Sustainable Supply Chain Advisory Committee

November Meeting Summary

Date: November 20th, 2019 | 10:30 am – 4:30 pm

Location: In-person at Port of Long Beach and via phone conference

Attendees: Attachment A

Meeting Agenda: Attachment B

Overview:

The Ports' Sustainable Supply Chain Advisory Committee (SSCAC) invited heavy-duty truck manufacturers, dealerships, fleet managers, leasing companies, and harbor trucking stakeholders to have an interactive dialogue around the present and future market for zero- and near zero- emission technologies. As the Clean Air Action Plan (CAAP) calls for aggressive measures to drive investment and deployment of near-zero emission technology in the near term (by 2023) and zero emission technology in the longer term (by 2035), the Committee is seeking an understanding of the current and forward landscape for these technologies.

Summary of Discussion:

Following brief introductions from all meeting attendees, the meeting was kicked off by Chris Cannon and Heather Tomley giving a high-level overview of the CAAP and a status update on the ports' definition of a clean truck rate. Lauren Faber O'Connor subsequently gave an overview of key goals for the ports and their relationship to Mayor Eric Garcetti's sustainability plans for the City of Los Angeles, as well as the C40 Cities Climate Leadership Group. Committee members emphasized the importance of acting on this issue as a matter of public health concern, and the need for clearly defined funding sources as well as use of revenues collected through the clean truck rate.

The conversation for the first half of the meeting was organized around near-zero and zero emission technologies, with manufacturers addressing questions about the readiness of natural gas, battery electric and hydrogen fuel cell trucks to meet port drayage truck performance requirements. Production timelines were also discussed in relationship to the Clean Truck Program's series of deadlines for ramping up a clean truck rate. Questions were circulated to meeting participants in advance as thought prompts (see Attachment C). The key points of this discussion are summarized below.

Near Zero-Emission (Natural Gas) Truck Technologies

- The group agreed that near-zero emission technologies are ready and available today, and that the use of renewable natural gas can further reduce GHG emissions. It was also discussed that the technology for diesel to achieve the ultra low NOx standard (generally agreed to be

0.02g/bhp-hr) does not exist today and does not have a clear timeline for achieving commercial and technical feasibility.

- Manufacturers Volvo and Daimler, and dealership representatives from Inland Kenworth and Rush Peterbilt, indicated that after a 4-6 month ramp-up period of their natural gas production process in 2020, they all could build and sell large volumes of natural gas trucks to meet market demand in 2020 and 2021. Even with a ramp-up period in order to scale production, it was noted that 6,000 to 8,000 natural gas trucks could be produced and delivered in 2020, if required. In 2021, there would be no limitation on natural gas production volumes, and additional fueling infrastructure would be built and scaled to meet growing demand.
- Dealerships and fleets observed that natural gas vehicles are not costly to maintain relative to diesel. While first generation natural gas truck / engine technology in 2006-2008 did experience higher levels of maintenance requirements and costs, it was noted that five generations of technology development has occurred over the last 10 plus years. In this process, the technology has continued to mature and today's natural gas engines are much more reliable and perform effectively.
- It was suggested by the drayage fleet operators in attendance that the Ports should set a performance standard for industry to meet, and the drayage truck market will find a way to meet the standard. If the Ports set the standard at 0.02g/bhp-hr NOx, industry will make investment to deploy the trucks as the technology is commercially available and viable. It was also noted that removing the fee waiver for near-zero emission technology prematurely will have an impact on the ability of the market to invest in this technology, as well as truck resale values.

Zero-Emission (Battery Electric & Hydrogen Fuel Cell) Truck Technologies

- The group observed that while several manufacturers have zero-emission vehicles on the road or in final development stages, the technology is not yet commercially ready and those vehicles that are in or near commercial production have not been proven in the port drayage duty cycle.
- Representatives from the port drayage fleets pointed out that just as natural gas truck technology took several generations to test and develop to the point of operational confidence, they anticipate that zero-emission technologies will require a similar maturation process and are thus still several years out from that same point of confidence.
- Demonstration projects were identified as incredibly important, and the group emphasized the need for more and long-term funding commitments to support further development and demonstration in real-world applications. It was noted that if the adoption of a technology is forced at a large scale before going thorough sufficient testing, demonstration and validation, and it does not perform as needed, major setbacks to the forward adoption of the technology can result. The experience with the 9-liter natural gas engine in port drayage applications was noted as a very applicable example of this point.
- TTSI pointed out that it has not yet seen a vehicle that can provide sufficient range and charging speeds to get the job done. Variations in loads, road grades, and drivers make it difficult to

assess if the manufacturer's estimate of range is accurate and appropriate for each unique customer and job.

- Manufacturers Volvo and BYD (which has two class 8 tractors in commercial production today) said that they are preparing to scale up production in the next year or so. BYD indicated it aims to be ready to meet demand, while Volvo cautioned that its VNR truck is spec'd to each customers' needs and is not exclusively for the port drayage duty cycle. Volvo is committed to putting its trucks on the road by the end of 2020 for its Volvo LIGHTS project but observed that production volumes will remain limited until infrastructure solutions become more clearly defined for the customer.
- Nikola plans to have its production plant in Phoenix up and running in 2023 with an initial production volume of 5,000 units, ramping up to 35,000 by 2028; the company is seeking alternative production solutions to deliver units before 2023. Nikola indicated that its current sold-out status does not necessarily affect its ability to serve the LA and Long Beach drayage market.
- Zero emission fueling infrastructure was identified by all stakeholders as a critical issue around which clarity is lacking. The timeline to install a charging solution depends on the size of the power supply at that location, while charging solution selections depend on the relationship between funding, charging standards, and UL listing status. It was also noted that without there being clarity as to the long term forward growth of battery electric and hydrogen fuel cell electric trucks, it is extremely difficult to predict which kind of zero emission fueling infrastructure should be pursued and constructed to facilitate scaled truck deployments in the future.

The second part of the meeting was organized around financing concerns and solutions specific to the port drayage truck market, for both near-zero and zero emission technologies. Questions were circulated to the meeting participants in advance as thought prompts (see Appendix C). The key points of the conversation are described below.

Financing for Near Zero- and Zero- Emission Truck Technologies

- The price tag for new zero-emission trucks remains out of reach for most port truck drivers, particularly those who work as Independent Owner-Operators (IOOs). The group discussed issues around additional price factors such as:
    - High interest rates on leases and loans due to poor or non-existent credit by IOOs and the risk of new technologies;
    - High vehicle license fees due to the DMV's practice of assessing these on the new vehicle's manufacturer-estimated market price by the DMV; and
    - Potentially high costs to fuel if fueling infrastructure needs to be built at a facility, or if charging must occur during peak periods when the electricity price is high.

- Bonds were discussed as an option from the state's Green Bonds program, which offers more security for investors. Municipal, tax-exempt and green bonds were described as options with very little variation between them.
    - The ports' financial representatives described the use of a green bond on the 2007 Clean Truck Program, whereby their backstopping of the bonds eliminated the issue of a default rate. They also noted that only a small number of trucks exhibited issues that led to their defaulting, which was a small fraction of the total number of trucks supported by the program. However, the representatives indicated that they are not ready to conduct a similar program for the current Clean Truck Program because there are still many unknowns and a lack of confidence around the vehicle technology.
    - The group discussed the effect of a high versus low clean truck rate on the revenue that would be generated and available to support a bond program. This discussion considered the macro effect of a high truck rate diverting cargo from the SPBP complex, and a low rate serving as an "annoyance" that prolongs the use of diesel, as well.
- Dealers articulated their concern of being stuck with trucks that can't be sold. As the middleman, they are tasked with selling product but also taking back product that a customer doesn't want and decides to return. The financial risk to the dealership is significant, and it reduces their interest in selling new, unproven technologies with high price tags that require external funding.
- Customer challenges accessing funding were raised as a major concern. In addition to the group's concern that not enough funds are available for current and future deployments, Volvo noted that funds are "all over the place from the customer perspective" with different programs offering different amounts on vehicles and infrastructure. The current scenario of the customer being tasked with pulling enough funding from multiple sources to outfit their fleet for a specific technology prevents the customer from taking the steps for fleet conversion. The group agreed that HVIP is commonly referenced because it is easy to use.
- While some have expressed concerns about having to turn over the port drayage truck fleet two times – once for near-zero emission in the next several years and then again to get to zero emission by 2035 – it was agreed by the group that any truck replaced with a near zero emission natural gas truck in the near term (2020-2025) would be nearing the end of its useful life by approximately 2035, and thus consistent with a normal truck turnover cycle.
- Better understanding the drayage truck rate study that will soon be released by the ports will be critical for the group assembled to having more effective dialogue on the funding and financing of zero and near-zero emission trucks for the drayage truck market.

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Attachment A

SSCAC Committee Members	
Michele Grubbs	PMSA
Thomas Jelenic	PMSA
Naveen Berry	SCAQMD
Bonnie Soriano	CARB (by phone)
Joe Lyou	CCA
Jerilyn Lopez Mendoza	CCA
Louis Dominguez	San Pedro Neighborhood Council
Adrian Martinez	EarthJustice
Stella Ursua	Grid Alternatives
Marnie Primmer	FuturePorts (by phone)
Steve Cadden	CRT (by phone)
Los Angeles Port & City Staff	
Chris Cannon	Port of Los Angeles
Max Reyes	City of LA, Mayor's Office
Irene Burga	City of LA, Mayor's Office
David Reich	City of LA, Mayor's Office
Lauren Faber O'Connor	City of LA, Mayor's Office
Michael Samulon	City of LA, Mayor's Office
Long Beach Port & City Staff	
Rick Cameron	Port of Long Beach
Heather Tomley	Port of Long Beach
Justin Ramirez	City of Long Beach, Mayor's Office
Sam Joumblat	Port of Long Beach
Wei Chi	Port of Long Beach
Meeting Facilitation Staff	
Erik Neandross	GNA
Lexi Wiley	GNA
Eleanor Johnstone	GNA
Patrick Couch	GNA
Other Stakeholders	
Zorik Pirveysian	SCAQMD
Bryan Choe	SCAQMD
Roundtable Guests	
Elizabeth Frethiem	Nikola
Dale Snowden	Rush/Peterbilt
Lacy Robertson	Rush/Peterbilt
Dawn Fenton	Volvo

Tony Williamson	Total Transportation Solutions, Inc.
Vic LaRosa	Total Transportation Solutions, Inc.
Bob Carrick	Vehicle Velocity Group
Matt Schrap	Vehicle Velocity Group
Tom Swenson	Cummins Westport
Ray van den Bergh	Penske
Mike Lewis	Penske
Bob Lively	NFI
Karla Sanchez	Harbor Trucking Association
Ray Rivera	Inland/Kenworth
Vincent Pellecchia	BYD
Renee Webster-Hawkins	CA Pollution Control Financing Authority

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Attachment B

Meeting Agenda

10:30 Arrival, Meet & Greet

10:45 Committee business

11:00 Update on the 2017 Clean Air Action Plan / Clean Truck Program (Ports)

11:30 Roundtable Discussion – Technology

12:45 Lunch (to be served during discussion)

1:45 Break

2:00 Overview of Upcoming / Available Grant and Incentive Funding (GNA)

2:15 Roundtable Discussion – Financing

4:15 Closing Comments

4:30 Meeting adjourned

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Attachment C

Questions for RoundTable Guests:

Please note that these questions are meant to serve as prep and thought starters. We are not planning to use this list of questions to survey or poll everyone in the meeting. We will ask each OEM to provide some general remarks on these issues in general; opening comments should be about 3 to 5 minutes. We are not looking for a PowerPoint or any kind of formal presentation materials (although if you want to bring printed materials to hand out, you are more than welcome). And we are looking for all commentary to be very specific to the port drayage market, with real information on product timelines, costs, operational capabilities, etc. We are not looking for general marketing information, high level directional information on the company's overall plans for future clean truck products, etc.

As additional background, we thought it would be helpful to summarize for you some of the key findings from the prior meetings we have held with truck OEMs and financing companies/lenders/leasing companies/dealers. Here is a short key point summary:

- Near-zero emission natural gas engines/trucks are: ready and commercially available on a wide scale from five major OEMs; cost competitive; and have a robust support network. They should be pursued as an effective air quality improvement strategy in the immediate term.
- Commercialization of zero emission truck technologies should be pursued in the longer term, with increased hybridization as a potential interim step. Focusing on infrastructure and after-sales support networks is critical to moving these technologies to the commercial stage.
- Increasing deployments of zero emission technologies is needed to support technology development and proliferation and drive down costs.
- A port drayage truck duty cycle is typically defined by the following parameters:
    - Shift range of 160 and 300 miles
    - Operate two shifts per day (600 miles of range) with <5 hours for re-fueling
    - Average uptime of 10 hours
    - Fuel in 15 minutes or less
    - On 6% grade, achieve top speed of 35 mph while carrying approximately 57,000 lbs or 40 mph while carrying approximately 80,000 lbs.
- A conventional diesel port drayage truck typically costs $122,000 (new) and $48,000 (used).
- Due to the economics of port drayage trucking, traditional financing/leasing of new diesel trucks has traditionally been challenging for the independent owner-operators that make up most of the drayage truck pool.
- The "sweet spot" for an affordable monthly payment in the drayage truck market is approximately $1,250. To reach this payment level on a $200K-$400K near-zero and/or zero-emission truck will require a grant incentive up to $150,000 per truck. This assumes a 10-year depreciation schedule to $0, a mid-range cost of credit of 13.5%, and the inclusion of a monthly maintenance package in the financing/lease agreement.

We realize that there will be competitive sensitivities, so we hope this format and approach will allow each representative to provide commentary in a way that allows you to navigate such issues, and provide some insight into the type of issues being addressed in the question list below. Ultimately, if you are not able to comment on some of these issues, you will not be asked to do so.

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Session 1: Technology

Market Volumes & Timelines

1. What worked well or didn't in the first clean truck program?
2. What is the total approximate annual volume of Class 7 and 8 trucks that your company currently manufactures and sells in the North American market, and specifically in California? How many of those are Class 8 semi-tractors?
3. Is the demand from large customers for NZE and ZE truck technology solutions sufficient to spur additional product offerings (beyond current models)? How does this volume demand, and expected volume in the future, affect cost reductions for your NZE and ZE technologies?
4. What is your timeline to accept and fill orders for near zero emission natural gas trucks? Are there any restrictions on production volumes here?
5. What, if any, key regulatory milestones do you see impacting your commercialization activities with NZE and ZE technology?
6. How important (or not important) are government grants and incentives to you as manufacturers?
7. When do you plan to offer Class 8 electric (BE or FC) commercially for sale?
    a. What is the planned range between fueling/charging?
    b. What is the anticipated fueling/charging time?
    c. What is the anticipated curb weight and what impact might there be on the ability to haul freight to and from the ports?
    d. What is the planned price point?
8. What is your company's view on the size of the Class 8 electric tractor market in California? In the nation? And how does the port drayage truck market fit into these forward plans?
    a. In 3, 5, and 10 years?
9. Can Class 8 BEV trucks be charged at a rate that is fast enough to be functional in this market segment, given the weight implications of meeting port drayage truck range requirements?
    a. What do roundtable participants believe is the required range on these trucks to complete a port duty cycle?
10. Is the port drayage truck market a target market for your electric truck product in the near, mid or long term?
11. When do you expect to be able to sell NZE and/or ZE trucks to port drayage operators in LA and Long Beach?

Technology Considerations

1. What are your primary concerns about introducing new NZE and ZE technology in port drayage applications? For those that participated in the first Clean Truck Program, what lessons learned do we need to be aware of today?

2. How do you anticipate the maintenance will be handled on zero emission trucks operated by the port drayage market? Are there differences with zero emission trucks compared to diesel and natural gas trucks?
3. What resources do you have/are you developing for after-sales support, maintenance, and warranty issues for zero emission trucks in the SoCal port market? Are these same after-sales support functions fully in place for near zero emission natural gas trucks?
4. How many qualified dealer locations do you have today to support ZE and NZE trucks? What is your timeframe for having this kind of support in place for ZE trucks?
5. As a truck OEM, how do you look at infrastructure costs and requirements to provide energy/fuel to NZE and ZE equipment? How do existing and planned infrastructure build-outs influence your volume sales expectations?
6. What is your experience and perspective on the market readiness of fueling/charging infrastructure solutions for NZE and ZE technologies? What, if any, key improvements are needed to enable widespread deployment and use by drayage operators?
7. What is your expectation for the build out of heavy-duty capable electric charging or hydrogen dispensing stations to support large volumes of zero emission port trucks in the future? What is your best estimate on when we could see this happen at a level to support zero emission port drayage operations in Southern California?
8. What key issues/requirements pertaining to operational performance and/or environmental performance have emerged from your development of ZE and NZE technologies to date, that affect your ongoing investments in these powertrains?

Customer Profile

1. What level of engagement do you have with drayage port truck drivers, and how does that influence your design approach?
2. What have you heard from port customers looking to deploy these technologies about the cost or ability to finance?
3. Are you seeing a shift in the use of owner operators in the LA/LB port drayage market towards more traditional asset- or employee- based operations?
4. For innovative financing solutions from the OEMs, do those need to come through the dealers and/or credit/finance arms or is there something that can be done at the OEM level? Are there any restrictions or major hurdles that you see when it comes to financing the typical port drayage truck operator?

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Session 2: Finance

Customer Profile

1. What have you heard from customers looking to deploy these technologies about the cost or ability to finance?
2. Independent owner-operators with little credit history and/or collateral is an issue. How can we structure incentive programs to reduce risk while financing the asset to as broad of a group as possible?
3. Do you have any ideas on how the Beneficial Cargo Owner (BCO) – which is the organization whose product is being moved by drayage truck operators – can "put skin in the game" and help to pay for the clean trucks we'd like to see moving their freight?
4. How do maintenance costs of NZE and ZE trucks factor into your customers' financing needs?

Financing Approaches

1. How can truck financing/leasing programs for NZE and ZE trucks avoid the challenges faced in the first Clean Truck Program, where the LMCs needed to guarantee payments to the lender in order for their owner-operator drivers to qualify for the loan/lease? Is such "backing" an option in the current market? And if not, what are the financing options for owner operators to invest in NZE or ZE trucks?
2. What ability does your organization have to provide financing for both the truck and the infrastructure? Is this an option that you're considering?
3. Are ownership models the right models for the drayage market or are rental or short-term lease or rental structures better? And how might lease programs be structured? Are there more innovative ways to rent or lease trucks to owner operators in the port drayage market given the credit challenges that are typical in the drayage market?
4. Do you have any examples of innovative financing solutions, partnerships, or other programs that you have seen in other markets that may be useful for the drayage market?
5. Are certain types of incentives more attractive – tax, direct/monetary, etc.?
6. What are your thoughts on the available grants and incentives available in the market and the ability to scale the deployment of ZE and NZE trucks? Is there enough money to really get to scale? If not, what are your ideas on how the Ports can accomplish their clean truck goals?

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Attachment D
Sustainable Supply Chain Advisory Committee
September Meeting Summary

Date: September 25th | 11 am – 3 pm

Location: In-person at Port of Los Angeles and via phone conference

Attendees: Attachment A

Meeting Agenda: Attachment B

Key Discussion Items
(Action items in green)

1. POLA / POLB Update on CAAP Implementation
    - The ports finalized both feasibility studies and are now working on the economic analysis and vendor selection for a clean truck rate program. They intend to present a proposal to their boards in fall 2019.
    - The ports are discussing two memorandum of understanding (MOUs): one with the South Coast AQMD to capture emission benefits in the CAAP in the SIP; and the second between the two ports to improve efficiencies for optimal competitiveness and impact on air quality across the San Pedro Bay Port (SPBP) complex.
    - The Committee and port staff discussed concerns raised about inconsistencies between the CAAP goals and the emissions inventory in the Port of Long Beach Master Plan.
    - The Port of Long Beach has been asked by its city council to conduct an economic impact analysis for automated equipment. A timeline has not been defined.

2. Review & Finalize July Meeting Summary
    - No corrections were submitted for the meeting summary and it was approved. GNA will submit the final meeting summary to the FMC.
    - A concern was raised that the Committee's website had been removed since the July meeting. The port staff explained that this is due to larger port website transitions. The ports agreed to identify a solution to ensure that the Committee's website is accessible.

3. Update on Port Demonstration Projects (POLB)
    - Heather Tomley and Chris Cannon presented on the scopes and status of the technology demonstration projects that are underway in the SPBP complex through both grant programs and the ports' Technology Advancement Program (TAP). **(see Attachment D)**
    - These projects encompass demonstrations of battery electric, fuel cell electric, and natural gas architectures in numerous yard truck, cargo handling, marine and rail applications, and include fuel supply infrastructure development and demonstration.
    - The presenters noted that several projects reliant on electric vehicle (EV) charging installation have encountered delays due to UL listing requirements, adding time and cost to their implementation. Standardization of charging infrastructure was also discussed by the Committee as a critical need.
    - Committee members discussed the need for funding that targets early stage charging infrastructure to help projects overcome this hurdle. They also determined that sharing

these challenges with policy makers and regulators could improve their ability to define charging standards and remove opportunities for escalating costs and delays.

4. Review of Recommendations & Progress to Date (POLA)
    - This agenda item was bypassed due to time constraints and is being considered for a future committee meeting.

5. Planning for Truck Stakeholder Workshop
    - The Committee reviewed materials from the previous truck stakeholder roundtables, hosted in September 2017 and August 2018 with representatives from truck OEMs and the financial industries. The Committee agreed that a roundtable in 2019 should include an update on technology status, and then be focused on options for financing ZE and NZE trucks for port truck drivers.
    - The Committee tasked GNA with creating a list of questions to structure the roundtable, and engaging stakeholders to participate in the Committee's November meeting.

6. Lunch

7. Coordinated Advocacy & Legislative Engagement
    - CARB Special Board Hearing (At-Berth Regulation) – December 5, Oakland
        i. This event was noted by the Committee.
    - SSCAC Coordination and Approach for 2020 Legislative & Advocacy Efforts
        i. With early discussions about California's 2020 budget likely already underway, the Committee recommended submitting a letter to key leadership in Sacramento to emphasize the need for ongoing designated funding to achieve the aggressive goals of the CAAP and other similar initiatives.
        ii. The Committee will draft and submit a letter in advance of the Committee's November meeting. The Committee's Prioritization Recommendation will serve as a foundation of this letter.

8. Other Activities
    - Regional Goods Movement Demonstration Projects & Data Dashboard
        i. There was discussion about the development of either a regional or a statewide online "dashboard" that will allow for stakeholders to gets updates on the array of pilot and demonstration programs now underway. There was also discussion about the need for a regional EV charging plan to support ZE truck deployments.
    - CARB Low NOx Rule Update
        i. Jack Kitowski shared that CARB will present a Low NOx Omnibus measure in the spring of 2020, with intent to go into effect between 2024 and 2026.
        ii. There was discussion about the need for US EPA to approve a California waiver request in order for the new Low NOx standard to go into effect. There was also discussion about the potential applicability of the current CARB Optional Low NOx Standard to the Clean Truck Program.

9. Future Agenda Items
    - Mayoral participation
        i. Both mayor's offices and port staff will work with GNA to identify a date that the Mayors are available to meet with the Committee.
    - Truck Stakeholder Meeting

i. GNA will work with port staff to identify an invite list and discussion prompts for a truck stakeholder roundtable during the November Committee meeting.

- Priority Recommendations
  i. Trucks
     1. The Committee noted that the California Energy Commission (CEC) has approved a new EV investment plan targeting regionally-focused infrastructure. The ports were encouraged to work with their utilities to capture this funding in support of their vehicle work.
        a. GNA will work with Committee members to draft a recommendation that can be brought to a future meeting for review and approval.
  ii. Cargo Handling Equipment
  iii. Harbor Craft
  iv. Ocean Going Vessels

10. Conclusion & Next Steps
    - Committee members and the ports will pursue the actions recommended in this meeting, including assembling truck manufacturers and stakeholders for a roundtable in September to focus on NZE and ZE early action deployments and issues related to the CARB low NOx standard, and drafting recommendations to submit to Sacramento articulating the need for ongoing ZE and NZE focused-funding.