Our Vision Clean Air
Santa Barbara County
Air Pollution Control District

March 7, 2013

Mary Nichols, Chair
California Air Resources Board
1001 I Street, PO Box 2815
Sacramento, CA 95812

Re: Use of Cap-and-Trade Auction Funds for a Ship Speed Reduction Incentive Program along the California Coast to Reduce Greenhouse Gas Emissions

Dear Chair Nichols and California Air Resources Board Members:

The Santa Barbara County Air Pollution Control District recommends that some auction proceeds be used to implement a Vessel Speed Reduction Incentive Program along the California coast to reduce greenhouse gas (GHG) emissions. The program would be modeled after the existing successful program at the Ports of Los Angeles and Long Beach. It aligns with investment plan objectives to reduce GHG emissions from transportation, and would achieve reductions within the three-year plan horizon. The program would have significant air quality and public health co-benefits by reducing particulates, air toxics, and smog-forming pollutants. Additional benefits include economic benefits from furthering progress of coastal air districts towards meeting air quality standards, and enhanced protection for endangered whale species.

Summary

We would work closely with the Ports and with shipping companies to develop the ingredients for a successful program. The initial phase (1-2 years) would involve: eliciting participation, pricing the incentive, and developing an implementation plan; and implementing a demonstration program from the Ports of Los Angeles and Long Beach through the Santa Barbara Channel. To ensure that reductions are not undermined by speed increases elsewhere on the route, speed data from existing Automatic Identification System (AIS) receivers up and down the coast would be monitored. In addition, the implementation plan will identify the best methodology to track fuel use over the full route to ensure GHG reductions.

We expect that full roll-out of the program to a large portion of the California coast, or the entire California coast, could be achieved within the first 3-year investment period. I have attached additional information, including a factsheet and implementation plan. Thank you for your consideration.

Sincerely,

Louis D. Van Mullem, Jr., Air Pollution Control Officer
Santa Barbara County Air Pollution Control District

Attachments

Our Vision Clean Air

Santa Barbara County
Air Pollution Control District

National Marine Sanctuaries
Channel Islands

environmental
DEFENSE CENTER

Vessel Speed Reduction Initiative
Fact Sheet

GOAL

Advance California's clean-transportation goals and sustainable freight strategy by implementing a voluntary vessel speed reduction incentive program to cut greenhouse gas (GHG) emissions and other air pollutants, with the ancillary benefit of potentially protecting endangered whale species along the California coast.

APPROACH

The initiative would use California Cap-and-Trade auction funds to expand the existing vessel speed reduction incentive programs at the Ports of Los Angeles and Long Beach. The Ports of Los Angeles and Long Beach speed reduction incentive programs have been successfully implemented with participation rates over 90%, and have achieved significant air pollutant reductions by limiting vessel speeds to 12 knots or less.

Photo courtesy of John Calambokidis, Cascadia Research Collective

Participation in an expanded program using Cap-and-Trade funds would be contingent on participation in the existing Ports programs, so the initiative would support the Ports' current clean-air goals while extending the benefits through the Santa Barbara Channel and possibly along the California coast.

PHASE ONE: DEVELOPMENT AND PILOT (1-2 years)

Working with the Ports, stakeholders, and shipping companies the Santa Barbara County Air Pollution Control District (SBCAPCD) will take the lead, determining incentive structure, costs, emission reductions, and emissions verification systems, and implement a pilot program from the slow speed zone boundary at the Los Angeles ports through the Santa Barbara Channel.

PHASE TWO: PROGRAM ROLL-OUT (2nd-3rd year out)

Program roll-out to larger portion of California coast, or entire coast.

BENEFITS

This is a prime and unique opportunity to fulfill multiple objectives of AB 32 (Global Warming Solutions Act of 2006) and AB 1532 (Greenhouse Gas Reduction Fund). Through a single policy mechanism, the project can cut shipping emissions of greenhouse gases, nitrogen oxides, and other air pollutants by up to 50 percent. The initiative supports the existing Port programs and helps ensure ships reduce speeds even during favorable economic conditions when it has been shown that they increase speeds. The

initiative would complement clean-air efforts, and is in line with clean-transportation and sustainable-freight strategies. In addition, reduced ship speeds could reduce the severity of injury to whales should a ship-whale collision occur.

MEASURABLE BENEFITS

- **Reduces GHG Air Pollution**: Reducing vessel speed to 12 knots will reduce shipping GHG emissions by 50%.
    - In California up to 2,580,000 tonnes/year[1]
    - In the Santa Barbara Channel up to 369,762 tonnes/year[1]
- **Reduces Nitrogen Oxides Air Pollution (NOx is a precursor to ozone):** Reducing vessel speeds to 12 knots will reduce NOx by 56%.
    - In California up to 43,108 tons/year[1]
    - In the Santa Barbara Channel up to 6,760 tons/year[1]
- **Improving Air Quality for Human Health:** Additional particulate matter reductions beyond CARB marine vessel fuel regulation[2]
- **Improving Whale Protection**: Ships traveling 12 knots or less could help reduce the chance of a lethal ship strike of a whale. [3]

Photo courtesy of NOAA

COORDINATED SOLUTION STRATEGY

The SBCAPCD proposes this unique program that finds common ground and pursues diverse partnership. The District and its Board, which is made up the five Santa Barbara County Supervisors and representatives from each incorporated city in the County, have been pursuing reducing emissions from cargo ships since 1994.

This proposal also has the support and backing of a number of stakeholders, including members of a *Marine Shipping Solutions Group* that has been meeting regularly. This group includes federal agencies (National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS), Channel Islands National Marine Sanctuary (CINMS), U.S. Coast Guard, and CINMS Advisory Council), NGO groups (Environmental Defense Center (EDC), Ocean Conservancy (OC), and Community Environmental Council (CEC), leading scientists (John Calambokidis, Cascadia Research Collective, Inc.), and local elected leaders.

CONCLUSION

This innovative program expands a successful program already in place and offers a unique opportunity to reduce GHG and other air pollution emissions. It also protects human health and marine wildlife, complies with the requirements of AB 32 and AB 1532, and can achieve shared goals across a broad range of stakeholders.

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[1] Santa Barbara County Air Pollution Control District calculations.

[2] Yusuf Khan et al. 2012. Greenhouse Gas and Criteria Emission Benefits through Reduction of Vessel Speed at Sea. Environmental Science & Technology. 46 (22) pp 12600-12607.

[3] Vanderlaan, A.S.M. and Taggart, C.T. 2007. Vessel Collisions with Whales: The probability of lethal injury based on vessel speed. Marine Mammal Science 23(1): 144-156.

Vessel Speed Reduction (VSR) Initiative
Compatibility with AB 1532

The VSR initiative builds on and expands the existing Ports of Long Beach and Los Angeles vessel speed reduction incentive programs. It fulfills funding requirements for investing in "low-carbon transportation" as outlined in newly-enacted statutory requirements[4] directing how AB 32 Cap-and-Trade auction funds are allocated while furthering the California Air Resources Board's Sustainable Freight Strategy.[5] In addition to reducing GHG emissions, the proposal fulfills funding goals required by legislation including: (1) maximizing economic, environmental, and public health benefits; (2) complementing efforts to improve air quality, (3) providing opportunities for businesses, public agencies, nonprofits, and others to participate in efforts to reduce GHG emissions, and (4) lessening impacts and effects of climate change. The following table outlines how the VSR initiative meets specific legal requirements outlined in AB 1532.

AB 1532	Vessel Speed Reduction Initiative
(b) Moneys shall be used to facilitate the achievement of reductions of greenhouse gas emissions in this state consistent with this division and, where applicable and to the extent feasible: (1) Maximize economic, environmental, and public health benefits to the state.	GHG reductions up to 50% from shipping Economic: supports ports by avoiding regulatory approach that could discourage ships from CA port calls; enhances ability of coastal areas to meet air standards Environmental: whale and other species protection Public health: reductions in criteria pollutants, particulate and air toxics
(3) Complement efforts to improve air quality.	Reductions in criteria pollutants, particulate and air toxics.
(5) Provide opportunities for businesses, public agencies, nonprofits, and other community institutions to participate in and benefit from statewide efforts to reduce greenhouse gas emissions.	Public agencies: SBCAPCD, NOAA, potentially other air districts, County and City of Santa Barbara Nonprofits: stakeholder organizations (EDC, CEC,OC) Other community (CINMS Advisory Council) Shipping Representatives: Marine Exchange, PMSA Ports: Ports of Long Beach and Los Angeles
(6) Lessen the impacts and effects of climate change on the state's communities, economy, and environment.	Reducing GHG emissions

[4] AB 1532, SB 535, and SB 1018

[5] California Environmental Protection Agency - Air Resources Board, January 2013. Annual Report to the Joint Legislative Budget Committee on Assembly Bill 32 (Chapter 488, Statutes of 2006) The California Global Warming Solutions Act of 2006. This report can be viewed at: http://www.arb.ca.gov/mandrpts/mandrpts.htm.

(c) Moneys appropriated from the fund may be allocated, consistent with subdivision (a), for the purpose of reducing greenhouse gas emissions in this state through investments that may include, but are not limited to, any of the following: (2) Funding to reduce greenhouse gas emissions through the development of state-of-the-art systems to move goods and freight…	Improving efficiencies of moving goods and freight and consistent with ARB's Sustainable Freight Strategy
(6) Funding to reduce greenhouse gas emissions through investments in programs implemented by local and regional agencies, local and regional collaboratives, and nonprofit organizations coordinating with local governments…	Regional collaborative; partnership with nonprofits and government
(7) Funding in research, development, and deployment of innovative technologies, measures, and practices related to programs and projects funded pursuant to this part.	Research and development of innovative measures and practices to reduce ship speeds.
The investment plan, consistent with the requirements of Section 39712, shall do all of the following: (1) Identify the state's short-term and long-term greenhouse gas emissions reduction goals and targets by sector. (2) Analyze gaps, where applicable, in current state strategies to meeting the state's greenhouse gas emissions reduction goals by sector.	CARB identified that it would assess a ship speed reduction rule as part of GHG measures in AB 32 scoping plan: http://www.arb.ca.gov/ports/marinevess/vsr/vsr.htm This assessment has yet to be completed, and regulatory measure uncertain, so this approach could fill gap.

Implementation Plan
Vessel Speed Reduction Incentive Program

Proposal

To implement a Vessel Speed Reduction Incentive Program along the California coast to reduce emissions of greenhouse gases, and realize additional public health, economic, and environmental benefits.

Our Vessel Speed Reduction Incentive (VSR) program will be modeled after the successful VSR programs operated since 2001 by the Port of Los Angeles (POLA) and Port of Long Beach (POLB).

Implementation will occur in two phases. Phase 1 will be development of the program structure, and implementation of a demonstration program from the POLA and POLB through the Santa Barbara Channel. Phase 2 will be roll-out of the program to a larger portion of the California coast, or the entire California coast. Since Phase 2 will be based on the foundation of information and practices developed in Phase 1, this Plan will focus on Phase 1. The duration of Phase 1 is expected to be one to two years.

Phase 1

Working with shipping companies, ports, shipping industry experts, and stakeholders, in Phase 1 we will complete the following tasks.

1) Conduct data analysis and work with shipping companies, ports and other stakeholders to identify optimal program structure, participation rate, incentive pricing. Develop the incentive approach and overall costs for VSR, including a tracking mechanism to ensure emission reductions are real and verifiable. Prepare report with detailed findings.

2) Prepare implementation plan for demonstration project based on the findings of the report.

3) Implement demonstration program to identify any adjustments needed for larger scale program. Ensure tracking mechanisms are effective. Prepare implementation plan for expanded program, making recommendations for Phase 2.

Task 1

A contractor with shipping industry experience and expertise will assist in data analysis and design of the program. The primary data set we will utilize for the analysis is the marine vessel Automated Identification System (AIS)[1]. This data coupled with Marine Exchange of Southern California port

[1] Along the entire California coast line the AIS collects dynamic (real time) information, such as vessel's position, speed, current status and course and static information, including vessel's name, International Maritime Organization number, dimensions and voyage-specific information (destination and Estimate Time of Arrival).

call data will allow us to identify existing average speeds by vessel type, shipping operator, and routes, and research best candidates for early adoption in the demonstration program. Data could also be obtained from the Lloyd's Registry to determine vessel specific engine power ratings and thus further refine emissions calculations. California Air Resources Board shipping inventory forecasts and the Port of Los Angeles and the Port of Long Beach port call forecasts will be used to estimate future year potential emission reductions from VSR.

Discussions with shipping operators, ports, and other agencies in California will be conducted to assist in designing program structure, and identifying key elements, for example whether the incentive should be fleet-based or individual ship-based; or whether there should be different considerations for northbound or southbound transits.

As mentioned above, our VSR program will be modeled after the successful Ports' VSR programs. These programs were initially configured to span a distance of 20 nautical miles (nm) from the Point Fermin Light. In 2009 the areal extent was expanded to include a 40 nm zone. To increase program participation, POLB (in 2005) and POLA (in 2008) began offering financial incentives to vessel operators.

Using the information gathered in data analysis and stakeholder discussions, we will adapt the Ports' programs to a larger scale program. Our initial focus will be on a 12 knot target, as used at the POLA and POLB. Our initial calculations for a 12 knot California–wide VSR program indicate in 2020 up to 2.5 million tonnes of CO2e could be eliminated with a 90% participation rate of ocean-going vessels traversing within 100 nm of the coastline (see the section "Potential Emission Reductions" for a more detailed discussion).

The Ports' programs are fleet-based, and operators who achieve 90% compliance in a calendar year (in the applicable VSR zone) are either eligible for a future dockage rate reduction, or receive a rebate. Operators are eligible for either the 20nm or the 40nm incentive, but not both. Compliance is based on actual vessel speeds (AIS data) as collected by the Marine Exchange of Southern California (Marine Exchange) and includes both arrivals and departures to/from the two ports. The Ports have developed an automated vessel registration and tracking system that uses AIS data to verify vessel compliance. This system could potentially be used in an expanded program. AIS data identify individual vessels and their speeds on a continuous basis and are available up and down the California coast. As part of this task, we will review the data available for tracking compliance over the areal extent of the proposed VSR program, and identify gaps and needed additional AIS receivers. Appropriate AIS datasets will be selected and tested. We will evaluate which existing elements of the port VSR program structure can be directly adapted for an extended VSR program, and identify additional provisions for consideration.

The Environmental Shipping Index (ESI) and Energy Efficiency Operational Indicator (EEOI) will be evaluated to determine how they can be integrated into the VSR incentive program structure. The ESI is a separate incentive program currently in effect at POLA and various ports around the world. The ESI awards points to the score for a particular ship when steps have been taken to reduce emissions in advance of regulations, for example by using cleaner engines before required to. Ships registered in the POLA ESI program are rewarded per port call based on their ESI scores.

Currently ships receive GHG points as carbon dioxide (CO2) points under the ESI for having a Ship Energy Efficiency Management Plan (SEEMP) in place. In July 2011, the International Maritime

Organization (IMO) made a SEEMP mandatory for all ships[2]. To receive CO2 points under the ESI in the future, shipping operators will have to go beyond simply having an energy efficiency plan in place to demonstrating operational fuel efficiency. The EEOI is a monitoring tool that enables operators to measure the fuel efficiency of the ship in operation and to gauge the effect of changes in operation. The EEOI will provide additional data to track GHG emissions and supplement compliance tracking based on speed. Linking these indices to a VSR program could make the program more attractive to shippers since the monetary rewards compound as rewards are obtained at each successive port for an index oriented program.

Task 1 will culminate in preparation of a report detailing the optimal VSR approach and tracking mechanisms. The report will include the projected participation rate, updated estimates of yearly costs for incentive pay-outs, and the resulting GHG and criteria pollutant reductions.

Task 2

Using the foundation of the report, a detailed plan will be developed for implementing the demonstration project. The plan will address:

- Geographic bounds of program
- Number of expected participants
- Alternative time periods for speed reduction (full year, half year, etc.)
- Payment structure (trip basis, fleet basis, etc.)
- Registration Procedures
- Ship speed tracking
- Fuel use tracking
- Logging requirements
- Data averaging procedures
- Incentive payment procedures

Task 3

A VSR incentive demonstration program will be implemented from the Ports of Los Angeles and Long Beach northern boundary through the Santa Barbara Channel. Incentive payments will be paid out to VSR participants in accordance with the procedures specified in the implementation plan. Changes to the implementation strategy will be made if necessary to ensure the program is operating smoothly and desired outcomes are met. As this demonstration program continues, recommendations will be made about expansion of the program, and optimal timing for the expansion. Phase 1 will culminate in development of an implementation plan for Phase 2.

Phase 2

In Phase 2, we would implement a program for a much larger portion of the California coast, or the entire California coast. The elements and parameters would be similar to those identified in Phase 1, adjusted with the information that would be developed in Phase 1.

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[2] See IMO website at (http://www.imo.org/ourwork/environment/pollutionprevention/airpollution/pages/technical-and-operational-measures.aspx) for additional information.

Potential Emission Reductions

We have estimated the CO2e and NOx emission reductions that could be achieved in 2020 should a 12 knot VSR program be instituted for the Santa Barbara Channel as well as for entire state coastline. The 2020 statewide and Santa Barbara County marine shipping NOx and CO2e emission estimates were generated utilizing the California Air Resources Board Marine Emissions Model and their California Emissions Projection Analysis Model (CEPAMS). The emissions are associated with shipping activity from the shoreline out to 100 nautical miles.

Emission projections take into account both anticipated shipping growth and federal and international fuel and engine control standards. ARB projected growth is based on trends in net registered tonnage (NRT). Controls include IMO fuel and engine standards that are expected to yield significant particulate matter and NOx reductions in the future.

The reductions estimates are based on assuming ships operate at an engine load of 50 percent in the open waters off California. This is a conservative estimate as a starting point for computing reductions as some ships cruise at 80% to 90% of rated load. This load translates to a cruise speed of 18 knots for container ships. The engine load at 12 knots for each ship type was calculated using the propeller law with the average maximum speed by ship type obtained from the ARB. The ratio of the engine load calculated at 12 knots to a 50 percent load was then applied to CO2e and NOx emissions to yield the reductions

Potential 2020 VSR emission reductions with and without a 12 knot VSR were calculated for participation rates of 90 percent. Statewide and Santa Barbara County emission estimates are displayed in Tables 1 and 2 respectively.

Table 1: 2020 Statewide Emission Estimates with and without a 12 knot VSR

Statewide	Emissions with No VSR	Emissions with VSR (90% participation)	Percent Reduction in Emissions
CO2e (tonnes)	5,104,917	2,521,345	51%
NOx (tons)	84,586	41,478	51%

Table 2: 2020 Santa Barbara County Emission Estimates with and without a 12 knot VSR

Santa Barbara County	Emissions with No VSR	Emissions with VSR (90% participation)	Percent Reduction in Emissions
CO2e (tonnes)	1,315,113	649,541	51%
NOx (tons)	24,044	11,875	51%

At a 90 percent participation rate, it is estimated that CO2e emissions on a statewide basis could be reduced by over 2,580,000 tonnes. Projected statewide NOx reductions would be 43,108 tons. For

Santa Barbara County CO2e emission decreases would be 665,000 tonnes at 90 percent participation. NOx emissions could be reduced by 12,169 tons at 90 percent participation.

Costs

Phase 1

Phase 1 program development and demonstration will be performed by a contractor selected and managed by the District. This contractor will be required to have prior experience in calculating marine shipping emissions, working with ports, and designing vessel speed reduction programs.

We estimate Phase 1 costs to be:

First Year – Program Development Estimated Costs

Contractor	$ 380,000
District labor and other direct costs (e.g. AIS upgrades, etc.)	$ 110,000
TOTAL	$ 490,000

Second Year – Demonstration Estimated Costs

Incentives	$4,000,000-$6,000,000
Ongoing – contractor	$ 120,000
District program implementation	100,000
TOTAL	$4,220,000-$6,220,000

Note: For reference, in its 2012/2013 budget, POLA dedicated $2 million to its incentive program. For fiscal year 2013, POLB anticipates that its incentive program will cost $2.4 million

Phase 2

The majority of the Phase 2 costs will be for the incentives awarded. This depends on the incentive price for the extended program area, the number of participants, and additional factors that will be identified in Phase 1. It is expected that the annual cost would be greater than $6 million annually to expand the program along the entire California coast.

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