

Thank you to all of the speakers for their presentations at the West Coast Collaborative (WCC) Goods Movement Webinar #1: Overview of the Near- and Zero-Tailpipe Emission Freight Transport Technologies on May 21st. The notes from this webinar can be found below. This was the first of a series of webinars that will be focused on various freight technologies, projects and activities. This webinar provided an overview of a workshop held in Diamond Bar in April: Transitioning to Zero Emission Freight Transport Technologies Symposium. All of the PowerPoint presentations from the speakers on this West Coast Collaborative webinar can be found here. <http://westcoastcollaborative.org/wkgrp-marine.htm>. Please note that the EPA and/or the WCC is not supporting or endorsing any of these technologies, vendors, manufacturers or providers.

Notes: West Coast Collaborative Goods Movement Webinar #1:

Overview of the Near- and Zero-Tailpipe Emission Freight Transport Technologies
Tuesday, May 21st 11am-1pm PDT

1. Welcome and Introductions- Trina Martynowicz, Trucking and Rail Sectors Lead, West Coast Collaborative, U.S. EPA Region 9

- This is the first of a series of goods movement webinars focusing on freight technologies. This webinar will cover the Freight Technology Symposium held in April in Diamond Bar, which focused on state of these technologies that may needed to meet CA's criteria pollutant and greenhouse gas air emission goals. These technologies emit no or ultra low tailpipe emissions. Future webinars will dive in deeper to each of the sectors or emission sources (e.g., trucking, locomotives, port equipment and harbor craft/marine vessels) to cover some of these low emission technologies in more detail. The manufacturers and/or users of these technologies will be invited to present on the future WCC Goods Movement Webinars.

2. Overview of the Freight Technology Symposium April 10-11th- Henry Hogo, Assistant Deputy Executive Officer, Mobile Source Division, Science and Technology Advancement, South Coast Air Quality Management District

- See PowerPoint presentation here.

<http://westcoastcollaborative.org/files/meetings/2013-05-21/WCC-Goods-Movement-Webinar-Presentation-052113.pdf>

- This Symposium was held April 10-11th at the AQMD office in Diamond Bar to educate participants about various truck, line-haul locomotive, port equipment and marine vessel technologies that may bring significant emission reductions to the South Coast and San Joaquin Valley areas of CA. This symposium included freight technology industry experts that discussed opportunities, challenges, and implementation timelines for promising zero- and near-zero emission freight transport technologies. The PowerPoint presentations from this Symposium in April can be found here.

http://www.aqmd.gov/tao/ConferencesWorkshops/ZeroEmissionFreightForum/ZeroEmissionFreight_Agenda.htm

- Criteria pollutant and greenhouse gas emissions from freight transport related mobile sources are significant contributors to California's air quality and climate change. Meeting federal ambient air quality standards and California's climate change goals will require technology transformation on all levels. As such, innovative freight technologies development, demonstration and deployment must be accelerated over the next several years.

- The anticipated results of this Symposium may provide input for policy options and decisions.

3. Trucking Technologies- Joe Calavita, CA Air Resources Board (ARB)

- Overall, the lack of wide deployment of these technologies is not due to their technological limitations, per say, but instead their high costs, among other barrier. There were commonalities amongst the various speakers that the technology costs are too high due to various reasons, such a lack of standardization because of low volumes.
- The various presentations at the Symposium included the following companies and types of truck technologies: Balqon- electric yard hostlers, Transpower- battery electric drayage trucks, US Hybrids- fuel cell battery electric hybrids, Vision Industries Corporation- fuel cell electric hybrids, Capstone Turbine Corporation- natural gas electric hybrids and diesel electric hybrids, ICR Turbine Engine Corporation- advance natural gas with lower NOx engines, Siemens- catenary truck along the I-710 freeway corridor and energy recuperation and exchange, Volvo Groups Truck Technology- DOE's SuperTruck program and electrifying road systems, and Cummins Westport Inc. and Westport Innovations- lower NOx natural gas engines and dual fuel direct injector low emission trucks.
- Some benefits of alternative fuels were discussed, especially for emission reductions needed in the near-term. The low cost of natural gas makes these engines a viable emission reduction strategy, yet challenges will exist for this fuel to meet ARB's long term criteria pollutant and greenhouse gas air quality goals. Cellulosic alternative fuels are also viable for low emissions in the near term. Additional investments are needed in alternative fuels, including renewable fuels, such as those derived from biomethane (i.e. dairy, landfill) sources.
- Many different strengths, challenges and opportunities exist for the various types of truck technologies, though overall all of the technologies need more funding for demonstrations and wider deployment.
- Hybrid trucks- over 1,000 on road in CA. They produce fewer emissions and use less fuel than diesel trucks, yet are limited in their application, especially for long haul use. Combined with an alternative fuel or fuel cell, hybrids may have significant emission reductions benefits.
- Battery electric trucks- essentially zero-tailpipe emissions and may be fueled by renewable energy such as solar or wind. They have low operating costs yet have high upfront and infrastructure charging costs. They can only operate locally. More financial charging infrastructure support and battery technology advancements are needed.
- Hydrogen fuel cells- also have zero-tailpipe emissions and have the potential to be fueled by renewable fuels. They are efficient and can be applied to short- and long-haul truck applications. They have challenges around fueling infrastructure, yet quick fueling may be a viable option. They are extremely high in costs and must greatly expand infrastructure to be viable.

4. Locomotive Technologies- Harold Holmes, Manager, Rail Strategies Section, ARB

- See PowerPoint presentation here starting on slide #11.
<http://westcoastcollaborative.org/files/meetings/2013-05-21/WCC-Goods-Movement-Webinar-Presentation-052113.pdf>
- Provided great background of the rail systems, including the similarities, differences and challenges in the California, US and European systems. Information of the specific locomotive manufacturers highlighted at the Symposium was provided, including:
 - Electro-Motive Diesel (EMD) LNG locomotive for line haul. Note natural gas locomotives were used in the 1990's in CA, though all are no longer in operation.
 - General Electric (GE) battery-hybrid locomotive. Can operate via zero emission miles in urban areas (i.e. traveling 30 miles in an all-electric move) and then with a Tier 4 diesel mode that may be used to recharge the batteries.
 - GE and Transpower battery locomotives. They would utilize battery tender cars to operate in zero-emission in urban areas, then remove the battery tender cars and continue throughout the nation.

- All electric- LKAB Iron Ore. This is currently being used in Sweden, Norway and China for both passenger and freight locomotives, though major infrastructure investments are needed.
- Dual-mode or two diesel and electric power plants on the same platform. This is currently being used by New Jersey Transit, among other transit agencies, yet the technology has challenges with limited size and space configurations for larger freight locomotives.
- Solid Oxide Fuel Cell/Gas Turbines. There are potential benefits of thermal efficiencies and the fact that various fuels can be reformulated into hydrogen for this application.

5. Ports Equipment- Kevin Maggay, Port of Los Angeles- overview and port equipment technologies

- The Ports of Los Angeles and Long Beach created their Clean Air Action Plan to set goals and identify opportunities to reduce emission from port sectors. The Plan was most recently updated in 2010 with long term emission reduction goals. The ports are on pace to meet their 2014 goals, though may have more challenges in meeting the 2023 criteria pollutant goals.
- The Ports are relying on new technologies and strategies to meet these goals and have already see major emission reductions from various sources. For example, cargo handling equipment increased their use of ULSD fuel, which led to significant emission reductions.
- At the Symposium, specific technologies were covered in detail.
- These projects are lead by the ports tenants, who have chosen to initially test and demonstrate these technologies due to operation and fuel cost savings. The following technologies were discussed: electric yard tractor, electric rail mounted gantry cranes, electric rubber tier gantry cranes, unmanned electric AGVs, and terminal automations to improve efficiencies and emission reductions. These technologies have various short- and long-term challenges.
- Kevin supported Joe Calavita's comment that many of these technologies are available and have major cost challenges, yet he noted that they also have significant operational challenges, such as the need to be totally reliable.
- See Kevin's presentation from the Symposium here.
http://www.aqmd.gov/tao/ConferencesWorkshops/ZeroEmissionFreightForum/22_KMaggay.pdf

Renee Moilanen, Port of Long Beach- ship and ocean going vessel (OGV) technologies

- Though the ports have significantly reduced emissions from ships and OGVs, they still make up 60% of the overall port emissions.
- Shorepower is seen as a key strategy to reduce these emissions. In January 2014 a state-wide rule will require 50% of the OGV fleet to plug into shoreside power and turn off their auxiliary engines. The Port of LA was the first in the nation to adopt this technology.
- Both ports have vessel speed reduction programs that provide financial incentives for OGVs, reducing air emissions and fuels. To date, 80-95% ships are complying with this voluntary program. The ships burn less fuel, essentially leading to fewer emissions, or 20% reductions in particulate matter and 17% NOx reductions compared to operating at normal speeds.
- Ships have also adopted ULSD, which has lead to significant emission reductions.
- Under the IMO, cleaner engine reductions have lead to 15% lower NOx emissions through Tier 2 engines and will reduce NOx by 80% with Tier 3 engines. The ports are trying to bring these cleaner engines to both ports through two different programs: the Port of LA supports the Environmental Ship Index and the Port of Long Beach supports the Green Ship Incentive Program, which both provide funding when cleaner ships arrive.
- Specific technologies that reduce OGV emissions were highlighted at the Symposium, including the following:

- Scrubbers- use sea water to scrub out contaminants, testing by APL, who is closing out this project now, as well as a project led by Cal State Long Beach that ends in July 2014.
- Emission capture technologies (like a bonnet or sock)- utilizes land or barge mounted equipment to capture emission from the OGV.
- Slide valves- or fuel valves for the main engines for low ship speeds at low loads. This project is seeing lower amounts of particulate matter emitted. The final report should be out by the end of this year.
- The ports continue to be actively looking for lower emission OGV technologies from main engines as ships transit to/from the ports.
- Challenges exist with OGV emission reduction activities since they have huge capital assets with major challenges, but the ports are still looking for major emission reduction opportunities. A ports Request for Information is now out: Ocean-Going Vessel Technology to Reduce Main Engine Emissions for use at the Port of Los Angeles and the Port of Long Beach. The Port of Long Beach and the Port of Los Angeles are seeking information about technologies that could substantially reduce air pollution from main engines on ships transiting to and from the ports. Vendors of such technologies can submit information as outlined in the RFI (attached link, below). Responses must be received no later than July 19. Final OGV6 Technologies RFI found here [http://library.constantcontact.com/download/get/file/1111570680785-2/FINAL+OGV6+Technologies+RFI+\(FINAL\)+\(2\).pdf](http://library.constantcontact.com/download/get/file/1111570680785-2/FINAL+OGV6+Technologies+RFI+(FINAL)+(2).pdf)
- Renee's PowerPoint from the Symposium can be found here. http://www.aqmd.gov/tao/ConferencesWorkshops/ZeroEmissionFreightForum/23_RMoilane_n_TPisano.pdf

6. WCC Update: Status of DERA Competitive National and Tribal RFP's- Penny McDaniel, WCC Co-Lead, EPA Region 9

- The Diesel Emission Reduction Act (DERA) FY2013 Request for Proposals (RFP) is currently out. Applications are due on June 25th. The West Coast Collaborative, EPA Region's 9 and 10, will award less than \$2 million under the national competitive program.
- DERA also has the automatic state program, where states must confirm their participation to receive these funds. Since not all states will participate, the funding amount for those who will participate will be increased.
- More information can be found here of the DERA RFP and below. <http://epa.gov/cleandiesel/prgnational.htm#rfp>

7. Roundtable Updates from our WCC Partners

- Puget Sound and Western Washington Clean Cities are hosting a renewable natural gas for transportation fuel workshop on July 16 in Pierce County, south of Tacoma, WA. <http://www.wccleancities.org/>
 - The Valley of the Sun (Phoenix, AZ area) Clean Cities Program will be hosting two different workshops with Ford and GM. <http://www.cleanairaz.org/>
 - Please continue to share any new, information, events and funding opportunities with the West Coast Collaborative team to include in our Communicator newsletter and/or future webinar events.
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