South Coast Air Quality Management District
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Via Email and U.S. Mail

November 14, 2012

Chris Cannon
Director of Environmental Management
Port of Los Angeles
425 South Palos Verdes Street
San Pedro, CA 90731

Dear Mr. Cannon:

Recirculated Draft Environmental Impact Report
Southern California International Gateway (SCIG) Project

The South Coast Air Quality Management District (AQMD) staff appreciates the opportunity to comment on the Recirculated Draft Environmental Impact Report (Recirculated DEIR) for the Southern California International Gateway (SCIG) Project. We appreciate the one-day extension the Lead Agency provided to submit comments on the Recirculated DEIR. The AQMD staff previously submitted comments on the Draft Environmental Impact Report (DEIR) on February 1, 2012. Our comments seek an EIR that fully evaluates and discloses environmental impacts of the project, and that identifies for the proposed project's decision makers all feasible measures to mitigate significant impacts.

The AQMD staff appreciates that the health risk assessment in the Recirculated DEIR uses a floating baseline, which is the appropriate baseline. The Recirculated DEIR includes detailed files on off-road and on-road sources used to calculate emissions such as locomotive fleet mixes and emission evaluation files. These files assisted AQMD staff in preparing our comments on the Recirculated DEIR. The AQMD staff remains concerned, however, as many of the most critical issues that the AQMD staff raised in our February 1, 2012 letter still remain unaddressed in the Recirculated DEIR.

The Recirculated DEIR shows that the Proposed SCIG project will generate significant localized air quality impacts. Based on the Recirculated DEIR, the Proposed SCIG project will generate localized NO_2, PM10, and PM2.5 concentrations and would exceed the applicable significance thresholds by more than 190%, 420%, and 80%, respectively. These NO_2, PM10, and PM2.5 concentrations from the proposed project will impact residents, school children and other sensitive populations near the proposed railyard. In addition, the Environmental Justice section of the Recirculated Draft EIR states that, "Because the area surrounding the proposed Project site is predominantly minority and low-income, Impact AQ-4 *[localized NO2 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 Recirculated DEIR does contain a mitigation measure for diesel PM, however, this measure does not address significant NO_2, PM10, and PM2.5 levels.

The following primary concerns that were not addressed in the Recirculated DEIR are discussed below.

1. **Zero-Emission Container Movement Between Marine Terminals and SCIG.**
While the Recirculated DEIR has modified the description of the zero-emissions technologies demonstration program (pg. 3.2-99) to contain more specificity and goals, there is still no proposed mitigation or project alternative which includes a zero-emission container movement system. The proposed Project must incorporate a zero-emission component to mitigate significant localized NO_2, PM10 and PM2.5 impacts to the surrounding communities. Additional discussion on this concern is included in Attachment A.

   Zero-emission container movement technologies are a feasible mitigation measure that must be included in the proposed Project because it: (1) is feasible within the early life of the project; (2) would only be required for the short distance of less than five miles; and (3) is consistent with the zero-emission freight corridor alternative contained in the Proposed I-710 Corridor Project Draft EIS/EIR.

   Due to the need for a zero-emission container transport demonstration program for electric-battery drayage trucks, the use of zero-emission container transport should account for 100% of containerized drayage trips by no later than 2020. An implementation schedule was provided in the Draft EIR as follows:

   1. By 2016, at least 25% of container transport between the terminals and SCIG shall be by zero emission technology (with potential modification of requirement based on specific findings).
   2. By 2020, 100% of container transport between the terminals and SCIG shall be by zero emission technology.

2. **Tier 4 Line-Haul Locomotives Entering SCIG**
The Recirculated DEIR fails to address the need to mitigate the air quality impacts from line-haul locomotives. In our original comment letter on the Draft EIR we specified that line-haul locomotives should meet the following requirements:

   1. By 2018, at least 25% of BNSF line-haul locomotives entering SCIG and other port properties shall be Tier 4.
   2. By 2020, at least 95% of BNSF line-haul locomotives entering SCIG and other port properties shall be Tier 4.

   The year 2020 requirement is consistent with the long-term goal of Clean Air Action Plan (CAAP) measure RL-3. Both the Draft EIR and Recirculated DEIR contain a project condition PC AQ-12 which incorporated the CAAP measure RL-3. As stated on page

3.2-99 of the Recirculated Draft EIR, "project conditions are recommended for inclusion in the lease between the LAHD and BNSF for the SCIG facility [and] are not required as CEQA mitigation measures." Further, on page 3.2-104 the Recirculated Draft EIR states "The following measures are Project Conditions that may be included in the lease for the SCIG facility subject to approval by the Board. The conditions are not required as CEQA mitigation measures but are included here for tracking purposes." This language is less stringent than what is required under CEQA and puzzling if the lead agency truly intends to make RL3 a requirement of the project. Pursuant to CEQA Guidelines 15091(a) and Public Resources Code 21081(a), all feasible mitigation must be implemented to reduce any significant impacts of the project. As the project has significant localized NO2 impacts, in part due to operation of locomotives, the lead agency must specify in the EIR that implementation of RL3 is a requirement, not just a recommendation. AQMD staff requests that this condition therefore be specified as a mitigation measure and as a requirement of the project, and that regular monitoring of this measure be made a part of the project.

In addition, the AQMD staff is also concerned that this condition does not meet the minimum performance standards of RL-3 which requires 50% of line-haul locomotives to be Tier 4 and 40% to be Tier 3 by 2023. PC AQ-12 also weakens the performance standards by allowing the RL-3 emission goals to be made up anywhere in the Basin, and not necessarily in and around the proposed SCIG project site. This has the effect of allowing adverse air quality impacts to be higher in the nearby residential community of West Long Beach than they would normally be if the emission reductions would occur at or near the proposed facility site. Additional discussion on this concern is included in Attachment A. Since the project has significant localized NO2 impacts, which are partly caused by locomotives, implementation of RL3 cannot be allowed to be satisfied by reductions occurring elsewhere in the Basin, as this would not mitigate localized impacts.

3. <u>Inconsistent use of Hobart Railyard in Baseline, Project, and No Project Alternatives</u>

Like the Draft EIR, the Recirculated DEIR fails to analyze and disclose the impacts at BNSF's Hobart Railyard (Hobart) implying that as capacity at Hobart is freed up because of SCIG, portions of Hobart will go dormant. The Recirculated DEIR assumes that the proposed project will eliminate 95 percent of truck trips between the ports and the Hobart Railyard, and all of the train activity going to the Hobart Railyard associated with SCIG-related cargo will be eliminated. By including Hobart in the Baseline, the Lead Agency is treating Hobart and SCIG as a system. The proposed project must be evaluated as the same system as the baseline. The containers going to Hobart due to the additional capacity that the proposed SCIG facility provides to the "system" must be analyzed as part of the proposed project.

The lead agency in the Recirculated DEIR states, "Because that growth is not dependent on SCIG being built, it is not appropriate to evaluate that growth as part of SCIG, or any truck trips not going to SCIG. The same is true for regional locomotive traffic. This approach is supported by BNSF's representation that they have no current plans to move intermodal business from other regional facilities to Hobart in the event that SCIG is

built." We disagree with this assessment. The Recirculated DEIR must evaluate the extent to which capacity opened up at the Hobart Railyard by the construction of the proposed SCIG facility. The amount, origination, destination, and growth of other cargo, e.g. domestic freight containers at the Hobart Railyard as a result of the proposed SCIG facility being built can certainly be reasonably estimated given that BNSF and the lead agency successfully estimated these parameters in order to evaluate the No Project Alternative. Leaving the Hobart-related trucks and trains in the baseline and No Project Alternative, and not putting the emissions in the proposed Project makes the proposed Project look better when compared to the No Project Alternative and the incremental emissions between the proposed Project and the CEQA Baseline appear smaller than they would be otherwise.

Attached are more details regarding these and other comments. Pursuant to Public Resources Code Section 21092.5, please provide the SCAQMD with written responses to all comments contained herein prior to the adoption of the Final Environmental Impact Report. The SCAQMD staff appreciates the opportunity to comment on this important project. We look forward to working with the Port of Los Angeles on this and future projects. If you have any questions, please call me at (909) 396-3105.

Sincerely,

Susan Nakamura

Susan Nakamura
Planning Manager

Attachments

EE:IM

Attachment A
Additional Comments on the Recirculated DEIR for Southern California International Gateway (SCIG) Project

The following includes specific comments on the Recirculated DEIR for the Proposed Southern California International Gateway (SCIG) Project.

Operational Mitigation Measures

Furthering CEQA's policy to ensure that the long-term protection of the environment is a guiding criterion in public decisions, CEQA contains a substantive mandate that requires public agencies "to refrain from approving projects with significant environmental effects if "there are feasible alternatives or mitigation measures" that can substantially lessen or avoid those effects."" (Pub. Res. Code § 21002; *County of San Diego v. Grossmont-Cuyamaca Community College Dist*. (2006) 141 Cal. App. 4th 86, 98.) Such measures must be fully enforceable through permit conditions, agreements, or other measures. (Pub. Res. Code § 21081.6(b).)

The Recirculated DEIR fails to include all feasible operational mitigation measures to reduce significant air quality impacts from the operation of the proposed Project. Under CEQA, the lead agency must adopt all feasible measures to mitigate significant air quality and health impacts. As with the Draft EIR, the Recirculated DEIR lacks any mitigation for NO_2 impacts. The Recirculated DEIR shows that locomotives and on-road trucks represent over 95% of the SCIG-related NOx emissions from the proposed Project. These emissions contribute to the significant localized NO_2 impacts caused by the proposed project. The Proposed Project can and must incorporate the following mitigation measures or project alternatives which would mitigate the significant localized NO_2 impacts, as well as the significant PM10 and PM2.5 impacts from the truck and locomotive sources to the surrounding community: (1) zero-emission container movement between marine terminals and SCIG; and (2) greater acceleration of use of Tier 4 line-haul locomotives. The elements and actions are discussed in more detail below.

Zero-Emission Container Movement Between Marine Terminals and SCIG is a Feasible Mitigation Measure

Transporting containers using zero-emission container transport technologies is a feasible mitigation measure and must be implemented to mitigate significant NO_2 and PM impacts from the proposed project. The proposed Project offers a unique opportunity to deploy zero-emission technologies because the distances between the marine terminals and the project site is less than five miles, which makes the use of zero-emission transport for this short range distance extremely practical. As was highlighted in our previous comment letter, the lead agency is in a position to provide a clear message to technology providers that zero-emission technologies will be needed.

In our original comment letter on the Draft EIR, the AQMD staff commented that zero-emission technologies are a feasible mitigation measure and should be used to move containers to and from the marine terminals and SCIG railyard. A zero-emission technology is an emissions technology that does not create tailpipe emissions from the vehicle or system transporting containers. Such a mitigation measure or project alternative is required by CEQA to be included

in the EIR in order to mitigate the significant impacts of the project (CEQA Guidelines section 15126.4).

While the Recirculated DEIR has modified the description of the zero-emissions technologies "demonstration program" (pg. 3.2-99) to contain more specificity and goals, the Recirculated DEIR still does not contain a commitment to implement a zero-emission component (either as a mitigation measure or as a project alternative). The AQMD staff agrees that a demonstration program is a necessary step, however, it is still necessary to include a mitigation measure for zero-emission container movement. A project condition to conduct a demonstration program does not guaranty that the proposed Project will implement zero-emission trucks draying containers to and from the SCIG Railyard. The proposed Project must incorporate a zero-emission component to mitigate the localized NO_2, PM10 and PM2.5 impacts to the surrounding communities.

Zero-emission technologies can be commercialized by 2016. Zero-emission container transport technologies can be commercialized in sufficient time to begin operational deployment between the ports and proposed SCIG facility beginning in 2016, with 100% deployment by 2020. Any of several types of zero-emission truck technologies could be used. 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). 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. A discussion of these technologies and their current state of commercialization is included in this comment letter as Attachment B.

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. 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 transport between the ports and near-dock railyards such as the proposed Project. 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.[1]

Implementation Schedule for Zero-Emission Container Movement Mitigation Measure. As previously commented on our comments on the Draft EIR, the use of zero-emission container transport, such as electric-battery drayage trucks should account for 100% of containerized drayage trips by no later than 2020. Zero-emission container transport technologies can and must be implemented at the beginning of the proposed Project's operation in 2016 as follows:

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

1. By 2016, at least 25% of container transport between the terminals and SCIG shall be by zero emission technology (with potential modification of requirement based on specific findings).
2. By 2020, 100% of container transport between the terminals and SCIG shall be by zero emission technology.

As indicated in our previous comment letter, a 2016 deployment of zero-emission technologies could be amended to allow the percentage requirement to be delayed under specified conditions. This would allow the lead agency flexibility in phasing in new technology without jeopardizing the ultimate level of mitigation. Specifically, AQMD staff would support allowing the Harbor Commission to modify the 2016 requirement as follows:

The Harbor Commission may reduce the percentage of containers required to be transported by zero-emission technologies in 2016 if the Commission makes findings based on substantial evidence that:

1. It is not practicable to implement such requirement without the modification
2. The Commission has adopted enforceable interim milestones to implement zero-emission transport to the extent possible and as early as possible, and
3. The modification will not jeopardize achieving 100% zero-emission transport by 2020.

A modification pursuant to this paragraph shall be approved at a public meeting of the Harbor Commission, after public review of a staff report fully describing the reasons for such extension. No modification may be approved prior to 2015, and such modification shall not be to zero.

Modifications to the 2020 requirement for 100% zero-emission transport should not be allowed since zero-emission technology, such as electric battery or similar technology can certainly be available in time to deploy sufficient numbers that time. We are also concerned that allowing modification of the 2020 requirement would also undermine the market signals that are important to ensure technology availability, and allow unmitigated impacts as the railyard approaches full capacity operation. What is important is that the public and commercial providers of zero-emission transport be certain that there will be a demand for zero-emission trucks in the near future. The only way to do this is with a mitigation measure with specific deployment milestones.

Maximizing On-dock Rail is a Feasible Mitigation Measure

Maximizing on-dock rail will reduce impacts at the proposed SCIG facility. The Port of LA and Port of Long Beach must have a plan to ensure on-dock rail is utilized before the proposed SCIG facility. AQMD staff is concerned that the proposed project provides additional capacity that will hinder maximizing on-dock. On-dock rail reduces the need to truck containers to near- and off-dock rail yards, and hence reduces the emissions from goods movement. As described in the *San Pedro Bay Ports Rail Study Update* (2006) several infrastructure projects (e.g. Thenard Junction, Badger Bridge, etc) and operational matters (e.g., labor agreements) must be addressed to maximize the amount of on-dock rail yard capacity and also to ensure that rail traffic from SCIG does not interfere with achieving on-dock rail capacity. By building capacity at the

proposed near-dock location before completing needed modification on-dock, there is the potential to create higher truck traffic and emissions than is necessary outside of the port complex. AQMD staff requests the lead agency include a mitigation measure that commits to implementing any infrastructure projects needed to support on-dock rail capacities in the future, addresses operation matters to ensure on-dock rail at the Ports of Los Angeles and Long Beach are maximized before the proposed SCIG site is utilized, and includes mechanisms to ensure that use of on-dock occurs before near- and off-dock.

Use of Tier 4 Line-Haul Locomotives is a Feasible Mitigation Measure

The Recirculated DEIR fails to address the need to mitigate the air quality impacts from line-haul locomotives. In our original comment letter on the Draft EIR we specified that line-haul locomotives should meet the following requirements:

1 By 2018, at least 25% of BNSF line-haul locomotives entering SCIG and other port properties shall be Tier 4.
2 By 2020, at least 95% of BNSF line-haul locomotives entering SCIG and other port properties shall be Tier 4.

The year 2020 requirement is consistent with the long-term goal of Clean Air Action Plan (CAAP) measure RL-3. Both the Draft EIR and Recirculated DEIR contain a project condition PC AQ-12 which incorporated the CAAP measure RL-3. As stated on page 3.2-99 of the Recirculated Draft EIR, "project conditions are recommended for inclusion in the lease between the LAHD and BNSF for the SCIG facility [and] are not required as CEQA mitigation measures." Further, on page 3.2-104 the Recirculated Draft EIR states "The following measures are Project Conditions that may be included in the lease for the SCIG facility subject to approval by the Board. The conditions are not required as CEQA mitigation measures but are included here for tracking purposes." This language is less stringent than what is required under CEQA and puzzling if the lead agency truly intends to make RL3 a requirement of the project. Pursuant to CEQA Guidelines 15091(a) and Public Resources Code 21081(a), all feasible mitigation must be implemented to reduce any significant impacts of the project. As the project has significant localized NO_2 impacts, in part due to operation of locomotives, the lead agency must specify in the EIR that implementation of RL3 is a requirement, not just a recommendation. AQMD staff requests that this condition therefore be specified as a mitigation measure and as a requirement of the project, and that regular monitoring of this measure be made a part of the project.

In addition, the AQMD staff is also concerned that this condition does not meet the minimum performance standards of RL-3 which requires 50% of line-haul locomotives to be Tier 4 and 40% to be Tier 3 by 2023. PC AQ-12 also weakens the performance standards by allowing the RL-3 emission goals to be made up anywhere in the Basin, and not necessarily in and around the proposed SCIG project site. This has the effect of allowing adverse air quality impacts to be higher in the nearby residential community of West Long Beach than they would normally be if the emission reductions would occur at or near the proposed facility site.

While Tier 4 locomotives are not yet available, Tier 4 emission standard are required under federal regulation. In establishing the Tier 4 locomotive emission standards, the U.S. EPA recognized that emissions from locomotive diesel exhaust was a challenging problem. However,

U.S. EPA believed it would be addressed feasibly and effectively through a combination of engine-out emission reduction technologies and high-efficiency catalytic aftertreatment technologies. EPA based this assessment on the successful development of these aftertreatment technologies for highway and non-road diesel applications which had advanced rapidly in recent years, so that new engines can achieve substantial emission reductions in PM and NOX (in excess of 90 and 80 percent, respectively). With the lead time available and the assurance of ultra low sulfur diesel fuel for the locomotives beginning in 2012, U.S. EPA was confident the application of advanced technology to locomotives diesel engines would proceed at a reasonable rate of progress and would result in systems capable of achieving the new standards on time.[1] Compliance with Tier 4 standards for model year 2015 and later locomotives is required by federal law

Commitment to CAAP Measure RL3 Goal of 95% Tier 4 by 2020

The Clean Air Action Plan (CAAP) Measure RL3 specifies a goal that 95% of all locomotives serving the ports by 2020 will be Tier 4. As stated in a 2009 state Air Resources Board (ARB) report[2], in order to achieve a 100% "statewide" fleet of Tier 4 locomotives by 2020, BNSF would need to have approximately 1,920 Tier 4 locomotives in its fleet. BNSF currently operates a fleet of 5,219 diesel freight locomotives.[3] According to the Recirculated Draft EIR emissions analysis, the locomotives visiting the SCIG site will be representative of the national average fleet. As analyzed in the emission calculation spreadsheets provided to AQMD staff, this national average will have approximately 26.5% Tier 4 locomotives in 2020. Assuming no growth in the number of BNSF line haul locomotives, this fraction would result in a minimum of 1,383 Tier 4 locomotives in BNSF's fleet in 2020. As SCIG will only handle between two and three trains per day in 2020, there will only be approximately 12 locomotives (four per train) serving SCIG in the South Coast Air Basin on any given day. These 12 locomotives represent less than 1% of BNSF's Tier 4 fleet. Given the abundance of excess Tier 4's that should be available to BNSF, it is unclear why the EIR cannot therefore commit to achieving RL3 for the largest intermodal market in the country, in the region with the worst air quality.

Inconsistent use of Hobart in the Baseline, No Project, and Proposed Project

The Recirculated Draft EIR's analysis of the Hobart railyard in the baseline, no project, and proposed project analyses are inconsistent and may potentially yield misleading conclusions about the environmental impacts of the proposed project. The Recirculated DEIR included trucks and locomotives at the Hobart Railyard in the Baseline and No Project analyses, but excluded Hobart from the Proposed Project.

As described in the Recirculated DEIR, the proposed SCIG Project will handle direct intermodal containers exclusively. In Appendix G4, it is described that the Hobart Railyard handles three types of containers: (1) direct intermodal (also referred to as Inland Point Intermodal (IPI)) containers, (2) transload, and (3) domestic containers. Because the Proposed SCIG Project will only handle direct intermodal containers, the Recirculated DEIR only addresses the direct

[1] Federal Register Vol. 73, No. 126, Monday, June 30, 2008 Rules and Regulations.
[2] *Technical Options to Achieve Additional Emissions and Risk Reductions from California Locomotives and Railyards*, 2009. Table II-2
[3] http://www.bnsf.com/about-bnsf/financial-information/surface-transportation-board-reports/pdf/11R1.pdf Table 710

intermodal containers at Hobart, ignoring how the other two types of containers (transload and domestic containers) would change under the proposed SCIG project as containers at SCIG would open capacity at the Hobart railyard. Under the No Project Alternative, Appendix G4 shows how transload and domestic containers will increase in the future. The Recirculated DEIR states that this increase in transload and domestic containers will also increase under the proposed Project. The AQMD staff believes that this growth in transload and domestic containers at Hobart will "fill-in" the gap from direct intermodal cargo that will go to the proposed SCIG site. If the lead agency insists on including drayage truck trips and train operations to and from the Hobart Railyard in the CEQA Baseline and No Project, it must also include the future truck and train trips to and from the Hobart Railyard allowed by the capacity at Hobart Railyard that is freed up because of construction of the proposed SCIG facility. The Final EIR must include the emissions from trucks and locomotives that will occur at the Hobart railyard that are result of additional capacity that the proposed SCIG project provides.

There is also a contradiction in the lead agency's argument that it is speculative to analyze the future operations at the Hobart Railyard. The emissions from Hobart-related trucks and trains are included for the No Project Alternative. If the amount, origination, destination, and growth at the Hobart Railyard can be projected for future years in the No Project Alternative (as presented in Appendix G4), it is possible to evaluate the growth in operations at Hobart for the proposed Project.

Under CEQA, a "project" means the *whole* of an action, which has a potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment." (CEQA Guidelines § 15378(a).) It is reasonably foreseeable that by diverting IPI trips from Hobart to SCIG, Hobart will be used by BNSF for other purposes, such as Transload and Domestic uses. By ignoring the impacts associated with the changed use of Hobart as a direct result of SCIG, the recirculated Draft EIR fails to analyze the whole of the project and therefore underestimates impacts. (*See*, *Association for a Cleaner Environment v. Yosemite Community College Dist*. (2004) 116 Cal. App. 4th 629, 637-41.)

The Proposed I-710 Zero Emission Freight Corridor Should be Considered in the Analysis of the No Project

In the No Project Alternative's analysis, trucks are assumed to dray containers from the ports to the Hobart rail yard via the I-710 freeway. The emissions from these trucks are calculated using emission factors from the EMFAC2011 software available from the state Air Resources Board. This analysis does not discuss how the proposed I-710 project may also affect emissions estimates. Two of the proposed alternatives analyzed in the I-710 project EIS/DEIR would include a zero-emissions freight corridor that would transport trucks from the ports directly into the Hobart rail yard.[1] The lead agency is a funding partner for the I-710 project and is aware that one of the zero-emissions freight corridor alternatives is under consideration as the preferred project alternative. Under either of the two alternatives, trucks travelling within this corridor would operate via zero emissions technology (e.g., with a wayside power system similar to some bus systems). The Draft EIR for the I-710 project has already completed its comment period and certification of the document is tentatively scheduled for certification in 2013. The I-710 Draft EIS/EIR assumed that the project would be constructed no later than 2035. Since it is reasonably

[1] Draft EIR available here: http://www.dot.ca.gov/dist07/resources/envdocs/docs/710corridor/

foreseeable that by 2035, the I-710 will involve a zero-emissions freight corridor, the no project alternatives analysis in the project peak year of 2035 should therefore consider that trucks traveling to Hobart would have zero emissions.

If trucks travelling to Hobart were considered to have zero emissions, then the offsite truck emissions would be approximately 125 lbs/day (from current tenants) or less, instead of the reported 1,151 lbs/day. With this reduction, the CEQA NOx impacts would be approximately negative 1,493 lbs/day. As shown in Table 3.2-26, the proposed project NOx emissions in 2035 are negative 901 lbs/day. Hence the No Project Alternative would have 592 lbs/day less NOx emissions than the Proposed Project Alternative. Similarly, Diesel Particulate Matter emissions would be reduced to near zero in the No Project Alternative. The reported health risk benefits from the Proposed Project compared to the No Project Alternative (Table 5-11)[4], especially along the I-710 freeway would probably no longer exist were the I-710 project taken into account in the SCIG analysis.

Because the negative air quality impacts of the No Project Alternative in comparison with the Proposed Project Alternative have been presented as a primary consideration in favor of constructing SCIG, it is imperative that the Final EIR accurately represent the true impact of the two alternatives. If the Proposed Project will worsen air quality compared to a No Project scenario, then the decision makers and the public must be aware of this prior to considering the project for approval.

Key Assumptions Used in Emissions Calculations Must be Conditions of Proposed Project

Several assumptions in the emissions calculations are key to determining the potential significance of air quality impacts. As many of these assumptions are not governed by existing regulations or other mitigation measures, the Lead Agency should include these conditions that limit the activity at the project site to what is analyzed in the Recirculated DEIR. If the activity should increase beyond what is assumed in the Recirculated DEIR, then CEQA must be re-opened and future Subsequent EIRs may be required. Specifically, AQMD staff requests that conditions be placed on the project that (See table below):

- limit the peak daily and annual average number of trucks and locomotives visiting the site to the values identified for key milestone years in the EIR,
- limit the peak daily and annual average locomotive tier to what is assumed in the EIR, and
- limit the amount of locomotive idling and switching activity onsite to what is assumed in the EIR.

[4] See also: http://www.bnsfconnects.com/pages/air-quality-maps

Table of Daily Maximums

	2016		2023		2035		2046	
Activity	**Average**	**Peak**	**Average**	**Peak**	**Average**	**Peak**	**Average**	**Peak**
Truck Trips	570	638	806	903	2,771	3,103	2,771	3,103
Train Trips	2	2	3	3	8	8	8	8
Train Idling (hrs)	5.4	5.5	5.2	5.5	5.2	5.5	5.4	5.5
Switcher Operation (hrs)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4

Note 1. Truck and train trips are presented as round trips
Note 2. Peak truck Trips based on average trips (Table C1.2-2) multiplied by 1.12
Note 3. Recirculate DEIR assumed peak train trips to be equivalent to average
Note 4. Train idling represents totally daily idling per train based on spreadsheets CBI-2016 thru -2016, and CBI-Worst Case
Note 5. Switcher operating hours are per switcher

Locomotive Emissions

Locomotive Peak Daily Emissions

The Recirculated DEIR contains insufficient information for the public to determine the reasonableness of the locomotive peaking factor used to calculate peak day locomotive emissions. In the Draft EIR, peak day locomotive emissions were estimated assuming that all daily locomotive trips on the peak day were conducted by the lowest Tier level locomotive in the fleet mix for each analysis year. The AQMD staff did not comment on this approach because it was conservative, in that it produced locomotive emissions based on the highest emission rate available in the projected fleet. However in the Recirculated DEIR, peak day locomotion emissions were determined by applying a peaking factor to all future year locomotive emission factors. The peaking factor used in the Recirculated DEIR has substantial impacts on the locomotive emissions reported for the proposed Project. For instance, the 2035 NOx emissions for the proposed Project in the Recirculated DEIR and Draft EIR were 916 pounds per peak day and 3669 pounds per peak day, respectively. This amounts to a 75 percent drop in off-site NOx locomotive emissions in 2035. The peaking factor used in the Recirculated DEIR was derived by assuming a ratio of the peak day locomotive fleet mix average emissions factor in 2010, to the average day locomotive fleet mix average emissions factor in 2010. No supporting data or information is provided in the Recirculated DEIR on the underlying assumptions that went into deriving the peaking factor. As a result, the AQMD staff is unable to verify that the peaking factor is reasonable.

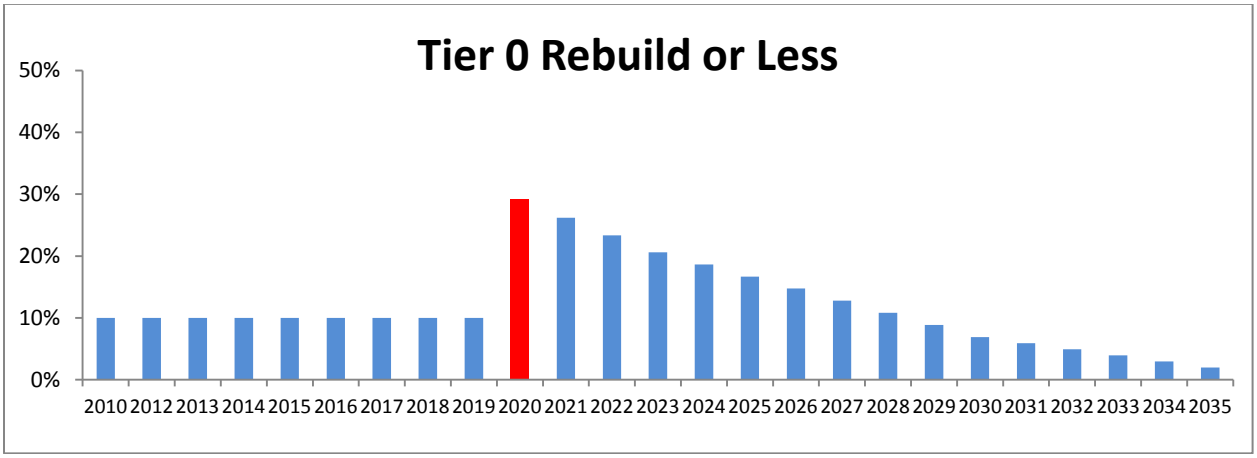
The application of the peaking factor to future locomotive emission rates further exacerbates the belief of AQMD staff that future locomotive fleet mixes, assumed in the emission rates tables of Appendix C1.2-21 and C1.2-22, over-predict the penetration of Tier 4 locomotives in milestone years 2023 and 2035. When coupled with the peaking factor, it results in an underestimation of the emission rates (and therefore emissions) for the peak day scenario. The approach used in the Draft EIR avoided this problem somewhat by assuming that the peak day emission rates were based on the lowest tier (highest emission rate) locomotive making up the fleet in a specific year.

Locomotive Emission Factors

The Recirculated DEIR fails to provide adequate clarity regarding how the locomotive emission factors relate to both the 1998 Fleet Average Agreement between CARB and the Class I railroads, and the EPA national locomotive fleet forecast. In our original comment letter on the Draft EIR we asked for an explanation on how the emission factors in Tables C1.2-20 through C1.2-22 were estimated and whether they were based on projected in-use emission rates or emission standards. AQMD staff made this same comment on the HRA analysis section of our original comment letter. In order for the AQMD staff to determine if the emission factors are reasonable, the lead agency needs to provide a methodology on the derivation (with appropriate references) of the emission factors and how they were converted from grams per brake-horsepower rate to a grams per hour rate. No change in the methodology description was provided in the Recirculated DEIR and the AQMD staff is requesting that the lead agency provide this information in the Final EIR.

Tier 0 Contribution to the Project Locomotive Fleet

The projected locomotive fleet mix shows a substantial increase in the percentage of Tier 0 and Tier 0 rebuilds starting in 2020. The air quality analysis in the Recirculated DEIR uses this fleet mix to evaluate the air impacts from the proposed Project. The Figure below presents the percentage of Tier 0 and Tier 0 rebuilds in the projected locomotive fleet. From 2010 to 2019, the percentage of Tier 0 and Tier 0 rebuilds is 10%. Starting in 2020, the percentage of Tier 0 and Tier 0 rebuilds abruptly increases to approximately 30%, and slowly declines to zero after 2035 (See figure below). The AQMD staff is concerned that there is no rationale for this dramatic increase in the number of Tier 0 and Tier 0 rebuilds. Including this many Tier 0 and Tier 0 rebuilds is a step backward towards the goal of a clean locomotive fleet. As compared to Tier 4 emission rates, Tier 0 and Tier 0 rebuilds emit approximately 630% more PM and 515%, more NOx, than a Tier 4. Because air quality impacts are greatly increased by the high emission rates and significant penetration of Tier 0 and Tier 0 rebuilds in the fleet, the lead agency should restrict access to the proposed SCIG Railyard to only locomotives that meet Tier 2 rebuild and above emission levels.



Emissions Calculation Error with Locomotives Exhaust

AQMD staff identified an error in the emission calculation spreadsheet titled Loco EFs.xls that appears to systematically affect nearly all locomotive exhaust emission calculations. In

worksheet 'Worst_2010_EFs_unmitigated', the emission factors in cells C6:L9 are calculated by multiplying the percentage of the fleet dedicated to a tier (e.g., Tier 0) specified in that worksheet by emission factors for that same tier found in another file titled 'Engine_EFs_summary_050907 forecasts_for2010.xls'. It appears that this calculation references the incorrect cells in the second file such that the percentage of Tier 0 locomotives is multiplied by the Tier 1 emission factor, Tier 1 is multiplied by Tier 2, etc.

These emission factors calculated in the 'Worst_2010_EFs_unmitigated' are then used to create peaking factors to describe peak to average locomotive emissions. These peaking factors are applied to different analysis years (2016, 2023, etc.) and scenarios (project, no project, etc.). It is unclear to AQMD staff what impact correcting this error will have on the significance determinations as it should modify both the project and baseline emissions estimates and modeling results. It is unclear if this error was also present in the Draft EIR as AQMD staff did not receive these spreadsheets for that document. AQMD staff recommends that the analysis be corrected to reflect appropriate calculations.

Locomotive Peaking Factors

It is unclear how the logic used to derive the peaking factors calculated in the LocoEF.xls table applies to future years. First it is unclear how the 2010 'peak' day was derived. A note in this spreadsheet refers to a memo (Hobart Average and Peak Day Memo 032112.pdf) that is not included in the Recirculated Draft EIR. More explanation should be provided explaining how the peak day was derived for the 2010 year. It is also unclear that this same peaking factor should apply to all future years. The Recirculated Draft EIR does not explain how the 2010 peaking factor will remain constant in future years, especially as turnover of the fleet may produce a jump in Tier 0 rebuilds in 2020 (from 10% to 26%).

Locomotive Activity Along the San Pedro Branch Line Adjacent to Sensitive Receptors

In the proposed project, when trains are being built or deconstructed, line haul locomotives will pull cars up the San Pedro Branch line to the north and east of the site. This rail line runs adjacent to sensitive receptors including homes and schools. As mitigation, the project should commit to avoiding whenever possible locomotive activities along this track during times when children are expected to be outside, including lunch periods, recesses, and other times that the school district may identify. In addition, there should be strict monitoring and enforcement of locomotive activity along this line to ensure that idling is kept to a minimum and does not exceed estimates in the EIR.

Train Counts

The Recirculated DEIR fails to address AQMD staff comments about the unusually low number of train trips reported for calendar year 2035. In our comments on the Draft EIR, the AQMD staff requested clarification on how the annual train trips can be so much lower than the estimated train trips for the projected train trips for the proposed expansion of the ICTF Railyard. Intuitively, we would expect the train counts to be similar since the number of container lifts was equivalent. The lead agency estimates the proposed project will process 1.5 million lifts per year at its maximum operating capacity in 2035. The Notice of Preparation (NOP) for the proposed modernization and expansion project for the Intermodal Container Transfer Facility (ITCF) released in January 2009, indicated that the ICTF will also process 1.5 million lifts per year at its

maximum operating capacity in 2023[5]. For the proposed project, the lead agency estimates that the number of annual rail round-trips will be 2,880 at full capacity, while the annual rail round-trips for the proposed ICTF will grow from the baseline activity of 2,373 to 4,745 at capacity[5]. The table below summarizes our concerns.

Table of Train Counts

	SCIG[1]	ICTF[2]
Container Lifts (Annual)[3]	1.5 million	1.5 million
Rail Round Trips (Annual)[3]	2,880	4,745

1. Recirculated DEIR, Table ES-1
2. Notice of Preparation and Initial Study, Intermodal Container Transfer Facility Modernization and Expansion Project, ICTF Joint Powers Authority, January 2009.
3. 2035 for SCIG; 2023 for ICTF

Locomotive Idling During Fueling and Servicing

The Recirculated DEIR does not include any locomotive idling during locomotive fueling and servicing. In our comment letter on the Draft EIR, we raised the issue that locomotive idling times during DTL fueling and service events can be up to 150 minutes per event, and that the Draft EIR did not include any locomotive idling when estimating the emissions from DTL fueling. Since this omission can have a significant impact on emissions and air quality impacts, the assumptions for locomotive idling during DTL fueling and service events should be included in the analysis or the lead agency should provide additional evidence that can substantiate why they should not be part of the analysis.

Drayage Truck Emissions

Drayage Truck Trips

The Recirculated DEIR fails to provide the assumptions on how the ratios in Table 3.10-13 were derived. In our previous comment letter on the Draft EIR, the AQMD staff expressed concern that it was impossible to determine the reasonableness of the bobtail ratio presented in Table 3.10-13 without further explanation on how it was derived. As a result, the proposed project would operate with fewer bobtails (tractors with no chassis) than the baseline operation (i.e., Hobart Railyard). Table 3.10-13 is repeated below for ease of discussion. As shown in the table, the bobtail ratio goes down from 0.862 drayage truck trips per intermodal lift for the baseline scenario to 0.100 drayage truck trips per intermodal lift for the proposed project. The project description indicates that there would be a "small amount" of chassis storage. Most lifts will be "live lifts" where the container is lifted from the chassis and the chassis leaves the facility. Table 7 should show an increase in chassis movements since there are more "live lifts" than a traditional intermodal railyard which is reflected in the lower bobtail ratio.

[5] Notice of Preparation and Initial Study, Intermodal Container Transfer Facility Modernization and Expansion Project, ICTF Joint Powers Authority, January 2009.

Table of Truck Trips per Intermodal Lift

Trip Generation Conditions	In-Gate Load (Depart Port)	Out-Gate Load (Arrive Port)	Chassis (in and out)	Bobtails (in and out)	Total
Baseline Intermodal Facilities	0.610	0.390	0.220	0.862	2.082
Proposed Project	0.610	0.390	0.220	0.100	1.320

The AQMD staff is concerned that the ratios in Table 3.10-13 are inaccurate. Specifically, we would expect the drayage truck trips per intermodal ratio for chassis (trucks entering or leaving the facility with a chassis but no container) would increase as the bobtail ratio decreases as compared to the baseline scenario. On page 2-36 of the Recirculated DEIR the lead agency states that "Trucks that had performed a live lift or delivered a container to a stacking area would in most cases be directed to a location in the container stacking area where another container would be loaded onto the chassis by an RMG for transport back to the port terminals." This means that the vast majority of drayage trucks will enter and leave the facility with a container. However, it is not clear how the ratio for bobtails in or out was determined for the proposed project when all other ratios remain the same for the proposed project (as compared to the baseline scenario). Therefore, the AQMD staff reiterates our request that the lead agency provide the assumptions on how the ratios in Table 3.10-13 were derived.

Claimed Reduction in Truck Trips

AQMD staff is concerned that the project proponents are claiming that this project will benefit air quality by removing trucks from the I-710 freeway, however after construction of SCIG the total number of TEU's handled are expected to be ten times higher than today. From the table below one can see that after this project is built, there will be a total rail yard capacity of 8.3 million TEUs, while the current number of TEUs handled by Hobart is only 0.83 million TEUs. While many truck trips will be diverted from Hobart to SCIG, growth will far outpace the diversion. Ultimately SCIG and Hobart combined will have the capacity to handle ten times the amount of goods as is currently handled at Hobart. This overall increase in goods movement is not addressed in the Recirculated Draft EIR and leads to the misleading conclusion that this project will reduce truck trips.

SCIG and Hobart Capacity

Scenario	SCIG Capacity (TEU/year)	Hobart Capacity* (TEU/year)	SCIG+Hobart Capacity (TEU/year)	Total TEUs analyzed in RDEIR
Existing Baseline (2010)	0	3,145,000	3,145,000	829,642 to Hobart
Proposed Project (2035)	2,775,000	5,550,000	8,325,000	2,775,000 to SCIG

**2010 capacity based on 56.9% utilization as reported in Appendix G4.*

Baseline Methodology

The AQMD staff appreciates that the Lead Agency used a floating baseline to evaluate health risk impacts from the proposed project. The staff commented on the DEIR that the floating baseline is the appropriate baseline for evaluating both the health risk impacts *and* regional criteria pollutant impacts. Although the Recirculated DEIR did use the floating baseline to evaluate health risk impacts, the floating baseline was not used to evaluate regional criteria pollutant impacts. A static baseline is an improper baseline to evaluate impacts for criteria pollutants. The static baseline used in Recirculated DEIR for criteria pollutants fails to disclose the impacts of the proposed project because it credits the proposed project with improvements in air quality that would occur independent of the proposed project due to adopted state and federal rules. This error has real-world implications since the lead agency will not be required to apply feasible measures or alternatives that would avoid or lessen the impacts. In order to properly evaluate the air quality impacts from criteria pollutants, the Recirculated DEIR should use a floating baseline similar to the one used to access health risk.

Dispersion Modeling Parameters

AQMD staff was provided emission calculations spreadsheets, dispersion modeling input and output files, and databases that contain the results of the modeling analysis. AQMD staff is unable to verify that the modeling analysis corresponds correctly to the emission calculation spreadsheets. Modeled source strength has generally been represented by 'unitary' rates (e.g., 1 gram per second) that are used for efficiency in the dispersion modeling analysis. If unitary rates are used, the modeled concentrations then need to be modified to match the actual calculated source strength from the emission calculation spreadsheets. It appears that these modifications may have been performed in the databases, however the Queries that would include these calculations have not been included with the databases.

In addition, it is not clear how the emission calculations in the provided spreadsheets are translated into the modeling. The table below illustrates an example of how the values in the spreadsheet, model inputs, and databases are not correlated for one of the sources (northernmost locomotive activity on the San Pedro Branch line). There are thousands of sources that were modeled for the EIR air quality analysis.

Values Used in Emissions Calculations for San Pedro Branch

File	NOx Hourly Emission Rate (grams/second)
Spreadsheet 'CBI-2035_03.27.12.xls'*	7.13×10^{-3}
Database 'Project Criteria tblEmissions.accdb	9.62×10^{-4}
Model Input File 'LHMOV'	0.5

**Rate summed from multiple sources by AQMD staff*

Without the ability to review these calculations, the public and AQMD staff are unable to verify the validity of the modeling analysis.

Construction Emissions and Construction Mitigation Measures

Crane Delivery

The Recirculated DEIR fails to correctly calculate the emissions from the delivery of rail mounted gantry cranes (RMG) to the proposed project site. In our comments on the Draft EIR,

we presented our concerns that the assumption of one ship capable of delivering 20 RMGs (pg. 3.2-27 in the Draft EIR) is not reasonable. This assumption has been unmodified in the Recirculated DEIR. Crane manufacturers have in the past transported two cranes per ship, which would result in at least 10 ship calls during the course of the construction phases for the proposed project. Even making allowances for the RMGs being larger than those proposed for the proposed project, the assumption of one ship call for 20 RMGs is extremely low. As a result of this assumption, construction emissions are underestimated. This is especially significant since the emissions from transporting RMGs make up such a large portion of the construction emissions (up to 70% of NOx emissions in 2015 of the Draft EIR).

Another concern presented in our comments in the draft EIR was that the cargo ships emission calculation lacks sufficient detail for AQMD staff to understand how the emissions were calculated. The lead agency failed to add sufficient detail on these calculations for us to verify their accuracy. The Final EIR should include more detailed emission calculations to fully document all emission sources of crane delivery.

MM AQ-1: Fleet Modernization for Construction Equipment

MM AQ-1 has not been revised in the Recirculated DEIR and the AQMD staff reiterates our concern that this mitigation measure does not represent the cleanest technology available since Tier 3 certified construction equipment has been available since 2006, and construction equipment meeting Tier 4 non-road emission standards became available beginning 2011. MM AQ-1 should be revised to require all construction equipment to meet the cleanest off-road engine emission standard available, and be equipped with Level 3 CARB verified DECS.

MM AQ-2: Fleet Modernization for On-road Trucks (used during construction)

Similar to MM AQ-1, MM AQ-2 has not been revised in the Recirculated DEIR, and MM AQ-2 still specifies exceptions for import haulers and earth movers from the requirement that all on-road trucks used during construction meet the EPA 2007 on-road PM and NOx emission standards. AQMD staff sees no reason for these exceptions. All trucks used during construction should operate on engines with the lowest certified NOx emissions levels, and if the lowest available does not meet the EPA 2007 on-road PM emission standards, then the lead agency shall require all trucks be equipped with CARB certified Level 3 DECS. It is also recommended that these requirements apply during circumstances where a piece of compliant equipment becomes available during the timeframe of construction.

Other Comments

Characterization of U.S. EPA locomotive rule

The Recirculated DEIR fails to properly characterize the 2008 U.S. EPA locomotive rule (40 CFR Part 92). This description is inaccurate and needs to be re-written. In our comments on the Draft EIR, we noted that Draft EIR description of the rule in Chapter 1 – Introduction stated "…by 2011, all diesel diesel-powered Class 1 switcher and helper locomotives entering port facilities must be Tier 3, and must use 15-minute idle limit devices." Under the 2008 U.S. EPA locomotive rule there is no requirement that Class 1 switchers and helper locomotives meet Tier 3 by 2011. However, CAAP Control Measure RL-1 does require that all PHL switchers be equipped with 15-minute idling devices and when used on Port property meet Tier 3-plus standards by the end of 2011, contingent upon funding being available. The 2008 U.S. EPA

locomotive rule does require anti-idling devices on locomotives, but only when for new Tier 3 and Tier 4 locomotives, or for lower tiers when they undergo their first remanufacture under the new standards. The DEIR description also contains, "Beginning in 2012 and fully implemented by 2014, the fleet average for Class 1 long-haul locomotives calling at Port properties must be Tier 3 equivalent (Tier 2 equipped with diesel particulate filters (DPF) and selective catalytic reduction (SCR) or new locomotives meeting Tier 3) PM and NOx and will use 15-minute idle restrictors." However, the 2008 U.S. EPA locomotive rule has no requirement that by 2014 the locomotives entering the Ports meet Tier 3. Finally, the DEIR description includes this statement "Class 1 long-haul locomotives must operate on ultra low sulfur diesel (USLD) while on Port properties by the end of 2007." This is not a requirement in 2008 U.S. EPA locomotive rule. Low sulfur fuel is however, required in the 2004 U.S. EPA Clean Air Nonroad Diesel Fuel Rule, but does not take effect until June 2012. The AQMD staff requests that the description of the 2008 U.S. EPA locomotive rule be amended in the Final DEIR to reflect the actual rule requirements.

ATTACHMENT B
ZERO-EMISSION TRUCK TECHNOLOGIES

Overview

AQMD comments regarding the Recirculated DEIR for the Proposed SCIG Railyard 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 Draft EIR we provided Attachment B which discussed the state of development of zero-emission container transport systems. 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 focuses only 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 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

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

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.
- 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

[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

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).

Additional Information: Types of 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)). Battery electric trucks can be connected to "wayside power" (such as overhead catenary wires) to extend range.

Figure 1 Balqon Electric Battery 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 2 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.

Figure 3: 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 4 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-dock railyards, and a potential east-west freight

[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/).

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

[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