

Transit Agency Subcommittee Meeting Summary
December 16, 2015

Meeting Location: Orange County Transportation Authority (OCTA), 600 South Main Street, Orange, California 92863 with conference call option

Attendees in Person

Last	First	Company
Barfjani	Shirin	Air Resources Board (ARB)
Brasil	Tony	ARB
Chow	Yachun	ARB
Cooney	Sharon	San Diego Metropolitan Transit System (SD MTS)
Cordero	Roland	Foothill Transit
Curry	Don	North County Transit District
DeMartino	Donna	San Joaquin Regional Transit District
Drayton	John	Los Angeles County Metropolitan Transportation Authority (LA Metro)
Engel	Len	Foothill Transit
Essner	Kristin	Orange County Transportation Authority (OCTA)
Hursh	Mike	Alameda-Contra Costa Transit District (AC Transit)
Jablonski	Paul	SD MTS
Johnson	Debra	Long Beach Transit
Lee	Jennifer	ARB
McCormick	Beth	OCTA
Miller	Steve	Golden Gate Bridge, Highway & Transportation District
Papson	Andrew	Foothill Transit
Pimentel	Michael	California Transit Association (Association)
Price	Alan	Solano County Transit
Ramacier	Rick	Central Contra Costa Transit Authority
Ramalingam	Jordan	ARB
Skyler	Lauren	SunLine Transit Agency
Thorne	Cliff	OCTA
Turner	Michael	LA Metro
Wiley	Mike	Sacramento Regional Transit District
Wixon	Mike	Roseville Transit

Attendees on Conference Line

Last	First	Company
Dhaliwal	Balbir	ARB
Davey-Bates	Lisa	Lake Transit
Easley	Terry	City of Modesto, Transit Division
Mellera	Marty	San Francisco Municipal Transportation Agency

Otten	Steve	ARB
Tepke	Glenn	Metropolitan Transportation Commission

Introduction

Tony Brasil opened the first meeting with a brief overview of ARB's plan to begin holding regular workgroup meetings in a manner that makes information available to interested stakeholders and makes the development process of the Advanced Clean Transit (ACT) regulation more transparent. ARB staff has been working closely with individual transit agencies and has attended several regional and annual transit meetings. Now ARB is taking a number of steps further to improve awareness of progress on the ACT regulation and to improve information sharing between impacted stakeholders.

ARB is forming an Advanced Clean Transit Workgroup that will include a wide range of stakeholders, with a Transit Agency Subcommittee that will focus on reviewing and resolving issues and concerns raised by transit agencies. These workgroups will meet regularly, and information about the meetings will be made available on the ARB website. ARB is also planning a technology symposium to be held on February 8, 2016 to inform interested stakeholders about the status of advanced technologies and to address challenges and solutions. ARB staff will be providing an update to the Board in February 2016 and is planning workshops for March 2016. The proposed Advanced Clean Transit regulation is currently scheduled to be considered by the Board in late 2016.

Discussion Items

The following are the key items discussed at the Transit Agency Subcommittee meeting:

- Goals of Subcommittee.
- Meeting organization and logistics.
- Advanced Technology Symposium.
- Cost methodology and data needs.
- Review of proposed Transit Fleet Survey.
- Alternatives and flexibility options.
- Action items.

Goals of Subcommittee

The group discussed setting goals for the subcommittee that would help establish common expectations and would guide future meetings. Following are items that were discussed:

- Ensure there is an open, transparent process for all transit agencies, regardless of their standing on the Subcommittee.
- Work towards shared goals of enhancing transit mobility, air quality, climate protection, and petroleum reduction through collaboration.
- Identify key transit agency issues and concerns (e.g. costs, commercial viability, funding, and impacts to service) and work towards identifying solutions.
- Consider impacts on local jurisdiction strategies to increase the ridership.
- Consider approaches that allow transit fleets to develop optimal compliance strategies to manage risk and costs.
- Collaboratively develop a framework and provide flexibility options in rule.
- Consider different transportation modes that can provide the same end goal.
- Provide additional education on technology, funding, and operation of Zero Emission Buses (ZBus).
- Identify funding sources
- Collect cost and fleet operation information for analysis
- Collaboratively develop consensus cost and fleet operation information, common analysis methodology

Meeting Organization and Logistics

ARB staff recommended that the group elect a Chair and Vice Chair to help facilitate future meetings of the Subcommittee, and to represent the collective interests of the Subcommittee on the Advanced Clean Transit Advisory Committee. Mr. Paul Jablonski of San Diego Metropolitan Transit System was elected as the Chair of the Subcommittee. His election satisfies the Subcommittee's desire to have representation from Southern California as well as from a large transit agency. Mr. Rick Ramacier of the Central Contra Costa Transit Authority was elected as the Vice Chair. His election satisfies the Subcommittee's desire to have representation from Northern California as well as from a small transit agency. The Chair and Vice Chair will be the primary representatives for the Subcommittee at the Advance Clean Transit Workgroup meetings.

Transit Agency Subcommittee meetings will be held about every two months, and any meeting materials will be provided to the entire subcommittee at least 24 hours prior to the meeting. The next meeting is planned for February 9, 2016 in Sacramento (the day after the Technology Symposium).

Subcommittee members are expected to attend meetings in person (a call-in option will be available, if necessary) to review meeting materials and summaries, to work on developing regulatory frameworks between meetings, and to prepare materials for future meetings as needed. The Subcommittee acknowledged that some issues will be better handled by smaller subgroups within the subcommittee that may meet between Subcommittee meetings in an

ad-hoc manner. The subgroups will be created as needed and will report back to the Subcommittee at the regular meetings.

Subcommittee members will be given one week to provide comments on meeting summaries. Final meeting summaries and other meeting materials will be posted at <http://www.arb.ca.gov/msprog/bus/bus.htm>.

Advanced Technology Symposium

ARB staff discussed plans to coordinate an advanced technology symposium that would educate interested parties about the current status of advanced technologies and would bring together a range of stakeholders to work through challenges and solutions. The symposium is scheduled for February 8, 2016, and ARB sought comments on the following proposed sessions:

- Session 1 will address transit agency experiences in overcoming initial and operational challenges of zero emission buses.
- Session 2 will address current status of advanced clean technologies for buses, including, but not limited to, battery-electric, fuel cell, low-NOx engines, and hybrid technologies.
- Session 3 will address availability and costs of low carbon fuels.
- Session 4 will address onsite infrastructure logistics and solutions for alternative fuels.

Key comments about the proposed symposium include:

- Session 2 should be about both current and future status of the advanced technology.
- Charging standardization and commonality of the technology has to be considered and discussed.
- ARB should work with the Federal Transit Administration (FTA). Transit agencies are concerned with being locked into a particular bus and charging technology, and the FTA requires transit agencies to have a low bid purchase that may result in multiple incompatible charging strategies for the same fleet.
- ARB should invite a technology neutral expert or entity, such as National Renewable Energy Laboratory (NREL), or Electric Power Research Institution (EPRI). (ARB will be inviting NREL for ZBus performance statistics discussions and EPRI for infrastructure discussions).

Cost Methodology and Analysis

ARB staff presented an overview of the proposed cost methodology and identified areas that need additional data. ARB will compare year by year costs with the rule (independent of funding sources) with year by year costs for normal bus replacements without the rule. The cost analysis will be in constant dollars

and is key in setting a proposed zero emission bus phase-in schedule and in understanding the potential costs from any proposal.

ARB has been coordinating with Steve Miller on cost methodologies and inputs. We have general agreement on the methodology, but some details still need to be addressed. The following are summaries of details that were discussed:

- The cost analysis should consider the total cost of ownership including operation and maintenance cost (O&M) and capital costs. Capital costs include vehicle purchase, fueling/charging infrastructure, and upgrades to maintenance infrastructure. O&M costs include fuel costs, and maintenance and repair costs for vehicles, fueling infrastructure, and maintenance bays.
- ARB has also evaluated electricity costs with standard electricity rate schedules for fast charging and slow charging battery electric buses for the three major utilities and several smaller utilities. The analysis accounts for all costs including demand charges, time of use, and seasonal variations. ARB will use the analysis to evaluate costs for individual transit fleets, unless there is an applicable schedule for electric bus charging. The electricity cost analysis is also potentially important in determining electricity costs for compressing natural gas and hydrogen.
- ARB also shared information regarding the potential value of Low Carbon Fuel Standard (LCFS) credits as they apply to buses. LCFS credits can reduce some compressed natural gas (CNG) costs, but they offset a substantial portion of electricity, hydrogen and renewable fuel costs. ARB will include these savings as part of its analysis. Foothill Transit commented that their LCFS credits for battery electric buses are worth about 7¢/kWh which is about 14¢/mile.
- Some details about bus prices still need to be addressed, such as what data sources should be used for projecting future bus prices and different fuel costs. Conventional bus prices will remain flat (in constant dollars), but battery electric buses and fuel cell bus prices have been declining and are expected to continue to decline compared to conventional buses.
- Additional data is also needed for repair and maintenance costs for operating buses with different fuel types. Staff has some information about maintenance costs for different bus technologies, but is seeking more robust data from transit fleets, such as maintenance costs for different bus ages, mid-life replacement costs, capital and O&M costs of fueling infrastructure and bus maintenance bays. For example, a number of transit fleets have provided information on their CNG contract prices, but did not include costs for compression or station maintenance that can be significant. Transit agencies will provide available cost information to ARB.
- ARB is seeking to assess potential residual value for batteries and fuel cell stacks at the end of the buses useful life. There were questions whether

- there could be a market without an original equipment manufacturer buyback program.
- Subcommittee members raised concerns about the possibility that they would be required to incur additional costs because of limited space for infrastructure or would need to purchase more buses or hire more operators because of range limitations. ARB agreed that the regulation should not require certain actions that would disrupt transit service or would require more buses to be purchased to maintain the same service. ARB has been considering technology off-ramps to address the concern and is interested in developing detailed proposals. For example, if a bus yard has limited space, the fleet should not have to acquire new property solely to fuel buses if no other options are available. An objective mechanism needs to be defined on how the off-ramp would be confirmed and implemented. If these types of issues can be addressed in the regulation, ARB believes there is no need to estimate costs for these kinds of actions.
 - Members agreed to create a subgroup to work on collecting transit agencies data on costs and to coordinate with ARB in January. Steve Miller offered to take the lead on identifying transit fleet participants for the subgroup that would include Paul Jablonski, Michael Pimentel and Cliff Thorne. The subgroup will report back at the next meeting.

Transit Survey

ARB has been working with transit fleets to develop a survey that provides additional details than the averages that are available in the National Transit Database. ARB is seeking input on the proposed questions and how best to design the survey. Survey responses would provide details that will help assess costs and could highlight key differences between fleets. Members agreed to provide comments by January 8, 2016. The Association will complete the survey for at least one larger transit property and will provide detailed edits to represent large transits. Rick Ramacier will do the same to ensure that survey questions are responsive to smaller agencies. When survey is finalized, ARB will send the revised version to transit fleets and will coordinate with the Association to improve response rates from Association members.

Alternatives and Flexibility Options

The group discussed ARB's proposed regional flexibility options and Association's proposed alternative framework that supports a performance based strategy. Both concepts have not been developed in sufficient detail to compare them. The Subcommittee agreed to establish a subgroup to develop additional details for both approaches with a common goal of achieving comparable emissions reductions while supporting the zero emission bus market. The following are comments regarding potential areas of emphasis or flexibility for consideration:

- Provide a technology neutral performance based regulation, like considering zero emission passenger miles regardless of mode.
- There is a general demand and desire amongst transits to reduce emissions of their fleets and be green. How they go about this varies.
- An emphasis should be put on quantifying the benefits of getting people out of vehicles.
- The regulation should have some consideration about the fleet size. Smaller agencies might not have resources.

Other Comments and Concerns

- The Association would like ARB to lobby for additional funding for zero emission bus adoption and work with the Public Utilities Commission and utilities to bring down electricity rates for charging infrastructure.
- ARB should consider differentiating between commuter and fixed route buses, because they have different abilities to deal with traffic and speed limits. They need different technology.
- Transit fleets also have experience in working with different technologies. For example, technology of light rail and heavy rail are not interchangeable and sometimes exist in the same system. We can learn from the past lessons.
- Concerns were raised regarding compliance axle weight limits for Zbuses. ARB staff believes the axle weight issue in California has largely been addressed by the recent passage of AB 1250. ARB made a preliminary evaluation of bus axle weights and found that rear axle weights for existing zero emission buses are in the same range as conventional buses and will prepare a summary for the next meeting.
- ARB should educate Transit Agencies about strategies to manage the costs of electricity for battery electric buses
- Transit Agencies have concerns regarding the availability of funds and restrictions on their use and need to find other sources of funding for operational costs.

Action Items

- Steve Miller will take the lead in creating a subgroup including Paul Jablonski, Michael Pimentel, Cliff Thorne and others to collect transit information on costs.
- Michael Pimentel will determine if the same subgroup can work closely with ARB to expand upon the Association proposal and ARB's flexibility options.
- Committee members will provide feedback on the survey questions to ARB by January 8, 2016.

- ARB will share the meeting summary with the Subcommittee and provide one week for comments.
- ARB staff will draft a short two page summary of the axle weight issue for review and comment prior to the next subcommittee meeting.
- ARB and the Subcommittee Chair and Vice Chair will work together to draft meeting agenda for the Feb 9th meeting in Sacramento. Mike Wiley will help find a meeting room.