August 11, 2008

Mary Nichols, Chairperson
California Air Resources Board
1001 I St., P.O. Box 2815
Sacramento, CA 95812

RE: AB 32 Draft Scoping Plan Comments on Goods Movement and Medium and Heavy-Duty Trucks

Dear Chairperson Nichols and Members of the Board:

The Union of Concerned Scientists, Natural Resources Defense Council, Environmental Defense Fund, Sierra Club California, and The Center for Energy Efficiency and Renewable Technologies applaud the California Air Resources Board (CARB) for developing the nation's most comprehensive plan to date for reducing the pollution that causes global warming. While still in draft form, the proposal represents the furthest step forward any state has taken in the fight against global warming. Tackling greenhouse gas (GHG) emissions from transportation, the largest source of emissions in California, is an absolute necessity to meet our 2020 targets. Within the transportation sector, heavy-duty vehicles and goods movement sources account for over 20 percent of the emissions, with significant growth expected in the coming decade. Many of the measures to reduce GHGs from goods movement sources have positive economic benefits as a result of fuel savings and operational efficiencies associated with them. In addition, co-benefits of reduced diesel emissions can aid California in its fight to achieve clean, healthy air throughout the state. We fully support CARB's inclusion of measures to reduce GHG from the goods movement sector and respectfully offer the following comments on the draft proposal.

Goods Movement Sources Draft Scoping Plan Measures (T4 – T5)

We appreciate the inclusion of goods movement in the Draft Scoping Plan; many opportunities exist for significant GHG reductions from this large sector. Although many of the measures for the goods movement system are unlikely to fully phase in by 2020, it is important to lay the groundwork for these measures now before the upcoming major port expansions are complete. As the Draft Scoping Plan states, California ports are projected to increase cargo throughput 250 percent by 2020 (p. C-22). The Port of Los Angeles recently finalized plans to move forward with the TRAPAC terminal, which at full build out will be the equivalent of adding the Port of Houston into one mega-terminal, and by itself would add 0.3 MMT of CO2e by 2015. Similarly large projects are under consideration now, such as the China Shipping terminal expansion at the Port of Los Angeles and Long Beach's Middle Harbor project. These present a significant opportunity to develop and incorporate a strong set of GHG reduction strategies into large new projects. We strongly encourage CARB to begin working right away with the ports and other large infrastructure providers such as rail companies to embed low carbon technologies and design elements into the plans of all major expansions before they are complete.

CARB, and particularly the staff who worked to develop the port truck and shorepower rules quickly, can only be applauded for these important, health-protective regulations that set a strong example for improving goods movement in California. We strongly support the other measures that clean up goods movement, including regulations covering cargo-handling equipment, harbor-craft and marine fuels. We note, however, that CARB should proceed with caution on the Vessel Speed Reduction measure, since a recent study indicates increased NOx emissions at lower speeds due to inefficient engine operation at lower loads.[1]

We appreciate the system-wide approach to goods movement contained in the Goods Movement Efficiency Measures (T-5). The relationships between ports, railroad operators, shipping companies, terminal operators, ship owners/operators, importers, exporters, trucking companies serving goods movement facilities, government agencies and the public require an integrated approach encompassing all of these entities. We also strongly support the two component approach to deal with the four key goods movement corridors, including an "audit" of sources and development of corridor plans; as well as a longer-term global approach to establish a sustainable goods movement vision, including a taskforce.

To ensure the development of comprehensive strategies to reduce emissions by 2020, CARB should convene the proposed Goods Movement Vision 2050 Task Force as an advisory body to develop the first component. This would help establish the experts and expertise needed for the phase two global approach. While many of the phase two approaches may appear to be 2050 solutions, there will be synergies and overlaps with near-term efforts that should be maximized.

In order to facilitate an accurate accounting for sources of GHGs within this sector, CARB should include all major ports, railyards, distribution centers and truckstops in the mandatory reporting regulation. While these facilities are not traditional stationary sources, GHG emissions from many goods movement facilities likely dwarf those from stationary sources and for practical purposes these facilities act in many ways as stationary sources, albeit with more diffuse smokestacks. Further, some goods movement facilities, including the Ports of Los Angeles and Long Beach, are already beginning to inventory their GHG releases.[2]

We support all of the following potential measures covering ships, port trucks, commercial harbor craft, cargo equipment and refrigeration units and look forward to working with staff to develop these further:

- Advanced hull and propeller designs, coatings and maintenance; advanced engine design, heat recovery and operational controls; and utilization of wind power for ships.
- Fleet modernization for port trucks.
- Efficiency improvements for harbor craft.
- Idling restrictions for cargo equipment.
- Energy efficiency guidelines and limitations to the use (or over-use in the case of extended cold storage) of transport refrigeration units on trucks, trailers, shipping containers and railcars.

[1] H. Agrawal et al. / Atmospheric Environment 42 (2008) 5504–5510.
[2] Port of Los Angeles, Inventory of Air Emissions for the Year 2006, prepared by Starcrest Consulting, LLC, July 2008; http://www.portoflosangeles.org/DOC/REPORT_Air_Emissions_Inventory_Volume1.pdf

Additional Measures to Reduce GHG from Goods Movement

We also urge you to consider the following additional measure to improve the efficiency and reduce GHGs from the Goods Movement sector:

Rail

Increased On-Dock Rail - Rail is a more efficient and less polluting means to transport cargo than drayage trucks. Considering that current demand on the Alameda Corridor in Southern California, for example, is low and that forecasted project-related increases in trains could be easily accommodated, use of on-dock rail should be increased. Greater use of on-dock rail at port terminals not only encourages greater use of more efficient rail in general, but cuts out the wasteful drayage truck step between the terminals and cargo already headed to rail yards.

Electrification of Rail – Numerous opportunities exist to electrify rail lines in California, particularly in urbanized areas that handle heavy rail traffic, such as the Alameda Corridor. Several options exist:

- **Maglev-** Using electromagnetic force, a Maglev system would create zero emissions at source and has been demonstrated in La Jolla, CA as a feasible cargo shipping technology, though not yet ready and market available. At 80 mph new, elevated guideways would move cargo, also utilizing associated terminal infrastructure. The technological capacity has been proven, though the economic feasibility needs further assessment, since the Maglev is admittedly expensive.
- **LIM-Rail-** Linear motors would be placed along railroad tracks and aluminum plates attached to the bottom of cars. A magnetic field moving along the motors in the track would induce a current in the plates and propel the vehicles. The LIM-Rail system uses existing infrastructure and current railroad operational practices, but can also be used in conjunction with the Maglev system. There is currently no test track for this concept, though the principles have been applied in other systems.
- **Electric Dual-Mode Trams-** CargoRail trams are rubber-wheeled vehicles that can carry marine cargo containers at 75 mph on an elevated guideway or on local streets. On the guideway, they would be propelled by electricity via permanent magnet hub motors in the wheels. On local streets they could be fueled by clean fuel, such as CNG, to generate the electricity for the motors.

Demonstration Projects should be funded to explore these options.

Other Rail Efficiency Improvements – Switching locomotives can also be electrified or at the very least required to utilize hybrid technologies. The Green Goat is just one of several battery electric hybrid options for locomotives. Significant GHG reductions could be achieved through the use of more efficient trains, yielding 13 percent fuel reductions, while advanced technology could yield even greater reductions of 30 percent. In fact, the Swiss railways forecast up to 60 percent efficiency gains through their R&D on lightweighting, cutting drag and friction and

optimizing operations.[3] Finally, more stringent idling limits for locomotives could save significant amounts of fossil fuel.

Port Trucks

Electric drayage trucks- The Port of Los Angeles recently announced the introduction of a heavy-duty electric short-haul truck. Based on the average emissions generated by the 2006 fleet of drayage trucks that served the San Pedro Bay ports, if 1.2 million truck trips were to be made with electric trucks, 34,987 tons per year of carbon dioxide (CO2) emissions would be eliminated. Furthermore, electric trucks present a significant 85 percent cost savings for operations.[4]

Truck Idling Reduction – While truck idling has been significantly curbed by CARB regulations, it is still a problem during queuing and other similar operations. Plug-ins should be provided for all trucks that must keep engines running for operational purposes at ports, rail-yards, distribution centers or truck-stops. Climate-controlled "comfort stations" could be provided for drivers who would otherwise idle their trucks in order to operate the air conditioner or heating. Mandatory logistics software as a part of the tracking system would improve scheduling, increase efficiency and ensure full truckloads. Finally, improvements could be made to existing heavy-duty idling laws to include GHG reductions or limits for alternative idling devices. Such requirements would help advance zero and near zero emissions idling alternatives.

Improved Freight Logistics – Empty containers can account for up to twenty percent of truck traffic in some areas. Software programs can and have already been utilized to improve logistics and remove empty containers from transport. Chassis pooling at large cargo centers, such as port terminals, rail yards, and airports could also be used to reduce unnecessary trips. Finally, the use of improved and expanded open hours of gate operations can minimize queuing at cargo centers as well as congestion on local roadways.

Lower Speed Limits – Reducing speed minimizes fuel consumption and therefore reduces GHG emissions.

Additional Efficiency and Electrification Improvements

Transportation Mode Shifting – Rail transport is significantly more efficient than truck transport, as mentioned earlier, and drastically more efficient than fuel-intensive air transport. Programs and incentives should be developed to shift truck and air freight to rail. The potential for "piggybacking" of trucks on flat-bed rail cars should be fully explored for routes simply transiting through California, such as along the I-5 and 99 corridors. Increased utilization of barges or other water transport of goods could also be evaluated to improve transport efficiencies.

Electrified tugs- could plug in to charge at dock and use stored electric energy to perform ship assist operations. Fast-charging systems have already been commercialized for use at airports

[3] Based on Winning the Oil Endgame: Innovation for Profits, Jobs and Security, Rocky Mountain Institute, p. 79.
[4] Port of LA. 16 May 2008. http://www.portoflosangeles.org/newsroom/2008_releases/news_051608_et.asp

(for ground support equipment) and other industrial settings, powering over 15,000 vehicles in North America.

Cranes- that are already powered by electricity could be further optimized to save energy. Virtually all ship-to-shore cranes are equipped with regenerative braking to capture energy while lowering containers. However, this energy often goes unused for lack of storage or load sharing. We recommend optimization of cranes to fully utilize regenerative power. Other cargo-handling equipment can be electrified, at least partially. RailPower Technologies, for example, offers a retrofit hybrid system for rubber-tired gantries.

Yard hostlers- may be the most promising piece of yard equipment to electrify, since these are the greatest source of GHGs from yard equipment. Yard hostlers idle up to half the time, often pull minimal loads rather than a full container, and operate at low speeds. These characteristics make yard hostlers amenable to similar technology used to electrify airport ground support equipment. The Port of Los Angeles is currently in development and demonstration of an electric hostler,[5] and is also considering the substitute of electric drayage trucks for hostlers. Now that prototypes exist, serious consideration should be given to phasing in electric yard hostlers where ever they are used.

Intelligent Container Design[6] and Efficient Goods Packaging - Numerous efficiency and design improvements can be made to containers. Dramatically reducing the weight and improving the design of containers can result in greenhouse gas as well as criteria pollutant reductions. The container itself is typically 10-25 percent of the gross weight of a container loaded with cargo, and 20 percent of containers are shipped empty. Container design has not changed in almost 50 years. Clear targets for redesign include weight reduction and technology to facilitate logistics, such as tracking devices, as well as improved design for refrigeration.

Nationwide adoptions of a lightweight container (~30-50 percent weight reduction) could reduce at least 1 million tons of CO2e (assuming that 5 percent of Class 8 trucks carry new containers and 20 percent of freight trains carry new containers). Also, there is significant potential to reduce greenhouse gas emissions from the volatilization of HFCs via alternate refrigeration and improved efficiency of the refrigerated containers.

Finally, standards for packaging that minimize excessive weight and bulk could be required.

Medium- and Heavy-Duty Trucks Draft Scoping Plan Measures (T6-T8)

Improving the GHG emissions of California's medium- and heavy-duty trucks, responsible for 20 percent of the states's transportation global warming emissions, will be critical to meeting our 2020 and 2050 climate change goals. Measures to improve GHG emissions from this sector, primarily fueled by diesel, will also compliment CARB's efforts to reduce toxic diesel particulate matter and nitrogen oxide emissions. We applaud CARB for including measures which apply to this sector in the Draft Scoping Plan, and offer the following comments.

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[5] SCQAMD. *Board Meeting Date: April 4, 2008. Agenda No. 5.* http://www.aqmd.gov/hb/2008/April/08045a.htm

[6] Information provided by Laura Schewel, Rocky Mountain Institute, Personal Communication, 21 September 2007.

ARB should consider developing comprehensive performance-based GHG standards for new heavy- and medium-duty trucks and trailers in California. CARB is in the process of developing requirements for the use of aerodynamic and rolling resistance devices to long-haul Class 8 box van trailer heavy-duty trucks and trailers. These proposed requirements, based on the EPA SmartWay program, apply to new and in-use heavy-duty trucks and rely on technology that is proven, cost-effective and available in the market today. Implementation of the proposed rule will provide near immediate reductions in GHGs from long-haul heavy-duty trucks.

However, the current rules are not technology forcing and do not advance emission reductions beyond today's currently available technology. To meet our 2020 and 2050 GHG reduction goals, CARB should set technology-forcing, performance-based GHG standards for medium- and heavy-duty trucks. The proposed engine standards for heavy-duty and hybridization standards for medium- and heavy-duty trucks as outlined in the Draft Scoping Plan partially achieve this goal. However, focusing solely on hybridization and engine improvements for medium- and heavy-duty ignores technology advancements in aerodynamics, rolling resistance, transmission and drivetrain improvements, and optimization through vehicle integration and weight reduction. To fully capture the potential improvement in truck GHG emissions, CARB should develop performance-based standards that advance both conventional as well as hybrid GHG technologies for heavy- and medium-duty trucks and maximize whole vehicle performance.

Development of Medium- and Heavy-Duty Standards should be developed as soon as possible. The hybridization of medium- and heavy-duty vehicles measure (T-7) has a proposed adoption date of 2011, ensuring standards would be in place by 2015. However, the heavy-duty engine efficiency standard would not be brought to the Board until 2015 with implementation in 2017, nearly a full decade from now. CARB should develop medium- and heavy-duty truck standards in the 2011 timeframe to ensure maximum 2020 and 2050 emission benefits.

Heavy-duty trucks can last decades in operation, meaning benefits of new vehicle standards will take many years to be fully realized. In addition, US DOT is beginning a multiyear process to develop fuel efficiency standards for medium- and heavy-duty trucks. This process will not deliver fuel economy benefits until the 2016 model year at the earliest and the standards will not be established based on GHG criteria. CARB should use its authority to develop standards for trucks in a more accelerated timeframe and expressly aimed at reducing GHG emissions. As proven by past success, California can lead the nation, and set global precedents in getting the cleanest cars and trucks in the world onto the state's roads and highways.

Developing comprehensive GHG performance standards for the medium- and heavy-duty truck sector in California will be a significant undertaking, but a worthwhile effort. Other countries around the world have recognized the need to advance heavy-duty efficiency and reduce GHG emissions. Japan was the first country to implement heavy-duty fuel economy standards in 2005. The China Automotive Technology and Research Center (CATARC) aims to propose methodologies for regulating fuel consumption (i.e. the basis for standards, what methods to use for each heavy-duty vehicle model fuel consumption determination, etc.) from heavy-duty vehicles by the end of 2008. CATARC hopes to propose the fuel consumption standards in 2009. In addition, the European Commission is working with industry to establish a global heavy-duty

fuel efficiency certification method and labeling requirements for heavy-duty fuel efficiency, starting with engines and then expanding to components and/or entire vehicles at a later date.

CARB should apply measures currently identified for light-duty vehicles to heavy-and medium-duty vehicles. In the Draft Scoping Plan, the vehicle efficiency measures (T-3) include low rolling resistance tires, low friction lubricants and solar-reflective automotive paint and window glazing. These same strategies can and should be applied to medium- and heavy-duty vehicles and trailers for both original equipment and aftermarket components.

We thank CARB again for taking bold steps to reduce California's greenhouse gas pollutants and for the opportunity to comment on the Draft Scoping Plan. We look forward to continuing to work with CARB to refine the Plan that will lead the state to achieving our GHG reduction goals.

Sincerely,

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