



# **At Berth Regulation Workshop: Interim Evaluation Report**

February 14, 2023

# Agenda

- Introductions & Overview
- Purpose and Preparation of Interim Evaluation Report
- Assessment of Compliance Readiness
- COVID-19 Pandemic Impacts
- Feasibility of Control Requirements for Bulk/General Cargo and Vessels at Anchor
- Next Steps and Future Measures
- Open Q&A

# New At Berth Regulation

- Adopted by CARB's Board on August 27, 2020
  - CARB's Board directed staff to accelerate tanker implementation dates to 2025/2027
- Every vessel visiting a regulated terminal must connect to shore power or alternative control strategy
- Emissions reductions requirements begin:
  - January 1, 2023: Container, Reefer, Cruise
  - January 1, 2025: Auto carrier
  - January 1, 2025 (SoCal) and January 1, 2027 (NorCal): Tanker
- Alternative compliance pathways:
  - Vessel and Terminal Incident Events (VIEs and TIEs)
  - Remediation Fund (for specific qualifying circumstances)
  - Innovative Concepts



# Regulation Implementation

- January 1, 2021 - New Regulation took effect
- December 1, 2021 - Ports and Terminal Plans due
- December 1, 2021 – Innovative Concept applications due
- December 1, 2022 - Published Interim Evaluation Report
- January 1, 2023 – New requirements took effect for container/reefer/cruise vessels
- January 1, 2025 – New requirements take effect for ro-ro and Southern California tanker terminals
- January 1, 2027 – New requirement take effect for Norther California tanker terminals

# Purpose of Interim Evaluation Report

- Implementation status update for At Berth Regulation
- Summary of CARB staff's findings and recommendations, including:
  - Assessment of compliance readiness
  - Summary of Innovative Concepts applications
  - Evaluation of COVID impacts
  - Feasibility of control requirements for bulk/general cargo vessels and vessels at anchor
- Recommendations for future efforts to CARB's Board

# Key Recommendations

- No adjustments to At Berth Regulation, including:
  - No change to implementation dates
  - No inclusion of additional vessel categories
- CARB Board direct staff to pursue additional reductions from vessels
  - Explore measures for in-transit, at anchor, and maneuvering



# Preparation of Interim Evaluation Report

- CARB solicited for comments starting in Fall 2021
- Staff analyzed:
  - Stakeholder meetings and comment letters
    - Received 11 comment letters by June 2022
  - Port and terminal plans
  - Innovative Concept applications
  - Tanker grant solicitation project
- Public outreach included:
  - Innovative Concepts application comment period
  - Remediation fund administrator process
  - Reporting system development
  - Public meetings and workshops
  - Consultations with technology providers

# Stakeholder Comment Letters

- Non-tanker vessel key concerns:
  - Delay installing shore power equipment due to COVID impacts
  - Time out of service to install shore power equipment
  - Lack of availability of non-shore power CAECS\*
  - Absence of international shore power standard (for ro-ro vessels)
- Tanker vessel key concerns:
  - Lack of availability of non-shore power CAECS
  - Timeline to adapt existing CAECS for use on tanker vessels
  - Safety concerns
  - Power availability and compatibility (for shore power equipment)
  - Logistical and operational constraints
  - Utility construction delay

# Current Status of Emissions Control Technologies

- CAECS include:
  - Shore power
  - Capture and control systems
- Other potential strategies
  - Distributed generation
  - Cable management systems
  - Alternative fuels



# Consultation with technology providers

- CARB staff is working with multiple technology providers
- Providers have expressed intention to enter/expand operations in the capture and control market
  - Developing more systems to service container vessels
  - Expanding research, testing, and development efforts to ro-ro and tanker vessels
- Development of capture and control systems for ro-ro and tanker vessels is proceeding as anticipated during rulemaking
- Two systems currently approved
  - ShoreKat Executive Order approved
  - Six additional approvals in progress

# Port and Terminal Plans

- Informed CARB staff of likely compliance pathways and potential delays
- Due to CARB by December 1, 2021
- CARB had 90 days to confirm plan completeness or identify deficiencies
- Plans posted to [CARB's website](#) for public review
  - CARB's responses and any revised plans received also posted to website
- Updated ro-ro and tanker terminal plans due to CARB one year prior to their compliance year
  - Ro-ro/Southern CA tankers by February 1, 2024
  - All other tankers by February 1, 2026

# Summary of Port and Terminal Plans: Non-Tanker Vessels

- Container/reefer/cruise:
  - All terminals indicated ability to meet 2023 compliance date
  - Main compliance option is shore power
  - Minimal infrastructure upgrades needed
- Ro-ro:
  - Nearly all terminals indicated ability to meet 2025 compliance date
  - Main compliance options: shore power, capture and control, and hydrogen fuel cells
  - Significant infrastructure installation necessary for shore power use



# Summary of Port and Terminal Plans: Tanker Vessels

- ~50 percent of S. California terminals indicated ability to meet 2025 compliance date
- ~25 percent of N. California terminals indicated ability to meet 2027 compliance date
- Main compliance options are shore power, capture and control, and Innovative Concepts
  - Significant infrastructure installation necessary for shore power use
- Insufficient site-specific information received to recommend changes to tanker implementation dates



# Feasibility Studies

- **Key takeaway: Installation timelines vary, but shore power and capture and control technologies are adaptable**
- CARB received multiple feasibility studies (all specific to tanker vessels)
  - DNV Report
  - ABS Study
  - Three site-specific studies
- DNV Report – key findings:
  - Shore power and land-based capture and control systems may take up to 14 years to implement
  - Barge-based systems may be developed in 5 years or less
- Valero site-specific study - key findings:
  - No compliance option can be implemented by January 1, 2027
  - Terminal will not select a CAECS until after reviewing CARB's Interim Evaluation Report

# Innovative Concept Applications

- CARB received a total of 12 Innovative Concept applications by December 1, 2021 deadline
  - Three applications have since been withdrawn
  - Many applications contain several sub-projects
    - 63 sub-projects
- Broad suite of proposals received, including:
  - Hydrogen fuel cells for cold ironing
  - On-board wind power generators
  - Capture and control technologies (early and extra reductions to use for compliance)
  - Deploying liquified natural gas (LNG) vessels



# Compliance Readiness Findings: Container/Reefer/Cruise

- Compliance began January 1, 2023
- Majority of vessels already reducing emissions under the 2007 At-Berth Regulation
- Stakeholder concerns mainly center around equipment installation delays
- Well positioned to use compliance flexibilities built into the Regulation if delays in equipment installation occur



# Compliance Readiness Findings: Ro-Ro/Auto Carrier

- Most vessel/terminal operators actively pursuing a compliance pathway
- Information received during Interim Evaluation review indicated ability to meet 2025 compliance date
  - Since publication of Interim Evaluation Report, some ports have expressed doubt about ability to meet the 2025 deadline
- Well positioned to use compliance flexibilities in the Regulation if delays in control equipment installation occur

# Compliance Readiness Findings: Tankers

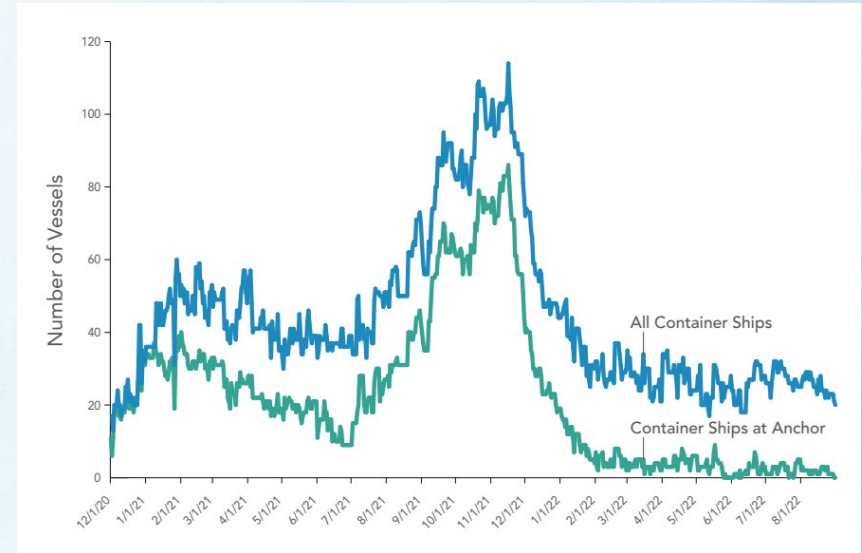
- Feasibility studies claim no commercially available safe compliance option however shore power is available/proven technology
- Many tanker terminal operators have not yet committed to a control strategy and have not yet provided complete terminal plans
- Compliance flexibilities available in the Regulation if delays in control equipment installation occur



# COVID-19 Pandemic Industry Impacts

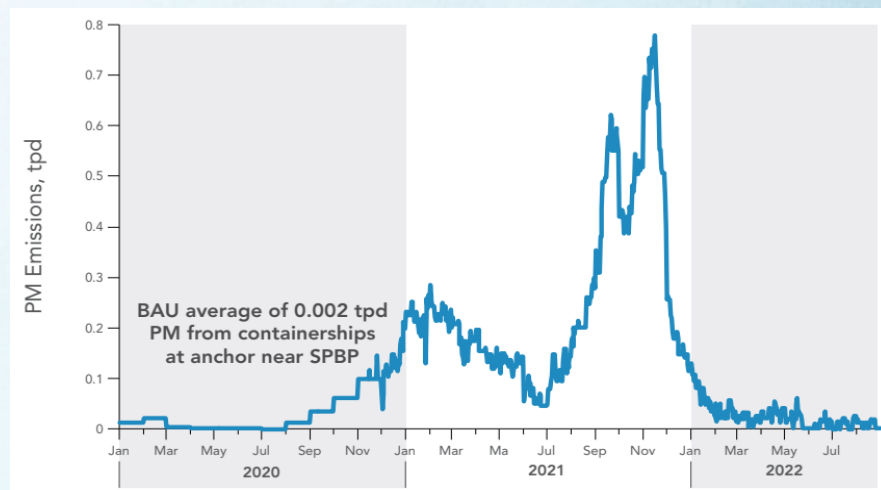
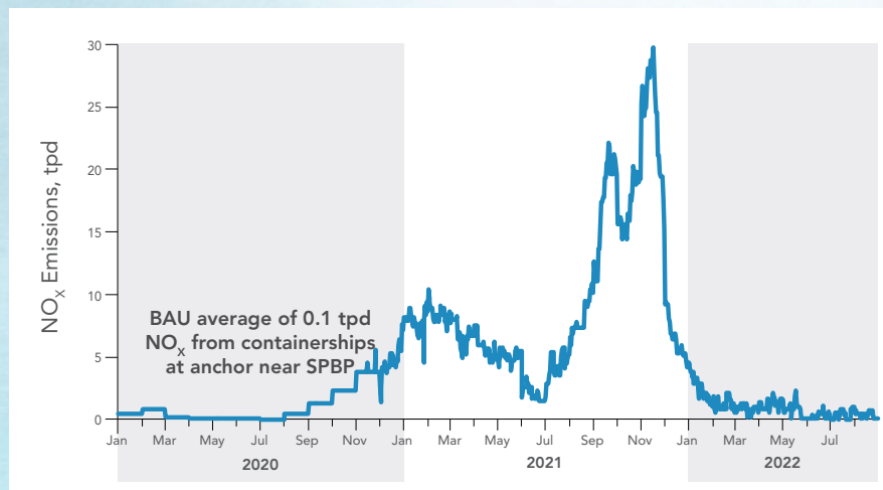
- Pandemic created widespread uncertainty in early days
  - Volatile schedules
  - Vessel lay-ups
  - Decreased vessel calls
  - Port congestion
- Port congestion led to high numbers of container vessels anchoring off San Pedro Bay Ports

Anchored Containerships off the Ports of Los Angeles and Long Beach



# NOx and PM Emissions from Anchored Container Vessels at San Pedro Bay Ports

- Increase in anchored container vessels led to sharp increase in NOx and PM emissions

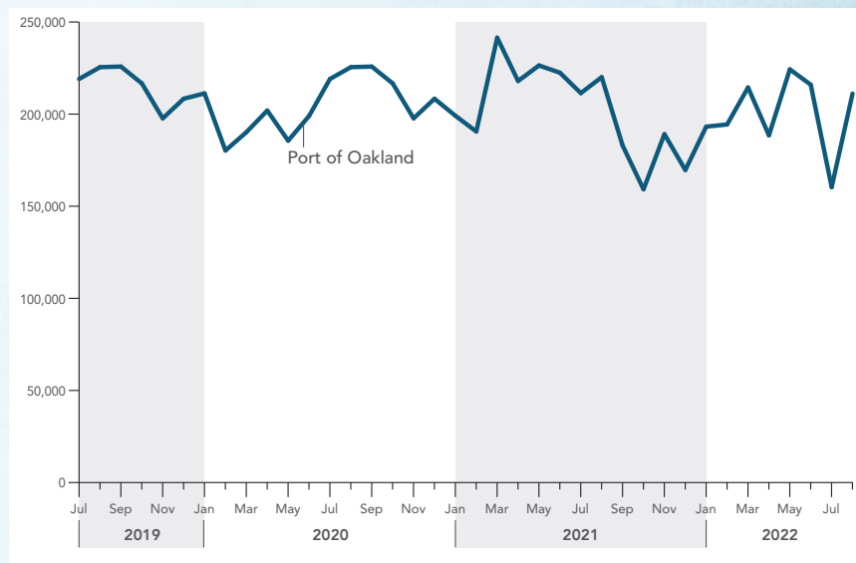
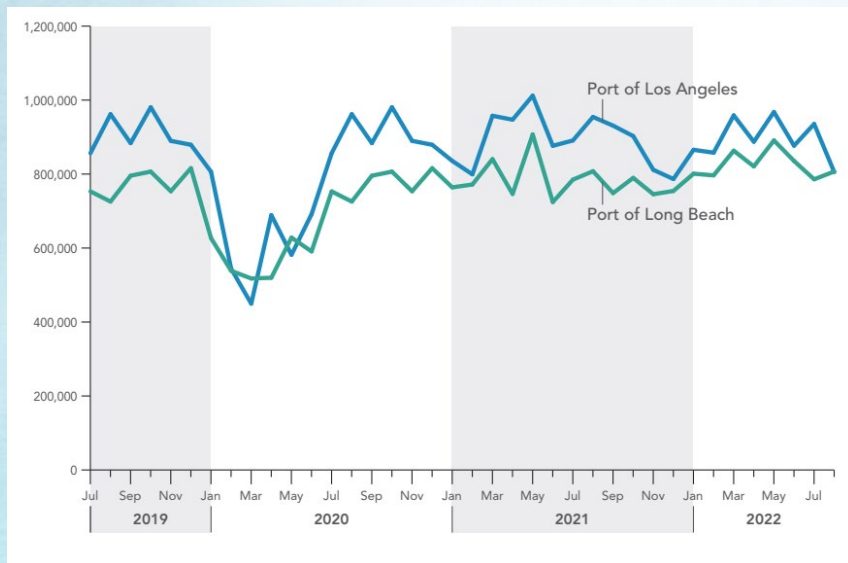


# Recovering from COVID-19 Pandemic

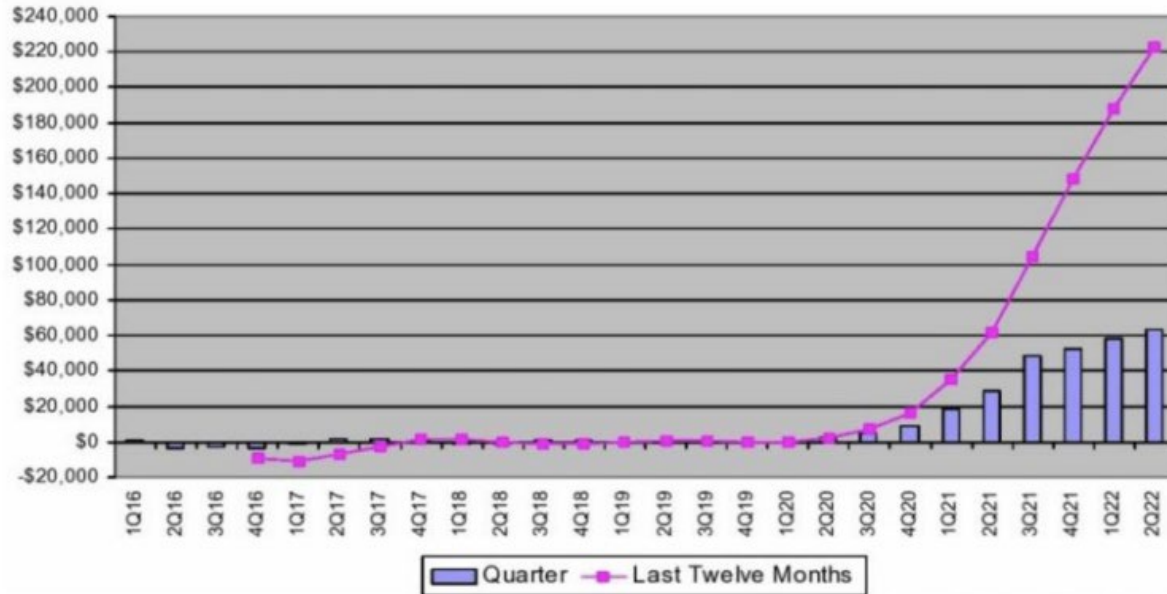
- Cargo rebound in 2020 led to record profits for container industry and oil companies
- Auto carrier volumes and cruise passenger demand were recovering to near pre-pandemic levels by mid-2022
- Supply chain disruptions and equipment shortages remain
  - The Regulation contains compliance pathways to accommodate pandemic-related delays, including:
    - Terminal and Vessel Incident Events (TIEs/VIEs)
    - Remediation Fund
    - Innovative Concepts

# Container Throughput (in TEUs\*)

- Cargo volumes (TEUs) dropped sharply at start of pandemic
- Container volumes grew sharply in 2020, reaching record highs



# Container Shipping Industry Net Income by Quarter From 2016 (in USD Millions)



Source: Blue Alpha Capital

# Feasibility of Control Requirements for Bulk/General Cargo

- CARB staff engaged with bulk and general cargo operators
  - Received limited responses to requests for information
- Unique operational challenges remain:
  - Line-hauling
  - Tramp schedules
  - Physical berth constraints
- Emissions projected to grow from increased activity
- Pursuing measures that require cleaner vessels may be best way to achieve emissions reductions



# Feasibility of Control Requirements for Vessels at Anchor

- Record numbers of container vessels anchored off San Pedro Bay Ports in 2021
- Solutions currently used to reduce emissions at berth are challenging to adapt to reduce emissions at anchor
- Voluntary vessel queuing system provided relief from 2021 anchorage congestion
  - No guarantee this program will be used in the future
  - More research needed to determine potential health impacts of vessels anchoring farther offshore
- Onboard solutions may provide best benefit to emissions at anchor

# Conclusions

- No new significant concerns brought to CARB's attention
- Main compliance pathways are shore power or capture and control
  - Generally reflects findings from CARB staff's Berth Analysis
- Stakeholder key concerns include:
  - Meeting compliance timelines
  - CAECS availability
  - Feasibility and safety of control technologies for tanker vessels
- All regulated vessel categories have recovered or are recovering steadily from COVID-19 pandemic

# Conclusions (cont.)

- Critical not to delay the health benefits provided by the At Berth Regulation
- Not recommending changes to implementation dates
  - Flexibilities built into the Regulation to assist with compliance
- Bulk/general cargo vessels and vessels at anchor
  - No significant technology advancements have been made
  - Further investigation of health impacts needed
  - Inclusion of these vessel categories may be more appropriate under future measures

# Next Steps & Recommendations for Future Efforts

- Submit comments on the Interim Evaluation Report by March 8, 2023
- Update to CARB Board in May 2023
  - Brief Board on findings and recommendations
- Reductions needed from transiting, maneuvering, and anchoring
- Achieving in-transit emissions from vessels is necessary for significant NOx and PM reductions
  - Key to meeting CA State Implementation Plan for attainment
  - Emissions from OGVs expected to continue growing
  - Essential to public health protection for disadvantaged communities
- CARB staff recommend prioritizing exploration of measures to achieve additional reductions from vessels

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- More information can be found at: <https://ww2.arb.ca.gov/our-work/programs/ocean-going-vessels-berth-regulation>

# Open Q&A