CALIFORNIA
AIR RESOURCES BOARD

Public Workshops to Discuss Draft New At Berth Regulation

May 14, 2019
Sacramento

&

May 16, 2019
Long Beach

Agenda

1. Need for Additional Emission Reductions
2. Summary of Updated Results
3. Overview of the Draft New At Berth Regulation
4. Updated Draft Regulatory Language
5. Ocean-going Vessel Emissions Inventory Updates
6. Updated Health Impacts
7. Updated Cost Analysis and Cost Effectiveness
8. Next Steps

1. Need for Additional Emission Reductions

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2. Summary of Updated Results Cumulative Totals (2021-2032)

- Valuation of avoided adverse health outcomes: ~$2.65 billion
- Estimated total cost*: $1.07 billion
- Emissions reduction estimates across all vessel categories:
  - **NOx:** 19,600 Tons
  - **PM2.5:** 385 Tons
  - **DPM:** 315 Tons
  - **GHG:** 400,000 Metric Tons

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Summary of Updated Results (cont.)

- Annualized costs and cost effectiveness for the draft New At Berth Regulation

Vessel Type	At Full Implementation in 2030	
	Annualized Cost	Cost Effectiveness ($/Wt Ton*)
Container/Reefer	$19,960,000	$13,500
Cruise	$18,470,000	$56,400
Auto/Ro-Ro	$19,220,000	$53,600
Tanker	$58,980,000	$40,800
Total – All Vessel Types	**$116,630,000**	$32,300

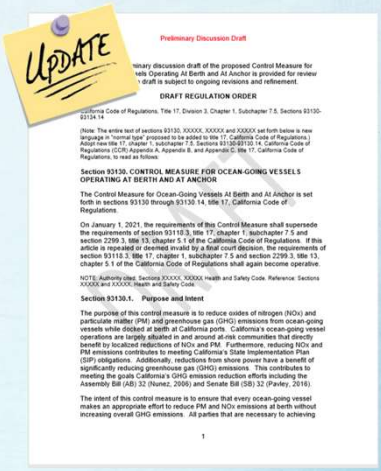
*Wt Ton = Weighted ton

3. Overview of Draft New At Berth Regulation

- Compliance based on actions during a single visit
- Responsibilities to reduce emissions for all crucial parties
- Achieves additional emissions reductions from new vessel categories and ports/marine terminals
- Resolves some operational challenges from existing regulation
- Flexibility to choose emissions reduction strategy that works best for unique situations

4. Updated Draft Regulatory Language

- The next several slides highlight updates to the draft regulatory text published September 2018
- Updates made in response to public input and additional staff analysis



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Implementation Schedule

Vessel Category	2021	2025	2027	2029
Container/Reefer	✔			
Cruise	✔			
Auto/Ro-Ro Carrier		✔		
Tankers			✔ LA/LB Terminals	✔ Remaining Statewide Terminals

Draft implementation schedule as of May 2019

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Common Types of Tanker Terminals

Tanker terminal at
Port of Long Beach

"T"-shaped marine oil terminal
in Northern California

- "T"-shaped terminals have significantly more infrastructure improvement challenges than terminals at traditional ports

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Interim Evaluation

- Conduct interim evaluation in 2023 to check status and progress of Auto/Ro-Ro and tanker categories
- Assess industry's ability to comply by respective implementation dates
- Release report and findings to the Board

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Updated Compliance Options

- Primary compliance pathway is use of a CARB approved control strategy
- Additional compliance options
  - Safety, research, and vessel commissioning
  - Terminal and Vessel Incident Exceptions (TIEs/VIEs)
  - Remediation fund

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Safety, Research, and Commissioning Exceptions

- Granted for vessels and/or terminals for certain scenarios:
  - Safety (including weather)
  - Vessel commissioning
  - CARB approved research projects
- Limited in duration

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Terminal and Vessel Incident Exceptions

- Terminal and Vessel Incident Exceptions (TIEs/VIEs) are a limited number of exceptions available to address situations where reducing emissions are not possible
- A TIE or VIE can be used for a visit (or partial visit) where the required reductions are not achieved
- Use of TIE or VIE must be reported while vessel still at berth

Determining TIEs/VIEs

- TIEs: determined by number of vessel visits to a terminal in a calendar year
- VIEs: determined by the number of visits a vessel fleet makes to a port in a single calendar year
- TIEs/VIEs expire annually
  - No banking or rolling over to the next year
  - No trading of TIEs or VIEs between fleets or terminals

TIE/VIE Percentages

	2021	2022	2023	2024	**2025**	2026	**2027**	2028	**2029**	2030+
Container, Reefer, Cruise	10%		6%							
Ro-Ro					10%	6%				
LA/LB Only Tanker							10%	6%		
All Statewide Tanker									10%	6%

- Percentage is split between terminal and vessel
- Higher percentage of TIEs/VIEs given during initial years of implementation

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Remediation Fund

- Remediates lost emissions reductions in certain operational circumstances:
  - Extended vessel and terminal equipment repair
  - Construction projects
  - Delays in connecting to control strategy
  - Third-party control failure
- Remediation funds must go back into projects in the impacted communities where emissions occurred

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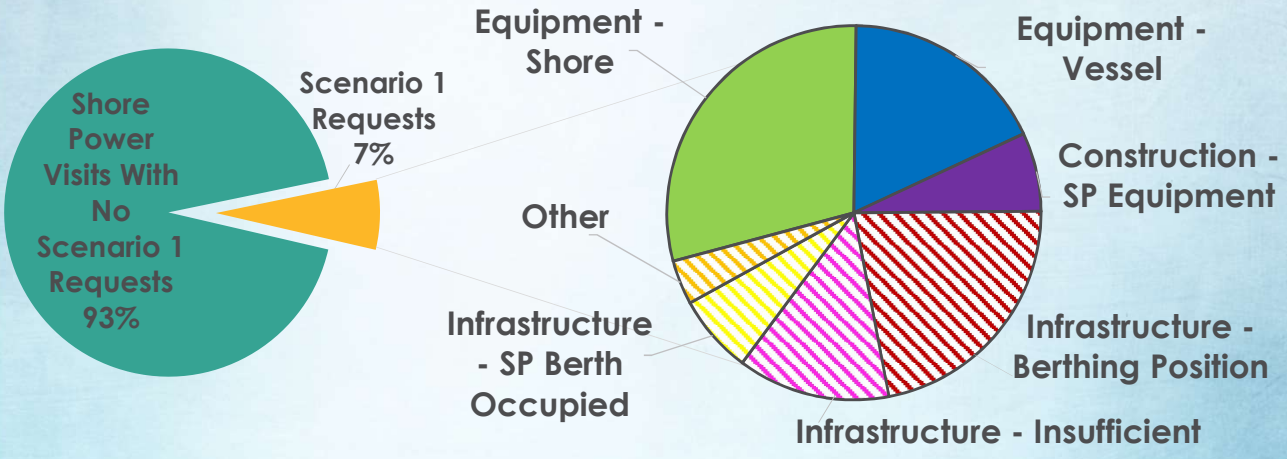
Requested Scenario 1 in 2017

(*From 2017 Marine Advisory)



Hashed slices = scenarios potentially addressed with TIEs or VIEs
Solid colors = scenarios eligible for remediation

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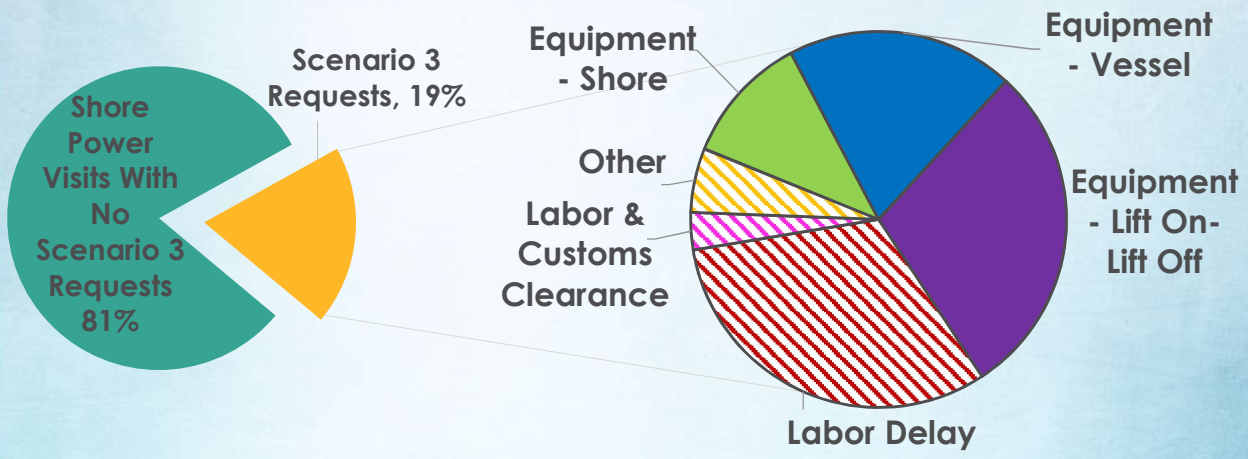
Requested Scenario 3 in 2017

(*From 2017 Marine Advisory)



Hashed slices = scenarios potentially addressed by redefining a vessel visit,
Solid colors = scenarios eligible for remediation

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Exceptions, TIEs/VIEs, and Remediation

Circumstances	Exception	TIEs/VIEs	Remediation	Applicable Party
Safety, Research, or Vessel Commissioning	✕			
Visits w/out reductions		✕	*	Terminal or Vessel
Terminal equipment repair		✕	✕	Terminal
Vessel equipment repair		✕	✕	Vessel
Delays, but reductions occur		✕	✕	Terminal or Vessel
ACT control failure**		✕	✕	Vessel
Terminal upgrades and/or construction		✕	✕	Terminal

*In general, all visits may use a VIE or TIE if available, but not all visits qualify for remediation
**ACT = Alternative Control Technology

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Updated Responsibilities Matrix

Berth	Vessel	Primary Compliance Responsibility
Has SP	No SP	Vessel
No SP/ACT	Has SP	Terminal
No SP/ACT	No SP	Terminal/Vessel
Has ACT	Doesn't allow use of ACT	Vessel

SP = Shore Power, ACT = Alternative Control Technology

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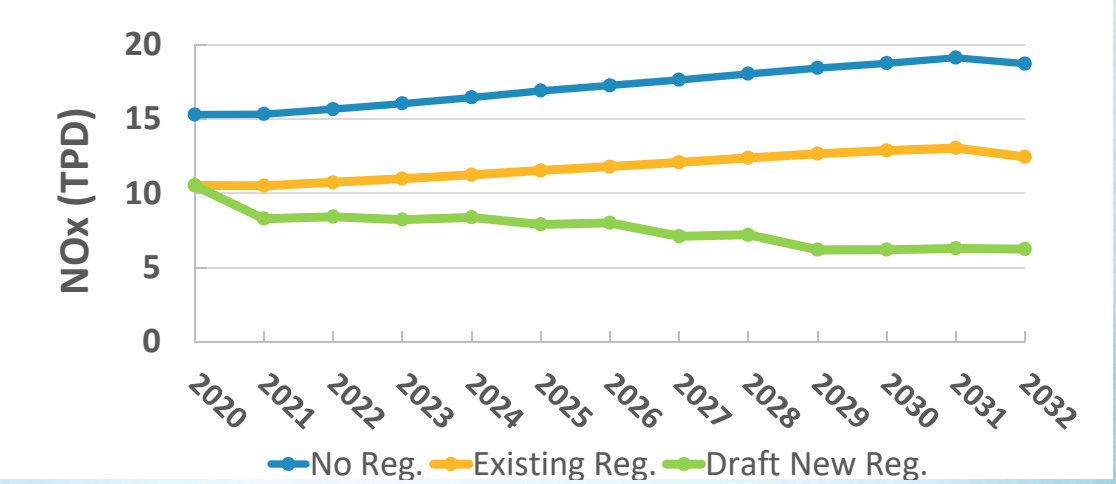
Compliance Checklists and Reporting

- Each item of the checklist is a requirement under the Control Measure
  - Example: failure to complete two checklist items may result in two violations
- Checklists items vary depending on control strategy
- Both vessel and terminal operators have reporting requirements
  - CARB is developing online Freight Regulations Reporting System (FRRS) for streamlined reporting

5. Ocean-going Vessel Emissions Inventory Updates

- Inventory documentation was released in February 2019
  - https://www.arb.ca.gov/ports/shorepower/shorepower.htm
- Subsequent updates include revisions to:
  - Shore power usage assumptions based on vessel size
  - Method to account for prolonged visit stay times
  - Tanker engine loads by activity type

Draft Statewide NOx Emissions Estimates (TPD)



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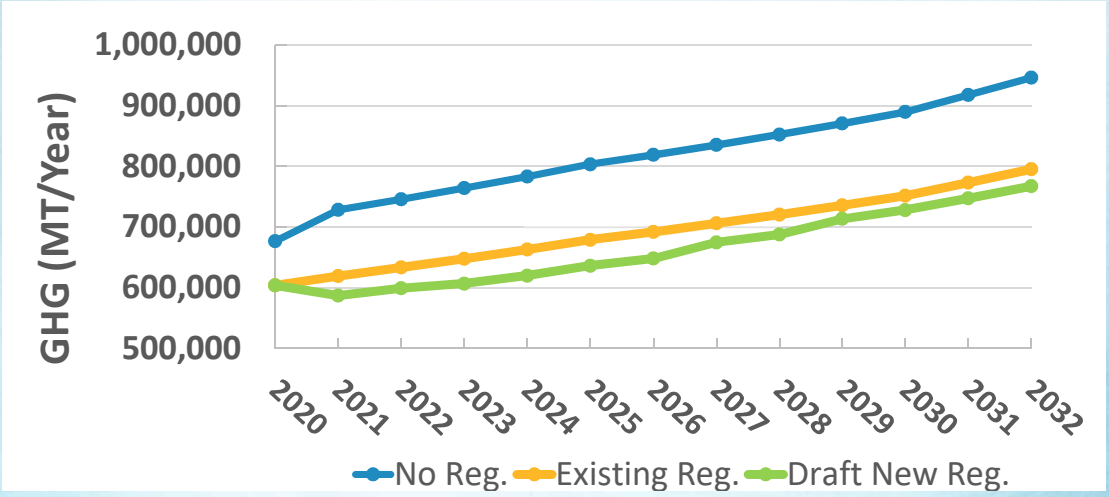
Draft Statewide GHG Emissions Estimates (MT/Year)



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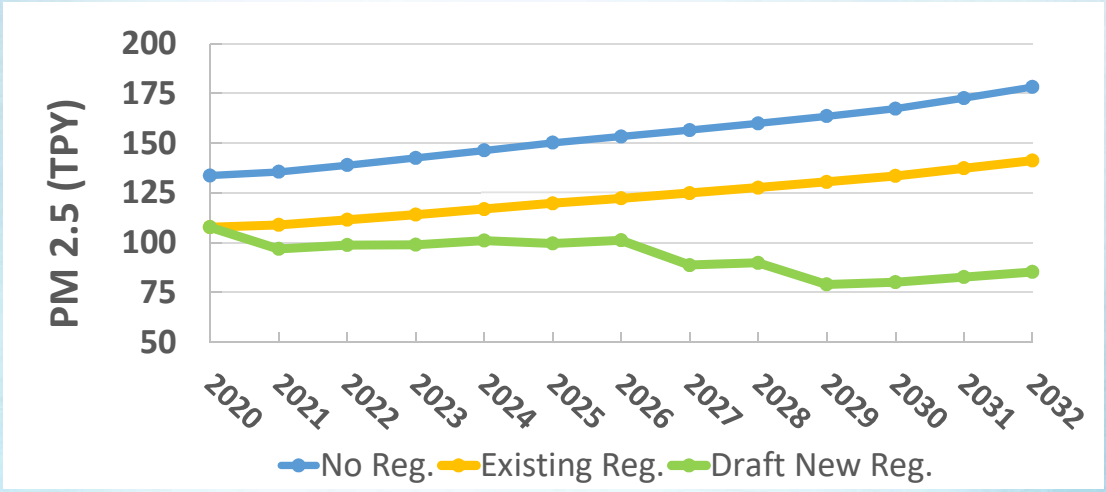
Draft Statewide PM2.5 Emissions Estimates (TPY)



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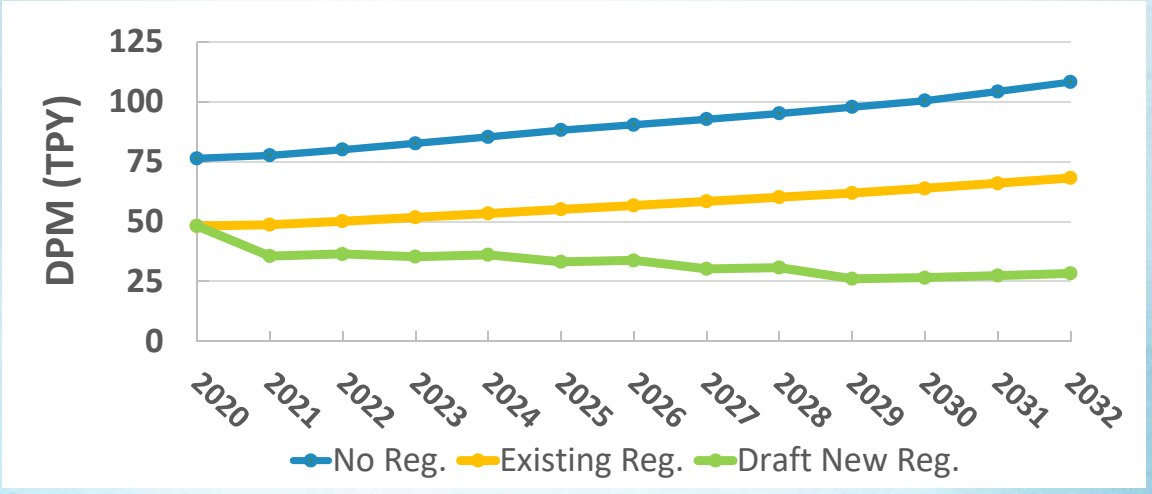
Draft Statewide Diesel PM Emissions Estimates (TPY)



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6. Updated Health Impacts

Statewide Valuation From Avoided Adverse Health Outcomes for the Draft New At Berth Regulation (Cumulative 2021-2032)	
Outcome	**Health Valuation (2019$, Rounded)**
Avoided Premature Deaths	$2,646,560,000
Avoided Hospitalizations	$4,800,000
Avoided Emergency Room Visits	$117,000
Total	**$2,651,477,000**

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7. Updated Cost Analysis and Cost Effectiveness

- Conducted statewide berth analysis
- Refined number of currently regulated vessels needing infrastructure for new regulation
- Revised assumptions for control technology usage
- Updated costs for terminal infrastructure:
  - Infrastructure improvement
  - Feasibility
  - Engineering and permitting costs

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Preliminary Estimates-At Berth Cost and Moyer Cost Effectiveness

Vessel Type	Annualized Estimates at Full Implementation (2030)		
	Annualized Cost	Moyer Wt Emissions Reductions* (Tons)	Moyer CE ($/Wt Ton)
Container/ Reefer	$19,960,000	1483	$13,500
Cruise	$18,470,000	327	$56,400
Auto/Ro-Ro	$19,220,000	358	$53,600
Tankers (Crude and Product)	$58,980,000	1445	$40,800
Total - All Vessels	**$116,630,000**	3613	$32,300

*Moyer Wt Emissions=20*PM2.5+NOx+ROG (tons)

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Container/Reefer Cost Assumptions

- Assume compliance through shore power, except infrequent visiting vessels at Ports of LA/LB
- Cost assumptions include:
  - 5 new vaults at container terminals statewide
  - 57 new vessels will retrofit for shore power
  - 55 additional visits assumed to use barge-based capture and control technology
    - 1 additional shared barge-based capture and control systems needed at Ports of LA/LB

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Cruise Cost Assumptions

- Cruise vessels assumed to comply using shore power
- Cost Assumptions include:
  - 26 new vessels will retrofit for shore power
  - New shore power berth assumed at Port of San Francisco to handle projected vessel activity

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Auto/Ro-Ro Cost Assumptions

- Auto/Ro-Ro vessels assumed to comply using capture and control technology
- Cost Assumptions include:
  - 6 barge-based capture and control systems
  - 3 land-based capture and control systems

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Tanker Cost Assumptions

- Tanker vessels assumed to comply using land-based capture and control technology
- Cost Assumptions include:
  - 23 land-based capture and control systems
  - 34 berths needing infrastructure upgrades
  - 34 crane installations

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8. Next Steps

- Provide cost information to CARB by May 29th for inclusion in the Standardized Regulatory Impact Assessment (SRIA)
- CARB staff requests feedback by June 10, 2019
- Finalize regulatory language and related analyses – mid-June 2019
- Finance to release SRIA early August 2019

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Next Steps (cont.)

- Formal regulatory proposal package released, with all evaluations – October 18, 2019
  - Written comment period runs from October 18 to December 2, 2019
- Board hearing date currently set for December 5, 2019 in West Oakland, California
  - New At Berth Regulation anticipated to be heard by CARB Board prior to the AB 617 West Oakland Community Emission Reduction Program item

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