Third Transit Agency Subcommittee Meeting Summary

Wednesday, October 26, 2016

South Coast Air Quality Management District, Diamond Bar

Attendees

Following is the list of Transit Agency Subcommittee (Subcommittee) members who participated in the meeting in person or identified themselves via telephone or email during the meeting.

Name	**Organization**
Andrew Papson	Foothill Transit
Bill Spraul	San Diego Metro Transit System
Brandon Bullock	Orange County Transportation Authority
Cliff Thorne	Orange County Transportation Authority
Donna DeMartino	San Joaquin Regional Transit District
Fang Yan	California Air Resources Board (CARB)
Jack Kitowski	CARB
Jennifer De Tapia	Trillium CNG
Jennifer Lee	CARB
Jing Guo	CARB
John Drayton	Los Angeles County Metropolitan Transportation Authority
Mark Perry	Antelope Valley Transit Authority
Marty Mellera	San Francisco Municipal Transportation Agency
Matthew Williams	CARB
Michael Masquelier	WAVE
Michael Pimentel	California Transit Association (CTA)
Michael Turner	Los Angeles County Metropolitan Transportation Authority
Norm Hickling	Antelope Valley Transit Authority
Paul Jablonski	Chair of Transit Agency Subcommittee/ San Diego Metro Transit System
Rick Ramacier	Vice Chair of Transit Agency Subcommittee/ Central Contra Costa Transit Authority
Ron Zirges	Victor Valley Transit
Sharon Cooney	San Diego Metro Transit System
Shirin Barfjani	CARB
Steve Miller	Golden Gate Bridge, Highway, and Transit District
Steve Schupak	Los Angeles County Metropolitan Transportation Authority
Todd R. Campbell	Clean Energy
Tony Brasil	CARB
Yachun Chow	CARB

The Subcommittee is part of a broader Advanced Clean Transit (ACT) Workgroup and consists solely of transit agencies. A few non-transit representatives participated at this Subcommittee meeting, but did

not share any comments. CARB also provides other forums, such as workgroup meetings and workshops for a wide range of stakeholders to actively participate in discussions and share their comments. This was the third Subcommittee meeting and the detailed agenda and presentation materials are available at Advanced Clean Transit webpage (https://www.arb.ca.gov/msprog/bus/actmeetings.htm). The meeting was not recorded. The following were the primary agenda items for the meeting:

- Adding detail to CTA proposal on performance based approach concept
  - How to establish a baseline
  - What metrics to use for GHG, NOx, PM
  - Treatment of bus only or mixed fleets
  - Treatment of diesel fleets and CNG fleets
- Discussion of other alternatives
- Total cost of ownership and financial impacts
- Consideration of fleet operations
- Action items
- Topics for next meeting

The objectives of this meeting were to discuss questions that are needed be answered in order to develop details of CTA's performance based concept and to continue discussion on the latest cost information. There are multiple ways to implement a performance based concept and the details are key to understanding how a performance based approach envisioned by CTA would compare with other implementation concepts that were discussed at the October 4, 2016 ACT workgroup meeting. CARB used a PowerPoint presentation format to guide discussion of fundamental questions that were needed to develop details of CTA's performance based framework. A copy of the presentation is available at https://www.arb.ca.gov/msprog/bus/arb_oct_2016_tas_pres.pptx .

Adding Detail to CTA Performance Based Framework

There are multiple ways to implement a performance based concept, and it is essential for CARB to understand details of CTA's suggested performance based approach to assist in developing the concept further. Some key criteria and details were initiated to discuss at this meeting and some examples are found below.

To understand the performance based approach better some practical implementation issues of the existing regulation (*Fleet Rule for Transit Agencies)* were discussed, including:

- Emissions reduction targets in current regulation are fleet specific not bus specific; therefore, transit agencies are not required to retrofit every polluting bus in their fleets as long as they can achieve the fleet specific emissions reduction targets.
- Current fleet rule does not address reductions in greenhouse gas (GHG) emissions. It requires percentage reductions from a baseline year for PM and meeting regulatory NOx compliance standards based on engine standard fleet averages by specific time frames.
- Emissions reductions from any strategy implemented through the ACT effort must be real, quantifiable, verifiable, and enforceable. For California to meet its goals, the strategy needs to

achieve PM, NOx and GHG reductions beyond existing programs without double counting emissions reductions that are expected from other programs. Examples of other regulatory programs include Low Carbon Fuel Standard (LCFS), sustainable communities' strategies, and new engine emission standards (normal replacements).

- Some transit agencies are still unclear why GHG emissions reductions from using renewable natural gas (RNG) or renewable diesel (RD) fuel is attributed to the LCFS program and wonder why GHG reductions benefits cannot be claimed by transit agencies that use RNG or renewable diesel. In summary, CARB established the LCFS regulation to reduce carbon intensity of transportation fuels by 10 percent. The regulation requires transportation fuel providers to expand the use of renewable fuels in transportation and created a debit and credit system to allow for compliance flexibility. The higher costs of producing and distributing RD and RNG are ultimately borne by the fuel producer who earns or buys the credits from others and applies the credits towards their compliance deficit. The emission reductions can only be claimed once.[1] Some agencies caveat that transit electrification will indirectly increase the cost of electricity and claimed there are high emissions associated with production of electricity. CARB does not agree with the general statement as it pertains to electricity used in California over the next 20 years. California grid electricity is already relatively clean and continues to become cleaner with continued increases in renewable energy production such as wind and solar which are highly effective in further reduction of both criteria pollution and GHG emissions. GHG emissions associated with extracting, producing, transporting and distributing the fuel or energy for any CARB recommendation will be evaluated with a well-to-wheel (WTW) analysis. CARB also commented that WTW is just one way of looking at climate change and GHG emissions. It is equally important, if not more, to look at how energy is used. For example, if CNG (or RNG) is used in a modern power plant to produce electricity for a battery electric bus, the battery electric bus would travel substantially further than if the fuel were used in a conventional CNG bus and is the most efficient use of the fuel's energy.
- Some mentioned the description of ACT proposal in Mobile Source Strategy is weak, because it is not about emissions reductions; yet it is about forcing a technology. It was also added that zero emission technologies are currently expensive, but if State provides enough money for this transformation transit agencies are willing to do it.
- Comments further include that costs analysis should be based on facts, not projections. CARB agrees with using current data as a starting point, but a long term analysis requires future projections to be meaningful. In addition, CARB is updating the cost information as more information becomes available and will continue working towards a common understanding of costs over the life of a vehicle and the twenty years timeline associated with meeting a 2040 end goal.
- Comments were raised that limited funding would be available to cover the ZEB's incremental costs to facilitate the transition to zero emission fleets. Therefore, CARB should take a technology-neutral position and adopt a combination of commercially available and cost-

[1] Double counting issue was discussed in details at the 3rd ACT Workgroup meeting on August 29, 2016 https://www.arb.ca.gov/msprog/bus/wg_summary_8_29.pdf .

efficient technologies. CARB acknowledges the funding availability is still to be addressed but need to be part of the recommendations once a specific strategy schedule and costs are considered together.

Treatment of bus only or mixed fleets

It is necessary to understand what should be included in the scope of defining a transit system for defining a performance based concept. For example, should this program include all modes of transportation, such as bicycle, car-sharing, street cars, rails, ferries, taxis, van pools, etc. or should it be limited to buses and modes of transportation that are managed by transit agencies. Which data sources would be available or what kind of reporting would be needed to track progress for each mode? How would public-private partnerships be considered?

- The group agreed that quantifiable emissions reductions and clarity of an approach are a must. It was also agreed that the ACT program should minimize overlapping with other existing programs, such as SB375.
- To understand which modes should be included, LA Metro representative suggested studying passenger trips to estimate percentage of people in next 10 years that are going to be moved by an approved mode of transportation.
- Collaboration with Lyft and Uber was brought up as an example for public-private partnership to expand the first and last mile connectivity with the following associated comments::
    - Car-hailing services are not much different than using taxis and do not really reduce emissions;
    - Public-private partnerships are still under consideration and negotiation by transit agencies. Some transit agencies are subsidizing the Uber use after the official working hours and tracking the data, but most transits do not[2].
    - Some transits believe quantification of Uber use is not practical or useful, because this connectivity is gasoline based and is not helping with emissions reductions.
    - Others raised concerns that they could not partner with private operators like Uber because they do not comply with ADA requirements and would risk loss of federal funds.
- Transit agencies already have partnership with taxis and vanpools and reporting such data to the National Transit Database. Vanpools are sometimes managed through metropolitan planning organizations. Again, some transit agencies do not believe these options be considered in the scope of transit system, unless they are directly managed by transits. Some agencies are still looking at these options.
- Some regions have heavy passenger rail systems which are mostly diesel with relatively high PM emissions, as some other regions have electric light rail or rapid transit system with no tailpipe/stack emissions. Some transit agencies have no passenger rail system in their service areas except for Amtrak. Therefore, it is beneficial for some transit agencies to include the rail system and for others to exclude it. As an example, San Diego MTS representative claimed their

[2] Some transit agencies told CARB during the case study that such collaboration cannot be funded by Federal Transit Administration (FTA) due to liability and other requirements.

electric light rail systems are almost six times more efficient in carrying people than buses; therefore, considering light rail in this approach make their transit system 70% zero emission.

- Unlike San Diego, some transit agencies, like the ones in Bay Area, do not have authority over the Bay Area Rapid Transit (BART) system. However, BART is within the same metropolitan area that directly competes funding with transit agencies. Therefore, bay area transit agencies will be disadvantaged by such approach.
- Some agencies recommended utilizing a regional approach instead of looking at transit agencies alone. CARB agreed regional flexibility can provide synergy effects and bring costs down. CARB has been supportive of a regional approach. It was then suggested by transit agencies that a regulation with individual fleet target should kick in if the regional approach fails.
- In general, some transits believe considering first and last connectivity adds to the complexity of issues, because it would be difficult to reach consensuses on which options need to be considered and how to account for them.
- Broadly, most participants agreed that all modes of transportation that are reported by the transit agency in the National Transit Database should be used except for modes that are not directly implemented by transit agencies.

Metrics and Surrogates to Simplify Approach

- Surrogates can be used to simplify reporting and compliance tracking. It is crucial to choose right metrics for tracking NOx, PM, and GHG emissions as each metric has advantages and disadvantages. Surrogates that are easy to measure and compare can help simplify all aspects of implementation and compliance planning.
- PM and NOx emissions depend on numerous factors, like vehicle type, engine model year (EMY), driving cycle, fuel type, etc. GHG emissions depend on vehicle type, fuel type, engine/vehicle efficiency, drive and duty cycles, other usage characteristics, etc. Total fleet emissions change with fleet size, EMY, engine type, fuel type, fuel usage, mode shifting, changes in vehicle utilization, annual miles travelled, etc. National Transit Database (NTD) and CARB reporting site contain some but not all of these necessary details.
- Transit agencies suggested looking at project screening criteria for Transit and Intercity Capital Program (TIRCP) which might provide good information about GHG benefits quantification of transit actions.
- It was suggested to look for mode shift and avoid using passenger miles as a measurement because of fluctuations in ridership. Comments were raised that metrics should be relatively stable and not vary with external factors like the economy that are outside the control of transit agencies. Some agencies mentioned metrics such as passenger miles or seat miles were used previously to indicate operation's efficiency. New metrics like emissions per vehicle operator, emissions per seat miles, or any indicator that shows potential loading capacity are worth considering. It was suggested using a composite index (a mixture of few metrics and weigh them and compare them over time) or a parameter that indicates potential loading capacity and use a multiplier.

- One transit agency pointed out that although ridership increase and higher loading capacity are efficiency indicators, over-crowding could discourage ridership and becomes an issue.
- Most participants agreed that seat miles should be used to avoid concerns about fluctuating ridership due to external factors. The number of seats would not change unless the fleet compositing changes. This metric neither provide an advantage for increasing ridership, nor a disadvantage for declining ridership.
- Comments were also raised about standing capacity. A ratio of standing passenger to available seats for each mode should be used to account for modes that typically have more standing passengers. CTA members will provide suggested ratios for CARB to incorporate.
- For NOx emissions, the existing regulation uses engine emissions factors to establish a fleet NOx average. The same basic approach could be used rather than reflecting actual in-use emission from testing data.
- Regarding a GHG surrogate, CARB would need to evaluate the project screening criteria for TIRCP, and fuel consumption records in the NTD to identify options for defining GHG metrics.

Establishing a Baseline and Targets

Other important discussion topics were about how to set baselines to address PM, NOx and GHG emissions, modes of transportation, and fuel types for various transit agencies, as well as how to set appropriate emissions reduction targets. Each mode has different emissions, fuel use, and replacement cycle and all transits have different equipment. Should a baseline be unique for each transit agency? Does it make more sense to set a unique target for each fleet based on existing mix of different modes, or we should use the same emissions reduction percentage goal for all fleets regardless of their starting point?

- Several transits agreed they prefer having a ratio rather than a fix number for targets.
- Transit agencies also prefer having a unique baseline for individual transits, and believe goals have to be transit specific as well. An example was given to illustrate the point, a transit with a cleaner CNG fleet should have less stringent target to meet than a relatively dirtier transit with diesel fuel. It was also added that more stringent goals cost transit agencies more money. Low NOx engines help transits achieving State's goals easily and less expensive. Once a transit achieves a State's emission reduction goal, it should consider compliant and should be left alone. Fuel switching costs transit agencies lots of money and challenges.
- Considering fleets have different fuel types and varying fuel consumption, fuel can play a big role in setting baselines and targets. Therefore, it is essential to learn and decide whether different baselines for diesel vs CNG fleets are needed. Besides, since GHG reductions from RNG and RD are already accounted in LCFS, they may need to be accounted differently.
- The baseline for GHG WTW emissions for statewide bus fleet[3] shows a steady increase. GHG emissions are expected to increase with time, despite the use of cleaner technologies, such as renewable fuels, due to increase in population and transit service miles. A transit agency

[3] Page 21 of CARB presentation on "Developing CTA Performance Based Concept": https://www.arb.ca.gov/msprog/bus/arb_oct_2016_tas_pres.pptx

mentioned if the population and the transit services are increasing with time, State and federal governments need to provide more funds for transits to be consistent. CTA representative added ZEB population has to be considered in the baseline as well.

- Some transit agencies wondered how they can get cleaner and achieve more stringent targets, if they are already using clean natural gas. Change of previously achieved targets would not be fair towards transit agencies, because they did whatever they were supposed to do.
- Another important parameter to consider is transit system growth and its influence on the baseline and target. National trends, California trends, expansion of mobility options, higher ridership density, emissions reduction benefits of using advanced technologies beyond conventional vehicles, and transit system efficiency increase could be good indicators for system growth, but we have to learn how to measure and apply them.
- There are concerns about small operators and comments raised to consider their baseline and emissions reduction targets separately from larger operators.
- ARB reminded, when deciding about targets and metrics, disadvantaged communities (DAC) benefits, and equitable benefits distribution need to be considered as well. Transit agencies commented CARB definition of DAC is not in line with the FTA title VI program that transit agencies need to be compliant with. Title VI has way broader definition; therefore, servicing DAC is not a good metrics to use. CTA is going to provide more information in this regards.
- ARB added after passage of SB 32 the mapping and criteria for DAC will be updated, but it will take some time.

Total Cost of Ownership and Financial Impacts

- Steve Miller, lead of the cost subgroup, briefly informed the Subcommittee about the cost subgroup meeting on October 14, 2016. The Cost Subgroup meeting summary was shared with the Subcommittee members prior to this meeting. CARB and the cost subgroup will be making adjustments to bus prices and some other cost assumptions and have agreed on a number of steps to answer some outstanding questions about maintenance costs and other modeling assumptions.

Action Items

- CTA is going to provide information about Title VI in conjunction with CARB's disadvantage communities.
- ARB will use the feedback received in this meeting to develop metrics and details to better define a performance based approach that was envisioned by CTA. The point of contact for questions and further discussion will be Michael Pimentel.
- CTA will provide CARB with a recommended scaling factor to account for standing passengers on different modes.
- Updated cost information will be shared at the next workgroup meeting.