reflash	0 DPFS	0.00	0	CD Funding Cleaire + Chip Reflash	0 DPFS	0	0		
Bond Funding CD Retro/Replace	Bond CD Funding Cleaire	0 DPFS	0.00	0	CD Funding Cleaire	0 DPFS	0	0		
Ports/SCAQMD Alt Fuel Replacements		16,800 trucks	858	2,176 Total		8,762 trucks	437	1,610 Total	3,560	
		0 DPFS		7,177		0 DPFS		18,021 Total	13,214 Total	

Assumptions

Mileage Accrual rate for Ports trucks is same as in EMFAC2002 ver 2.2
 Replaced trucks VMT is same as of the original trucks

SCAQMD will commit \$12 million first year then minimum of \$6 million per year over the last four fiscal years
 ARB & EPA funding not identified at this time

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 1 - Funding Focused on Greatest DPM Emissions Reductions

Budget Overview

Measure #	Measure Description	Budget by Measure					Total	Notes Funding Type
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Clean Diesel)							
	Clean Diesel - POLA	\$13,000,000	\$15,000,000	\$14,000,000	\$13,000,000	\$12,000,000	\$67,000,000	Operational
	Clean Diesel - POLB	\$13,000,000	\$15,000,000	\$14,000,000	\$13,000,000	\$12,000,000	\$67,000,000	
	Clean Diesel - SCAQMD	\$6,000,000	\$0	\$0	\$0	\$0	\$6,000,000	Assumes SC annual \$
	Clean Diesel - Bond Funding	\$0	\$0	\$0	\$0	\$0	\$0	Assumes no bond \$
		\$32,000,000	\$30,000,000	\$28,000,000	\$26,000,000	\$24,000,000	\$140,000,000	
	HDV Incentives (Alt Fuels)							
	LNG - POLA	\$1,000,000	\$1,000,000	\$2,000,000	\$3,000,000	\$4,000,000	\$11,000,000	Operational
	LNG - POLB	\$1,000,000	\$1,000,000	\$2,000,000	\$3,000,000	\$4,000,000	\$11,000,000	
	LNG - SCAQMD	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$30,000,000	Assumes SCAQMD \$6M/y
	LNG - Bond Funding	\$0	\$0	\$0	\$0	\$0	\$0	Assumes no bond \$
		\$8,000,000	\$8,000,000	\$10,000,000	\$12,000,000	\$14,000,000	\$52,000,000	
	Measure FY Totals	\$40,000,000	\$38,000,000	\$38,000,000	\$38,000,000	\$38,000,000	\$192,000,000	
SBP-HDV2	Alternate Fuel Infrastructure							
	POLA	\$1,000,000	\$0	\$0	\$0	\$0	\$1,000,000	
	POLB	\$1,000,000	\$0	\$0	\$0	\$0	\$1,000,000	
	SCAQMD	\$0	\$0	\$0	\$0	\$0	\$0	
	Bond Funding	\$0	\$0	\$0	\$0	\$0	\$0	
	Measure FY Totals	\$2,000,000	\$0	\$0	\$0	\$0	\$2,000,000	
	TOTAL HDV COSTS	\$42,000,000	\$38,000,000	\$38,000,000	\$38,000,000	\$38,000,000	\$194,000,000	

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 1 - Funding Focused on Greatest DPM Emissions Reductions

Budget Scenario 1 - Options for Clean Diesel (CD)

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Clean Diesel)	\$32,000,000	\$30,000,000	\$28,000,000	\$26,000,000	\$24,000,000	\$140,000,000	

CD Option 1 - Cleaner Diesel Trucks MY2007+

	\$129,500 /truck (\$126k O/Op, \$1.3k AVL, \$2.2k admin)					\$126K based on ARB's Por
Number of total trucks/year	247	232	216	201	185	1,081
Total DPM Emis Red tpy	18	34	50	64	77	243
Total NOx Emis Red tpy	132	255	371	517	653	1,928

CD Option 2 - Purchase of DPFs for 1994+ Trucks

	\$10,300 /truck (\$8k DPF, \$1.3k AVL, \$500 Installation, \$500 Incentive)					
Number of total DPFs/year	1,500	1,500	1,500	1,200	0	5,700
Assumes that this would put a DPF on all 1994+ trucks; If ARB rule comes out requiring this then money moves another scenario						
Total DPM Emis Red tpy	49	98	147	186	186	667

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 1 - Funding Focused on Greatest DPM Emissions Reductions

Budget Scenario 1 - Options for Alt Fuels

Alt Fuel Option 1 - Purchase of New LNG Trucks \$188,500 /truck (\$185k O/Op, \$1.3k AVL, \$2.2k admin) see note below

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Alt Fuel)	\$8,000,000	\$8,000,000	\$10,000,000	\$12,000,000	\$14,000,000	\$52,000,000	
	Number of total trucks/year	42	42	53	64	74	276	
	Total DPM Emis Red tpy	3.1	6.2	10.1	14.7	20.2	54	
	Total NOx Emis Red tpy	23	50	83	123	170	450	

Alt Fuel Option 2 - Purchase of Westport LNG Trucks \$169,500 /truck (\$166k O/Op, \$1.3k AVL, \$2.2k admin) see note below

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Alt Fuel)	\$8,000,000	\$8,000,000	\$10,000,000	\$12,000,000	\$14,000,000	\$52,000,000	
	Number of total trucks/year	47	47	59	71	83	307	
	Total DPM Emis Red tpy	3.4	6.9	11.2	16.3	22.4	60	
	Total NOx Emis Red tpy	29.7	61.8	101.9	149.9	206.0	549	

SBP-HDV1	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011	Total
Total DPM Reduction (tpy)	70	229	342	443	469	1,553
Total NOx Reduction (tpy)	155	377	558	735	908	2,732
Total SOx Reduction (tpy)	0.020	0.020	0.025	0.029	0.034	0.13

Note

Based on April 18, 2006 meeting between Westport, POLA, POLB and Starcrest

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 2 - Funding Focused on Quickest POLA Movement to Alt Fuels

Budget Overview

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Clean Diesel)							
	Clean Diesel - POLA	\$13,000,000	\$2,000,000	\$0	\$0	\$0	\$15,000,000	Operational
	Clean Diesel - POLB	\$13,000,000	\$2,000,000	\$0	\$0	\$0	\$15,000,000	
	Clean Diesel - SCAQMD	\$6,000,000	\$0	\$0	\$0	\$0	\$6,000,000	Assumes SC annual \$
	Clean Diesel - Bond Funding	\$0	\$0	\$0	\$0	\$0	\$0	Assumes no bond \$
		\$32,000,000	\$4,000,000	\$0	\$0	\$0	\$36,000,000	
	HDV Incentives (Alt Fuels)							
	LNG - POLA	\$1,000,000	\$14,000,000	\$16,000,000	\$16,000,000	\$16,000,000	\$63,000,000	Operational
	LNG - POLB	\$1,000,000	\$14,000,000	\$16,000,000	\$16,000,000	\$16,000,000	\$63,000,000	
	LNG - SCAQMD	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$30,000,000	Assumes SCAQMD \$6M/yr Match
	LNG - Bond Funding	\$0	\$0	\$0	\$0	\$0	\$0	Assumes no bond \$
		\$8,000,000	\$34,000,000	\$38,000,000	\$38,000,000	\$38,000,000	\$156,000,000	
	Measure FY Totals	\$40,000,000	\$38,000,000	\$38,000,000	\$38,000,000	\$38,000,000	\$192,000,000	
SBP-HDV2	Alternate Fuel Infrastructure							
	POLA	\$1,000,000	\$0	\$0	\$0	\$0	\$1,000,000	
	POLB	\$1,000,000	\$0	\$0	\$0	\$0	\$1,000,000	
	SCAQMD	TBD	\$0	\$0	\$0	\$0	\$0	
	Bond Funding	\$0	\$0	\$0	\$0	\$0	\$0	
	Measure FY Totals	\$2,000,000	\$0	\$0	\$0	\$0	\$2,000,000	
	TOTAL HDV COSTS	\$42,000,000	\$38,000,000	\$38,000,000	\$38,000,000	\$38,000,000	\$194,000,000	

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 2 - Funding Focused on Quickest POLA Movement to Alt Fuels

Budget Scenario 2 - Options for Clean Diesel (CD)

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Clean Diesel)	\$32,000,000	\$4,000,000	\$0	\$0	\$0	\$36,000,000	

CD Option 1 - New Cleaner Diesel Trucks

	\$129,500 /truck (\$126k O/Op, \$1.3k AVL, \$2.2k admin)					see note below
Number of total trucks/year	247	31	0	0	0	278
Total DPM Emis Red tpy	18	20	20	20	20	97
Total NOx Emis Red tpy	132	148	148	148	148	725

CD Option 2 - Purchase of DPFs for 1994+ Trucks

	\$10,300 /truck (\$8k DPF, \$1.3k AVL, \$500 Installation, \$500 Incentive)					
Number of total DPFs/year	3,107	388	0	0	0	3,495
Assumes that this would put a DPF on all 1994+ trucks; If ARB rule comes out requiring this then money moves another scenario						
Total DPM Emis Red tpy	102	114	114	114	114	559

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 2 - Funding Focused on Quickest POLA Movement to Alt Fuels

Budget Scenario 2 - Options for Alt Fuels

Alt Fuel Option 1 - Purchase of New LNG Trucks

\$188,500 /truck (\$185k O/Op, \$1.3k AVL, \$2.2k admin) see note below

Measure #	Measure Description	Budget by Measure					Total	Notes
SBP-HDV1	HDV Incentives (Alt Fuel)	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
		\$8,000,000	\$34,000,000	\$38,000,000	\$38,000,000	\$38,000,000	\$156,000,000	
	Number of total trucks/year	42	180	202	202	202	828	
	Total DPM Emis Red tpy	3.1	16.3	31.0	45.8	60.5	157	
	Total NOx Emis Red tpy	23	137	264	391	518	1,332	

Alt Fuel Option 2 - Purchase of Westport LNG Trucks

\$169,500 /truck (\$166k O/Op, \$1.3k AVL, \$2.2k admin) see note below

Based on A

Measure #	Measure Description	Budget by Measure					Total	Notes
SBP-HDV1	HDV Incentives (Alt Fuel)	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
		\$8,000,000	\$34,000,000	\$38,000,000	\$38,000,000	\$38,000,000	\$156,000,000	
	Number of total trucks/year	47	201	224	224	224	920	
	Total DPM Emis Red tpy	3.4	18.1	34.4	50.8	67.1	174	
	Total NOx Emis Red tpy	29.7	166.0	318.2	470.5	622.8	1,607	

SBP-HDV1	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011	Total
Total DPM Reduction (tpy)	122	151	165	180	195	813
Total NOx Reduction (tpy)	155	285	412	539	666	2,057
Total SOx Reduction (tpy)	0.020	0.083	0.093	0.093	0.093	0.38

Notes

Diesel Truck Cost - Based on ARB's Ports Truck Report, page B-16

LNG Truck Cost - Based on April 18, 2006 meeting between Westport, POLA, POLB and Starcrest

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 3 - Funding Focused on DPM w/Alt Fuel Funding \$1M/yr (Replacement, Infrastructure, & R&D)

Budget Overview

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Clean Diesel)							
	Clean Diesel - POLA	\$13,000,000	\$15,000,000	\$15,000,000	\$15,000,000	\$15,000,000	\$73,000,000	Operational
	Clean Diesel - POLB	\$13,000,000	\$15,000,000	\$15,000,000	\$15,000,000	\$15,000,000	\$73,000,000	
	Clean Diesel - SCAQMD	\$6,000,000	\$0	\$0	\$0	\$0	\$6,000,000	Assumes SCAQMD 1 Time \$6M
	Clean Diesel - Bond Funding	\$0	\$0	\$0	\$0	\$0	\$0	Assumes no bond \$
		\$32,000,000	\$30,000,000	\$30,000,000	\$30,000,000	\$30,000,000	\$152,000,000	
	HDV Incentives (Alt Fuels)							
	LNG - POLA	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$5,000,000	Operational
	LNG - POLB	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$5,000,000	
	LNG - SCAQMD	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$30,000,000	Assumes SCAQMD \$6M/yr Match
	LNG - Bond Funding	\$0	\$0	\$0	\$0	\$0	\$0	Assumes no bond \$
		\$8,000,000	\$8,000,000	\$8,000,000	\$8,000,000	\$8,000,000	\$40,000,000	
	Measure FY Totals	\$40,000,000	\$38,000,000	\$38,000,000	\$38,000,000	\$38,000,000	\$192,000,000	
SBP-HDV2	Alternate Fuel Infrastructure							
	POLA	\$1,000,000	\$0	\$0	\$0	\$0	\$1,000,000	
	POLB	\$1,000,000	\$0	\$0	\$0	\$0	\$1,000,000	
	SCAQMD	TBD	\$0	\$0	\$0	\$0	\$0	
	Bond Funding	\$0	\$0	\$0	\$0	\$0	\$0	
	Measure FY Totals	\$2,000,000	\$0	\$0	\$0	\$0	\$2,000,000	
	TOTAL HDV COSTS	\$42,000,000	\$38,000,000	\$38,000,000	\$38,000,000	\$38,000,000	\$194,000,000	

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 3 - Funding Focused on DPM w/Alt Fuel Funding \$1M/yr (Replacement, Infrastructure, & R&D)

Budget Scenario 3 - Options for Clean Diesel (CD)

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Clean Diesel)	\$32,000,000	\$30,000,000	\$30,000,000	\$30,000,000	\$30,000,000	\$152,000,000	

CD Option 1 - Cleaner Diesel Trucks MY 2007+

66% CD Funding \$129,500 /truck (\$126k O/Op, \$1.3k AVL, \$2.2k admin) see note below

Number of total trucks/year	163	153	153	153	153	775
Total DPM Emis Red tpy	12	23	34	45	56	168
Total NOx Emis Red tpy	87	169	250	362	473	1,341

34% CD Funding \$10,300 /truck (\$8k DPF, \$1.3k AVL, \$500 Installation, \$500 Incentive)

Number of total DPFs/year	1,056	990	990	990	990	5,017
Total DPM Emis Red tpy	35	67	99	132	164	497

Assumes that this would put a DPF on all 1994+ trucks; If ARB rule comes out requiring this then money moves another scenario

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 3 - Funding Focused on DPM w/Alt Fuel Funding \$1M/yr (Replacement, Infrastructure, & R&D)

Budget Scenario 3 - Options for Alt Fuels

Alt Fuel Option 1 - Purchase of New LNG Trucks

\$188,500 /truck (\$185k O/Op, \$1.3k AVL, \$2.2k admin) see note below

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Alt Fuel)	\$8,000,000	\$8,000,000	\$8,000,000	\$8,000,000	\$8,000,000	\$40,000,000	
	Number of total trucks/year	42	42	42	42	42	212	
	Total DPM Emis Red tpy	3.1	6.2	9.3	12.4	15.5	47	
	Total NOx Emis Red tpy	23	50	77	103	130	383	

Alt Fuel Option 2 - Purchase of Westport LNG Trucks

\$169,500 /truck (\$166k O/Op, \$1.3k AVL, \$2.2k admin) see note below

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Alt Fuel)	\$8,000,000	\$8,000,000	\$8,000,000	\$8,000,000	\$8,000,000	\$40,000,000	
	Number of total trucks/year	47	47	47	47	47	236	
	Total DPM Emis Red tpy	3.4	6.9	10.3	13.8	17.2	52	
	Total NOx Emis Red tpy	29.7	61.8	93.9	125.9	158.0	469	

SBP-HDV1	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011	Total
Total DPM Reduction (tpy)	49	96	142	189	235	711
Total NOx Reduction (tpy)	110	218	327	465	604	1,724
Total SOx Reduction (tpy)	0.020	0.020	0.020	0.020	0.020	0.10

Notes

Diesel Truck Cost - Based on ARB's Ports Truck Report, page B-16

LNG Truck Cost - Based on April 18, 2006 meeting between Westport, POLA, POLB and Starcrest

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 4 - Funding Focused on DPM w/Alt Fuel Funding \$2M/yr (Replacement, Infrastructure, & R&D)

Budget Overview

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Clean Diesel)							
	Clean Diesel - POLA	\$12,000,000	\$14,000,000	\$14,000,000	\$14,000,000	\$14,000,000	\$68,000,000	Operational
	Clean Diesel - POLB	\$12,000,000	\$14,000,000	\$14,000,000	\$14,000,000	\$14,000,000	\$68,000,000	
	Clean Diesel - SCAQMD	\$6,000,000	\$0	\$0	\$0	\$0	\$6,000,000	Assumes SCAQMD 1 Time \$6M
	Clean Diesel - Bond Funding	\$0	\$0	\$0	\$0	\$0	\$0	Assumes no bond \$
		\$30,000,000	\$28,000,000	\$28,000,000	\$28,000,000	\$28,000,000	\$142,000,000	
	HDV Incentives (Alt Fuels)							
	LNG - POLA	\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000	\$10,000,000	Operational
	LNG - POLB	\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000	\$10,000,000	
	LNG - SCAQMD	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$30,000,000	Assumes SCAQMD \$6M/yr Match
	LNG - Bond Funding	\$0	\$0	\$0	\$0	\$0	\$0	Assumes no bond \$
		\$10,000,000	\$10,000,000	\$10,000,000	\$10,000,000	\$10,000,000	\$50,000,000	
	Measure FY Totals	\$40,000,000	\$38,000,000	\$38,000,000	\$38,000,000	\$38,000,000	\$192,000,000	
SBP-HDV2	Alternate Fuel Infrastructure							
	POLA	\$1,000,000	\$0	\$0	\$0	\$0	\$1,000,000	
	POLB	\$1,000,000	\$0	\$0	\$0	\$0	\$1,000,000	
	SCAQMD	TBD	\$0	\$0	\$0	\$0	\$0	
	Bond Funding	\$0	\$0	\$0	\$0	\$0	\$0	
	Measure FY Totals	\$2,000,000	\$0	\$0	\$0	\$0	\$2,000,000	
	TOTAL HDV COSTS	\$42,000,000	\$38,000,000	\$38,000,000	\$38,000,000	\$38,000,000	\$194,000,000	

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 4 - Funding Focused on DPM w/Alt Fuel Funding \$2M/yr (Replacement, Infrastructure, & R&D)

Budget Scenario 4 - Options for Cleaner Diesel (CD)

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Clean Diesel)	\$30,000,000	\$28,000,000	\$28,000,000	\$28,000,000	\$28,000,000	\$142,000,000	

CD Option 1 - Clean Diesel Trucks MY2004+ w/DPF & DPFs

64% CD Funding **\$129,500** /truck (\$126k O/Op, \$1.3k AVL, \$2.2k admin) see note below

Number of total trucks/year	148	138	138	138	138	702
Total DPM Emis Red (tpy)	11	21	30	40	50	152
Total NOx Emis Red (tpy)	79	153	227	328	429	1,215

36% CD Funding **\$10,300** /truck (\$8k DPF, \$1.3k AVL, \$500 Installation, \$500 Incentive)

Number of total DPFs/year	1,049	979	979	979	979	4,963
Assumes that this would put a DPF on all 1994+ trucks; If ARB rule comes out requiring this then money moves another scenario						
Total DPM Emis Red (tpy)	34	66	98	130	162	492

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 4 - Funding Focused on DPM w/Alt Fuel Funding \$2M/yr (Replacement, Infrastructure, & R&D)

Budget Scenario 4 - Options for Alt Fuels

Alt Fuel Option 1 - Purchase of New LNG Trucks \$188,500 /truck (\$185k O/Op, \$1.3k AVL, \$2.2k admin) see note below

Measure #	Measure Description	Budget by Measure					Total	Notes
SBP-HDV1	HDV Incentives (Alt Fuel)	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
		\$10,000,000	\$10,000,000	\$10,000,000	\$10,000,000	\$10,000,000	\$50,000,000	
	Number of total trucks/year	53	53	53	53	53	265	
	Total DPM Emis Red (tpy)	3.9	7.8	11.6	15.5	19.4	58	
	Total NOx Emis Red (tpy)	29	62	96	129	163	479	

Alt Fuel Option 2 - Purchase of Westport LNG Trucks \$169,500 /truck (\$166k O/Op, \$1.3k AVL, \$2.2k admin) see note below

Measure #	Measure Description	Budget by Measure					Total	Notes
SBP-HDV1	HDV Incentives (Alt Fuel)	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
		\$10,000,000	\$10,000,000	\$10,000,000	\$10,000,000	\$10,000,000	\$50,000,000	
	Number of total trucks/year	59	59	59	59	59	295	
	Total DPM Emis Red (tpy)	4.3	8.6	12.9	17.2	21.5	64	
	Total NOx Emis Red (tpy)	37.2	77.2	117.3	157.4	197.5	587	

SBP-HDV1	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011	Total
Total DPM Reduction (tpy)	49	95	140	186	232	702
Total NOx Reduction (tpy)	108	215	322	457	591	1,694
Total SOx Reduction (tpy)	0.025	0.025	0.025	0.025	0.025	0.12

Notes

Diesel Truck Cost - Based on ARB's Ports Truck Report, page B-16

LNG Truck Cost - Based on April 18, 2006 meeting between Westport, POLA, POLB and Starcrest

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 5 - Funding Focused Matching SCAQMD Alt Fuel Funding of \$6M/yr (Replacement, Infrastructure, & R&D)

Budget Overview

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Clean Diesel)							
	Clean Diesel - POLA	\$9,000,000	\$10,000,000	\$10,000,000	\$10,000,000	\$10,000,000	\$49,000,000	Operational
	Clean Diesel - POLB	\$9,000,000	\$10,000,000	\$10,000,000	\$10,000,000	\$10,000,000	\$49,000,000	
	Clean Diesel - SCAQMD	\$6,000,000	\$0	\$0	\$0	\$0	\$6,000,000	Assumes SCAQMD 1 Time \$6M
	Clean Diesel - Bond Funding	\$0	\$0	\$0	\$0	\$0	\$0	Assumes no bond \$
		\$24,000,000	\$20,000,000	\$20,000,000	\$20,000,000	\$20,000,000	\$104,000,000	
	HDV Incentives (Alt Fuels)							
	LNG - POLA	\$5,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$29,000,000	Operational
	LNG - POLB	\$5,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$29,000,000	
	LNG - SCAQMD	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$30,000,000	Assumes SCAQMD \$6M/yr Match
	LNG - Bond Funding	\$0	\$0	\$0	\$0	\$0	\$0	Assumes no bond \$
		\$16,000,000	\$18,000,000	\$18,000,000	\$18,000,000	\$18,000,000	\$88,000,000	
	Measure FY Totals	\$40,000,000	\$38,000,000	\$38,000,000	\$38,000,000	\$38,000,000	\$192,000,000	
SBP-HDV2	Alternate Fuel Infrastructure							
	POLA	\$1,000,000	\$0	\$0	\$0	\$0	\$1,000,000	
	POLB	\$1,000,000	\$0	\$0	\$0	\$0	\$1,000,000	
	SCAQMD	TBD	\$0	\$0	\$0	\$0	\$0	
	Bond Funding	\$0	\$0	\$0	\$0	\$0	\$0	
	Measure FY Totals	\$2,000,000	\$0	\$0	\$0	\$0	\$2,000,000	
	TOTAL HDV COSTS	\$42,000,000	\$38,000,000	\$38,000,000	\$38,000,000	\$38,000,000	\$194,000,000	

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 5 - Funding Focused Matching SCAQMD Alt Fuel Funding of \$6M/yr (Replacement, Infrastructure, & R&D)

Budget Scenario 5 - Options for Cleaner Diesel (CD)

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Clean Diesel)	\$24,000,000	\$20,000,000	\$20,000,000	\$20,000,000	\$20,000,000	\$104,000,000	

CD Option 1 - Clean Diesel Trucks MY2004+ w/DPF & DPFs

50% CD Funding **\$129,500** /truck (\$126k O/Op, \$1.3k AVL, \$2.2k admin) see note below

Number of total trucks/year	93	77	77	77	77	402
Total DPM Emis Red tpy	7	12	18	23	29	89
Total NOx Emis Red tpy	49	91	132	188	245	705

50% CD Funding **\$10,300** /truck (\$8k DPF, \$1.3k AVL, \$500 Installation, \$500 Incentive)

Number of total DPFs/year	1,165	971	971	971	971	5,049
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Assumes that this would put a DPF on all 1994+ trucks; If ARB rule comes out requiring this then money moves another scenario

Total DPM Emis Red tpy	38	70	102	133	165	508
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Budget Scenario 5 - Options for Alt Fuels

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 5 - Funding Focused Matching SCAQMD Alt Fuel Funding of \$6M/yr (Replacement, Infrastructure, & R&D)

Alt Fuel Option 1 - Purchase of New LNG Trucks \$188,500 /truck (\$185k O/Op, \$1.3k AVL, \$2.2k admin) see note below

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Alt Fuel)	\$16,000,000	\$18,000,000	\$18,000,000	\$18,000,000	\$18,000,000	\$88,000,000	
Number of total trucks/year		85	95	95	95	95	467	
Total DPM Emis Red tpy		6.2	13.2	20.2	27.1	34.1	101	
Total NOx Emis Red tpy		46	106	167	227	287	833	

Alt Fuel Option 2 - Purchase of Westport LNG Trucks \$169,500 /truck (\$166k O/Op, \$1.3k AVL, \$2.2k admin) see note below

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Alt Fuel)	\$16,000,000	\$18,000,000	\$18,000,000	\$18,000,000	\$18,000,000	\$88,000,000	
Number of total trucks/year		94	106	106	106	106	519	
Total DPM Emis Red tpy		6.9	14.6	22.4	30.1	37.9	112	
Total NOx Emis Red tpy		59.5	131.6	203.7	275.9	348.0	1,019	

SBP-HDV1	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011	Total
Total DPM Reduction (tpy)	51	95	139	184	228	698
Total NOx Reduction (tpy)	96	197	298	415	532	1,538
Total SOx Reduction (tpy)	0.039	0.044	0.044	0.044	0.044	0.22

Notes

Diesel Truck Cost - Based on ARB's Ports Truck Report, page B-16

LNG Truck Cost - Based on April 18, 2006 meeting between Westport, POLA, POLB and Starcrest

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 6 - Focus on Replacements w/Focus On Alt Fuels + Retrofits

7,000 Frequent Trucks (preliminary 2005 EI data)

7,000 Frequent Caller Trucks Alt Fuel Replaced

3,575 Semi-Freq Caller Trucks Alt Fuel Replaced

46 Semi-Freq Caller Trucks CD Replaced

10,622 Total Trucks Replaced

9,800 Semi-Frequent Trucks (preliminary 2005 EI data)

5,112 LNOx + Chip Reflash

844 LNOx

3,622 Cannot be retrofitted

LNOx - Lean NOx Catalyst

1993 to 1998 MY trucks; 4 to 5 years useful life

1999 to 2003 MY trucks; to 5 years useful life

Pre 1993 MY trucks

Budget Overview

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Clean Diesel)							
	Clean Diesel - POLA	\$0	\$0	\$0	\$0	\$0	\$0	Operational
	Clean Diesel - POLB	\$0	\$0	\$0	\$0	\$0	\$0	
	Clean Diesel - SCAQMD	\$6,000,000	\$0	\$0	\$0	\$0	\$6,000,000	Assumes SCAQMD 1 Time \$6M
	Clean Diesel - Bond Funding	\$0	\$66,100,000	\$49,800,000	\$0	\$0	\$115,900,000	Assumes Bond Funding
		\$6,000,000	\$66,100,000	\$49,800,000	\$0	\$0	\$121,900,000	
	HDV Incentives (Alt Fuels)							
	LNG - POLA	\$16,000,000	\$16,000,000	\$18,000,000	\$18,000,000	\$18,000,000	\$86,000,000	Operational
	LNG - POLB	\$16,000,000	\$16,000,000	\$16,000,000	\$16,000,000	\$16,000,000	\$80,000,000	
	LNG - SCAQMD	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$30,000,000	Assumes SCAQMD \$6M/yr Match
	LNG - Bond Funding	\$0	\$453,000,000	\$451,000,000	\$451,000,000	\$442,300,000	\$1,797,300,000	Assumes Bond Funding
		\$38,000,000	\$491,000,000	\$491,000,000	\$491,000,000	\$482,300,000	\$1,993,300,000	
	Measure FY Totals	\$44,000,000	\$557,100,000	\$540,800,000	\$491,000,000	\$482,300,000	\$2,115,200,000	

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 6 - Focus on Replacements w/Focus On Alt Fuels + Retrofits

7,000 Frequent Trucks (preliminary 2005 EI data)

7,000 Frequent Caller Trucks Alt Fuel Replaced

3,575 Semi-Freq Caller Trucks Alt Fuel Replaced

46 Semi-Freq Caller Trucks CD Replaced

9,800 Semi-Frequent Trucks (preliminary 2005 EI data)

5,112 LNOxC + Chip Reflash

844 LNOxC

3,622 Cannot be retrofitted

1993 to 1998 MY trucks; 4 to 5 years useful life

1999 to 2003 MY trucks; to 5 years useful life

Pre 1993 MY trucks

10,622 Total Trucks Replaced

LNOxC - Lean NOx Catalyst

SBP-HDV2	Alternate Fuel Infrastructure	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011	Total	Notes
	POLA	\$1,000,000	\$0	\$0	\$0	\$0	\$1,000,000	
	POLB	\$1,000,000	\$0	\$0	\$0	\$0	\$1,000,000	
	SCAQMD	TBD	\$0	\$0	\$0	\$0	\$0	
	Bond Funding	\$0	\$0	\$0	\$0	\$0	\$0	
Measure FY Totals		\$2,000,000	\$0	\$0	\$0	\$0	\$2,000,000	
TOTAL HDV COSTS		\$46,000,000	\$557,100,000	\$540,800,000	\$491,000,000	\$482,300,000	\$2,117,200,000	

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 6 - Focus on Replacements w/Focus On Alt Fuels + Retrofits

7,000 Frequent Trucks (preliminary 2005 EI data)	9,800 Semi-Frequent Trucks (preliminary 2005 EI data)	
7,000 Frequent Caller Trucks Alt Fuel Replaced	5,112 LNOxC + Chip Reflash	1993 to 1998 MY trucks; 4 to 5 years useful life
3,575 Semi-Freq Caller Trucks Alt Fuel Replaced	844 LNOxC	1999 to 2003 MY trucks; to 5 years useful life
46 Semi-Freq Caller Trucks CD Replaced	3,622 Cannot be retrofitted	Pre 1993 MY trucks
10,622 Total Trucks Replaced	LNOxC - Lean NOx Catalyst	

Budget Scenario 6 - Options for Cleaner Diesel (CD)

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Clean Diesel)	\$6,000,000	\$66,100,000	\$49,800,000	\$0	\$0	\$121,900,000	

CD Option 1 - Clean Diesel Trucks MY2007+

50% CD Funding **\$129,500** /truck (\$126k O/Op, \$1.3k AVL, \$2.2k admin) see note below

Number of total trucks/year	46	0	0	0	0	46
Total DPM Emis Red tpy	3	3	3	3	3	17
Total NOx Emis Red tpy	25	25	25	25	25	124

50% CD Funding **\$19,500** /truck (\$14.5k Retrofit, \$2.2k Admin, \$1k Installation, \$1.3k AVL, \$500 Incentive)

# of LNOxC + Chip Units/year	0	2,556	2,556	0	0	5,112
Total DPM Emis Red tpy	0	41	82	82	82	285
Total NOx Emis Red tpy	0	353	705	705	705	2,468
# of LNOxC	0	844	0	0	0	844
Total DPM Emis Red tpy	0	7	7	7	7	30
Total NOx Emis Red tpy	0	45	45	45	45	182

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 6 - Focus on Replacements w/Focus On Alt Fuels + Retrofits

7,000 Frequent Trucks (preliminary 2005 EI data)	9,800 Semi-Frequent Trucks (preliminary 2005 EI data)	
7,000 Frequent Caller Trucks Alt Fuel Replaced	5,112 LNOx + Chip Reflash	1993 to 1998 MY trucks; 4 to 5 years useful life
3,575 Semi-Freq Caller Trucks Alt Fuel Replaced	844 LNOxC	1999 to 2003 MY trucks; to 5 years useful life
46 Semi-Freq Caller Trucks CD Replaced	3,622 Cannot be retrofitted	Pre 1993 MY trucks
10,622 Total Trucks Replaced	LNOxC - Lean NOx Catalyst	

Budget Scenario 6 - Options for Alt Fuels

Alt Fuel Option 1 - Purchase of New LNG Trucks

\$188,500 /truck (\$185k O/Op, \$1.3k AVL, \$2.2k admin) see note below

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Alt Fuel)	\$38,000,000	\$491,000,000	\$491,000,000	\$491,000,000	\$482,300,000	\$1,993,300,000	
	Number of total trucks/year	202	2,605	2,605	2,605	2,559	10,575	
	Total DPM Emis Red tpy	13	185	357	529	697	1,781	
	Total NOx Emis Red tpy	90	1,434	2,779	4,123	5,444	13,870	

Alt Fuel Option 2 - Purchase of Westport LNG Trucks

\$169,500 /truck (\$166k O/Op, \$1.3k AVL, \$2.2k admin) see note below

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Alt Fuel)	\$34,200,000	\$441,600,000	\$441,600,000	\$441,600,000	\$433,700,000	\$1,792,700,000	
	Number of total trucks/year	202	2,605	2,605	2,605	2,559	10,575	
	Total DPM Emis Red tpy	13	185	356	527	696	1,777	
	Total NOx Emis Red tpy	104	1,553	3,002	4,451	5,874	14,984	

SBP-HDV1	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011	Total
Total DPM Reduction (tpy)	17	236	449	621	789	2,112
Total NOx Reduction (tpy)	115	1,857	3,554	4,899	6,219	16,644
Total SOx Reduction (tpy)	0.1	1.2	1.2	1.2	1.2	5

Notes

Diesel Truck Cost - Based on ARB's Ports Truck Report, page B-16

LNG Truck Cost - Based on April 18, 2006 meeting between Westport, POLA, POLB and Starcrest

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 7 - Focus on Replacements w/Focus on 50/50 Alt Fuels & Clean Diesel (CD) + Retrofits

<u>7,000 Frequent Trucks (preliminary 2005 EI data)</u>	<u>9,800 Semi-Frequent Trucks (preliminary 2005 EI data)</u>	
3,500 Frequent Caller Trucks Alt Fuel Replaced	5,112 LNOxC + Chip Reflash	1993 to 1998 MY trucks; 4 to 5 years useful life
3,500 Frequent Caller Trucks CD Replaced	844 LNOxC	1999 to 2003 MY trucks; to 5 years useful life
1,811 Semi-Freq Caller Trucks Alt Fuel Replaced ←	3,622 Cannot be retrofitted	Pre 1993 MY trucks
1,811 Semi-Freq Caller Trucks CD Replaced ←	LNOxC - Lean NOx Catalyst	
10,622 Total Trucks Replaced		

Budget Overview

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Clean Diesel)							
	Clean Diesel - POLA	\$8,000,000	\$8,000,000	\$9,000,000	\$9,000,000	\$9,000,000	\$43,000,000	Operational
	Clean Diesel - POLB	\$8,000,000	\$8,000,000	\$8,000,000	\$8,000,000	\$8,000,000	\$40,000,000	
	Clean Diesel - SCAQMD	\$6,000,000	\$0	\$0	\$0	\$0	\$6,000,000	Assumes SCAQMD 1 Time \$6M
	Clean Diesel - Bond/Other Funding	\$0	\$213,800,000	\$196,500,000	\$152,200,000	\$152,200,000	\$714,700,000	
		\$22,000,000	\$229,800,000	\$213,500,000	\$169,200,000	\$169,200,000	\$803,700,000	
	HDV Incentives (Alt Fuels)							
	LNG - POLA	\$8,000,000	\$8,000,000	\$9,000,000	\$9,000,000	\$9,000,000	\$43,000,000	Operational
	LNG - POLB	\$8,000,000	\$8,000,000	\$8,000,000	\$8,000,000	\$8,000,000	\$40,000,000	
	LNG - SCAQMD	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$30,000,000	Assumes SCAQMD \$6M/yr Match
	LNG - Bond/Other Funding	\$0	\$222,800,000	\$221,800,000	\$221,800,000	\$221,800,000	\$888,200,000	Assumes Bond Funding
		\$22,000,000	\$244,800,000	\$244,800,000	\$244,800,000	\$244,800,000	\$1,001,200,000	
	Measure FY Totals	\$44,000,000	\$474,600,000	\$458,300,000	\$414,000,000	\$414,000,000	\$1,804,900,000	

SBP-HDV2	Alternate Fuel Infrastructure	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
	POLA	\$1,000,000	\$1,000,000	\$0	\$0	\$0	\$2,000,000	
	POLB	\$1,000,000	\$1,000,000	\$0	\$0	\$0	\$2,000,000	
	SCAQMD	TBD	TBD	\$0	\$0	\$0	\$0	
	Bond Funding	\$0	\$0	\$0	\$0	\$0	\$0	
	Measure FY Totals	\$2,000,000	\$2,000,000	\$0	\$0	\$0	\$4,000,000	
	TOTAL HDV COSTS	\$46,000,000	\$476,600,000	\$458,300,000	\$414,000,000	\$414,000,000	\$1,808,900,000	

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 7 - Focus on Replacements w/Focus on 50/50 Alt Fuels & Clean Diesel (CD) + Retrofits

<u>7,000 Frequent Trucks (preliminary 2005 EI data)</u>	<u>9,800 Semi-Frequent Trucks (preliminary 2005 EI data)</u>	
3,500 Frequent Caller Trucks Alt Fuel Replaced	5,112 LNOxC + Chip Reflash	1993 to 1998 MY trucks; 4 to 5 years useful life
3,500 Frequent Caller Trucks CD Replaced	844 LNOxC	1999 to 2003 MY trucks; to 5 years useful life
1,811 Semi-Freq Caller Trucks Alt Fuel Replaced	3,622 Cannot be retrofitted	Pre 1993 MY trucks
1,811 Semi-Freq Caller Trucks CD Replaced	LNOxC - Lean NOx Catalyst	
10,622 Total Trucks Replaced		

Budget Scenario 7 - Options for Cleaner Diesel (CD)

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Cleaner Diesel)	\$22,000,000	\$229,800,000	\$213,500,000	\$169,200,000	\$169,200,000	\$803,700,000	

CD Option 1 - Clean Diesel Trucks MY2007+

50% CD Funding \$129,500 /truck (\$126k O/Op, \$1.3k AVL, \$2.2k admin) see note below

Number of total trucks/year	85	1,306	1,306	1,306	1,306	5,311
Baseline DPM in tpy	6	92	178	264	350	888
Total DPM Emis Red tpy	5	90	174	259	344	873
Baseline NOx in tpy	54	884	1,714	2,544	3,373	8,568
Total NOx Emis Red tpy	37	613	1,188	1,969	2,750	6,557

50% CD Funding \$19,500 /truck (\$14.5k Retrofit, \$2.2k Admin, \$1k Installation, \$1.3k AVL, \$500 Incentive)

# of LNOxC + Chip Units/year	564	2,274	2,274	0	0	5,112
Baseline DPM in tpy	11	53	96	96	96	352
Total DPM Emis Red tpy	9	45	82	82	82	299
Baseline NOx in tpy	178	895	1,612	1,612	1,612	5,908
Total NOx Emis Red tpy	78	392	705	705	705	2,585
# of LNOxC	0	844	0	0	0	844
Total DPM Emis Red tpy	0	7	7	7	7	30
Total NOx Emis Red tpy	0	45	45	45	45	182

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 7 - Focus on Replacements w/Focus on 50/50 Alt Fuels & Clean Diesel (CD) + Retrofits

<u>7,000 Frequent Trucks (preliminary 2005 EI data)</u>	<u>9,800 Semi-Frequent Trucks (preliminary 2005 EI data)</u>	
3,500 Frequent Caller Trucks Alt Fuel Replaced	5,112 LNOxC + Chip Reflash	1993 to 1998 MY trucks; 4 to 5 years useful life
3,500 Frequent Caller Trucks CD Replaced	844 LNOxC	1999 to 2003 MY trucks; to 5 years useful life
1,811 Semi-Freq Caller Trucks Alt Fuel Replaced ←	3,622 Cannot be retrofitted	Pre 1993 MY trucks
1,811 Semi-Freq Caller Trucks CD Replaced ←	LNOxC - Lean NOx Catalyst	
10,622 Total Trucks Replaced		

Budget Scenario 7 - Options for Alt Fuels

Alt Fuel Option 1 - Purchase of New LNG Trucks

\$188,500 /truck (\$185k O/Op, \$1.3k AVL, \$2.2k admin) see note below

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Alt Fuel)	\$22,000,000	\$244,800,000	\$244,800,000	\$244,800,000	\$244,800,000	\$1,001,200,000	

Number of total trucks/year	117	1,299	1,299	1,299	1,299	5,311
Baseline DPM in tpy	7.7	93.2	178.7	264.3	349.8	894
Total DPM Emis Red tpy	7.7	93.2	178.7	264.3	349.8	894
Baseline NOx in tpy	74	899	1724	2549	3373	8,619
Total NOx Emis Red tpy	52	721	1390	2059	2728	6,949

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 7 - Focus on Replacements w/Focus on 50/50 Alt Fuels & Clean Diesel (CD) + Retrofits

<u>7,000 Frequent Trucks (preliminary 2005 EI data)</u>	<u>9,800 Semi-Frequent Trucks (preliminary 2005 EI data)</u>	
3,500 Frequent Caller Trucks Alt Fuel Replaced	5,112 LNOxC + Chip Reflash	1993 to 1998 MY trucks; 4 to 5 years useful life
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1,811 Semi-Freq Caller Trucks Alt Fuel Replaced ←	3,622 Cannot be retrofitted	Pre 1993 MY trucks
1,811 Semi-Freq Caller Trucks CD Replaced ←	LNOxC - Lean NOx Catalyst	
10,622 Total Trucks Replaced		

Alt Fuel Option 2 - Purchase of Westport LNG Trucks \$169,500 /truck (\$166k O/Op, \$1.3k AVL, \$2.2k admin) see note below

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Alt Fuel)	\$19,800,000	\$220,100,000	\$220,100,000	\$220,100,000	\$220,100,000	\$900,200,000	

Number of total trucks/year	117	1,299	1,299	1,299	1,299	5,311
Baseline DPM tpy	7.7	93.2	178.7	264.3	349.8	894
Total DPM Emis Red tpy	7.7	93.0	178.3	263.6	349.0	892
Baseline NOx in tpy	74	899	1724	2549	3373	8,619
Total NOx Emis Red tpy	60	781	1604	2325	3148	7,918

SBP-HDV1	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011	Total
Total DPM Reduction (tpy)	22	236	442	612	782	2,095
Total NOx Reduction (tpy)	167	1,771	3,329	4,778	6,228	16,273
Total SOx Reduction (tpy)	0.1	0.7	1.3	1.9	2.5	6

Notes

Diesel Truck Cost - Based on ARB's Ports Truck Report, page B-16

LNG Truck Cost - Based on April 18, 2006 meeting between Westport, POLA, POLB and Starcrest

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 8 - Focus on Replacements w/Focus On Clean Diesel (CD) + Retrofits

7,000 Frequent Trucks (preliminary 2005 EI data)	9,800 Semi-Frequent Trucks (preliminary 2005 EI data)
7,000 Frequent Caller Trucks CD Fuel Replaced	5,112 LNOxC + Chip Reflash
3,463 Semi-Freq Caller Trucks CD Replaced	844 LNOxC
159 Semi-Freq Caller Trucks Alt Replaced	3,622 Cannot be retrofitted
10,622 Total Trucks Replaced	LNOxC - Lean NOx Catalyst

Note: Arrows in the original image point from the '3,463 Semi-Freq Caller Trucks CD Replaced' and '159 Semi-Freq Caller Trucks Alt Replaced' rows to the '3,622 Cannot be retrofitted' row.

Budget Overview

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Clean Diesel)							
	Clean Diesel - POLA	\$16,000,000	\$16,000,000	\$18,000,000	\$18,000,000	\$18,000,000	\$86,000,000	Operational
	Clean Diesel - POLB	\$16,000,000	\$16,000,000	\$16,000,000	\$16,000,000	\$16,000,000	\$80,000,000	
	Clean Diesel - SCAQMD	\$6,000,000	\$0	\$0	\$0	\$0	\$6,000,000	Assumes SCAQMD 1 Time \$6M
	Clean Diesel - ARB	\$0	\$0	\$0	\$0	\$0	\$0	
	Clean Diesel - EPA	\$0	\$0	\$0	\$0	\$0	\$0	
	Clean Diesel - Bond Funding	\$0	\$356,900,000	\$338,600,000	\$298,300,000	\$298,300,000	\$1,292,100,000	Assumes Bond Funding
		\$38,000,000	\$388,900,000	\$372,600,000	\$332,300,000	\$332,300,000	\$1,464,100,000	
	HDV Incentives (Alt Fuels)							
	LNG - POLA	\$0	\$0	\$0	\$0	\$0	\$0	Operational
	LNG - POLB	\$0	\$0	\$0	\$0	\$0	\$0	
	LNG - SCAQMD	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$30,000,000	Assumes SCAQMD \$6M/yr Match
	LNG - ARB	\$0	\$0	\$0	\$0	\$0	\$0	
	LNG - EPA	\$0	\$0	\$0	\$0	\$0	\$0	
	LNG - Bond Funding	\$0	\$0	\$0	\$0	\$0	\$0	Assumes No Bond Funding
		\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$30,000,000	
	Measure FY Totals	\$44,000,000	\$394,900,000	\$378,600,000	\$338,300,000	\$338,300,000	\$1,494,100,000	

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 8 - Focus on Replacements w/Focus On Clean Diesel (CD) + Retrofits

7,000 Frequent Trucks (preliminary 2005 EI data)	9,800 Semi-Frequent Trucks (preliminary 2005 EI data)
7,000 Frequent Caller Trucks CD Fuel Replaced	5,112 LNOxC + Chip Reflash 1994 to 1998 MY trucks; 4 to 5 years useful life
3,463 Semi-Freq Caller Trucks CD Replaced	844 LNOxC 1999 to 2002 MY trucks; to 5 years useful life
159 Semi-Freq Caller Trucks Alt Replaced	3,622 Cannot be retrofitted Pre 1994 MY trucks
10,622 Total Trucks Replaced	LNOxC - Lean NOx Catalyst

SBP-HDV2	Alternate Fuel Infrastructure	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011	Total	Notes
	POLA	\$1,000,000	\$0	\$0	\$0	\$0	\$1,000,000	
	POLB	\$1,000,000	\$0	\$0	\$0	\$0	\$1,000,000	
	SCAQMD	TBD	\$0	\$0	\$0	\$0	\$0	
	ARB	\$0	\$0	\$0	\$0	\$0	\$0	
	EPA	\$0	\$0	\$0	\$0	\$0	\$0	
	Bond Funding	\$0	\$0	\$0	\$0	\$0	\$0	
	Measure FY Totals	\$2,000,000	\$0	\$0	\$0	\$0	\$2,000,000	
	TOTAL HDV COSTS	\$46,000,000	\$394,900,000	\$378,600,000	\$338,300,000	\$338,300,000	\$1,496,100,000	

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 8 - Focus on Replacements w/Focus On Clean Diesel (CD) + Retrofits

7,000 Frequent Trucks (preliminary 2005 EI data)		9,800 Semi-Frequent Trucks (preliminary 2005 EI data)	
7,000 Frequent Caller Trucks CD Fuel Replaced		5,112 LNOxC + Chip Reflash	1994 to 1998 MY trucks; 4 to 5 years useful life
3,463 Semi-Freq Caller Trucks CD Replaced		844 LNOxC	1999 to 2002 MY trucks; to 5 years useful life
159 Semi-Freq Caller Trucks Alt Replaced		3,622 Cannot be retrofitted	Pre 1994 MY trucks
10,622 Total Trucks Replaced		LNOxC - Lean NOx Catalyst	

Budget Scenario 8 - Options for Clean Diesel (CD)

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Clean Diesel)	\$44,900,000	\$388,900,000	\$372,600,000	\$332,300,000	\$332,300,000	\$1,471,000,000	

CD Option 1 - Cleaner Diesel Trucks MY2007+

50% CD Funding \$129,500 /truck (\$126k O/Op, \$1.3k AVL, \$2.2k admin) see note below

	200	2,566	2,566	2,566	2,566	10,463
Number of total trucks/year						
Total DPM Emis Red tpy	13	179	346	512	679	1,730
Total NOx Emis Red tpy	89	1,225	2,362	3,906	5,450	13,032

50% CD Funding \$19,500 /truck (\$14.5k Retrofit, \$2.2kAdmin, \$1k Installation, \$1.3k AVL, \$500 Incentive)

	974	2,069	2,069	0	0	5,112
# of LNOxC + Chip Units/year						
Total DPM Emis Red tpy	16	49	82	82	82	309
Total NOx Emis Red tpy	134	420	705	705	705	2,670
# of LNOxC	0	844	0	0	0	844
Total DPM Emis Red tpy	0	7	7	7	7	30
Total NOx Emis Red tpy	0	45	45	45	45	182

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 8 - Focus on Replacements w/Focus On Clean Diesel (CD) + Retrofits

7,000 Frequent Trucks (preliminary 2005 EI data)	9,800 Semi-Frequent Trucks (preliminary 2005 EI data)	
7,000 Frequent Caller Trucks CD Fuel Replaced	5,112 LNOxC + Chip Reflash	1994 to 1998 MY trucks; 4 to 5 years useful life
3,463 Semi-Freq Caller Trucks CD Replaced	844 LNOxC	1999 to 2002 MY trucks; to 5 years useful life
159 Semi-Freq Caller Trucks Alt Replaced	3,622 Cannot be retrofitted	Pre 1994 MY trucks
10,622 Total Trucks Replaced	LNOxC - Lean NOx Catalyst	

Budget Scenario 8 - Options for Alt Fuels

Alt Fuel Option 1 - Purchase of New LNG Trucks

\$188,500 /truck (\$185k O/Op, \$1.3k AVL, \$2.2k admin) see note below

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Alt Fuel)	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$30,000,000	
	Number of total trucks/year	32	32	32	32	32	159	
	Total DPM Emis Red tpy	2	4	6	8	11	32	
	Total NOx Emis Red tpy	14	31	47	64	80	236	

Alt Fuel Option 2 - Purchase of Westport LNG Trucks

\$169,500 /truck (\$166k O/Op, \$1.3k AVL, \$2.2k admin) see note below

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Alt Fuel)	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$30,000,000	
	Number of total trucks/year	35	35	35	35	35	177	
	Total DPM Emis Red tpy	2	5	7	9	12	35	
	Total NOx Emis Red tpy	18	38	58	78	97	290	

SBP-HDV1	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011	Total
Total DPM Reduction (tpy)	31	38	50	60	70	247
Total NOx Reduction (tpy)	237	1,722	3,160	4,721	6,281	16,120
Total SOx Reduction (tpy)	0.015	0.015	0.015	0.015	0.015	0.074

Notes

Diesel Truck Cost - Based on ARB's Ports Truck Report, page B-16

LNG Truck Cost - Based on April 18, 2006 meeting between Westport, POLA, POLB and Starcrest

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 9 - Focus on Replacements w/Focus On Alt Fuels

7,000 Frequent Trucks (preliminary 2005 EI data)

5,252 Frequent Caller Trucks Alt Fuel Replace

46 Frequent Caller Trucks CD Replaced

5,298 Total Trucks Replaced

9,800 Semi-Frequent Trucks (preliminary 2005 EI data)

5,112 LNOxC + Chip Reflash

844 LNOxC

3,622 Cannot be retrofitted

LNOxC - Lean NOx Catalyst

1993 to 1998 MY trucks; 4 to 5 years useful life

1999 to 2003 MY trucks; to 5 years useful life

Pre 1993 MY trucks

Budget Overview

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Clean Diesel)							
	Clean Diesel - POLA	\$0	\$0	\$0	\$0	\$0	\$0	Operational
	Clean Diesel - POLB	\$0	\$0	\$0	\$0	\$0	\$0	
	Clean Diesel - SCAQMD	\$6,000,000	\$0	\$0	\$0	\$0	\$6,000,000	Assumes SCAQMD 1 Time \$6M
	Clean Diesel - ARB	\$0	\$0	\$0	\$0	\$0	\$0	
	Clean Diesel - EPA	\$0	\$0	\$0	\$0	\$0	\$0	
	Clean Diesel - Bond Funding	\$0	\$0	\$0	\$0	\$0	\$0	Assumes No Bond Funding
		\$6,000,000	\$0	\$0	\$0	\$0	\$6,000,000	
	HDV Incentives (Alt Fuels)							
	LNG - POLA	\$16,000,000	\$16,000,000	\$16,000,000	\$16,000,000	\$16,000,000	\$80,000,000	Operational
	LNG - POLB	\$16,000,000	\$16,000,000	\$16,000,000	\$16,000,000	\$16,000,000	\$80,000,000	
	LNG - SCAQMD	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$30,000,000	Assumes SCAQMD \$6M/yr Match
	LNG - ARB	\$0	\$0	\$0	\$0	\$0	\$0	
	LNG - EPA	\$0	\$0	\$0	\$0	\$0	\$0	
	LNG - Bond Funding	\$0	\$200,000,000	\$200,000,000	\$200,000,000	\$200,000,000	\$800,000,000	Assumes Bond Funding
		\$38,000,000	\$238,000,000	\$238,000,000	\$238,000,000	\$238,000,000	\$990,000,000	
	Measure FY Totals	\$44,000,000	\$238,000,000	\$238,000,000	\$238,000,000	\$238,000,000	\$996,000,000	

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 9 - Focus on Replacements w/Focus On Alt Fuels

7,000 Frequent Trucks (preliminary 2005 EI data)

5,252 Frequent Caller Trucks Alt Fuel Replace

46 Frequent Caller Trucks CD Replaced

5,298 Total Trucks Replaced

9,800 Semi-Frequent Trucks (preliminary 2005 EI data)

5,112 LNOxC + Chip Reflash

844 LNOxC

3,622 Cannot be retrofitted

1993 to 1998 MY trucks; 4 to 5 years useful life

1999 to 2003 MY trucks; to 5 years useful life

Pre 1993 MY trucks

LNOxC - Lean NOx Catalyst

SBP-HDV2	Alternate Fuel Infrastructure	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011	Total	Notes
	POLA	\$1,000,000	\$0	\$0	\$0	\$0	\$1,000,000	
	POLB	\$1,000,000	\$0	\$0	\$0	\$0	\$1,000,000	
	SCAQMD	TBD	\$0	\$0	\$0	\$0	\$0	
	ARB	\$0	\$0	\$0	\$0	\$0	\$0	
	EPA	\$0	\$0	\$0	\$0	\$0	\$0	
	Bond Funding	\$0	\$0	\$0	\$0	\$0	\$0	
Measure FY Totals		\$2,000,000	\$0	\$0	\$0	\$0	\$2,000,000	
TOTAL HDV COSTS		\$46,000,000	\$238,000,000	\$238,000,000	\$238,000,000	\$238,000,000	\$998,000,000	

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 9 - Focus on Replacements w/Focus On Alt Fuels

7,000 Frequent Trucks (preliminary 2005 EI data)

5,252 Frequent Caller Trucks Alt Fuel Replace

46 Frequent Caller Trucks CD Replaced

5,298 Total Trucks Replaced

9,800 Semi-Frequent Trucks (preliminary 2005 EI data)

5,112 LNOxC + Chip Reflash

844 LNOxC

3,622 Cannot be retrofitted

LNOxC - Lean NOx Catalyst

1993 to 1998 MY trucks; 4 to 5 years useful life

1999 to 2003 MY trucks; to 5 years useful life

Pre 1993 MY trucks

Budget Scenario 9 - Options for Cleaner Diesel (CD)

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Clean Diesel)	\$6,000,000	\$0	\$0	\$0	\$0	\$6,000,000	

CD Option 1 - Clean Diesel Trucks MY2007+

100% CD Funding

\$129,500 /truck (\$126k O/Op, \$1.3k AVL, \$2.2k admin)

see note below

Number of total trucks/year	46	0	0	0	0	46
Total DPM Emis Red tpy	3	3	3	3	3	17
Total NOx Emis Red tpy	25	25	25	25	25	124

0% CD Funding

\$19,500 /truck (\$14.5k Retrofit, \$2.2kAdmin, \$1k Installation, \$1.3k AVL, \$500 Incentive)

Assumed no funding available

# of LNOxC + Chip Units/year	0	0	0	0	0	0
Total DPM Emis Red tpy	0	0	0	0	0	0
Total NOx Emis Red tpy	0	0	0	0	0	0
# of LNOxC	0	0	0	0	0	0
Total DPM Emis Red tpy	0	0	0	0	0	0
Total NOx Emis Red tpy	0	0	0	0	0	0

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 9 - Focus on Replacements w/Focus On Alt Fuels

7,000 Frequent Trucks (preliminary 2005 EI data)

5,252 Frequent Caller Trucks Alt Fuel Replace

46 Frequent Caller Trucks CD Replaced

5,298 Total Trucks Replaced

9,800 Semi-Frequent Trucks (preliminary 2005 EI data)

5,112 LNOxC + Chip Reflash

844 LNOxC

3,622 Cannot be retrofitted

LNOxC - Lean NOx Catalyst

1993 to 1998 MY trucks; 4 to 5 years useful life

1999 to 2003 MY trucks; to 5 years useful life

Pre 1993 MY trucks

Budget Scenario 9 - Options for Alt Fuels

Alt Fuel Option 1 - Purchase of New LNG Trucks

\$188,500 /truck (\$185k O/Op, \$1.3k AVL, \$2.2k admin) see note below

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Alt Fuel)	\$38,000,000	\$238,000,000	\$238,000,000	\$238,000,000	\$238,000,000	\$990,000,000	
	Number of total trucks/year	202	1,263	1,263	1,263	1,263	5,252	
	Total DPM Emis Red tpy	15	107	199	292	384	997	
	Total NOx Emis Red tpy	110	797	1,485	2,172	2,860	7,424	

Alt Fuel Option 2 - Purchase of Westport LNG Trucks

\$169,500 /truck (\$166k O/Op, \$1.3k AVL, \$2.2k admin) see note below

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Alt Fuel)	\$38,000,000	\$238,000,000	\$238,000,000	\$238,000,000	\$238,000,000	\$990,000,000	
	Number of total trucks/year	224	1,404	1,404	1,404	1,404	5,841	
	Total DPM Emis Red tpy	16	118	221	323	425	1,103	
	Total NOx Emis Red tpy	141	1,026	1,911	2,796	3,681	9,555	

SBP-HDV1	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011	Total
Total DPM Reduction (tpy)	18	110	203	295	387	1,013
Total NOx Reduction (tpy)	134	822	1,510	2,197	2,885	7,548
Total SOx Reduction (tpy)	0.093	0.583	0.583	0.583	0.583	2.427

Notes

Diesel Truck Cost - Based on ARB's Ports Truck Report, page B-16

LNG Truck Cost - Based on April 18, 2006 meeting between Westport, POLA, POLB and Starcrest

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 10 - Focus on Replacements w/Focus on 50/50 Alt Fuels & Clean Diesel (CD) + Retrofits

<u>7,000 Frequent Trucks (preliminary 2005 EI data)</u>	<u>9,800 Semi-Frequent Trucks (preliminary 2005 EI data)</u>	
2,706 Frequent Caller Trucks Alt Fuel Replaced	5,112 LNOxC + Chip Reflash	1993 to 1998 MY trucks; 4 to 5 years useful life
3,273 Frequent Caller Trucks CD Replaced	844 LNOxC	1999 to 2003 MY trucks; to 5 years useful life
0 Semi-Freq Caller Trucks Alt Fuel Replaced	3,622 Cannot be retrofitted	Pre 1993 MY trucks
0 Semi-Freq Caller Trucks CD Replaced	LNOxC - Lean NOx Catalyst	
5,979 Total Trucks Replaced		

Budget Overview

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Clean Diesel)							
	Clean Diesel - POLA	\$8,000,000	\$8,000,000	\$8,000,000	\$8,000,000	\$8,000,000	\$40,000,000	Operational
	Clean Diesel - POLB	\$8,000,000	\$8,000,000	\$8,000,000	\$8,000,000	\$8,000,000	\$40,000,000	
	Clean Diesel - SCAQMD	\$6,000,000	\$0	\$0	\$0	\$0	\$6,000,000	Assumes SCAQMD 1 Time \$6M
	Clean Diesel - ARB	\$0	\$0	\$0	\$0	\$0	\$0	
	Clean Diesel - EPA	\$0	\$0	\$0	\$0	\$0	\$0	
	Clean Diesel - Bond Funding	\$0	\$100,000,000	\$100,000,000	\$100,000,000	\$100,000,000	\$400,000,000	Assumes Bond Funding
		\$22,000,000	\$116,000,000	\$116,000,000	\$116,000,000	\$116,000,000	\$486,000,000	
	HDV Incentives (Alt Fuels)							
	LNG - POLA	\$8,000,000	\$8,000,000	\$8,000,000	\$8,000,000	\$8,000,000	\$40,000,000	Operational
	LNG - POLB	\$8,000,000	\$8,000,000	\$8,000,000	\$8,000,000	\$8,000,000	\$40,000,000	
	LNG - SCAQMD	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$30,000,000	Assumes SCAQMD \$6M/yr Match
	LNG - ARB	\$0	\$0	\$0	\$0	\$0	\$0	
	LNG - EPA	\$0	\$0	\$0	\$0	\$0	\$0	
	LNG - Bond Funding	\$0	\$100,000,000	\$100,000,000	\$100,000,000	\$100,000,000	\$400,000,000	Assumes Bond Funding
		\$22,000,000	\$122,000,000	\$122,000,000	\$122,000,000	\$122,000,000	\$510,000,000	
	Measure FY Totals	\$44,000,000	\$238,000,000	\$238,000,000	\$238,000,000	\$238,000,000	\$996,000,000	

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 10 - Focus on Replacements w/Focus on 50/50 Alt Fuels & Clean Diesel (CD) + Retrofits

<u>7,000 Frequent Trucks (preliminary 2005 EI data)</u>	<u>9,800 Semi-Frequent Trucks (preliminary 2005 EI data)</u>
2,706 Frequent Caller Trucks Alt Fuel Replaced	5,112 LNOxC + Chip Reflash 1993 to 1998 MY trucks; 4 to 5 years useful life
3,273 Frequent Caller Trucks CD Replaced	844 LNOxC 1999 to 2003 MY trucks; to 5 years useful life
0 Semi-Freq Caller Trucks Alt Fuel Replaced	3,622 Cannot be retrofitted Pre 1993 MY trucks
0 Semi-Freq Caller Trucks CD Replaced	LNOxC - Lean NOx Catalyst

5,979 Total Trucks Replaced

SBP-HDV2	Alternate Fuel Infrastructure	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011	Total	Notes
	POLA	\$1,000,000	\$0	\$0	\$0	\$0	\$1,000,000	
	POLB	\$1,000,000	\$0	\$0	\$0	\$0	\$1,000,000	
	SCAQMD	TBD	\$0	\$0	\$0	\$0	\$0	
	ARB	\$0	\$0	\$0	\$0	\$0	\$0	
	EPA	\$0	\$0	\$0	\$0	\$0	\$0	
	Bond Funding	\$0	\$0	\$0	\$0	\$0	\$0	
	Measure FY Totals	\$2,000,000	\$0	\$0	\$0	\$0	\$2,000,000	
	TOTAL HDV COSTS	\$46,000,000	\$238,000,000	\$238,000,000	\$238,000,000	\$238,000,000	\$998,000,000	

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 10 - Focus on Replacements w/Focus on 50/50 Alt Fuels & Clean Diesel (CD) + Retrofits

7,000 Frequent Trucks (preliminary 2005 EI data)	9,800 Semi-Frequent Trucks (preliminary 2005 EI data)	
2,706 Frequent Caller Trucks Alt Fuel Replaced	5,112 LNOxC + Chip Reflash	1993 to 1998 MY trucks; 4 to 5 years useful life
3,273 Frequent Caller Trucks CD Replaced	844 LNOxC	1999 to 2003 MY trucks; to 5 years useful life
0 Semi-Freq Caller Trucks Alt Fuel Replaced	3,622 Cannot be retrofitted	Pre 1993 MY trucks
0 Semi-Freq Caller Trucks CD Replaced	LNOxC - Lean NOx Catalyst	
5,979 Total Trucks Replaced		

Budget Scenario 10 - Options for Cleaner Diesel (CD)

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Clean Diesel)	\$22,000,000	\$118,800,000	\$116,000,000	\$116,000,000	\$116,000,000	\$488,800,000	

CD Option 1 - Cleaner Diesel Trucks MY2007+

90% CD Funding \$129,500 /truck (\$126k O/Op, \$1.3k AVL, \$2.2k admin) see note below

Number of total trucks/year	153	702	806	806	806	3,273
Total DPM Emis Red tpy	11	61	119	177	234	602
Total NOx Emis Red tpy	82	456	886	1,316	1,746	4,486

10% CD Funding \$19,500 /truck (\$14.5k Retrofit, \$2.2kAdmin, \$1k Installation, \$1.3k AVL, \$500 Incentive)

# of LNOxC + Chip Units/year	113	595	595	595	595	2,492
Total DPM Emis Red tpy	2	11	21	30	40	104
Total NOx Emis Red tpy	16	98	180	262	344	898
# of LNOxC	0	844	0	0	0	844
Total DPM Emis Red tpy	0	7	7	7	7	30
Total NOx Emis Red tpy	0	45	45	45	45	182

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 10 - Focus on Replacements w/Focus on 50/50 Alt Fuels & Clean Diesel (CD) + Retrofits

7,000 Frequent Trucks (preliminary 2005 EI data)		9,800 Semi-Frequent Trucks (preliminary 2005 EI data)	
2,706 Frequent Caller Trucks Alt Fuel Replaced		5,112 LNOxC + Chip Reflash	1993 to 1998 MY trucks; 4 to 5 years useful life
3,273 Frequent Caller Trucks CD Replaced		844 LNOxC	1999 to 2003 MY trucks; to 5 years useful life
0 Semi-Freq Caller Trucks Alt Fuel Replaced		3,622 Cannot be retrofitted	Pre 1993 MY trucks
0 Semi-Freq Caller Trucks CD Replaced		LNOxC - Lean NOx Catalyst	
5,979 Total Trucks Replaced			

Budget Scenario 10 - Options for Alt Fuels

Alt Fuel Option 1 - Purchase of New LNG Trucks \$188,500 /truck (\$185k O/Op, \$1.3k AVL, \$2.2k admin) see note below

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Alt Fuel)	\$22,000,000	\$122,000,000	\$122,000,000	\$122,000,000	\$122,000,000	\$510,000,000	
	Number of total trucks/year	117	647	647	647	647	2,706	
	Total DPM Emis Red tpy	9	56	103	150	198	516	
	Total NOx Emis Red tpy	64	416	768	1,121	1,473	3,842	

Alt Fuel Option 2 - Purchase of Westport LNG Trucks \$169,500 /truck (\$166k O/Op, \$1.3k AVL, \$2.2k admin) see note below

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Alt Fuel)	\$22,000,000	\$122,000,000	\$122,000,000	\$122,000,000	\$122,000,000	\$510,000,000	
	Number of total trucks/year	130	720	720	720	720	3,009	
	Total DPM Emis Red tpy	9	62	114	167	219	571	
	Total NOx Emis Red tpy	82	535	989	1,443	1,896	4,945	

SBP-HDV1	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011	Total
Total DPM Reduction (tpy)	21	136	250	365	479	1,251
Total NOx Reduction (tpy)	161	1,015	1,880	2,744	3,609	9,408
Total SOx Reduction (tpy)	0.054	0.299	0.299	0.299	0.299	1.250

Notes

Diesel Truck Cost - Based on ARB's Ports Truck Report, page B-16

LNG Truck Cost - Based on April 18, 2006 meeting between Westport, POLA, POLB and Starcrest

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 11 - Focus on Replacements w/Focus On Clean Diesel (CD) + Retrofits

7,000 Frequent Trucks (preliminary 2005 EI data)	9,800 Semi-Frequent Trucks (preliminary 2005 EI data)	
7,000 Frequent Caller Trucks CD Fuel Replaced	5,112 LNOxC + Chip Reflash	1993 to 1998 MY trucks; 4 to 5 years useful life
1,900 Semi-Freq Caller Trucks CD Replaced	844 LNOxC	1999 to 2003 MY trucks; to 5 years useful life
159 Semi-Frequentr Trucks Alt Replaced	3,622 Cannot be retrofitted	Pre 1993 MY trucks
9,059 Total Trucks Replaced	LNOxC - Lean NOx Catalyst	

Budget Overview

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Clean Diesel)							
	Clean Diesel - POLA	\$16,000,000	\$16,000,000	\$16,000,000	\$16,000,000	\$16,000,000	\$80,000,000	Operational
	Clean Diesel - POLB	\$16,000,000	\$16,000,000	\$16,000,000	\$16,000,000	\$16,000,000	\$80,000,000	
	Clean Diesel - SCAQMD	\$6,000,000	\$0	\$0	\$0	\$0	\$6,000,000	Assumes SCAQMD 1 Time \$6M
	Clean Diesel - ARB	\$0	\$0	\$0	\$0	\$0	\$0	
	Clean Diesel - EPA	\$0	\$0	\$0	\$0	\$0	\$0	
	Clean Diesel - Bond Funding	\$0	\$200,000,000	\$200,000,000	\$200,000,000	\$200,000,000	\$800,000,000	Assumes Bond Funding
		\$38,000,000	\$232,000,000	\$232,000,000	\$232,000,000	\$232,000,000	\$966,000,000	
	HDV Incentives (Alt Fuels)							
	LNG - POLA	\$0	\$0	\$0	\$0	\$0	\$0	Operational
	LNG - POLB	\$0	\$0	\$0	\$0	\$0	\$0	
	LNG - SCAQMD	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$30,000,000	Assumes SCAQMD \$6M/yr Match
	LNG - ARB	\$0	\$0	\$0	\$0	\$0	\$0	
	LNG - EPA	\$0	\$0	\$0	\$0	\$0	\$0	
	LNG - Bond Funding	\$0	\$0	\$0	\$0	\$0	\$0	Assumes No Bond Funding
		\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$30,000,000	
	Measure FY Totals	\$44,000,000	\$238,000,000	\$238,000,000	\$238,000,000	\$238,000,000	\$996,000,000	

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 11 - Focus on Replacements w/Focus On Clean Diesel (CD) + Retrofits

<u>7,000 Frequent Trucks (preliminary 2005 EI data)</u>	<u>9,800 Semi-Frequent Trucks (preliminary 2005 EI data)</u>	
7,000 Frequent Caller Trucks CD Fuel Replaced	5,112 LNOxC + Chip Reflash	1993 to 1998 MY trucks; 4 to 5 years useful life
1,900 Semi-Freq Caller Trucks CD Replaced	844 LNOxC	1999 to 2003 MY trucks; to 5 years useful life
159 Semi-Frequentr Trucks Alt Replaced	3,622 Cannot be retrofitted	Pre 1993 MY trucks
9,059 Total Trucks Replaced	LNOxC - Lean NOx Catalyst	

SBP-HDV2	Alternate Fuel Infrastructure	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011	Total	Notes
	POLA	\$1,000,000	\$0	\$0	\$0	\$0	\$1,000,000	
	POLB	\$1,000,000	\$0	\$0	\$0	\$0	\$1,000,000	
	SCAQMD	TBD	\$0	\$0	\$0	\$0	\$0	
	ARB	\$0	\$0	\$0	\$0	\$0	\$0	
	EPA	\$0	\$0	\$0	\$0	\$0	\$0	
	Bond Funding	\$0	\$0	\$0	\$0	\$0	\$0	
Measure FY Totals		\$2,000,000	\$0	\$0	\$0	\$0	\$2,000,000	
TOTAL HDV COSTS		\$46,000,000	\$238,000,000	\$238,000,000	\$238,000,000	\$238,000,000	\$998,000,000	

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 11 - Focus on Replacements w/Focus On Clean Diesel (CD) + Retrofits

7,000 Frequent Trucks (preliminary 2005 EI data)		9,800 Semi-Frequent Trucks (preliminary 2005 EI data)	
7,000 Frequent Caller Trucks CD Fuel Replaced		5,112 LNOxC + Chip Reflash	1993 to 1998 MY trucks; 4 to 5 years useful life
1,900 Semi-Freq Caller Trucks CD Replaced	←	844 LNOxC	1999 to 2003 MY trucks; to 5 years useful life
159 Semi-Frequentr Trucks Alt Replaced	←	3,622 Cannot be retrofitted	Pre 1993 MY trucks
9,059 Total Trucks Replaced		LNOxC - Lean NOx Catalyst	

Budget Scenario 11 - Options for Clean Diesel (CD)

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Clean Diesel)	\$38,000,000	\$234,800,000	\$232,000,000	\$232,000,000	\$531,700,000	\$1,268,500,000	

CD Option 1 - Cleaner Diesel Trucks MY2007+

50% CD Funding \$129,500 /truck (\$126k O/Op, \$1.3k AVL, \$2.2k admin) see note below

Number of total trucks/year	147	1,376	1,480	1,792	4,106	8,900
Total DPM Emis Red tpy	10	102	202	323	599	1,236
Total NOx Emis Red tpy	70	723	1,427	2,586	5,244	10,050

50% CD Funding \$19,500 /truck (\$14.5k Retrofit, \$2.2kAdmin, \$1k Installation, \$1.3k AVL, \$500 Incentive)

# of LNOxC + Chip Units/year	974	2,069	2,069	0	0	5,112
Total DPM Emis Red tpy	16	49	82	82	82	309
Total NOx Emis Red tpy	134	420	705	705	705	2,670
# of LNOxC	0	844	0	0	0	844
Total DPM Emis Red tpy	0	7	7	7	7	30
Total NOx Emis Red tpy	0	45	45	45	45	182

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 11 - Focus on Replacements w/Focus On Clean Diesel (CD) + Retrofits

7,000 Frequent Trucks (preliminary 2005 EI data)	9,800 Semi-Frequent Trucks (preliminary 2005 EI data)	
7,000 Frequent Caller Trucks CD Fuel Replaced	5,112 LNOxC + Chip Reflash	1993 to 1998 MY trucks; 4 to 5 years useful life
1,900 Semi-Freq Caller Trucks CD Replaced	844 LNOxC	1999 to 2003 MY trucks; to 5 years useful life
159 Semi-Frequentr Trucks Alt Replaced	3,622 Cannot be retrofitted	Pre 1993 MY trucks
9,059 Total Trucks Replaced	LNOxC - Lean NOx Catalyst	

Budget Scenario 11 - Options for Alt Fuels

Alt Fuel Option 1 - Purchase of New LNG Trucks \$188,500 /truck (\$185k O/Op, \$1.3k AVL, \$2.2k admin) see note below

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Alt Fuel)	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$30,000,000	
	Number of total trucks/year	32	32	32	32	32	159	
	Total DPM Emis Red tpy	2	4	7	9	11	33	
	Total NOx Emis Red tpy	15	33	51	69	86	254	

Alt Fuel Option 2 - Purchase of Westport LNG Trucks \$169,500 /truck (\$166k O/Op, \$1.3k AVL, \$2.2k admin) see note below

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Alt Fuel)	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$6,000,000	\$30,000,000	
	Number of total trucks/year	35	35	35	35	35	177	
	Total DPM Emis Red tpy	2	5	7	10	12	36	
	Total NOx Emis Red tpy	20	41	62	84	105	312	

SBP-HDV1	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011	Total
Total DPM Reduction (tpy)	28	163	297	420	699	1,607
Total NOx Reduction (tpy)	219	1,222	2,228	3,406	6,081	13,157
Total SOx Reduction (tpy)	0.015	0.015	0.015	0.015	0.015	0.074

Notes

Diesel Truck Cost - Based on ARB's Ports Truck Report, page B-16

LNG Truck Cost - Based on April 18, 2006 meeting between Westport, POLA, POLB and Starcrest

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 12 - Focus on Replacements all FF and SFF trucks 50:50 CD and Alt Fuel

7,000 Frequent Trucks (preliminary 2005 EI data)	9,800 Semi-Frequent Trucks (preliminary 2005 EI data)
4,200 Frequent Caller Trucks Alt Fuel Replaced	0 LNOxC + Chip Reflash (Semi-Frequent) 1993 to 1998 MY trucks; 4 to 5 years useful life
4,200 Semi-Frequent Caller Alt Fuel Replaced	0 LNOxC + Chip Reflash (Frequent Callers) 1993 to 1998 MY trucks; 4 to 5 years useful life
4,200 Semi Frequent Caller Trucks CD Replaced	0 LNOxC (Frequent Callers)
4,200 Frequent Caller Trucks CD Replaced	0 LNOxC (Semi-Frequent) 1999 to 2003 MY trucks; to 5 years useful life
16,800 Total Trucks Replaced	0 Total Trucks Retrofitted LNOxC - Lean NOx Catalyst
	0 Semi-Frequent Trucks Cannot be LNOxCd

Budget Overview

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Clean Diesel)							
	Clean Diesel - POLA	\$0	\$0	\$0	\$0	\$0	\$0	Operational
	Clean Diesel - POLB	\$0	\$0	\$0	\$0	\$0	\$0	
	Clean Diesel - SCAQMD	\$0	\$0	\$0	\$0	\$0	\$0	
	Clean Diesel - ARB	\$0	\$0	\$0	\$0	\$0	\$0	
	Clean Diesel - EPA	\$0	\$0	\$0	\$0	\$0	\$0	
	Clean Diesel - Bond Funding	\$0	\$272,000,000	\$272,000,000	\$272,000,000	\$272,000,000	\$1,088,000,000	
		\$0	\$272,000,000	\$272,000,000	\$272,000,000	\$272,000,000	\$1,088,000,000	
	HDV Incentives (Alt Fuels)							
	LNG - POLA	\$16,000,000	\$16,000,000	\$16,000,000	\$16,000,000	\$16,000,000	\$80,000,000	Operational
	LNG - POLB	\$16,000,000	\$16,000,000	\$16,000,000	\$16,000,000	\$16,000,000	\$80,000,000	
	LNG - SCAQMD	\$12,000,000	\$12,000,000	\$12,000,000	\$12,000,000	\$12,000,000	\$60,000,000	Assumes SCAQMD \$6M/yr Match
	LNG - ARB	\$0	\$0	\$0	\$0	\$0	\$0	
	LNG - EPA	\$0	\$0	\$0	\$0	\$0	\$0	
	LNG - Bond Funding	\$0	\$340,900,000	\$340,900,000	\$340,900,000	\$340,900,000	\$1,363,600,000	
		\$44,000,000	\$384,900,000	\$384,900,000	\$384,900,000	\$384,900,000	\$1,583,600,000	
	Measure FY Totals	\$44,000,000	\$656,900,000	\$656,900,000	\$656,900,000	\$656,900,000	\$2,671,600,000	
SBP-HDV2	Alternate Fuel Infrastructure							
	POLA	\$1,000,000	\$0	\$0	\$0	\$0	\$1,000,000	
	POLB	\$1,000,000	\$0	\$0	\$0	\$0	\$1,000,000	
	SCAQMD	TBD	\$0	\$0	\$0	\$0	\$0	
	ARB	\$0	\$0	\$0	\$0	\$0	\$0	
	EPA	\$0	\$0	\$0	\$0	\$0	\$0	
	Bond Funding	\$0	\$0	\$0	\$0	\$0	\$0	
	Measure FY Totals	\$2,000,000	\$0	\$0	\$0	\$0	\$2,000,000	
	TOTAL HDV COSTS	\$46,000,000	\$656,900,000	\$656,900,000	\$656,900,000	\$656,900,000	\$2,673,600,000	

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 12 - Focus on Replacements all FF and SFF trucks 50:50 CD and Alt Fuel

<u>7,000 Frequent Trucks (preliminary 2005 EI data)</u>	<u>9,800 Semi-Frequent Trucks (preliminary 2005 EI data)</u>
4,200 Frequent Caller Trucks Alt Fuel Replaced	0 LNOxC + Chip Reflash (Semi-Frequent) 1993 to 1998 MY trucks; 4 to 5 years useful life
4,200 Semi-Frequent Caller Alt Fuel Replaced	0 LNOxC + Chip Reflash (Frequent Callers) 1993 to 1998 MY trucks; 4 to 5 years useful life
4,200 Semi Frequent Caller Trucks CD Replaced	0 LNOxC (Frequent Callers)
4,200 Frequent Caller Trucks CD Replaced	0 LNOxC (Semi-Frequent) 1999 to 2003 MY trucks; to 5 years useful life
16,800 Total Trucks Replaced	0 Total Trucks Retrofitted LNOxC - Lean NOx Catalyst
	0 Semi-Frequent Trucks Cannot be LNOxCd

Budget Scenario 12 - Options for Cleaner Diesel (CD)

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Clean Diesel)							
	Bond Funding	\$0	\$272,000,000	\$272,000,000	\$272,000,000	\$272,000,000	\$1,088,000,000	

CD Option 12 - Clean Diesel Trucks MY2007+

	\$129,500 /truck (\$126k O/Op, \$1.3k AVL, \$2.2k admin)					see note below
Bond Funding						
Number of FF+SF trucks/year	0	2,100	2,100	2,100	2,100	8,400
Total DPM Emis Red tpy	0	106	212	319	425	1,062
Total NOx Emis Red tpy	0	791	1,581	2,664	3,455	8,491

Budget Scenario 12 - Options for Alt Fuels

Alt Fuel Option 1 - Purchase of New LNG Trucks \$188,500 /truck (\$185k O/Op, \$1.3k AVL, \$2.2k admin) see note below

Measure #	Measure Description	Budget by Measure					Total	Notes
		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
SBP-HDV1	HDV Incentives (Alt Fuel)							
	Ports/SCAQMD Funding	\$44,000,000	\$384,900,000	\$384,900,000	\$384,900,000	\$384,900,000	\$1,583,600,000	
	Number of total trucks/year	233	2,042	2,042	2,042	2,042	8,400	
	Total DPM Emis Red tpy	12.0	117.4	222.8	328.1	433.5	1,114	
	Total NOx Emis Red tpy	90	998	1,906	2,814	3,723	9,531	

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Clean Diesel & Alt Fuel Options for Policy Discussion

Heavy-Duty Vehicles (Trucks)

Budget Scenario 12 - Focus on Replacements all FF and SFF trucks 50:50 CD and Alt Fuel

<u>7,000 Frequent Trucks (preliminary 2005 EI data)</u>	<u>9,800 Semi-Frequent Trucks (preliminary 2005 EI data)</u>
4,200 Frequent Caller Trucks Alt Fuel Replaced	0 LNOxC + Chip Reflash (Semi-Frequent) 1993 to 1998 MY trucks; 4 to 5 years useful life
4,200 Semi-Frequent Caller Alt Fuel Replaced	0 LNOxC + Chip Reflash (Frequent Callers) 1993 to 1998 MY trucks; 4 to 5 years useful life
4,200 Semi Frequent Caller Trucks CD Replaced	0 LNOxC (Frequent Callers)
4,200 Frequent Caller Trucks CD Replaced	0 LNOxC (Semi-Frequent) 1999 to 2003 MY trucks; to 5 years useful life
16,800 Total Trucks Replaced	0 Total Trucks Retrofitted LNOxC - Lean NOx Catalyst
	0 Semi-Frequent Trucks Cannot be LNOxCd

Alt Fuel Option 2 - Purchase of Westport LNG Trucks **\$169,500** /truck (\$166k O/Op, \$1.3k AVL, \$2.2k admin) see note below

Measure #	Measure Description	Budget by Measure					Total	Notes
SBP-HDV1	HDV Incentives (Alt Fuel)	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011		
	Ports/SCAQMD Funding	\$44,000,000	\$345,000,000	\$345,000,000	\$345,000,000	\$345,000,000	\$1,424,000,000	
	Number of total trucks/year	260	2,035	2,035	2,035	2,035	8,400	
	Total DPM Emis Red tpy	13.3	118.1	222.9	327.7	432.5	1,114	
	Total NOx Emis Red tpy	115	1,091	2,067	3,042	4,018	10,334	
SBP-HDV1		FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011	Total	
	Total DPM Reduction (tpy)	12	224	435	647	858	2,176	
	Total NOx Reduction (tpy)	90	1,789	3,488	5,478	7,177	18,021	
	Total SOx Reduction (tpy)	0.108	0.944	0.944	0.944	0.944	3.882	

Notes:

Diesel Truck Cost - Based on ARB's Ports Truck Report, page B-16

LNG Truck Cost - Based on April 18, 2006 meeting between Westport, POLA, POLB and Starcrest

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

Implementation Schedule for the San Pedro Bay Ports Clean Air Action Plan Measures (Lease plus Phase In)

Measure	Description	Implementation Strategy	Overall Implementation				
			2006/2007	2007/2008	2008/2009	2009/2010	2010/2011
POLA							
SPBP-HDV1	All FF and SFF HDVs	Incentive Funding by Ports, SCAQMD and Bonds	5%	39%	68%	83%	100%
SPBP-OGV1	VSR speed to 20 nm	Voluntary, Incentive and Lease Requirement	100%	100%	100%	100%	100%
	VSR speed to 40 nm		0%	50%	100%	100%	100%
SPBP-OGV2	Reduction at Berth for container, liquid bulk and cruise terminals	Infrastructure-Ports OGV retrofit cost by OGV owners	2%	3%	7%	16%	27%
SPBP-OGV3	OGV Auxiliary Engine Fuel Improvement	Lease Based	1%	5%	28%	40%	48%
SPBP-OGV4	OGV Main Engine Fuel Improvement	Lease Based	1%	5%	28%	40%	48%
SPBP-OGV5	Slide Valve Retrofits for Main Engine OGVs	Lease Based	1%	5%	28%	40%	48%
SPBP-CHE1	Yard Tractors, Side Picks and Top Handlers	Lease Based	1%	5%	30%	45%	57%
	Other CHE	Lease Based	0%	0%	0%	0%	57%
POLB							
SPBP-HDV1	All FF and SFF HDVs	Funding by Ports, SCAQMD and Bonds	5%	39%	68%	83%	100%
SPBP-OGV1	All ships VSR speed to 20 nm	Voluntary, Incentive and Lease Requirement	100%	100%	100%	100%	100%
	All Ships VSR speed to 40 nm		0%	50%	100%	100%	100%
SPBP-OGV2	Reduction at Berth for container and liquid bulk terminals	Infrastructure-Ports OGV retrofit cost by OGV owners	0%	0%	0%	0%	14%
SPBP-OGV3	OGV Auxiliary Engine Fuel Improvement	Lease Based	2%	12%	20%	24%	25%
SPBP-OGV4	OGV Main Engine Fuel Improvement	Lease Based	2%	12%	20%	24%	25%
SPBP-OGV5	Slide Valve Retrofits for Main Engine OGVs	Lease Based	2%	12%	20%	24%	25%
SPBP-CHE1	Yard Tractors, Side Picks and Top Handlers	Lease Based	2%	12%	21%	27%	28%
	Other CHE	Lease Based	0%	0%	0%	0%	28%
			Year 1	Year 2	Year 3	Year 4	Year 5
	Lease Required phase in (SPBP-OGV3,4 and 5)		50%	70%	90%	90%	90%
	Lease Required phase in (SPBP-CHE1)		50%	70%	100%	100%	100%

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report
2001 OGV Baseline Emissions in tpyfor POLA

¹ Applicable to all OGV measures

Tons Per Year						
Type	NO_xMain	NO_xAux	DPM_{Main}	DPM_{Aux}	SO_xmain	SO_xAux
Auto Carrier	125	31	13	1	72	17
Bulk	171	99	18	4	99	66
Containership	2,968	1,290	320	44	1,824	663
Cruise	839	604	86	14	500	201
General Cargo	60	27	6	1	35	20
Miscellaneous	5	10	1	1	3	8
Other Tug	11	1	1	0	8	0
Reefer	45	6	5	0	26	4
RoRo	10	25	3	1	63	21
Tanker	232	342	26	14	174	207
Totals	4,464	2,434	478	81	2,804	1,206
Total Main plus Auxiliary Engines		6,898		558		4,010

¹ VSR speeds not included

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report
2002 OGV Baseline Emissions in tpy for POLB

¹ Applicable to all OGV measures

Tons Per Year						
Type	NOx_{Main}	NOx_{Aux}	DPM_{Main}	DPM_{Aux}	SOx_{main}	SOx_{Aux}
Auto	91.9	43.0	12.1	2.0	45.0	28.1
Container	2518.3	1729.7	335.8	78.9	1140.2	1128.2
Other	500.4	434.1	69.6	19.8	292.1	139.8
RoRo	62.4	135.6	8.8	6.2	32.9	87.9
Reefer	42.8	90.2	6.7	4.1	26.3	58.6
Tanker	646.2	381.8	110.8	17.4	512.1	247.9
Totals	3862.1	2814.3	543.9	128.4	2048.7	1690.5
Total Main plus Auxiliary Engines		6,676		672		3,739

¹ VSR speeds not included

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report
Emission Reductions Achieved by Fuel Substitutions

The following tables present emission reduction percentages potentially achieved by switching fuels
Applied to calculate emissions reductions from CARB's Marine Auxiliary Engine regulation, SPBP-OGV3 and SPBP-OGV4

		Substituted Fuel Type								
NOx		2.7% S IFO	1.5% S IFO	1.5% S MDO	0.5% S MGO	0.2% S MGO	0.1% S MGO	500 ppm S EPA	500 ppm S CARB	15 ppm S CARB
Current Fuel Type	Designation	NOx Reduction from Switching								
Residual	2.7% S IFO	0%	0%	10%	10%	10%	10%	10%	15%	15%
Residual	1.5% S IFO	0%	0%	10%	10%	10%	10%	10%	15%	15%
Distillate	1.5% S MDO			0%	0%	0%	0%	0%	7%	7%
Distillate	0.5% S MGO				0%	0%	0%	0%	7%	7%
Distillate	0.2% S MGO					0%	0%	0%	7%	7%
Low S Distillate	0.1% S MGO						0%	0%	7%	7%
EPA Onroad	500 ppm S EPA							0%	7%	7%
CARB Onroad	500 ppm S CARB								0%	0%
CARB Onroad	15 ppm S CARB									0%

Note: The 10% NOx redn. is based on lower N in distillate fuel per EPA420-D-02-002, 4/02, Table 8.3-4.

Note: The 7% reduction for CARB diesel is estimated based on the lower aromatic content.

Note: Entec reported a 6% NOx reduction for the residual to distillate switch (rather than 10%).

		Substituted Fuel Type								
DPM		2.7% S IFO	1.5% S IFO	1.5% S MDO	0.5% S MGO	0.2% S MGO	0.1% S MGO	500 ppm S EPA	500 ppm S CARB	15 ppm S CARB
Current Fuel Type	Designation	PM Reduction from Switching								
Residual	2.7% S IFO	0%	18%	53%	61%	64%	65%	68%	74%	75%
Residual	1.5% S IFO	0%	0%	42%	51%	53%	54%	61%	68%	69%
Distillate	1.5% S MDO			0%	15%	20%	21%	61%	68%	69%
Distillate	0.5% S MGO				0%	5%	6%	7%	10%	10%
Distillate	0.2% S MGO					0%	2%	8%	25%	28%
Low S Distillate	0.1% S MGO						0%	4%	21%	25%
EPA Onroad	500 ppm S EPA							0%	20%	23%
CARB Onroad	500 ppm S CARB								0%	4%
CARB Onroad	15 ppm S CARB									0%

Assumption: Reduction due to S and Distillate are calculated using multiplicative CFs

		Substituted Fuel Type								
SOx		2.7% S IFO	1.5% S IFO	1.5% S MDO	0.5% S MGO	0.2% S MGO	0.1% S MGO	500 ppm S EPA	500 ppm S CARB	15 ppm S CARB
Current Fuel Type	Designation	SO2 Reduction from Switching								
Residual	2.7% S IFO	0%	44%	44%	81%	93%	96%	98%	98%	99%
Residual	1.5% S IFO		0%	0%	67%	87%	93%	97%	97%	99%
Distillate	1.5% S MDO			0%	67%	87%	93%	97%	97%	99%
Distillate	0.5% S MGO				0%	60%	80%	90%	90%	97%
Distillate	0.2% S MGO					0%	50%	75%	75%	93%
Low S Distillate	0.1% S MGO						0%	50%	50%	85%
EPA Onroad	500 ppm S EPA							0%	0%	97%
CARB Onroad	500 ppm S CARB								0%	97%
CARB Onroad	15 ppm S CARB									0%

Note: Gray color areas represent no emission reductions.

Note: Sulfur oxide reductions directly proportional to reductions in fuel sulfur content.

DPM Reduction Calculations

% S	% Rdn from 2.7%
2.7	0%
1.5	18%
0.5	56%
0.3	63%

From EPA420-D-02-002, switching from 2.7% IFO to 0.3 % S distillate

	Reduction	CF
DPM reduction per 1% S reduction	15%	85%
DPM reduction due to S from 2.7 to 1.5 (2.7-1.5)	18%	82%
DPM reduction due to S from 2.7 to 0.5 (2.7-0.5)	33%	67%
DPM reduction due to S from 2.7 to 0.3 (2.7-0.3)	36%	64%
DPM reduction due to S from 2.7 to 0.2 (2.7-0.2)	38%	63%
DPM reduction due to S from 2.7 to 0.1 (2.7-0.1)	39%	61%
DPM reduction due to S from 1.5 to 0.5 (1.5-0.5)	15%	85%
DPM reduction due to S from 1.5 to 0.2 (1.5-0.2)	20%	81%
DPM reduction due to S from 1.5 to 0.1 (1.5-0.1)	21%	79%
DPM reduction due to S from .5 to 0.2 (1.5-0.2)	5%	96%
DPM reduction due to S from .5 to 0.1 (1.5-0.1)	6%	94%
DPM reduction due to S from .2 to 0.1 (2-0.1)	2%	99%
DPM reduction due to switch from residual to distillate fuel	42%	58%

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report
CARB's Adopted Marine Auxiliary Engines Regulation Adopted in December of 2005

Assumption: Ships utilizing AMP/Cold Ironing are also meeting CARB's Marine Auxiliary Engine regulation
Port of Los Angeles

Requirements for all OGV auxiliary engines operating within 24 nautical miles:

Starting January 1, 2007, use MGO 0.5% or less S content

Starting January 1, 2010, use MGO with 0.1% or less S content

Emission Reduction (tpy)	FY	FY	FY	FY	FY	FY
	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011
¹ Baseline OGV NOx emissions (tpy)	6,898	6,898	6,898	6,898	6,898	6,898
NOx Emissions Reduced 24 nm	0	35	69	69	69	69
NOx CF (Total OGV)	1.000	0.995	0.990	0.990	0.990	0.990
¹ Baseline OGV PM emissions (tpy)	558	558	558	558	558	558
DPM Emissions Reduced 24 nm	0	12	23	23	24	25
DPM CF (Total OGV)	1.000	0.979	0.958	0.958	0.957	0.956
¹ Baseline SOx Emissions (tpy)	4010	4010	4010	4010	4010	4010
SOx Emissions Reduced 24 nm	0	373	747	747	747	747
SOx CF (Total OGV)	1.000	0.907	0.814	0.814	0.814	0.814

¹ Includes Main and Auxiliary Engine Emissions

Percent of total POLA auxiliary and main OGV emissions
within 24 nm

82%

	Fuel Use Distribution ²		% Emissions			% of Emissions from IFO380 in all Auxiliary Engines		
	% IFO380	%MDO	Aux NOx	Aux PM	AuxSOx	NOx	PM	SOx
	Containership	37.4%	62.6%	53.0%	54.8%	54.98%	20.5%	33.6%
Tanker	54.8%	45.2%	14.0%	17.0%	17.19%	7.9%	13.0%	13.3%
Cruise Ship	4.1%	95.9%	24.8%	17.2%	16.64%	1.1%	1.8%	1.8%
Other	60.7%	39.3%	8.2%	11.0%	11.19%	5.1%	8.9%	9.1%
Composite			100.0%	100.0%	100.0%	34.5%	57.2%	59.0%

⁽²⁾ Table 2.3, pg.53; FINAL DRAFT Port-Wide Baseline Air Emissions Inventory, 2004

Sample Calc:

% Emissions from IFO380 in Aux =

$((\% \text{IFO} \times \text{IFO EF}) / ((\% \text{IFO} \times \text{IFO EF}) + (\% \text{MDO} \times \text{MDO EF}))) \times \% \text{ Emissions}$

Reduction in tpy =

Total Aux Emissions x % Emissions from IFO 380 in Aux x % Red due to fuel switch x % Emissions within 24 nm

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report
CARB's Adopted Marine Auxiliary Engines Regulation Adopted in December of 2005

Assumption: Ships utilizing AMP/Cold Ironing are also meeting CARB's Marine Auxiliary Engine regulation Port of Long Beach

Requirements for all OGV auxiliary engines operating within 24 nautical miles:

Starting January 1, 2007, use MGO with 0.5% or less sulfur content

Starting January 1, 2010, use MGO with 0.1% or less sulfur content

Emission Reduction (tpy)

	FY 2005/2006	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011
¹ Baseline OGV NOx emissions (tpy)	6,676	6,676	6,676	6,676	6,676	6,676
NOx Emissions Reduced 24 nm	0	97	194	194	194	194
NOx CF (Total OGV)	1.000	0.985	0.971	0.971	0.971	0.971
¹ Baseline OGV PM emissions (tpy)	672	672	672	672	672	672
DPM Emissions Reduced 24 nm	0	33	65	65	67	69
DPM CF (Total OGV)	1.000	0.952	0.903	0.903	0.900	0.898
¹ Baseline SOx Emissions (tpy)	3739	3739	3739	3739	3739	3739
SOx Emissions Reduced 24 nm	0.000	640	1,279	1,279	1,279	1,279
SOx CF (Aux OGV) 24 nm	1.000	0.622	0.243	0.243	0.243	0.243
SOx CF (Total OGV)	1.000	0.829	0.658	0.658	0.658	0.658

¹ Includes Main and Auxiliary Engine Emissions

Percent of total POLB auxiliary and main
OGV emissions within 24 nm

95%

	Fuel Use Distribution ²		% Emissions			% of Emissions from IFO380 in all Auxiliary Engines		
	% IFO380	%MDO	Aux NOx	Aux PM	Aux SOx	NOx	PM	SOx
Containership	71.0%	29.0%	66.7%	66.7%	66.7%	48.1%	57.9%	58.4%
Tanker	71.0%	29.0%	14.7%	14.7%	14.7%	10.6%	12.7%	12.8%
Cruise Ship	71.0%	29.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Other	71.0%	29.0%	18.6%	18.6%	18.6%	13.4%	16.1%	16.3%
Composite			100.0%	100.0%	100.0%	72.1%	86.7%	87.5%

Sample Calc:

% Emissions from IFO380 in Aux =

$((\% \text{IFO} \times \text{IFO EF}) / ((\% \text{IFO} \times \text{IFO EF}) + (\% \text{MDO} \times \text{MDO EF}))) \times \% \text{ Emissions}$

Reduction in tpy =

Total Aux Emissions x % Emissions from IFO 380 in Aux x % Red due to fuel switch x % Emissions within 24 nm

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report
 SPBP-OGV 1 - Vessel Speed Reduction (VSR) based on Tariff and Inventives

Applicable to all OGVs

Port of Los Angeles

	FY 2005/2006	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011
Participation rate @ 20 nm from Pt. Fermin	70%	100%	100%	100%	100%	100%
Participation rate @ 40 nm from Pt. Fermin	0%	0%	50%	100%	100%	100%

Emission Reduction Percentages ⁽¹⁾

	Main Engine	Auxiliaries	
NO _x	57.6%	-6.7%	Auxiliary engine emissions increase because
PM ₁₀	0.0%	-8.1%	of increased time in transit (due to lower speeds)

Speed assumptions: w/out VSR 22 knots
 with VSR 12 knots

20-mile VSR

	FY 2005/2006	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011
Distance of Compliance Zone (nm)	20	20	20	20	20	20
Participation Rate ² (at 12 kts)	70%	100%	100%	100%	100%	100%

Main Engine (relative to current VSR distance & emissions)	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011
NO _x % reduction	20%	29%	29%	29%	29%	29%
NO _x tons reduction per year	900	1,286	1,286	1,286	1,286	1,286
DPM ₁₀	(credit only taken for NO _x reductions pending evaluation of effect on PM emissions)					

Increase in Auxiliary Engine Emissions due to longer transit times

NO _x % increase	2.3%	3.4%	3.4%	3.4%	3.4%	3.4%
NO _x tons increase per year	11	16	16	16	16	16
DPM, % increase	2.8%	4.1%	4.1%	4.1%	4.1%	4.1%
DPM, tons increase per year	0.5	0.6	0.5	0.5	0.5	0.5
Net Decrease, tons NO _x :	888	1,269	1,270	1,270	1,270	1,270
Expanded Distance VSR ³						
DO NOT DOUBLE COUNT						

	FY 2005/2006	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011
Additional Distance of Compliance Zone (nm)	20	20	20	20	20	20
Participation Rate ² (at 12 kts)	0%	0%	50%	100%	100%	100%

Main Engine Emission Decreases

(Only enhanced VSR distance)	FY 2005/2006	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011
NO _x % reduction	0%	0%	14%	29%	29%	29%
NO _x tons reduction per year	0	0	643	1,286	1,286	1,286
DPM	(credit only taken for NO _x reductions pending evaluation of effect on PM emissions)					

Increase in Auxiliary Engine Emissions due to longer transit times

NO _x % increase	0.0%	0.0%	1.7%	3.4%	3.4%	3.4%
NO _x tons increase per year	0	0	8	16	16	16
DPM, % increase	0.0%	0.0%	2.0%	4.1%	4.1%	4.1%
DPM, tons increase per year	0.0	0.0	0.2	0.3	0.3	0.3
Net Decrease, tons NO _x :	0	0	635	1,270	1,270	1,270
Net Decrease, tons NO _x , only expanded VSR:	0	0	635	1,270	1,270	1,270
Nox CF for current plus expanded VSR	0.871	0.815	0.721	0.628	0.628	0.628

Notes:

- 1 - Reductions calculated using 20-mile VSR applicability distance @ 100% participation (12 knots)
- 2 - Participation Rate: Currently, as modeled, the participation rate only takes into account those vessels that reach the target speed of 12 knots, however the POLA VSR program takes into account the reductions associated w/all vessels that reduce speed over their baseline corrected speed. This difference will be incorporated into the next version of this control measure worksheet.
- 3 - Percent reductions and increases are relative to emissions within the expanded VSR zone. Tons of reductions and increases have been estimated using the ratio of expanded VSR distance to current (20 nm) VSR distance to adjust for the greater emissions basis of the expanded program.

Information Used to Estimate Emissions Reductions From VSR Program

1. BLEI Speed Emissions Total, tpy for POLA

Tons Per Year	NO _x Main	NO _x Aux	PM _{Main}	PM _{Aux}
Auto Carrier	124.6	30.5	13.2	1.1
Bulk	170.6	98.8	18.0	4.3
Containership	2,967.6	1,290.3	319.8	44.2
Cruise	838.5	603.8	85.6	13.9
General Cargo	59.8	27.3	6.3	1.3
Miscellaneous	5.3	9.6	0.6	0.5
Other Tug	10.6	1.1	0.6	0.0
Reefer	44.8	6.5	4.6	0.2
RoRo	9.8	24.8	2.9	1.4
Tanker	231.9	341.7	26.0	13.7
Totals	4,463.6	2,434.4	477.7	80.7

2. Modeled at 12-Knot Scenario in Fairway, t

Tons Per Year	NO _x Main	NO _x Aux	PM _{Main}	PM _{Aux}
Auto Carrier	64.7	32.4	6.9	1.2
Bulk	137.3	103.3	14.5	4.8
Containership	1,068.6	1,356.0	117.0	47.4
Cruise	353.6	687.6	36.6	15.9
General Cargo	41.9	28.3	4.5	1.4
Miscellaneous	4.0	9.9	0.4	0.6
Other Tug	10.6	1.1	0.6	0.0
Reefer	20.1	7.5	2.1	0.4
RoRo	7.6	25.4	2.2	1.4
Tanker	183.6	345.7	20.7	14.1
Totals	1,892.0	2,597.3	205.6	87.0

3. Reduction between Corrected & 12 Knot Scenario, tpy Based on POLA emissions

Tons Per Year	NO _x Main	NO _x Aux	PM _{Main}	PM _{Aux}
Auto Carrier	59.9	-1.9	6.3	-0.1
Bulk	33.3	-4.5	3.5	-0.4
Containership	1,899.0	-65.6	202.8	-3.2
Cruise	484.9	-83.8	49.0	-2.0
General Cargo	17.8	-1.1	1.9	-0.1
Miscellaneous	1.3	-0.3	0.1	-0.1
Other Tug	0.0	0.0	0.0	0.0
Reefer	24.7	-1.0	2.5	-0.2
RoRo	2.2	-0.5	0.7	0.0
Tanker	48.3	-4.0	5.3	-0.4
Totals	2,571.4	-162.7	272.1	-6.5

4. Percentage Reduction by Vessel Type

	NO _x Main	NO _x Aux	PM _{Main}	PM _{Aux}
Auto Carrier	48%	-6%	48%	-9%
Bulk	20%	-5%	19%	-9%
Containership	64%	-5%	63%	-7%
Cruise	58%	-14%	57%	-14%
General Cargo	30%	-4%	30%	-8%
Miscellaneous	24%	-3%	17%	-20%
Other Tug	0%	0%	0%	0%
Reefer	55%	-15%	54%	-100%
RoRo	22%	-2%	24%	0%
Tanker	21%	-1%	20%	-3%
Totals	57.6%	-6.7%	57.0%	-8.1%

Notes:

- 1 - Adjusted Speeds: 2001 Baseline OGV transit emissions modeled with speed correction factors used by the Port in estimating reductions from the VSR program
 - 2 - 12-Knot Scenario: Modeled corrected speed emissions from all OGVs transiting at 12 knots; auxiliary engine emissions increased because of longer transit times
- Percent of auxiliary emissions during transit: 20%

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report
 SPBP-OGV 1 - Vessel Speed Reduction (VSR) based on Tariff and Incentives

Applicable to all OGVs

Port of Long Beach

	FY 2005/2006	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011
Participation rate @ 20 nm from Pt. Fermin	0%	100%	100%	100%	100%	100%
Participation rate @ 40 nm from Pt. Fermin	0%	0%	50%	100%	100%	100%

Emission Reduction Percentage⁽⁹⁾

	Main Engine	Auxiliaries
NO _x	23.4%	-1.1% Auxiliary engine emissions increase because
PM ₁₀	0.0%	-1.1% of increased time in transit (due to lower speeds)

Speed assumptions:

w/out VSR 22 knots
 with VSR 12 knots

20-mile VSR

	FY 2005/2006	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011
Distance of Compliance Zone (nm)	20	20	20	20	20	20
Participation Rate ² (at 12 kts)	78%	100%	100%	100%	100%	100%

Main Engine Emission Decreases

(relative to current VSR distance & emissions)	FY 2005/2006	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011
NO _x % reduction	9%	12%	12%	12%	12%	12%
NO _x tons reduction per year	353	453	453	453	453	453
DPM ₁₀	(credit only taken for NO _x reductions pending evaluation of effect on PM emissions)					

Increase in Auxiliary Engine Emissions due to longer transit times

NO _x % increase	0.4%	0.5%	0.5%	0.5%	0.5%	0.5%
NO _x tons increase per year	2	2	2	2	2	2
DPM ₁₀ % increase	0.4%	0.5%	0.5%	0.5%	0.5%	0.5%
DPM ₁₀ tons increase per year	0.1	0.1	0.0	0.0	0.0	0.0
Net Decrease, tons NO _x :	352	451	451	451	451	451

Expanded Distance VSR¹

DO NOT DOUBLE COUNT

with current 20 nm program	FY 2005/2006	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011
Additional Distance of Compliance Zone (nm)	20	20	20	20	20	20
Participation Rate ² (at 12 kts)	0%	0%	50%	100%	100%	100%

Main Engine Emission Decreases

(Only enhanced VSR distance)	FY 2005/2006	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011
NO _x % reduction	0%	0%	6%	12%	12%	12%
NO _x tons reduction per year	0	0	226	453	453	453
DPM ₁₀	(credit only taken for NO _x reductions pending evaluation of effect on PM emissions)					

Increase in Auxiliary Engine Emissions due to longer transit times

NO _x % increase	0.0%	0.0%	0.3%	0.5%	0.5%	0.5%
NO _x tons increase per year	0	0	1	2	2	2
DPM ₁₀ % increase	0.0%	0.0%	0.3%	0.5%	0.5%	0.5%
DPM ₁₀ tons increase per year	0.0	0.0	0.0	0.0	0.0	0.0
Net Decrease, tons NO _x :	0	0	225	451	451	451
Net Decrease, tons NO _x , only expanded VSR:	0	0	225	451	451	451
NO _x CF for current plus expanded VSR	0.947	0.931	0.896	0.861	0.861	0.861

Notes:

- 1 - Reductions calculated using 20-mile VSR applicability distance @ 100% participation (12 knots)
- 2 - Participation Rate: 2002 baseline emissions inventory assumes before VSR speeds.
- 3 - Percent reductions and increases are relative to emissions within the expanded VSR zone. Tons of reductions and increases have been estimated using the ratio of expanded VSR distance to current (20 nm) VSR distance to adjust for the greater emissions basis of the expanded program.

Information Used to Estimate Emissions Reductions From VSR Program

2002 POLB, Emissions in TPY

NO VSR

Type	NO _x Main	NO _x Aux	NO _x	PM _{Main}	PM _{Aux}	PM
Auto Carrier	91.94	43.03	134.97	12.11	1.96	14.07
Bulk	293.96	259.66	553.62	41.60	11.84	53.45
Containership	2,518.34	1,729.68	4,248.02	335.83	78.89	414.73
General Cargo	97.02	66.95	163.98	13.31	3.05	16.37
ITB	85.06	29.71	114.78	11.19	1.36	12.54
MISC	24.31	77.75	102.06	3.51	3.55	7.06
RORO	62.44	135.60	198.04	8.84	6.19	15.03
Reefer	42.82	90.19	133.01	6.73	4.11	10.84
Tanker	646.18	381.76	1,027.94	110.78	17.41	128.19
	3,862.08	2,814.35	6,676.43	543.91	128.37	672.27

Reductions

Type	NO _x Main	NO _x Aux	NO _x	PM _{Main}	PM _{Aux}	PM
Auto Carrier	22.08	-0.78	21.29	3.02	-0.04	2.98
Bulk	23.51	-0.58	22.93	3.49	-0.03	3.47
Containership	755.55	-25.04	730.51	106.71	-1.14	105.56
General Cargo	10.92	-0.30	10.62	1.53	-0.01	1.51
ITB	8.04	-0.12	7.92	1.09	-0.01	1.08
MISC	1.31	-0.05	1.26	0.20	0.00	0.20
RORO	12.82	-0.52	12.30	1.88	-0.02	1.86
Reefer	6.90	-0.82	6.08	1.11	-0.04	1.08
Tanker	64.32	-2.12	62.20	11.61	-0.10	11.52
	905.44	-30.32	875.12	130.65	-1.38	129.26

Notes:

- 1 - Adjusted Speeds: 2001 Baseline OGV transit emissions modeled with speed correction factors used by the Port in estimating reductions from the VSR program
- 2 - 12-Knot Scenario: Modeled corrected speed emissions from all OGVs transiting at 12 knots; auxiliary engine emissions increased because of longer transit times

Percent of auxiliary emissions during transit:

13%

VSR to 20 Miles - 12 Knots

Type	NO _x Main	NO _x Aux	NO _x	PM _{Main}	PM _{Aux}	PM
Auto Carr	69.87	43.81	113.68	9.09	2.00	11.09
Bulk	270.45	260.24	530.69	38.11	11.87	49.98
Container	1,762.79	1,754.72	3,517.51	229.13	80.04	309.16
General C	86.11	67.25	153.36	11.79	3.07	14.85
ITB	77.02	29.83	106.86	10.10	1.36	11.46
MISC	23.00	77.80	100.80	3.31	3.55	6.86
RORO	49.62	136.12	185.74	6.96	6.21	13.17
Reefer	35.92	91.01	126.93	5.61	4.15	9.76
Tanker	581.87	383.88	965.74	99.16	17.51	116.67
	2,956.64	2,844.67	5,801.31	413.26	129.75	543.01

Percentage Reductions

Type	NO _x Main	NO _x Aux	NO _x	PM _{Main}	PM _{Aux}	PM
Auto Carr	24.0%	-1.8%	15.8%	24.9%	-1.8%	21.2%
Bulk	8.0%	-0.2%	4.1%	8.4%	-0.2%	6.5%
Container	30.0%	-1.4%	17.2%	31.8%	-1.4%	25.5%
General C	11.3%	-0.4%	6.5%	11.5%	-0.4%	9.3%
ITB	9.5%	-0.4%	6.9%	9.7%	-0.4%	8.6%
MISC	5.4%	-0.1%	1.2%	5.8%	-0.1%	2.9%
RORO	20.5%	-0.4%	6.2%	21.3%	-0.4%	12.4%
Reefer	16.1%	-0.9%	4.6%	16.6%	-0.9%	9.9%
Tanker	10.0%	-0.6%	6.1%	10.5%	-0.6%	9.0%
	23.4%	-1.1%	13.1%	24.0%	-1.1%	19.2%

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report
 SPBP-OGV 2 - Reduction of At-Berth OGV Emissions through Lease requirement, Incentives and Capital Funding
 Assumption: Ships utilizing AMP are also meeting CARB's Marine Auxiliary Engine regulation

Port of Los Angeles

	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011
Annual kW-hrs - Containerships	6,264,000	7,020,000	7,020,000	22,032,000	50,220,000
Annual kW-hrs - Tanker	0	0	0	648,000	648,000
Annual kW-hrs - Cruise Ships	0	0	6,400,000	12,800,000	12,800,000
NOx Reductions, tons, containerships	92	101	101	318	725
NOx Reductions, tons, Tankers	0	0	0	9	9
NOx Reductions, tons, cruise ships	0	0	91	181	181
Combined NOx Reductions, tons	92	101	192	509	915
NOx CF	0.987	0.985	0.972	0.926	0.866
DPM Reductions, tons, containerships	3	3	3	8	18
DPM Reductions, tons, Tankers	0.0	0.0	0.0	0.3	0.3
DPM Reductions, tons, cruise ships	0.0	0.0	1.5	3.0	3.0
Combined DPM Reductions, tons	3	3	4	11	21
DPM CF	0.995	0.995	0.992	0.979	0.961
SOx Reductions, tons, containerships	43	43	43	136	310
SOx Reductions, tons, Tankers	0	0	0	5	5
SOx Reductions, tons, cruise ships	0	0	25	50	50
Combined SOx Reductions, tons	43	43	69	191	366
SOx CF	0.987	0.986	0.977	0.937	0.880

Auxiliary Engine Emission Factors, g/kW-hr	Residual	Distillate	Container	Tanker	Cruise
NOx	14.70	13.90	14.20	14.34	13.93
PM	0.8	0.3	0.49	0.57	0.32
SOx	12.3	4.3	7.26	8.68	4.62
Percentage fuel used, Container	37%	63%			
Percentage fuel used, Tanker	55%	45%			
Percentage fuel used, Cruise	4%	96%			

From Table 2.3:Summary of Mono-Fuel or Dual-Fuel by Vessel Type, page 56 from report "Port of Los Angeles Baseline Air Emissions Inventory-2001"

Percentage of hoteling emissions eliminated: 95%

Assumed Schedule for Containership AMP Participation - POLA

	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011
B212-218 (YTI)	4	11	0	36	52
B224-236 (Evergreen)	0	0	11	36	52
Pier 400 APM	0	0	0	0	10
B136-147 (Trapac)	0	0	0	40	106
Pier 300 (APL)	0	0	0	0	72
B100-102 (CS)	54	54	54	92	131
B206-209 (LTF)	0	0	0	0	6
B121-131 (Yang Ming or WBCT)	0	0	0	0	36
Total container calls	58	65	65	204	465
5-year	857				
kW-HR	6,264,000	7,020,000	7,020,000	22,032,000	50,220,000

108,000 kW per call (72 hrs/ container&tanker call, 1,500 kW load during hoteling)

Assumed Schedule for Liquid Bulk (tanker) AMP Participation

Pier 400 (Liquid Bulk)	0	0	0	6	6
kW-HR	0	0	0	648000	648000

Assumed Schedule for Cruise Ship AMP Participation

B90-93Cruise	0	0	100	200	200
kW-HR	0	0	6400000	12800000	12800000
Total Calls	58	65	165	410	671
% of tot calls	2%	3%	7%	16%	27%
kW/hrs per call:	64,000	(8 hrs per cruise call, 8,000 kW load during hoteling)			

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report

SPBP-OGV 2 - Reduction of At-Berth OGV Emissions through Lease requirement, Incentives and Capital Funding

Assumption: Ships utilizing cold ironing are also meeting CARB's Marine Auxiliary engines regulation

Port of Long Beach

	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011
Annual kW-hrs - Containerships	0	0	0	0	39,852,000
Annual kW-hrs - Tanker	0	324,000	1,296,000	1,296,000	1,296,000
Annual kW-hrs - Cruise Ships	0	0	0	0	0
NOx Reductions, tons, containerships	0	0	0	0	562
NOx Reductions, tons, Tankers	0	5	18	18	18
NOx Reductions, tons, cruise ships	0	0	0	0	0
Combined NOx Reductions, tons	0	5	18	18	580
NOx CF	1.000	0.999	0.997	0.997	0.911
DPM Reductions, tons, containerships	0.0	0.0	0.0	0.0	12.7
DPM Reductions, tons, Tankers	0.0	0.2	0.6	0.6	0.4
DPM Reductions, tons, cruise ships	0.0	0.0	0.0	0.0	0.0
Combined DPM Reductions, tons	0.0	0.2	0.6	0.6	13.1
DPM CF	1.000	1.000	0.999	0.999	0.978
SOx Reductions, tons, containerships	0	0	0	0	274
SOx Reductions, tons, Tankers	0	2	9	9	9
SOx Reductions, tons, cruise ships	0	0	0	0	0
Combined SOx Reductions, tons	0	2	9	9	283
SOx CF	1.000	0.999	0.996	0.996	0.885

Auxiliary Engine Emission Factors, g/kW-hr	Residual	Distillate	Container	Tanker Tanker	Cruise
NOx	14.70	13.90	14.47	14.47	14.47
PM	0.8	0.3	0.66	0.66	0.66
SOx	12.3	4.3	9.98	9.98	9.98
Percentage used, Container	71%	29%			
Percentage used, Tanker	71%	29%			
Percentage used, Cruise	71%	29%			

Percentage of hoteling emissions eliminated: 95%

Assumed Schedule for Containership Shore Power Participation-POLB

Site	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011
Pier G (ITS K-Line - Three berths)	0	0	0	0	150
Pier C (Matson -Two berths)	0	0	0	0	52
Piers D, E, F (Middle Harbor, 1 berth)	0	0	0	0	17
Pier S (Three berths)	0	0	0	0	150
Total container calls	0	0	0	0	369
5-year	369				
kW-HR	0	0	0	0	39,852,000
	108,000	kW per call (72 hrs/ container&tanker call, 1,500 kW load during hoteling)			

50 calls per berth

Assumed Schedule for Liquid Bulk (tanker) Cold Ironing Participation

	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011
Pier T 121	0	3	12	12	12
kW-HR	0	324,000	1,296,000	1,296,000	1,296,000

12 vessels per year, 3 utilizing shore power in 4 qtr of 2007
Construction finishes in August of 2007

Assumed Schedule for Cruise Ship Cold Ironing Participation

	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011
B90-93Cruise	0	0	0	0	0
kW-HR	0	0	0	0	0
Total Calls	0	3	12	12	381
% of total call	0.0%	0.1%	0.4%	0.4%	14%

kW/hrs per call: 64,000 (8 hrs per cruise call, 8,000 kW load during hoteling)

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report
 SPBP-OGV 3 - Lease Required Auxiliary Engine Fuel Improvement (0.2% S Fuel)

Applicable to all OGVs

Port of Los Angeles

	FY 2005/2006	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011
Participation rate @ 20 nm from Pt. Fermin	0%	100%	100%	100%	100%	100%
Participation rate @ 40 nm from Pt. Fermin	0%	0%	50%	100%	100%	100%

Emission Reduction Estimates (tpy)	FY 2005/2006	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011
Implementation Schedule	0%	1%	5%	28%	40%	48%
NOx Emissions Reduced	0	0	1	7	10	12
¹ NOx CF (Total OGV)	1.000	1.000	1.000	0.999	0.999	0.998
DPM Emissions Reduced	0	0	0	2	3	2
¹ DPM CF (Total OGV)	1.000	1.000	0.999	0.996	0.995	0.995
SOx Emissions Reduction	0	3	15	80	66	21
¹ SOx Emissions CF	1.000	0.999	0.995	0.975	0.980	0.994

Based on Lease Renewal

¹ CARB's Marine Auxiliary Engine Regulation Adopted in December of 2005 is included in the CF calculations
 2001 BLEI info on 40-mile radius

Percent of auxiliary emissions during transit 20%
 Percent of auxiliary emissions during transit within 20 nm plus hotelling:: 90%
 Percent of auxiliary emissions during transit within 40 nm plus hotelling:: 100%

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report
 SPBP-OGV 3 - Lease Required Auxiliary Engine Fuel Improvement (0.2% S Fuel)

Applicable to all OGVs

Port of Long Beach

	FY 2005/2006	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011
Participation rate @ 20 nm from Pt. Fermin	0%	100%	100%	100%	100%	100%
Participation rate @ 40 nm from Pt. Fermin	0%	0%	50%	100%	100%	100%
Emission Reduction Estimates (tpy)	FY 2005/2006	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011
Implementation Schedule	0%	2%	12%	20%	24%	25%
Total NOx reduced	0.0	0.0	0.7	2.6	3.1	3.2
¹ NOx CF (Total OGV)	1.000	1.000	1.000	1.000	1.000	1.000
Total DPM Reduced	0.0	0.3	1.1	2.1	1.8	0.9
² DPM CF (Total OGV)	1.000	1.000	0.998	0.996	0.997	0.998
Total SOx Reduced	0.0	19.8	37.0	62.7	44.5	4.5
¹ SOx CF (Total OGV)	1.000	0.994	0.985	0.975	0.982	0.998

Based on Lease Renewal

¹ CARB's Marine Auxiliary Engine Regulation Adopted in December of 2005 is included in the CF calculations

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report
 SPBP-OGV 4 -Main Engine Fuel Improvement

Fuel Switch from IFO 380 to 0.2% S MGO

Assumption: Applicable to all OGVs; Based on
 Lease Renewal

Port of Los Angeles

	FY 2005/2006	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011
Participation rate @ 20 nm from Pt. Fermin	0%	100%	100%	100%	100%	100%
Participation rate @ 40 nm from Pt. Fermin	0%	0%	50%	100%	100%	100%

	FY 2005/2006	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011
Fuel Implementation						
IFO 380 to 0.2% S MGO participation rate	0%	1%	5%	28%	40%	48%
Participation rate @ 20 nm from Pt. Fermin	0%	100%	100%	100%	100%	100%
Participation rate @ 40 nm from Pt. Fermin	0%	0%	50%	100%	100%	100%

Lease based

Emission Reduction (tpy) Estimates

	FY 2005/2006	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011
NOx Emissions Reduced, MGO	0	1	18	123	177	213
NOx CF (Total OGV)	1.000	1.000	0.997	0.982	0.974	0.969
DPM Emissions Reduced, MGO	0	1	13	84	121	146
DPM CF (Total OGV)	1.000	0.998	0.977	0.842	0.774	0.727
SOx Emissions Reduced, MGO	0.000	8	106	718	1,027	1,240
SOx CF	1.000	0.998	0.967	0.780	0.685	0.620

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report
 SPBP-OGV 4 -Main Engine Fuel Improvement

Fuel Switch from IFO 380 to 0.2% S MGO

Assumption: Applicable to all OGVs; Based on
 Lease Renewal

Port of Long Beach
 Apply to all Ship Types

	FY 2005/2006	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011
Participation rate @ 20 nm from Pt. Fermin	0%	100%	100%	100%	100%	100%
Participation rate @ 40 nm from Pt. Fermin	0%	0%	50%	100%	100%	100%
IFO 380 to 0.2% S MGO participation rate	0%	2%	12%	20%	24%	25% Lease based

Emission Reduction (tpy) Estimates

	FY 2005/2006	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011
NOx Emissions Reduced , MGO	0	4	34	78	94	98
NOx CF (Total OGV)	1.000	0.999	0.995	0.988	0.985	0.985
DPM Emissions Reduced , MGO	0	4	30	70	85	88
DPM CF (Total OGV)	1.000	0.994	0.950	0.884	0.860	0.854
SOx Emissions Reduction, MGO	0.000	21	165	384	462	482
SOx CF (Total OGV)	1.000	0.993	0.933	0.844	0.812	0.804

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report
 SPBP-OGV 5 - Slide Valve Retrofit-Main
 Engine

Assumption: Applicable to all OGVs; Based
 on Lease Renewal

Port of Los Angeles

Reductions due to Slide Valve-Main Engine

NOx	30%
PM	25%

	FY 2005/2006	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011
Slide Valve Retrofit Implementation Rate	0%	1%	5%	28%	40%	48% Lease based

Emission Reduction (tpy) Estimates

	FY 2005/2006	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011
Total NOx Emissions Reduced	0	9	73	370	530	640
NOx CF (Total OGV)	1.000	0.999	0.989	0.946	0.922	0.906
Total DPM Emissions Reduced	0	1	7	33	47	57
DPM CF (Total OGV)	1.000	0.999	0.988	0.938	0.912	0.893
Total SOx Emissions Reduced	0	0	0	0	0	0
SOx CF (Total OGV)	1.000	1.000	1.000	1.000	1.000	1.000

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report
 SPBP-OGV 5 - Slide Valve Retrofit-Main
 Engine

Assumption: Applicable to all OGVs;
 Based on Lease Renewal

Port of Long Beach

Reductions due to Slide Valve-Main Engine

NO _x	30%
PM	25%

	FY 2005/2006	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011
Slide Valve Retrofit Implementation Rate	0%	2%	12%	20%	24%	25% Lease Based

Emission Reduction (tpy) Estimates

	FY 2005/2006	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011
Total NO _x Emissions Reduced	0	26	134	234	282	294
NO _x CF (Total OGV)	1.000	0.996	0.979	0.964	0.956	0.955
Total DPM Emissions Reduced	0	3	16	27	33	35
DPM CF (Total OGV)	1.000	0.995	0.974	0.955	0.945	0.943
Total SO _x Emissions Reduced	0	0	0	0	0	0
SO _x CF (Total OGV)	1.000	1.000	1.000	1.000	1.000	1.000

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report
Implementation and Reduction Estimates Used to Calculate Emissions Reduction Due to
CARB's Cargo Handling Equipment Regulation Adopted in December of 2005 and SPBP-CHE 1

Implementation Schedule for Yard Tractors per CARB's Regulation

⁵ MY	Off-Road YT with no VDEC					Off-Road YT with VDEC				
	2007	2008	2009	2010	2011	2007	2008	2009	2010	2011
pre-2003	50%	100%	100%	100%	100%	50%	100%	100%	100%	100%
2003				25%	50%					25%
2004					25%					

⁵ MY	On-Road YT with no VDEC					On-Road YT with VDEC				
	2007	2008	2009	2010	2011	2007	2008	2009	2010	2011
pre-2000	25%	50%	100%	100%	100%	25%	50%	100%	100%	100%
2000		25%	50%	100%	100%		25%	50%	100%	100%
2001			25%	50%	100%			25%	50%	100%
2002				25%	50%				25%	50%
2003					25%					25%

Following emissions reduction estimates were used to calculate control factors for CARB's cargo handling equipment regulation adopted in December of 2005.

Emissions Reduction Table for Diesel Yard Tractors

Off-Road Diesel	¹ NOx	¹ PM	² NOx	² PM
Tier 0 (Pre 1996)	87%	97%	98%	97%
Tier 1 (1996-2001)	84%	98%	97%	98%
Tier 2 (2002-2005)	76%	93%	96%	93%
Tier 3 (2006-2010)	59%	93%	93%	93%
Tier 4 (2011-2013)	87%	33%	87%	33%
Tier 4 (2013+)	33%	33%	33%	33%

¹ Reduction (%) due to 2007-2009 on-road hdv replacement

² Reduction (%) due to 2010 + MY on-road hdv replacement

On-Road HDV Diesel Emission Rate (gm/hp-hr)

2007-2009	1.1	0.01
2010+	0.2	0.01

On-Road HDV LNG Emissions Rate (gm/hp-hr)

2007-2009	0.2	0.01
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No adjustment for the off-road duty cycle was made when considering replacement with on-road engines

Implementation Schedule for Non-Yard Tractors

⁵ MY	2007	2008	2009	2010	2011	2012	2013
Pre 1988	25%	50%	75%	100%	100%	100%	100%
1988-1995	0%	25%	50%	75%	100%	100%	100%
1996-2002	0%	0%	25%	50%	75%	100%	100%
2003-2006	0%	0%	0%	25%	50%	75%	100%

Emissions Reduction Table for Diesel Yard Tractors

	Cranes	Cranes	Excavator	Excavator	Forklift	Forklift	Loader	Loader
% Affected	91%	91%	100%	100%	100%	100%	100%	100%
⁴ Technology	Passive DPF		DOC		Active DPF		DOC	
% Reduction	0%	85%	0%	25%	0%	85%	0%	25%

	RTG	RTG	Sweeper	Sweeper	Other	Other	Other
% Affected	100%	100%	100%	100%	100%	100%	100%
⁴ Technology	DPF		DOC		³ DOC or DOC w. Emulsified		
% Reduction	0%	85%	0%	25%	20%	50%	25%

³ Except for pre 2003 where it is only DOC

Source:

Implementation schedule from CARB's staff report obtained from CARB's website under board reports dated Jan 28, 2006.

⁴ Technology assumption from appendix D @ <http://www.arb.ca.gov/regact/cargo2005/appd.pdf>

⁵ Implementation for remaining model years not applicable within FY 2006/2007 to 2010/2011

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report
CARB's Cargo Handling Equipment Regulation Adopted in December of 2005

Port of Los Angeles

Emission Reduction (tpy)	FY	FY	FY	FY	FY	FY
	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011
Baseline CHE NOx emissions (tpy)	2,106	2,106	2,106	2,106	2,106	2,106
NOx Emissions Reduced	0	95	449	708	713	755
NOx CF	1.000	0.955	0.787	0.664	0.661	0.642
Baseline CHE DPM emissions (tpy)	86	86	86	86	86	86
DPM Emissions Reduced	0	6	25	40	45	50
DPM CF	1.000	0.930	0.709	0.535	0.477	0.419
Baseline CHE SOx Emissions (tpy)	3	3	3	3	3	3
SOx Emissions Reduced	0	0	0	0	0	0
SOx CF	1.000	1.000	1.000	1.000	1.000	1.000

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report
CARB's Cargo Handling Equipment Regulation Adopted in December of 2005

Port of Long Beach

Emission Reduction (tpy)

	FY 2005/2006	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011
Baseline CHE NOx emissions (tpy)	1,810	1,810	1,810	1,810	1,810	1,810
NOx Emissions Reduced	0	29	323	588	588	622
NOx CF	1.000	0.984	0.822	0.675	0.675	0.656
Baseline CHE DPM emissions (tpy)	67	67	67	67	67	67
DPM Emissions Reduced	0	4	21	36	40	43
DPM CF	1.000	0.940	0.687	0.463	0.403	0.358
Baseline CHE SOx Emissions (tpy)	5	5	5	5	5	5
SOx Emissions Reduced	0	0	0	0	0	0
SOx CF	1.000	1.000	1.000	1.000	1.000	1.000

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report
SPBP-CHE 1 Performance Standards for CHE

Port of Los Angeles

Emission Reduction (tpy)

	FY 2005/2006	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011
NOx Emissions Reduced (tpy)	0	90	126	179	199	225
¹ NOx CF	1.000	0.955	0.924	0.872	0.857	0.833
DPM Emissions Reduced (tpy)	0	2	3	5	5	6
¹ DPM CF	1.000	0.971	0.946	0.898	0.885	0.836
SOx Emissions Reduced (tpy)	0	0	0	0	0	0
SOx CF	1.000	1.000	1.000	1.000	1.000	1.000

¹ CARB's Cargo Handling Equipment Regulation Adopted in December of 2005 is included in the baseline for the CF calculator

Emissions Reduction Calculations Basis for SPBP-CHE 1:

50% of the 2003+ MY Yard Tractors, Top Handlers and Side Handlers not covered by CARB's regulation within next five years , with those equipped with cleanest available 2007+ MY on-road diesel and remaining

50% with 2007+ MY LNG engines meeting 0.01 g/hp-hr PM and 0.2 g/hp-hr NOx standards.

CHE other than Yard Tractors, Top Handlers and Side Handlers will be replaced with those meeting Tier 4 standards in FY 2010

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report
SPBP-CHE 1 Performance Standards for CHE

Port of Long Beach

Emission Reduction (tpy)

	FY 2005/2006	FY 2006/2007	FY 2007/2008	FY 2008/2009	FY 2009/2010	FY 2010/2011
NOx Emissions Reduced (tpy)	0	37	69	110	136	151
NOx CF	1.000	0.979	0.954	0.910	0.889	0.873
DPM Emissions Reduced (tpy)	0	2	3	4	5	5
DPM CF	1.000	0.973	0.938	0.861	0.831	0.786
SOx Emissions Reduced (tpy)	0	0	0	0	0	0
SOx CF	1.000	1.000	1.000	1.000	1.000	1.000

¹ CARB's Cargo Handling Equipment Regulation Adopted in December of 2005 is included in the baseline for the CF calculations

Emissions Reduction Calculations Basis for SPBP-CHE 1:

50% of the 2003+ MY Yard Tractors, Top Handlers and Side Handlers not covered by CARB's regulation within next five years will be with those equipped with cleanest available 2007+ MY on-road diesel and remaining

50% with 2007+ MY LNG engines meeting 0.01 g/hp-hr PM and 0.2 g/hp-hr NOx standards.

CHE other than Yard Tractors, Top Handlers and Side Handlers will be replaced with those meeting Tier 4 standards in FY 2010/2011

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report
SPBP - RL1 PHL Agreement Reductions

Port of Los Angeles

¹ Emission Reduction (tpy)	FY	FY	FY	FY	FY	FY
	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011
Baseline NOx emissions (tpy)	2,466	2,466	2,466	2,466	2,466	2,466
NOx Emissions Reduced	0	163	163	163	163	163
NOx CF	1.000	0.934	0.934	0.934	0.934	0.934
BaselineDPM emissions (tpy)	60	60	60	60	60	60
DPM Emissions Reduced	3	3	3	3	3	3
DPM CF	0.950	0.950	0.950	0.950	0.950	0.950
Baseline SOx Emissions (tpy)	90	90	90	90	90	90
SOx Emissions Reduced	0.2	0.2	0.2	0.2	0.2	0.2
SOx CF	0.998	0.998	0.998	0.998	0.998	0.998

¹ Estimated in August 2005 based on MOU terms and on data associated with baseline emissions inventories:

2006 Final San Pedro Bay Ports Clean Air Action Plan Technical Report
SPBP - RL1 PHL Agreement

Port of Long Beach

¹ Emission Reduction (tpy)	FY	FY	FY	FY	FY	FY
	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011
Baseline NO _x emissions (tpy)	2,067	2,067	2,067	2,067	2,067	2,067
NO _x Emissions Reduced	0	137	137	137	137	137
NO_x CF	1.000	0.934	0.934	0.934	0.934	0.934
Baseline DPM emissions (tpy)	51	51	51	51	51	51
DPM Emissions Reduced	2.6	2.6	2.6	2.6	2.6	2.6
DPM CF	0.949	0.949	0.949	0.949	0.949	0.949
Baseline SO _x Emissions (tpy)	86	86	86	86	86	86
SO _x Emissions Reduced	0.2	0.2	0.2	0.2	0.2	0.2
SO_x CF	0.998	0.998	0.998	0.998	0.998	0.998

¹ Estimated using POLA and POLB baseline emissions inventories ratio applied to POLA emissions reduction benefit

