

Reduction of Air Emissions in California's Ports: Update on Ocean-Going Vessel At-Berth and Clean Fuel Regulations

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Discussion Items

- I. CARB's Mission and Programs for Freight Transport
- II. Existing Programs for Ocean-Going Vessels
- III. Future Measures
- IV. Questions



I. CARB's Mission and Programs for Freight Transport



About the California Air Resources Board



Existing CARB Strategies to Cut Freight Emissions and Health Risk

Trucks	Ships	Locomotives	Equipment	Harbor Craft
<ul style="list-style-type: none">• Idling and smoke limits• International trucks• Drayage trucks• All on-road trucks• GHG limits for tractor-trailers	<ul style="list-style-type: none">• Fuel standards• At berth reductions• Ship incineration ban	<ul style="list-style-type: none">• Fuel standards• Fleet emission limits for South Coast• Diesel soot reduction at rail yards	<ul style="list-style-type: none">• Fuel standards• Port & rail equipment• Gas forklifts• Airport equipment• Transport refrigerators	<ul style="list-style-type: none">• Fuel standards• Harbor craft

-----Incentives for cleaner equipment-----

Why Does California Need to do More?



Cut air
toxics
health risk



Attain air
quality
standards



Mitigate
climate
change

Zero-emission technology/ renewable energy

II. Existing Programs for Ocean-Going Vessels



At-Berth Regulation Overview

- Ports of Los Angeles, Long Beach, Oakland, San Diego, Hueneme, and San Francisco
- Container, passenger, and refrigerated cargo (reefer) vessel fleets
 - Container/reefer fleets ≥ 25 annual visits
 - Passenger fleets ≥ 5 annual visits
- Emissions/power reduction requirement, currently at 70%, will increase to 80% in 2020



At-Berth Regulation Overview (Continued)

- 63 berths at 23 terminals shore power equipped
- Between 2014-2016, around 7000 shore power visits
- Two barge-based alternatives to shore power in commercial operation at Ports of Los Angeles and Long Beach
 - AMECS
 - METS-1
- Land-side project in development – ShoreKat at Port of LA



AMECS



METS-1



ShoreKat

Expanded Vessel Controls: Goals?



- Address implementation issues of existing At-Berth Regulation
- Simplify requirements and increase enforceability
- Increase the community health benefits by including additional vessels, ports, and tanker auxiliary boilers
- Hold terminals and ports accountable for their roles to achieve reductions
- Meet March 2017 Board direction to capture more vessel visits
- Ensure opacity standards at berth and at anchor

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Overview of Changes



<u>Existing Rule</u>	<u>Draft Concepts</u>
Vessel fleets	Vessel visits
Container, reefer and cruise	Additional vessel types
Implementation issues	Simplified requirements
Shore power or CARB approved alternative	Shore power or CARB approved alternative
Annual compliance reported	Clear, real time enforcement
Ports and terminals have limited responsibilities	Requirements for ports and terminals
Covers 6 named ports	Port and terminal thresholds
Reduces auxiliary engine emissions	Also reduces tanker boiler emissions

Expanded Vessel Controls: Which Vessels?

- Additional vessel types considered in rule:
 - Roll-On/Roll-Off, Tankers
- Room for innovation
- Potential control options may differ depending on:
 - Vessel specific emissions profiles
 - Safety requirements
 - Unique terminal layouts
 - Individual vessel design



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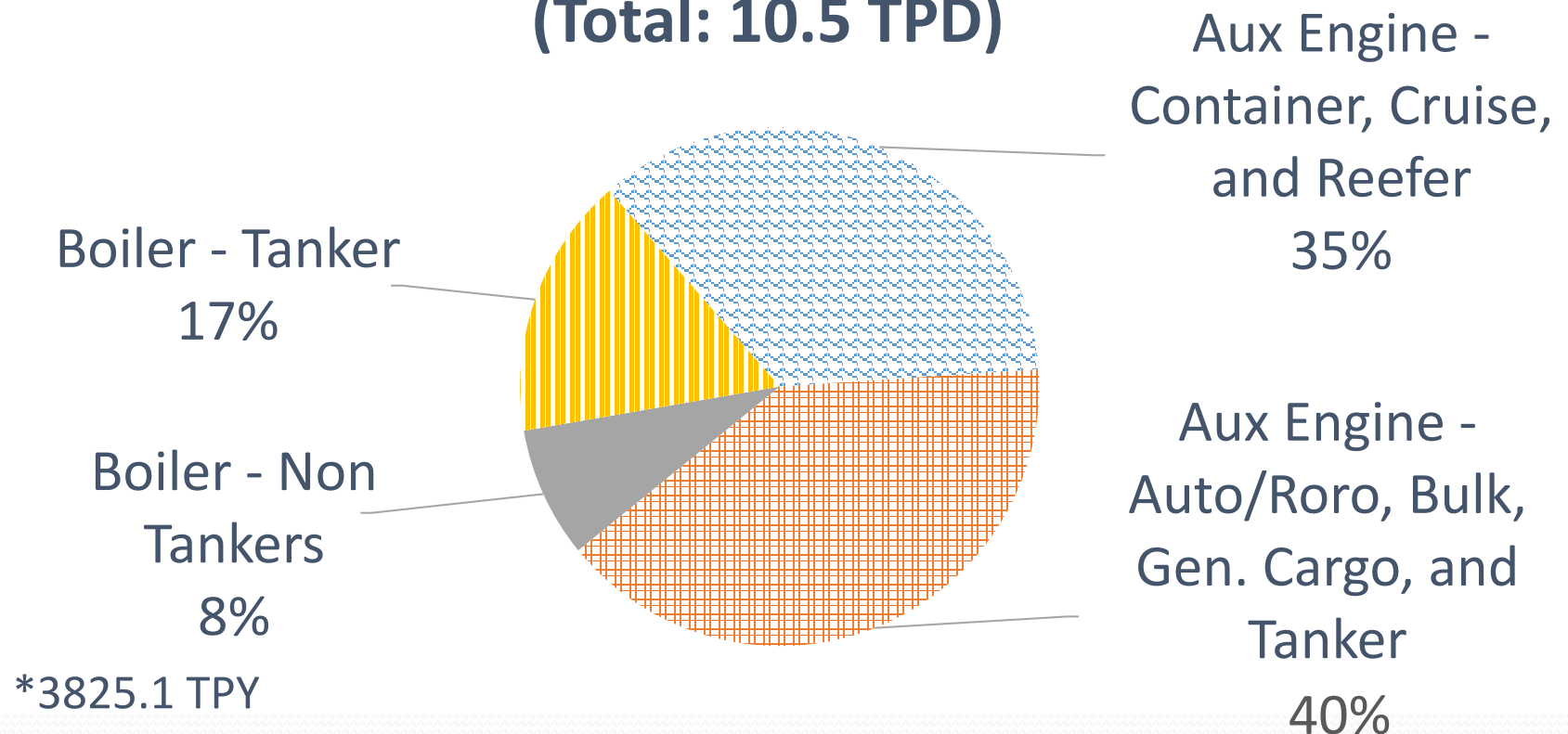
Looking Beyond Auxiliary Engine Controls – Tanker Auxiliary Boilers

- A subset of tanker vessels utilize a large auxiliary boiler onboard to power steam-driven pumps to offload product at berth
- Tanker boilers are the largest emitting category in CARB's Emissions Inventory not subject to the original At-Berth Regulation
- Boiler emissions profile differs from auxiliary engines
 - PM emissions are not considered Diesel PM like emissions from internal combustion engines, but cancer and non-cancer health risks exist
- Boilers are responsible for a significant portion of PM and CO₂ emissions and moderate NOx emissions at berth

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Need For Additional Reductions

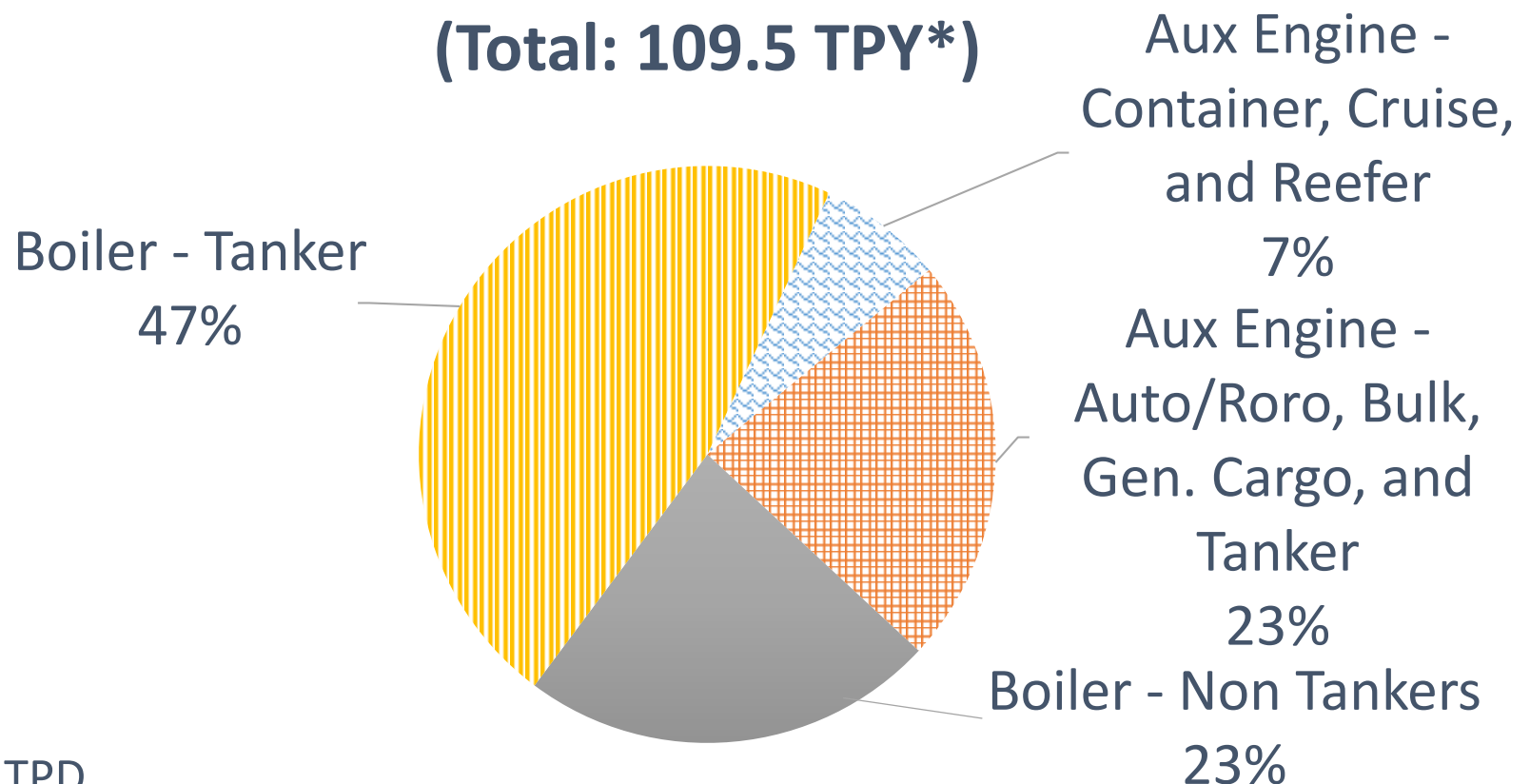
2021 Projected Statewide NOx Emissions At Berth - Existing Rule (Total: 10.5 TPD)



NOx = Oxides of Nitrogen, TPD = Tons Per Day, TPY = Tons Per Year
Source: CARB Emissions Inventory, 2018

Need For Additional Reductions

2021 Projected Statewide PM_{2.5} Emissions At Berth - Existing Rule (Total: 109.5 TPY*)



*0.3 TPD

PM = Particulate Matter,

Source: CARB Emissions Inventory, 2018

Expanded Vessel Controls: How?

- Use an approved compliance strategy for each visit including:
 - Shore power
 - Technologies with a CARB Executive Order
- Future strategies might include:
 - Onboard controls
 - Cleaner vessels



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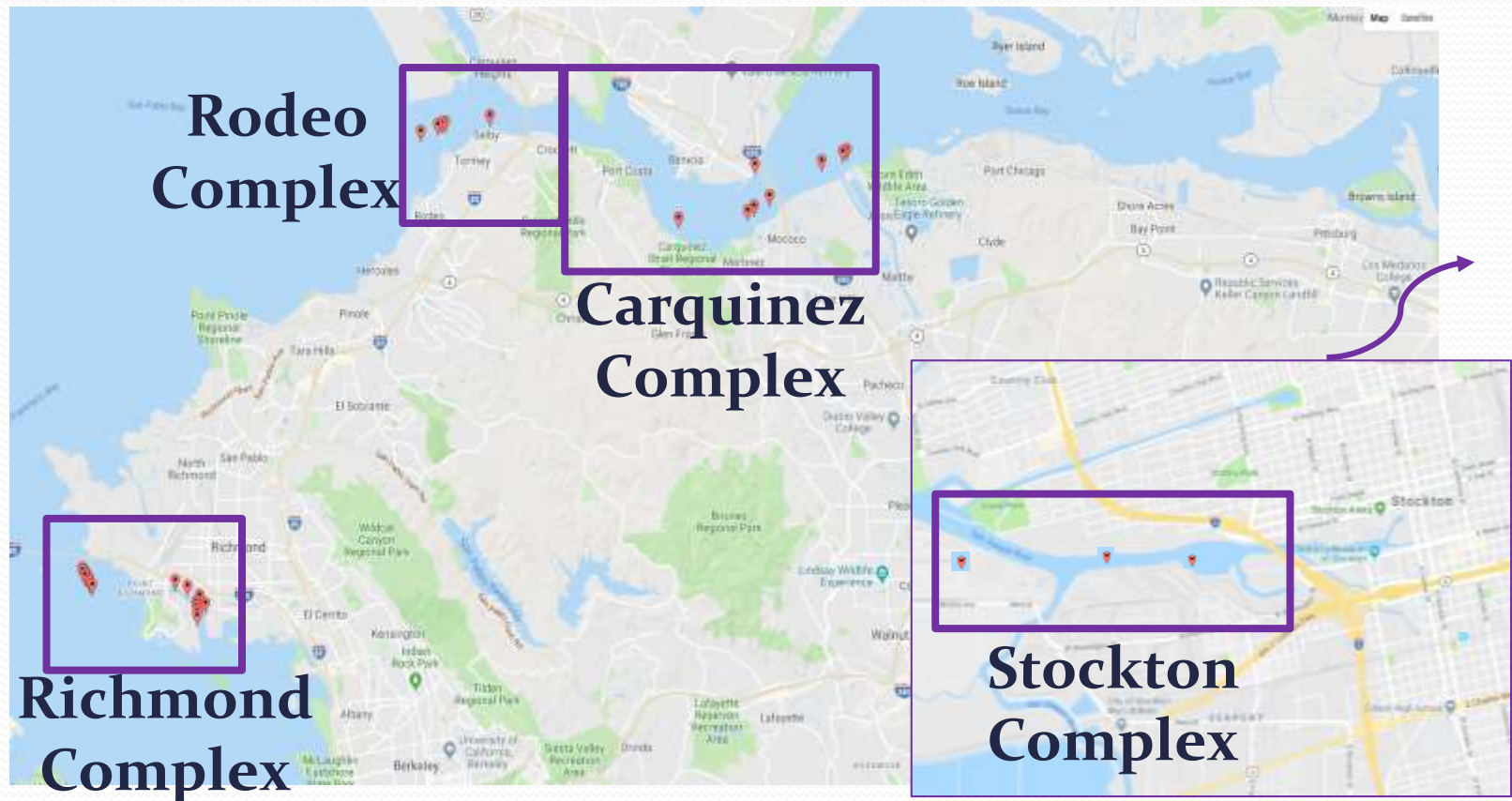
Expanded Vessel Controls: Where?



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All are in, or adjacent to, disadvantaged communities

Expanded Vessel Controls: Where? (Cont'd)



*Complexes made up of geographically close marine emissions sources that impact surrounding community

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Expanded Vessel Controls: When?

Vessel category	Controls for 100% of visits*		
	2021	2025	2031
Container, Reefer, Cruise			
Ro-Ro/Auto Carrier			
Tanker (<i>plus boilers for steam powered pumps</i>)			

* *Above port and terminal thresholds*

- Does not include control requirements for bulk and general cargo vessels (still subject to opacity and reporting)

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Next Steps

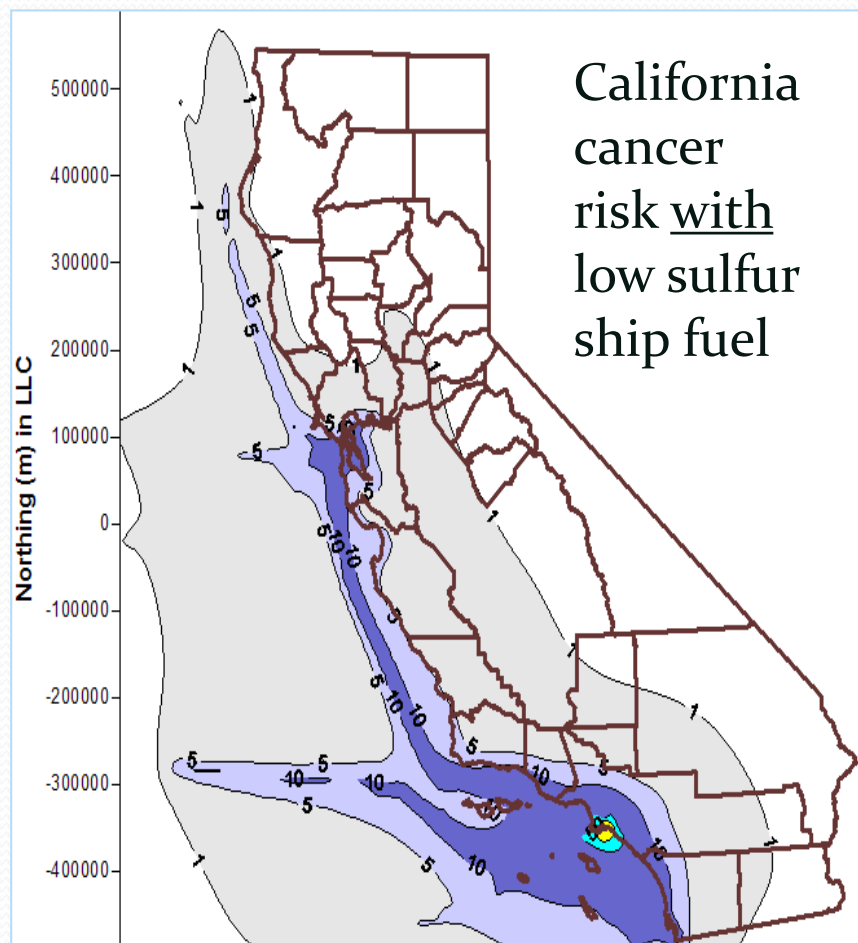
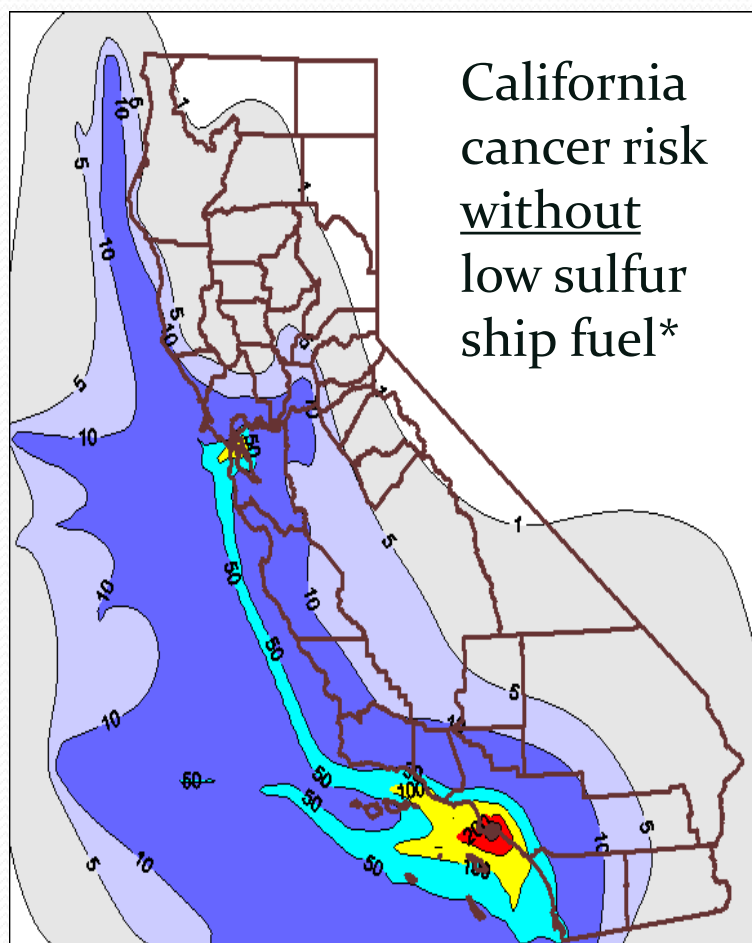
- Fall meetings with community groups
- Evaluation of public comments, new data
- Updated regulatory concepts and analyses
- Fall/Winter meetings on revised concepts
- Issue formal regulatory proposal with draft environmental analysis for comment 45 days prior to Board Hearing

CA Vessel Fuel Regulation Overview

- 2008 CA rule for cleaner fuels within 24 nm zone
- Main & auxiliary engines, auxiliary boilers
- Step down in sulfur levels: 2009, 2012, 2014
- Now: 0.1% sulfur
- Practical experience supported IMO standards and North American ECA
- CA rule to sunset when Federal Rule achieves equivalent reductions



Lower Sulfur Ship Fuel = Lower Potential Cancer Risk Footprint



*CALPUFF Diesel PM Numbers

Safety Exemption

- Used by master when use of distillate fuel would endanger vessel/crew/cargo
 - Must be beyond master's reasonable control, such as mechanical problem, inclement weather, medical emergency
- Use exemption immediately
 - Notify CARB within 24 hours after use of exemption, and four days to provide documentation

Research Exemption

- Marine Notice 2017-1
 - The expedited research exemption process for scrubbers or low sulfur HFO* has been phased out, but the regular research exemption is still in place
- Research exemption requires:
 - Full research project, testing, progress reports, etc.
 - Exemption valid only during the period of the research project

*HFO: Heavy Fuel Oil



CA Vessel Speed Reduction (VSR)

- Through partnerships vessel speed reduction has proven successful
- U.S. Coast guard has established limit of 15 knots in the San Francisco Bay
- Ports of Los Angeles, Long Beach MOU* with industry in 2001 established VSR of 12 knots @ 20 nm
 - Offer dockage discounts for VSR @ 40 nm

*MOU: Memorandum of Understanding

III. Future Measures

Planned CARB Actions for Further Reductions of Air Emissions in CA Ports

- Develop new At Berth and At Anchor rule to capture additional vessels/reductions
- Commercial Harbor Craft rule amendments
- Cargo Handling Equipment rule amendments
- Advocate for tighter international emission standards, plus efficiency targets for existing vessels
- Define “Low-Emission Efficient Ship;” use incentives for advanced technologies

How Can We Collaborate?



- Well planned investments in the development of new technologies and major infrastructure upgrades
- Local air agencies offer expertise, on-ground presence, research & funding
- Communities raise political will
- Ports offer complementary programs
- Industry forms partnerships and implements emission controls
- Expand regulations beyond California

IV. Questions?



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Vessel Fuel Regulation:

<https://www.arb.ca.gov/ports/marinevess/ogv.htm>

Vessel At-Berth Regulation:

<http://www.arb.ca.gov/ports/shorepower/shorepower.htm>

Port Activities:

<https://www.arb.ca.gov/ports/ports.htm>

