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Review of the Draft Environmental Impact Statement/Report (Draft EIS/EIR) for the Proposed Berths 212-224 (YTI) Container Terminal Improvements Project

The South Coast Air Quality Management District (SCAQMD) staff appreciates the opportunity to comment on the Draft EIS/EIR for the Proposed Berths 212-224 (YTI) Container Terminal Improvements Project. The proposed Project involves deepening two existing berths, adding one additional berth, modifying and replacing cranes, adding on-dock rail track, and constructing backland improvements. At completion, the modifications will increase the terminal capacity by approximately 13 percent from 1,692,000 TEUs to 1,913,000 and result in a 10 and 13 percent increase in resulting truck and train trips, respectively over the No Project Alternative.

The proposed Project is also one of two major port projects that are currently going through the approval process (Yang Ming being the other one). It is important that these projects are developed in a complementary and coordinated manner to achieve the long-term goal of reducing the significant air quality impacts the Ports of Los Angeles creates in the South Coast Air Basin.

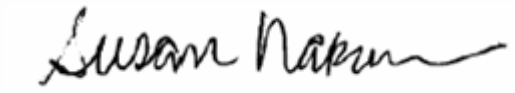
Based on the Draft EIS/EIR, the proposed Project will cause significant impacts after mitigation for construction and operation. The proposed project's regional emissions impacts from construction under CEQA will remain significant after mitigation for PM2.5, NOx, CO, and VOC. PM2.5 is significant after mitigation in 2015. Construction impacts also cause exceedances of the significance thresholds for the localized impacts

from NO_2 and PM10 during both construction years (2015 and 2016). The proposed project's regional operational emissions impacts under CEQA will remain significant after mitigation for NOx, CO, and VOC. Peak day operational emissions impacts also cause exceedances of the localized significance thresholds for NO_2 and PM10. SCAQMD staff is also concerned that the modeling conducted for this EIR demonstrates that emissions from this terminal exceed the federal ambient air quality standard for NO_2 during long-term operations. Further, the proposed Projects impacts on cancer risk show that even after mitigation, the maximum predicted cancer risk is above 10 in 1 million for occupational and marina-residential receptors in comparison to the future CEQA baseline (31 in 1 million for occupational, and 11 in I million for marina-residential), which is above the significance threshold.

Exceedances of the SCAQMD significance thresholds even after implementation of proposed mitigation measures necessitate the lead agency to mandate additional mitigation measures. These findings of significance show that all feasible mitigation measures including zero emission technologies such as battery-electric truck technologies are necessary, and should be incorporated as enforceable project requirements. Further, although the DEIR states that on-dock rail is already being maximized at this facility, given the significant air quality impacts related to other rail yard projects proposed for development off port, the lead agency should reconsider this conclusion and provide additional analysis showing the possibilities for increasing on-dock rail beyond what is currently proposed. In Attachment A, the SCAQMD staff has provided a discussion of changes to existing mitigation measures and some additional mitigation measures which the lead agency should implement. Attachment A also includes specific comments on the Draft EIS/EIR's modeling and emission quantification analysis and assumptions.

Pursuant to Public Resources Code Section 21092.5, please provide the SCAQMD staff with written responses to all comments contained herein prior to the adoption of the Final EIS/EIR. Further, staff is available to work with the lead agency to address these issues and any other questions that may arise. Please contact me, at (909) 396-3105, if you have any questions regarding the enclosed comments.

Sincerely,



Susan Nakamura
Director, Strategic Initiatives

SN:EE:IM:JK
Attachments

ATTACHMENT A

Zero Emission Container Transport System

- The proposed Project will increase the number of containers at the YTI terminal. The change to the on-dock rail yard as proposed has insufficient capacity to handle the increase in containers. As a result, the number of annual truck trips to near or off-dock rail yards will increase by 10% over the No Project Alternative (Table 3.2-7). Because of the significant NOx regional emissions and NO_2 localized impacts from the proposed Project operations (including trucking activities) identified in the Draft EIS/EIR, CEQA requires the lead agency to implement all feasible mitigation (CEQA Guidelines 15126.4). The proposed project should include a measure that requires transport of containers using a zero-emission technology that does not create tailpipe emissions from the vehicle or system that is transporting containers. Zero-emission container transport technologies can be commercialized in sufficient time to begin operational deployment between the YTI terminal and the near-dock railyards. An update to the discussion of zero-emission truck technologies and their current state of commercialization previously submitted with our comments to the Draft and Recirculated Draft Environmental Impact Report (Recirculated DEIR) for the Southern California International Gateway (SCIG) Project in 2012 is also included in this comment letter as Attachment B.

Compatibility with the 2010 CAAP and San Pedro Bay Standards

- The proposed Project is not consistent with the San Pedro Bay Standards. As outlined in the 2010 Update to the Clean Air Action Plan (CAAP)[1] the San Pedro Bay Standards represent the health risk and emissions reduction goals for the ports through the year 2023. According to the San Pedro Bay Standards, environmental analysis of each proposed port project, such as the YTI Container Improvement Project must include a review of newly feasible and available project-related emission control technologies, if any, that if imposed on the proposed project, would contribute to achievement of the 85% risk reduction goal of the Health Risk Reduction Standard and the various emission reduction goals of the Emission Reduction Standards outlined in the CAAP. The proposed Project is inconsistent with this goal.

  One example of the inconsistency with the San Pedro Bay Standards is that all projects must meet the 10 in 1,000,000 (10 in 1 million) in excess residential cancer risk threshold, as determined by health risk assessments conducted subject to CEQA statute, regulations and guidelines, and implemented through required CEQA mitigations associated with lease negotiations. However, the proposed Projects impacts on cancer risk shows that even after mitigation, the maximum predicted cancer risk is above 10 in 1 million for occupational and marina-residential receptors in comparison to the future CEQA baseline (31 in 1 million for occupational, and 11 in 1 million for marina-residential), which is above the significance threshold.

[1] San Pedro Bay Ports Clean Air Action Plan 2010 Update, http://www.portoflosangeles.org/CAAP/12_21_2010_CAAP_update_full_text.pdf

The Final EIS/EIR should provide a comparison of the proposed Project's with the San Pedro Bay Standards. As specified in the 201 Update to the CAAP, the evaluation should be based on the following criteria[2]:

- Projects must meet the 10 in 1 million excess residential cancer risk threshold, as determined by health risk assessments conducted subject to CEQA statute, regulations and guidelines, and implemented through required CEQA mitigations associated with lease negotiations.
- Projects that exceed the SCAQMD CEQA significance threshold for criteria pollutants must implement the maximum available controls and feasible mitigations for any emissions increases.
- The contribution of emissions from a particular project to the cumulative effects, in conjunction with CAAP and other adopted/implemented control measures, will allow for the timely achievement of the San Pedro Bay Standards.

Criteria Pollutant Impacts

- *NO_2 Ambient Air Quality Standard Exceedance*

  Table 3.2-35 of the EIR shows that the mitigated incremental project impact (36 $\mu g/m^3$), when added to the background (164 $\mu g/m^3$), yields a total project impact of 200 $\mu g/m^3$. This concentration causes an exceedance of the federal 1-hr NO_2 ambient air quality standard (188 $\mu g/m^3$) during long-term operations. Although the exceedance is dominated by the background concentration, the location of the background monitor within about a quarter mile of the project site indicates that the YTI terminal is a significant contributor to the high background.

  SCAQMD staff is concerned that a potential future exceedance of an ambient air quality standard may be caused in whole or in large part by a single facility. Besides affecting public health, exceedances of ambient air quality standards can have other repercussions (e.g., economic, regulatory, etc.) to the region due to the federal mandates to address the exceedance. The primary sources contributing to these exceedances in the dispersion modeling are locomotives, trucks, and ships, depending on location. Because of the limited paths to reduce emissions from these sources through traditional regulatory mechanisms, this CEQA document may represent the most effective way of addressing this exceedance. The Final EIR should therefore require additional mitigation to ensure that this project will not cause an exceedance of the NO_2 ambient air quality standard.

- *Maps of Criteria Pollutant Impacts*

  The EIR and appendices contain tables and text describing the dispersion modeling of criteria pollutants, however no maps are provided showing the extent of those impacts. The only maps provided (e.g., Figure 3-16 in Appendix B2) only show the points of maximum impact. Maps that show contours of all areas affected

[2] San Pedro Bay Ports Clean Air Action Plan 2010 Update, http://www.portoflosangeles.org/CAAP/12_21_2010_CAAP_update_full_text.pdf

significantly by NO_2 and other criteria pollutants should be provided in the Final EIR, similar to what is shown for cancer risks.

- *Source Contributions of Criteria Pollutant Impacts*

  Table 3-34 from Appendix B2 of the DEIR presents a useful breakdown of source contributions at the points of maximum impact for each criteria pollutant. The Final EIR should include an expansion of this table showing source contributions at other key areas. For example, the dispersion modeling files provided to SCAQMD staff show that 1-hr NO_2 concentrations exceed federal ambient air quality standards in an area surrounding the project, and also in residential areas in San Pedro. As shown in Table 3-34, referenced above, locomotives are the key contributor at the point of maximum impact. However from the dispersion modeling files it appears that ocean going vessels are the key contributor for residential areas in San Pedro. The Final EIR should illustrate these differences, and tailor mitigation accordingly.

On Dock Rail

- Section 2.9.2.3 of the DEIR states that additional on dock rail beyond what is proposed for the project is not possible for this facility. Three reasons are provided:

  1. There are infrastructure limitations between the marine terminals and the Alameda Corridor
  2. Not all intermodal cargo can be placed on a train on-dock due to the time needed to build a train for some cargo. Building trains sourced from multiple locations is easier and faster off port at near or off dock rail yards.
  3. Not all intermodal cargo needs to travel by train, most only travels by truck.

  SCAQMD staff appreciates this rationale, however conditions may change in the future that allow greater use of on dock rail. For example, if rail infrastructure limitations are addressed in the future (e.g,. the bottleneck at Badger Bridge), then the only remaining impediment to increasing on dock rail may be the on dock rail yards themselves. Given the significant impacts to the community from proposed near dock rail yards, the YTI project should allow the flexibility to increase on dock use in the future. As one example, though not necessarily a recommendation, if the TICTF rail yard were rebuilt to include electric wide span gantry cranes to allow greater throughput, access was allowed at all on dock rail yards from other terminals, and rail infrastructure limitations were addressed, then the percentage of on-dock rail may be able to significantly increase. The Final EIR should present additional analysis of ways that on dock rail can be increased in the future, even if the analysis doesn't assume that all new cargo throughput utilizes on dock rail (as already dismissed in Section 2.9.2.3).

CEQA Baseline

- The Draft EIS/EIR should include a realistic baseline which accurately reflects the improvements in air quality that will occur, independent of the proposed project. The Draft EIS/EIR uses a CEQA baseline for determination of air quality impacts from criteria pollutants based on calendar year 2012 which corresponds to the release of

the Notice of Preparation (NOP) for the proposed Project. For analysis purposes under Air Quality Impacts AQ-1 through AQ-5, this baseline is held constant and compared to future years under the proposed Project. However, this approach uses a comparison between the proposed Project impacts and a baseline that is not reflective of future emission reductions from existing air quality rules and regulations. As mentioned in previously submitted comment letters, the SCAQMD staff believes that CEQA not only allows but actually requires a determination of significant impacts that does not credit the project with unrelated improvements in air quality that will occur anyway. The lead agency did take this baseline approach when determining significance for cancer and other health risks of the proposed Project, and for consistency, this approach should be used when determining significance for regional criteria emissions.

The purpose of CEQA is to disclose environmental impacts from the proposed Project to the public and decision makers. Not taking into account future emission reductions from existing air quality rules in the baseline masks adverse impacts and results in the appearance that the proposed Project benefits air quality, while in fact the effect of implementing existing rules and regulations is contributing most of the air quality benefits. CEQA's intent is to provide the public and decision makers the actual changes to the environment from the proposed Project.

Mitigation Measures

- *MM AQ-3: Fleet Modernization for On-road Trucks (used during construction)*

  MM AQ-3 of the Draft EIS/EIR requires that all on-road heavy-duty diesel trucks used during construction should comply with the EPA 2007 on-road PM and NOx emission standards. Because of the significant NOx and NO_2 impacts, the Draft EIS/EIR should require as part of this mitigation measure, use of the trucks that emit the lowest levels of NOx available. Specifically, trucks used during construction should operate on engines with the lowest certified NOx emissions levels (i.e., meeting a 0.2 g/bhp-hr NOx emission level), and if the cleanest available truck does not meet the EPA NOX emission level of 0.2 g/bhp-hr, then those meeting the 2007 on-road NOx emission standards may be used. Mitigation Measure MM AQ-3 should also apply during circumstances where a piece of compliant equipment becomes available during the timeframe of construction.

- *MM AQ-6: Construction Best Management Practices (BMPs)*

  Mitigation Measure MM AQ-6 of the Draft EIS/EIR requires the lead agency to implement BMPs contained in the LAHD Sustainable Construction Guidelines to reduce fugitive dust air emissions during construction. The Draft EIS/EIR is clear on how construction equipment and on-road trucks used during construction are consistent with the Guidelines. However, it is far from evident what the list of fugitive dust construction BMPs are for the proposed Project. At minimum, the fugitive dust prevention BMPs should be specified in the Draft EIS/EIR and include the control measures contained in the SCAQMD CEQA Air Quality Analysis Handbook available at the following link: *http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies/fugitive-dust*

- *MM AQ-9: Cleaner OGV Engines*

  As the Draft EIS/EIR acknowledges, the majority of the NOx emissions impacts are caused by ocean going vessels (OGV) transiting to and from the YTI terminal. The lead agency has proposed mitigation measure MM AQ-9 (Vessel Speed Reduction) which reduces NOx emissions from OGV during transit. Because the project will have significant regional and localized air quality impacts related to NOx emissions and NO_2 concentrations, the lead agency must implement additional feasible mitigation measures for all sources, including OGV.

  Considering that the transit emissions from ocean going vessels are a substantial portion of the NOx emissions from the proposed Project, the Final EIS/EIR should include a mitigation measure for vessels to meet the cleanest new engine standards to preferentially call at the YTI terminal. By January 1, 2016 for vessels operating in the west coast ECA, IMO compliant Tier 3 vessels meet a NOx limit of 3.4 g/kW-hr. This NOx emission limit represents a 400% decrease in the NOx emission rate from uncontrolled OGV engines. Implementing a preferential low emission OGV mitigation measure will potentially reduce residual NOx emissions from OGV, below significance.

  The SCAQMD staff notes that such a measure was included in the Draft EIS/EIR for the APL Terminal Berths 302 – 306 released in 2011, as well as being included as a key implementation component of the 2010 CAAP update Control Measure OGV5. As stated in the text for OGV5: "Further, the ports shall also consider developing a targeted outreach program and/or establishing of an incentive program geared toward facilitating the early introduction of lower emitting OGVs and their preferential deployment to the ports of Long Beach and Los Angeles."[3] While the Draft EIS/EIR does state that the Environmental Ship Index (ESI) Program instituted in May 2012 is the method by which OGV5 is implemented Port-wide, the lead agency should include a OGV preferential deployment incentive program as a lease agreement for the proposed Project, especially given the air quality impacts from the proposed Project OGV emissions.

- *MM AQ-10: OGV Alternative Marine Power (AMP)*

  MM AQ-10 requires that by 2026, NYK Line operated ships calling at the YTI Terminal must use AMP for 95% of total hoteling hours while hoteling at the YTI terminal. The SCAQMD staff is encouraged that the lead agency is proposing to go beyond the CARB statewide regulation which requires 80% of at-berth emissions be reduced by on-shore power (or other equivalent methods). However, because the project will have significant regional and localized air quality impacts related to NOx emissions, the lead agency must strengthen this mitigation measure for all sources by including the following:

  – Accelerate the 95% requirement for NYK Line operated ships (56% of total) to 2017 because this is the first year that AMP will be available for use at Berths 217-220, and there is no reasonable explanation for delaying the implementation to 2026.

[3] San Pedro Bay Ports Clean Air Action Plan 2010 Update, pg.119
http://www.portoflosangeles.org/CAAP/12_21_2010_CAAP_update_full_text.pdf

- Apply the 95% requirement to non-NYK Line ships calling at the YTI Terminal (44% of total). The Draft EIS/EIR currently applies an 80% reduction to non-NYK Line ships calling at the YTI Terminal (Appendix B, Table B1.25) which mirrors the CARB Shore-side Power regulation requirement. However, since AMP will be available at all berths beginning in 2017, non-NYK Line ships have the capability to take advantage of this extra AMP capacity and if properly equipped, should be mandated to utilize shore power (in fact, the CARB regulation requires it).

- *Rail Mitigation Measure*

  The Draft EIS/EIR does not contain any mitigation measures for rail operations. Instead the lead agency relies on existing CAAP measure RL-2 (*Class 1 Line-haul and Switcher Fleet Modernization*) to further reduce emissions from Class 1 locomotives operating at the YTI terminal. The CAAP control measure RL-2 relies on the existing CARB MOUs and the existing U.S. EPA 2008 locomotive engine rulemaking to achieve emission reductions from rail operations. In addition, there is a complete absence of any discussion of the existing CAAP measure RL-3 (*New and Redeveloped Rail Yards*). Under CAAP Measure RL-3 the Port of Los Angeles should incorporate the cleanest locomotive technologies at new rail facilities, or modifications to existing rail facilities located on Port property. Since the Proposed Project includes expansion of the existing on-dock railyard, this in effect constitutes a modification to an existing rail facility on Port property and RL-3 should apply.

  While most of the switching and building of trains under the proposed Project is done by PHL, line haul locomotives do operate at the proposed Project site and the total annual number of on-dock rail trips is predicted to increase by 18% over the life of the project as compared to the no project alternative. Rail emissions represent the third highest contributor to NOx, after mitigation.

  In order to address these discrepancies and reduce the impacts from locomotive operations under Air Quality Impacts AQ-3 and AQ-4, the lead agency should add mitigation that requires accelerated introduction of Tier 4 line haul locomotives used at the YTI on-dock railyard.

- *Low Emission Drayage Trucks*

  Because the project will have significant regional and localized air quality impacts related to NOx emissions and NO_2 concentrations, the lead agency must implement additional feasible mitigation measures for all sources, including drayage trucks. NOx and PM emissions from diesel vehicles are substantially higher than emissions from zero-emission vehicles such as electric trucks. Even the cleanest combustion engine technology will have associated local NOx emissions impacts substantially above zero-emission technologies. Zero-emissions technologies such as those discussed in Attachment B thus must be included as mitigation measures for significant NO_2 concentrations. The deployment of zero-emissions technologies will also provide additional co-benefits in terms of additional reduction in diesel fine particulates and cancer risk.

- *Zero-Emission Yard Trucks*

  The Draft EIS/EIR for the proposed Project lacks any additional mitigation measures for cargo handling equipment (CHE). Instead it relies on implementation of CARB's Mobile Cargo Handling Equipment Regulation as a project element. Due to the operational air quality impacts being significant after mitigation for NOx (regional) and PM10 (localized), additional mitigation is needed. Going beyond CARB's regulation is required and the lead agency should include a mitigation measure requiring a specific percentage of yard trucks to be zero emissions. Zero-emission yard trucks offer substantial reductions in NOx and PM emissions compared to diesel yard trucks and are currently nearing the completion of their in-use testing. The SCAQMD staff anticipates their commercial availability within a two-year time frame which is well within the near-term operation schedule of the proposed Project.

- *Additional Mitigation Needed to Address Cumulative and Environmental Justice Impacts*

  State CEQA 13 Guidelines (14 California Code of Regulations [CCR] 15130) require a reasonable analysis of the cumulatively considerable impacts of a proposed Project. The conclusion of the Draft EIS/EIR is that after mitigation, the proposed Project would result in a cumulatively considerable and unavoidable contribution to an existing significant cumulative impact from regional impacts for PM2.5, NOx, CO, and VOC emissions under CEQA construction, and NOx, CO, and VOC emissions for operation. In addition, the proposed Project after mitigation would make a cumulatively considerable and unavoidable contribution to localized impacts from PM10 and NO_2. It is also clear that the proposed Project's cumulative impacts from cancer risks are above the significance threshold for occupational and marina-residential receptors in comparison to the future CEQA baseline.

  In addition, the Environmental Justice section of the Draft EIS/EIR states that, "Because the area surrounding the proposed Project site is predominantly minority and low-income, Impacts AQ-1 *[regional VOCs, CO, NOx, and PM2.5 impacts]*, AQ-2 *[localized NO_2 and PM impacts for construction]*, AQ-3 *[regional NOx and VOC]*, and AQ-4 *[localized NO_2 and PM impacts]* would constitute a disproportionately high and adverse effect on minority and low-income populations." These pollutants are associated with chronic respiratory diseases such as asthma as well as declines in pulmonary function, especially in children.

  The Draft EIS/EIR includes no additional mitigation measures to address these cumulative and environmental justice impacts. The lead agency needs to supplement the existing mitigation measures with new or enhanced emission reduction strategies for the proposed Project in order to reduce the cumulative and environmental justice impacts from the proposed Project and all other port-related projects. The strategies that should be considered have been stated above and include enhancements to MM AQ-3, MM AQ-9, MM AQ-10, as well as a separate rail mitigation measure and zero-emission container transport proposal.

Proposed Project Emission Quantification Analysis and Assumptions

- *Unavailability of DEIR Modeling and Emission Calculation Files*
  SCAQMD staff originally requested electronic copies of all modeling and supporting emission calculation files in our May 3, 2013 NOP comment letter. These files were not provided to us with the release of the Draft EIR, nor were they available online. We again requested these files on May 28, 2014 and did not receive a cd until June 10, 2014, six days before the end of the comment period. Due to the lateness of our receipt of these files, the lead agencies granted an extension to our review until June 30, 2014. However, as part of our review, we discovered that some of the files still were not included on the cd. These files included crucial connections between the dispersion modeling inputs and the emission calculations (files received June 26, 2014) as well as emission calculations related to trucks (file not received). Review of these detailed calculations and modeling take considerable time, and this is made more difficult when time is wasted attempting to work around unknown missing information.

  SCAQMD staff has previously commented to the port how crucial it is to receive a complete set of files for review (e.g., SCIG project comment letters from 2/1/12, 2/14/12, 11/14/12, 3/6/13). We are concerned that despite our repeated and consistent requests that the lead agency still has not implemented procedures for making the technical analysis of the DEIR available to the public or our agency. We have attempted to provide an expedited review in the two and half weeks granted to us, however this shortened period and the missing files, have made a complete review impossible. In the future, we strongly encourage the port to provide complete sets of air quality analyses to our agency at the beginning of review periods, as required by CEQA.

- *Quantification of Mitigation Measure MM AQ-4 Impacts*

  It is unclear how the mitigated impacts from MM AQ-4 (Tier 4 Construction Equipment) were taken into account in the Draft EIS/EIR mitigated construction emissions. The emission quantification methodology found in Table B1.6 of Appendix B of the Draft EIS/EIS uses the LAHD Sustainable Construction Guidelines - Table A: Compliance Step-Down Schedule to determine mitigated emissions. The Step-Down schedule provides criteria to allow non-tier 4 equipment use. However, MM AQ-4 states *"[E]xcept vessels, harbor craft, on-road trucks, and dredging equipment . . . [a]ll diesel-powered construction equipment greater than 50 hp must meet EPA Tier 4 off-road emission standards."* The SCAQMD staff is concerned with the methodology used to calculate the emissions using the Step-Down Schedule. The emission calculation sheet Table B1.6 in Appendix B of the Draft EIS/EIR uses the assumptions shown in the following table to determine the offroad equipment fleet mix. Further clarification should be provided to explain this assumed low level of compliance with the Tier 4 mandate of MM AQ-4. Further, it is not clear why some of the 'steps' in the Step-Down Schedule are skipped, such as Tier 4 interim engines, or Tier 2 equipment with Level 3 DECS. This discrepancy should be corrected in the Final EIS/EIR.

Fleet Mix Assumption from Appendix B1 Table B1.6

Engine Standard	Percentage of Fleet in 2015
Tier 4 final	50%
Tier 3 – Level 3 DECS	20%
Tier 1 – Level 3 DECS	10%
Tier 2 – Level 2 DECS	10%
Tier 1 – Level 2 DECS	10%

- *Quantification of Cumulative Impacts*
  Air quality impacts from cumulative impacts in the Draft EIS/EIR (page 4-28 for criteria and toxic air pollutant emissions and pages 4-75 to 4-76 for greenhouse gas emissions) were qualitatively analyzed. The lead agency assessed cumulative impacts by assuming project air quality impacts, which exceeded significance thresholds, were then significant under cumulative air quality impacts. However, the severity of this cumulative impact is not clear with this simple determination of significance. SCAQMD staff recommends that the Final EIS/EIR include a quantification of cumulative air quality impacts that includes other proposed projects in the POLA area.

  Figure 4-1 in the Draft EIS/EIR incorrectly identifies the location of other projects contributing to the overall cumulative project impact. For example, the ICTF modernization project and the SCIG projects are both shown south of Pacific Coast Highway. The SCIG project is dominantly located north of PCH, while the ICTF project is located north of SCIG. The locations of all cumulative projects should be checked and updated as necessary on this map in the Final EIS/EIR.

- *Quantification of Idling Activity at the YTI Terminal*

  Page 3.2-46 of the Draft EIS/EIR indicates that heavy-duty diesel-fueled idling emissions were developed assuming six minutes of idling for trucks arriving at the gate, eight minutes for trucks leaving the gate and 10 minutes on-site. Additional clarifying information should be provided to support this assumption. This clarification should include information about:

  – Existing idling times, including during peak periods,
  – An analysis of queuing impacts once the facility is operating at full built out capacity, and
  – Confirmation that there are not other idling locations associated with the project other than those specified above.

- *Morbidity and Mortality Methodology.*

  On page 3.2-56 of the Draft EIS/EIR, the lead agency describes the methodology that was used to determine when a mortality and morbidity analysis would be conducted for the proposed Project. Mortality is a measure of the number of deaths in a population, scaled to the size of that population, per unit time. Morbidity refers to the number of individuals who have contracted a disease during a given time period (the incidence rate) or the number who currently have that disease (the prevalence rate), scaled to the size of the population. The Draft EIS/EIR determined that mortality and

morbidity significance would be identified by air dispersion modeling where the incremental operational emissions would result in off-site 24-hour PM2.5 concentrations that exceed the SCAQMD significance criterion of 2.5 $\mu g/m^3$.

The SCAQMD staff does not agree with using a screening threshold of an incremental increase of 2.5 $\mu g/m^3$ for determining mortality and morbidity. The SCAQMD's PM2.5 significance threshold of 2.5 $\mu g/m^3$ is designed to determine the significance of localized impacts on nearby receptors, and was made consistent to existing permitting requirements under our Rule 1303. The PM2.5 significance threshold of 2.5 $\mu g/m^3$ was not intended to be used as a screening tool to further analyze mortality and morbidity impacts.

The lead agency set precedent for conducting mortality and morbidity analyses in three of its own previous EIRs: TraPac, China Shipping, and San Pedro Waterfront EIRs. In all three cases there was no threshold used to determine if an analysis for mortality and morbidity would be done. The SCAQMD staff considers this to be sufficient precedent for the POLA to continue this practice for the proposed Project. The PM mortality analysis in the Draft EIS/EIR should therefore instead use the methods described in CARB's 2008 guidance document.[4]

- *Meteorological Data*

  Page B2 -21 of Appendix B2 of the Draft EIS/EIR indicates that 2006-2007 meteorological data from the Terminal Island Water Reclamation Plant (TITP) was used for dispersion modeling for both criteria pollutants and toxic air contaminants (TACs). This meteorological data does not appear to have been validated by SCAQMD staff. The lead agency should provide SCAQMD the protocol for developing the meteorological data and demonstrate that U.S. EPA and SCAQMD procedures were followed.

  Page B2-21 of the Air Quality Appendix B of the Draft EIS/EIR indicates that the POLA's consultant ENVRON evaluated the completeness of the meteorological data by quarter, the average wind speed and visually examined the wind pattern based on wind roses between the 2006-2007 meteorological data and data collected between 2009 and 2012; however, no additional information (e.g., evaluation criteria, statistical analysis, etc.) was provided to support this assertion.

  The Federal one-hour NO_2 NAAQS is the 3-year average of the 98th percentile of the yearly distribution of one-hour daily maximum NO_2 concentrations. Since only one year of meteorological data was used for air dispersion modeling, the project proponent used the 8^{th} highest NO_2 concentration to represent the 3-year average of the 98th percentile of the yearly distribution of one-hour daily maximum NO_2 concentrations. This could have resulted in an over estimation of the NO_2 concentration since the highest concentrations may have occurred on the same day. However, multiple years of met data may reveal other peaks that are not captured by the single year that was used.

[4] Methodology for Estimating Premature Deaths Associated with Long-term Exposure to Fine Airborne Particulate Matter in California, 10/24/2008.
http://www.arb.ca.gov/research/health/pm-mort/PMmortalityreportFINALR10-24-08.pdf

In addition, the information derived from the 2006-2007 meteorological data in the TITP does not include sufficient data to estimate the 98th percentile of the yearly distribution of one-hour daily maximum NO_2 concentrations correctly. The SCAQMD staff recommends that additional verification of the meteorological data be provided, or that criteria and TAC concentration be remodeled with SCAQMD meteorological data collected at the Long Beach station. The SCAQMD Long Beach meteorological data can be downloaded by using the following link: http://www.aqmd.gov/docs/default-source/air-quality/meterorological-data/aermod-ready-meteorological-data/table-1-meteorological-sites/aermod-table-1-long-beach.exe?sfvrsn=4.

Page B2-22 of Air Quality Appendix B2, states that 1-hour ozone concentrations from the Long Beach Ambient Air Quality Monitoring Stations were used in AERMOD. If new met data is used, then the ozone files should also be updated to correspond to the new met data period.

- *Air Dispersion Modeling Parameters*

  SCAQMD requires that the urban air dispersion option be used for air dispersion modeling. An urban population of 664,078 was used in the input files for air dispersion modeling. Air dispersion modeling with urban populations less than two million may result in concentrations that resemble modeling with the rural dispersion option. Since the rural dispersion option typically generates more conservative concentrations than the urban dispersion option, the concentrations in the Draft EIS/DEIR may be too conservative. The SCAQMD staff recommends that concentrations be remodeled using the Los Angeles County population of 9,862,049.

  Ozone evaluation concentration is listed as 0.056 ppm in the air dispersion input files, but this value does not match values in Table 3.2-2. Please clarify the source of this value.

- *Health Risk Assessment (HRA)*

  Page B3-8 of Appendix B3 – Health Risk Assessment of the DEIR states that boiler emission TAC emissions were speciated using ARB Speciation 112 for distillate. The boiler emission factors in the file OperationalCalculations22_AQMD.xlsb state that they are using a residual oil emission factor. It is unclear from the narrative whether the actual fuel used in the boilers is fuel oil or diesel. Hence, it is unclear if the correct ARB speciation profile was used. Further clarification should be provided in the Final EIS/EIR.

  Carcinogenic health risks to student receptors were estimated using the following parameters: 581 liters per kilogram-day breathing rate, six hours per day daily exposure, 180 days per year and six years of exposure (page B3-39 of Appendix B3 of the Draft EIS/EIR). The fewest number of years allowed in current OEHHA risk guidance is nine years. The student health risk in the Final EIS/EIR should be based on no less than a nine- year exposure duration in the Final EIS/EIR.

- *Emission factors*

  Mitigated emissions from on-road vehicles were estimated using Clean Truck Program (CTP) emission factors (EF_OnroadEngine spreadsheet in the file

Construction Calculations_8_OceanDisposal_CargoShip_AQMD.xlb). It is unclear how the CTP emission factors were developed. The Final EIS/EIR should include documentation of how the CTP emission factors were developed.

The 20 percent HCFC-22 loss from refrigeration units on ocean-going vessels in Table B1.33 of Appendix B1 of the Draft EIS/EIR is referenced as being based on the UN Environmental Programme 2006 and 2010 Reports from the Refrigeration, Air Conditioning and Heat Pumps Technical Options Committee. However, based on the reference, an annual loss of 20 percent seems too low. Table 5-6 in the 2010 Report from the Refrigeration, Air Conditioning and Heat Pumps Technical Options Committee lists 30 percent loss HCFC-22 for all ships. The SCAQMD staff recommends using the 30 percent loss rate unless documentation is provided in the Final EIS/EIR for the 20 percent value.

SCAQMD staff could not replicate annual horsepower-hour values with CARB's cargo handling emissions inventory model (CHEI) for operational equipment. The Final EIS/EIR should include documentation on the development of the annual horsepower-hour values in the CARB CHEI model or the version of the CHEI model used if the values were obtained from a previous version of the current CARB CHEI model.

Genset emission factors for TRU's seem to be lower than cited references (ARB ATCM and CalEEMod Appendix D). The following table provides an example of the differences between the NOx emissions in the DEIR and CalEEMod Appendix D). The Final EIS/EIR should include documentation on the development of the genset emission factors for the TRU's .

Year	Draft EIS/EIR NOx, g/bhp-hr	CalEEMod Appendix D NOx, g/bhp-hr
2012	5.38	5.485
2013	4.96	5.263
2014	4.54	5.048
2015	4.12	4.858
2016	3.68	4.685
2017	3.56	4.522
2018	3.457	4.366
2019	3.353	4.215
2020	3.25	4.075

ATTACHMENT B
SCAQMD COMMENTS ON DRAFT EIS/EIR FOR THE PROPOSED BERTHS 212-224 (YTI) CONTAINER TERMINAL PROJECT
ZERO-EMISSION TRUCK TECHNOLOGIES

Overview

The SCAQMD comments regarding the Draft EIS/EIR for the Proposed Berths 212-224 (YTI) Container Terminal Improvements Project strongly support the inclusion of a zero-emission component into the proposed project. The specific technology or technologies used to implement this component would be determined by the lead agency. In our comments on the SCIG Recirculated Draft EIS/EIR[5] we provided Attachment B which discussed the state of development of zero-emission truck technologies. Based on this discussion we concluded that the deployment of electric trucks was feasible early in the lifetime of the proposed Project. The following discussion includes an update to the previously submitted attachment and again focuses on electric truck technologies.

Zero emission technologies for transport applications, including heavy trucks, are developing rapidly and can, with appropriate actions by the lead agency and other entities, be deployed early in the operational phase of the proposed Project. Any of several types of zero-emission truck technologies could be used. As is described below, these include, but are not limited to, on-road technologies such as battery-electric trucks, fuel cell trucks, hybrid-electric trucks with all-electric range (which could be coupled with natural gas or other power for range extension), and zero-emission hybrid or battery-electric trucks with "wayside" power (such as electricity from overhead wires).

Several recent analyses have supported the technical feasibility of implementing zero emission truck technologies in the I-710 corridor. For example, AQMD and LA Metro co-funded preparation by CALSTART of a report titled, "Technologies, Challenges & Opportunities I-710 Corridor Zero Emission Freight Corridor Vehicle Systems." The report was released in June and examines whether a Class 8 truck could be developed that would meet the zero-emission needs of the I-710 project alternatives described in the Draft EIR/EIS. CALSTART prepared the report with input from a wide range of industry experts. Among the findings are the following:

> "The development of a vehicle or vehicle system (truck and infrastructure power source) that can move freight through the I-710 Corridor with zero emissions has no major technological barriers. In fact, there are several technical approaches that can achieve the desired outcome. Solutions can be developed based on existing designs and technical knowledge, and require no fundamental research or technology breakthroughs. Small-scale demonstrations can begin immediately and commercialization of proven designs can certainly be achieved by 2035, the horizon year of the I-710 Corridor Project. Provided there is a strong focus on the

[5] http://www.aqmd.gov/docs/default-source/ceqa/comment-letters/2012/november/southern-california-international-gateway-august-2012.pdf?sfvrsn=4

> commercialization process, this assessment finds commercial viability could occur well before 2035, indeed within the next decade." [6]

The report also noted an unprompted and "particularly striking" degree of consensus by experts around the most promising and commercially viable approaches. The report states:

> "A 'dual mode' or 'range extender' Hybrid Electric Vehicle (HEV) with some EV-only capability was seen as the most feasible solution, particularly if combined with an infrastructure power source such as catenary or in-road, which would allow for smaller battery packs aboard the vehicles." [7]

The report concluded by stating:[8]

- "A ZE truck to serve the I-710 freight corridor (in Alternatives 6B or 6C) is fully technically feasible and can be based on vehicle architectures and designs already in prototype status.
  - Several manufacturers and suppliers have existing systems and prototype trucks ranging from near-zero- to full zero-emissions. These include dual-mode hybrids; plug-in hybrids; range-extender battery electrics; hydrogen fuel cell EVs, and battery electric trucks.
- "A zero-emissions freight truck can be developed for potential production well within the proposed timing of the corridor project. Indeed, such a truck could be developed in advance of the corridor's actual construction.
- There is a high degree of agreement on the near-term technical approaches that are most promising for a zero-emissions truck over the next five years to meet the stated requirements of the I-710 freight corridor alternatives 6B & 6C.
  - A dual-mode hybrid or range-extended hybrid (possibly using a natural gas engine) with some engine-off driving capability (hence zero tailpipe emissions) coupled with corridor-supplied electrical power (lowest risk is believed to be a catenary system) was overwhelmingly identified as the most feasible system in the 5-year time frame.
- Other possible less likely near-term solutions included in-road power, all-battery trucks with fast charge or battery swap, zero-emission equivalent engines (virtually zero NOx and PM) and exotic fuel engines.
- A single-purpose truck is considered less likely to be successful, while a multiple purpose truck is considered much more likely. Manufacturers in particular believe a successful system must be useful beyond the corridor or its production cannot be justified or sustained.
- Based on interview responses, technology is not considered a barrier to a zero-emission freight truck. Fundamental research and development is not required. Additional development and demonstration of systems and system integration, and on fielding and validating prototype vehicles, would be valuable.

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[6] http://www.metro.net/projects_studies/zero_emission/images/CALSTART_I-710_TCO_Report.pdf, pg.2
[7] http://www.metro.net/projects_studies/zero_emission/images/CALSTART_I-710_TCO_Report.pdf, pg.4,7
[8] http://www.metro.net/projects_studies/zero_emission/images/CALSTART_I-710_TCO_Report.pdf, pg.31

- Development timelines run from near term demonstrations within eighteen months to three years, to the potential for production in as few as five years, assuming market demand was sufficient to justify moving to production. Funding assistance will be needed to speed development, validation and deployment. It will also be likely needed to support purchase. Longer-term solutions were not examined here, as the 5-year time frame best fit the I-710 project."

The report also noted the need to establish an economic case for a zero-emission corridor and its vehicles, including incentives, inducements and potential regulations. CALSTART recommended that developing this structure for a zero-emission freight corridor should be conducted in parallel with technology demonstration as soon as practicable (Page 33).

Reasons for Zero-Emission Transport

As is described in the SCAQMD comment letter regarding the Draft EIS/EIR for the Proposed Berths 212-224 (YTI) Container Terminal Improvements Project, deployment of zero-emission technologies for transport between the YTI Terminal and the near dock railyards will mitigate significant project impacts as required by CEQA.

In addition, zero emission transport is important for the following reasons:

- In the 2010 Update to the San Pedro Bay Ports Clean Air Action Plan, the ports underscored their commitment to air quality improvement by adopting San Pedro Bay Standards. These targets for port air quality programs are comprised of two components: 1) reduction in health risk from port-related diesel particulate matter (DPM) emissions in residential areas surrounding the ports, and 2) "fair share" reduction of port-related air emission to assist the region in achieving federal air quality standards. These components reflect the ports' stated goals of reducing health risks to local communities from port-related sources, and reducing emissions to support the attainment of health-based ambient air quality standards on a regional level.

  Specifically, the ports' Health Risk Reduction Standard is to reduce the population-weighted cancer risk of ports-related DPM emissions by 85% by 2020, relative to 2005 conditions, in highly impacted communities located near port sources and throughout the residential areas in the port region. The San Pedro Bay Emission Reduction Standards are to, by 2014, reduce emissions by 22% for nitrogen oxides, 93% for sulfur oxides, and 72% for DPM; and to, by 2023, reduce emissions by 59% for nitrogen oxides, 93% for sulfur oxides and 77% for DPM.

  While the ports have made significant progress toward meeting these goals, as reflected in each port's annual emission inventories, emissions forecasts indicate that CAAP measures and existing emissions control regulations will not be adequate to achieve and maintain the San Pedro Bay Standards. Implementation of zero-emission technology options would provide significant benefits to the ports, bringing them closer to achieving the San Pedro Bay Standards, addressing

community concerns about pollution from port operations and projects, and assisting the region in attaining National Ambient Air Quality Standards. The South Coast Air Quality Management District and the California Air Resources Board have determined that, in order to attain currently-adopted federal ozone standards, zero-emission technologies will need to be broadly deployed in transportation sources. Absent timely adoption of sufficient plans and measures to attain the national standards as required by the Clean Air Act, federal transportation funds for infrastructure projects will be jeopardized, and restrictions on construction of stationary sources will be imposed.

- Deployment of zero-emission technologies for the transport corridor between the YTI Terminal and the near-dock railyards is particularly important for the following reasons:

  - Emissions in this transport corridor occur relatively close to locations where people live, work and go to school.

  - These areas are also impacted by cumulative emissions from other port-related sources: ships, harbor craft, cargo handling equipment, locomotives and trucks.

  - Achieving emission reductions beyond current regulations and CAAP measures, as needed to attain the San Pedro Bay Standards, will be relatively challenging in the case of some port-related sources (e.g. vessel main engines) compared to further reducing emissions from other sources such as trucks.

  - The transport corridor to near dock rail yards is in an area where existing regulations and CAAP measures are projected to achieve a lower percentage level of risk reduction than other areas. *See* 2010 CAAP Update, Figure 2.2: Percent Reduction in DPM-Related Health Risk Between 2005 and 2020 for Areas Located Closest to the Ports (p.35).

  - The transport corridor to near dock rail yards--as a high volume, relatively short (approximately five mile)--route, is particularly suited to deployment of new technologies such as electric trucks, which ultimately could be deployed by the ports, and then in broader areas as technologies evolve.

- In addition to air quality benefits, utilization of zero-emission technologies could be a significant strategy for reducing greenhouse gas (GHG) emissions. Each port, in cooperation with their respective cities, has initiated a process to quantify, evaluate and implement strategies to reduce GHG emissions from their administrative operations as well as from port-related activities of their tenants and customers.

- Finally, energy security (i.e. reducing dependence on foreign oil) is also a significant consideration as the ports transition into the future. Uncertainty about

potential future supplies of oil and rising costs provide another reason for moving away from technologies that rely on petroleum to technologies that are powered by electricity, ideally produced using renewable energy sources.

Zero-Emission Truck Technologies

A variety of zero-emission truck technologies can be available for deployment early in the life of the proposed Project if the port requires them. The following is a discussion of key technology options.

Zero-Emission Trucks

Zero-emission trucks can be powered by grid electricity stored in a battery, by electricity produced onboard the vehicle through a fuel cell, or by "wayside" electricity from outside sources such as overhead catenary wires, as is currently used for transit buses and heavy mining trucks (discussed below). All technologies eliminate fuel combustion and utilize electric drive as the means to achieve zero emissions and higher system efficiency compared to conventional fossil fuel combustion technology. Hybrid-electric trucks with all electric range can provide zero emissions in certain corridors and flexibility to travel extended distances (e.g. outside the region) powered from fossil fuels (e.g. natural gas) or fuel cells.

Vehicles employing electrified drive trains have seen dramatic growth in the passenger vehicle market in recent years, evidenced by the commercialization of various hybrid-electric cars, and culminating in the sale of all-electric, plug in, and range extended electric vehicles in 2011. A significant number of new electric light-duty vehicles will come on the market in the next few years. The medium- and heavy-duty markets have also shown recent trends toward electric drive technologies in both on-road and off-road applications, leveraging the light-duty market technologies and component supply base. Indeed, the California-funded Hybrid Truck and Bus Voucher Incentive Project (HVIP) website currently lists more than 75 hybrid-electric on-road trucks and buses available for order from eight manufacturers.

Battery-Electric Trucks

Battery-electric vehicles operate continuously in zero-emissions mode by utilizing electricity from the grid stored on the vehicle in battery packs. Battery-electric technology has been tested, and even commercially deployed for years in other types of heavy-duty vehicles (e.g., shuttle buses). Technologically mature prototypes have recently become available to demonstrate in drayage truck applications. (TIAX, *Technology Status Report - Zero Emission Drayage Trucks*, 1 (June 2011)). Improving on vehicle efficiency and assembly costs over earlier prototypes, TransPower is currently developing heavy-duty battery electric trucks for demonstration in real world drayage service as part of a zero emission cargo transport demonstration program funded by the U.S. Department of Energy. Each demonstration truck will be capable of moving a fully loaded container on highway and over the steep Vincent Thomas and Desmond Gerald bridges at the San Pedro Bay Port. The truck will be equipped with lithium batteries providing 70 to 100 miles of operating range per charge depending on the payload and duty cycle. TransPower recently completed a first demonstration truck, EDD-1 and has

partnered with Total Transportation Services to deploy the truck in revenue drayage service by July 2014. TransPower will build six more electric drayage trucks for this demonstration. In addition to TransPower, Balqon and US Hybrid are also working to develop and demonstrate battery electric drayage trucks under this program. Battery electric trucks can be connected to "wayside power" (such as overhead catenary wires) to extend range.

Figure 1 TransPower Battery Electric Truck (EDD-1)

Figure 2 Balqon Battery Electric Truck

Fuel Cell Battery-Electric Trucks

Fuel cell vehicles utilize an electrochemical reaction of hydrogen and oxygen in fuel cell "stacks" to generate electricity onboard a vehicle to power electric motors. Fuel cells are typically combined with battery packs, potentially with plug-in charging capability, to extend the operating range of a battery-electric vehicle. Because the process is combustion free, there are no emissions of criteria pollutants or CO_2.

Fuel cell vehicles are less commercially mature than battery-electric technologies, but have been successfully deployed in transit bus applications, are beginning to be deployed in passenger vehicles, and are beginning to be demonstrated in heavy duty truck port applications.

Figure 3 Vision Zero-Emission Fuel Cell Battery Electric Truck

Hybrid-Electric with All-Electric Range (AER) Trucks

Hybrid vehicles combine a vehicle's traditional internal combustion engine with an electric motor. Hybrid-electric heavy-duty trucks that improve fuel mileage are in commercial operation today. Hybrid-electric technologies can also be designed to allow all electric propulsion for certain distances, similar to the Chevrolet Volt passenger automobile which is currently being marketed. For example, the large vehicle drive-train manufacturer Meritor has developed such a heavy-duty truck and it has been demonstrated by Walmart Inc. in the Detroit area. This "dual mode" vehicle was developed as part of a U.S. Department of Energy program. Besides the advantages of increased range flexibility, dual-mode hybrid trucks can incorporate smaller battery packs as compared to those for all-battery electric trucks. This saves weight and cost while increasing range. The Meritor truck is powered solely by battery power (i.e. produces zero emissions) at speeds less than 48 mph. These plug-in hybrid trucks can also be designed to intelligently and selectively use their stored electrical energy. The selective use of the stored electrical energy could result in meaningful gains in drive system efficiency and emissions reductions while utilizing a modestly sized battery. By targeting the use of the electrical energy at the least efficient operating points or greatest polluting operating regimes of the internal combustion engine, the utilization of the electrical energy can be best leveraged to yield the greatest gains, as is being investigated by an ongoing Class 8 PHEV development project by Volvo Powertrain.

Figure 4: Dual-Mode Hybrid (Meritor)

Trucks With Wayside Power (e.g. "Trolley Trucks")

One largely existing technology that could be used to move trucks regionwide is wayside power to power motors and/or charge vehicle batteries. Wayside power from overhead catenary wires is commonly provided to on-road transit buses, and has been used for heavy mining trucks. An example of how wayside power is feasible would be to outfit a battery-electric or hybrid AER truck with a connection to overhead catenary wires. Many cities operate electric transit buses that drive on streets with overhead wires, as well as streets without them. In such cities, "dual-mode" buses have capability to disconnect from the overhead wire and drive like a conventional bus. In Boston and other cities, such buses are propelled "off wire" by diesel engines. In Rome, such buses are propelled off wire by battery power to the same electric motors used on wire. The batteries are charged as the bus operates on the wired roadways. Figure 4 shows a dual-mode electric and battery-electric transit bus with detachable catenary connection in Rome, Italy.[9]

Figure 5 Dual-Mode Battery Electric Transit Bus (Rome)

The AQMD funded and provided input to a study titled Zero-Emission Catenary Hybrid Truck Market Study. This study was prepared by Gladstein, Neandross & Associates and was released in late March 2012, and presented at the ACT Expo in May. The study explores the potential market for zero-emission trucks, including hybrid electric trucks with all electric range, that receive wayside power, such as from overhead electric catenary wires. Potential markets include the I-710, transport between the ports and near-

[9] Other proposals have been evaluated and awarded by the SCAQMD and the CEC to develop catenary trucks and hybrid trucks with AER. Similarly, in 2010, Volvo announced an award by the Swedish Energy Agency to develop a "slide in" technology for both automobiles and trucks which would provide wayside power from the road to the vehicle using a connection from the bottom of the vehicle to a slot in the roadway (http://www.energimyndigheten.se/en/Press/Press-releases/New-initiatives-in-electrical-vehicles/).

dock railyards, and a potential east-west freight corridor. The report concludes that such technologies could provide standard operating range for local or regional trucks and could have similar or lower cost compared to other zero-emission technologies.[10]

The Zero-Emission Catenary Hybrid Truck Market Study[11] states "As the I-710 expansion project moves forward, decisions will be made about the best technologies to reduce truck related emissions and traffic congestion from the corridor. In 2004, the local communities along the I-710 identified their preferred strategy, an expansion of the I-710 including the addition of a four lane dedicated roadway for trucks. Since that time, much work has been done to evaluate the feasibility of zero emission trucks on the proposed dedicated roadway. The concept of zero emission trucks has gathered significant support by some I-710 project committee members and the concept looks very promising for inclusion in the ultimate project recommendation, due in 2012. Whether the recommendation would specify catenary systems, other wayside power options, or opportunity charging, the truck platform considered in this market study would be easily adapted to suit the selected zero emission system. The zero emission system selected by the I-710 project committee could be strongly influenced by a working system serving the near-dock rail yards at the ports. The benefits of using the same system for the CA-47/103 and the I-710 are significant."

The global technology manufacturer Siemens has developed a prototype truck to catenary wire connection for this purpose. Figure 5 shows a photo of this system on a prototype roadway in Germany. The truck is a hybrid electric with zero emission all electric operation when operated under the overhead wire. The truck automatically senses the wire which allows the driver to raise the pantograph connection while driving at highway speeds. The pantograph automatically retracts when the truck leaves the lane with catenary power. The powered lane can be shared by cars and traditional trucks. The truck may be operated off the powered lane propelled by a diesel engine, or could be configured with battery or fuel cell power sources.

Figure 6 Truck Catenary (Siemens)

As applied to hybrid AER trucks, wayside power could provide zero-emission operation and battery charging on key transport corridors, allowing the vehicle to operate beyond

[10] http://www.gladstein.org/tmp/ZETECH_Market_Study_FINAL_2012_03_08.pdf
[11] http://www.gladstein.org/tmp/ZETECH_Market_Study_FINAL_2012_03_08.pdf

such corridors in zero-emission mode. As the battery is depleted, the vehicle would have the flexibility for extended operation on fossil fuel power.