Innovative Clean Transit Regulation
Airport Shuttle Regulation

Regional Meetings

October 2019
REGIONAL MEETINGS

October 9, 2019, 12:00 p.m. to 3:00 p.m. (PST)
San Bernardino

October 10, 2019, 10 a.m. to 2:30 p.m. (PST)
Los Angeles
(Including Airport Shuttle Program)

October 18, 2019, 12:00 p.m. to 3:00 p.m. (PST)
Fresno

October 22, 2019, 10 a.m. to 2:30 p.m. (PST)
Sacramento
(Including Airport Shuttle Program)

October 29, 2019, 11 a.m. to 3:00 p.m. (PST)
San Francisco
(Including Airport Shuttle Program)
MEETING AGENDA

- Introduction
- Overview of the Innovative Clean Transit regulation
- Overview of the Airport Shuttle regulation
- Regional coordination and funding opportunities
  - Metropolitan Planning Organization(s) and/or air districts
  - TIRCP/LCTOP
  - CEC
  - Utilities
  - HVIP, VW, and LCFS
- Roundtable discussions on issues, barriers, solutions, and needed resources
Innovative Clean Transit Regulation
ELEMENTS OF INNOVATIVE CLEAN TRANSIT REGULATION

- Applicability
- Zero Emission Bus (ZEB) Rollout Plan
- ZEB purchase requirements
  - Flexibility, exemptions, and credits
- Renewable fuels
- Low-NOx engines
- Annual reporting and record keeping
APPLICABILITY

- Applies to all transit agencies that own, operate, or lease buses with gross vehicle weight rating (GVWR) > 14,000 lbs.
  - Include standard, articulated, over-the-road, double-decker, and cutaway buses
  - Include demand response buses

- Does not apply to:
  - Caltrans, Caltrain, Amtrak, or school districts
  - Vehicles operate on rails, trolleybuses, or school buses
REQUIREMENTS DIFFER BY FLEET SIZE

A Large Transit Agency (as of Dec 31, 2017)

- Serves areas with populations >200,000
- Has ≥100 buses* during peak operation
- Operates in South Coast or San Joaquin Valley
- Has >65 buses* during peak operation

* Includes all buses with a GVWR >14,000 lbs., but excludes demand response

A Small Transit Agency

All other transit agencies
An individual transit agency plan on how to transition to a zero emission bus fleet by 2040

Approved by the transit agency’s governing body and submitted to CARB
  - July 1, 2020 for large transit agencies
  - July 1, 2023 for small transit agencies

Intent:
  - Helps inform the state’s funding plans and utility planning, and engage general public
  - Serves as the transit agency’s blueprint
**ROlLOUT PLAN AND THE GUIDANCE DOCUMENT**

- **Rollout Plan**
  - Non-binding and could be a moving target
  - The Air Resources Board only enforces the submittal of the initial Rollout Plan but does not enforce the implementation of the Rollout Plan
  - All timelines are estimated with best input from partners, e.g. utilities or other fuel providers

- **Rollout Plan Guidance Document**
  - Provides general guidance to transit agencies for planning purpose
  - Is not a form or required format
  - Includes both required and recommended information
ZEB PURCHASE SCHEDULE

- Purchase means when a transit identifies, commits, and encumbers funds to execute a Notice to Proceed, or to sign a lease or a purchase agreement with a bus manufacture to begin with production of a bus.
- 2023 requirement discharged if 850 ZEBs purchased by 12/31/2020.
- 2024 requirement discharged again if 1,250 ZEBs purchased by 12/31/2021.
- Early ZEB purchases count towards future compliance.
- Retain newly purchased ZEBs for at least 5 years, starting January 1, 2023.

<table>
<thead>
<tr>
<th>Year</th>
<th>ZEB Percentage of Total New Bus Purchases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Large Transit Agency</td>
</tr>
<tr>
<td>2023</td>
<td>25%</td>
</tr>
<tr>
<td>2024</td>
<td>25%</td>
</tr>
<tr>
<td>2025</td>
<td>25%</td>
</tr>
<tr>
<td>2026</td>
<td>50%</td>
</tr>
<tr>
<td>2027</td>
<td>50%</td>
</tr>
<tr>
<td>2028</td>
<td>50%</td>
</tr>
<tr>
<td>2029 &amp; after</td>
<td>100%</td>
</tr>
</tbody>
</table>
LATE PHASE-IN FOR LESS COMMON BUS TYPES

- Purchase of zero-emission cutaway, over-the-road, double decker, and articulated buses
  - Starts on or after January 1, 2026
  - When bus type passes Altoona testing
  - Aligned with small transits’ schedule
- Voluntary early ZEB purchases of these types will still count towards compliance
<table>
<thead>
<tr>
<th>Technology</th>
<th>Vehicle In Service Date</th>
<th>Bonus Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel cell electric bus</td>
<td>As of January 1, 2018</td>
<td>2</td>
</tr>
<tr>
<td>Fuel cell electric bus</td>
<td>Between January 1, 2018 and December 31, 2022</td>
<td>1</td>
</tr>
<tr>
<td>Battery electric bus</td>
<td>As of January 1, 2018</td>
<td>1</td>
</tr>
<tr>
<td>Electric trolleybus</td>
<td>Between January 1, 2018 and December 31, 2019</td>
<td>0.1</td>
</tr>
</tbody>
</table>
Eligibility to form a ZEB Joint Group
- All members must share the use of some infrastructure, or
- Be within the same Metropolitan Planning Organization, Regional Transportation Planning Organization, Air District, or Air Basin

Compliance requirements
- Submit the request one year before the Joint Group takes effect
- Comply with individual ZEB purchase requirements collectively (including bonus credits)
- If the largest member is a large transit agency it must meet its minimum number of ZEBs required
- Exemptions apply only if ZEB purchase requirements cannot be met by whole group
- May submit one Rollout Plan as a ZEB Joint Group
Zero-emission car sharing, vanpool, micro-transit, active transportation
- Vehicles with GVWR ≤14,000 lbs., scooters, or bicycles
- Must be either directly operated by the transit agency or operated by a contractor to the transit agency
- Transit agency must track zero-emission passenger miles for each eligible vehicle

Large Transit Agency

\[
\frac{320,000 \text{ Passenger Miles}}{180,000 \text{ Passenger Miles}} = \quad \text{3X multiplier}
\]

Miles from bike sharing programs receive a 3X multiplier
ZEB PURCHASE COMPLIANCE SUMMARY

- Required number of ZEBs calculated based on percentage of new bus purchased each year
  - Round to nearest whole number
- Meet the required number of ZEBs with any combination of the following:
  1. Zero-emission mobility credits
  2. Bonus credits
  3. Existing ZEBs in the fleet
    - Include ZEBs from previous purchases exceeding the required number of ZEBs, leased ZEBs, and buses converted from conventional technologies to ZEBs
  4. New ZEB purchase
- Items (1), (2), and (3) can only be used once and must be used first before item (4) is being counted towards compliance calculation
EXEMPTIONS TO SAFEGUARD AGAINST UNCERTAINTIES

- Ensure transit service not adversely affected
- Address circumstances beyond transit agency’s control
- Tailor to individual transit agency’s special situations
- Request must be submitted to CARB by November 30th of each year
- Approved exemptions from ZEB purchases valid until the next bus purchase
  - For the approved year, a transit agency may purchase conventional buses with internal combustion engines instead
RENEWABLE FUELS REQUIREMENTS

- Only apply to large transit agencies
- Only when fuel contracts are renewed or executed on 01/01/2020 or after
- Only apply to diesel or natural gas used by buses
  - Fossil natural gas → Renewable natural gas
  - Diesel → Renewable diesel
- Do not require fuel switching
LOW-NOX ENGINES REQUIREMENTS

- Requirement starts 01/01/ 2020
- Apply to all transit agencies on new purchases only
- Excludes buses dispatched from NOx exempt areas
- Does not require switching fuel types or repower
- Determination of Low-NOx engine availability
  - Must be commercially available for 2 years
  - Must be certified to lowest level of NOx emissions
- Current Cummins 8.9 L CNG engines are all low-NOx engines
REPORTING AND RECORD KEEPING REQUIREMENTS

- Initial reporting starts in 2021 for all transit agencies
- Every transit agency must report annually by March 31\textsuperscript{st} each year
  - Information on agency, bus purchases, fuel purchases
  - Individual bus, engine and propulsion system information
  - Total annual zero-emission passenger mile if using the mobility option
- Every transit agency must retain records of information reported for 3 years after bus retirement or contract expiration
  - Records of Notices to Proceed and related bus purchase contracts, lease, and conversion
  - Records of Low-NO\textsubscript{x} engine purchases
  - All fuel purchase contracts (large transit agencies)
  - Record of zero-emission passenger miles if using the mobility option
Explains the ICT regulation in everyday English, e.g. how exemptions can be applied

- Provides examples in
  - Zero-emission mobility program
  - Compliance for ZEB purchase requirements
  - Joint Group option

- Does not replace the adopted regulatory text, which controls in all instances
COMPREHENSIVE REVIEW

- Inform HD ZE policy and funding strategies
- Ensure transit service not adversely impacted
- Address program readiness
- One year before the first ZEB purchase requirement
- Complements annual updates to the Board
STATEWIDE DATA COLLECTION

- Support comprehensive review and long-term technology evaluation
- Anticipated work from participating transit agencies
  - ZEB and infrastructure specs upon vehicle deployment
  - Continued data collection on ZEB performance and O&M costs
- Uniform data collection template
  - Soliciting comments on the draft template through December 6, 2019
- Participating transit agencies with existing ZEBs may start data collection in January 2020
- Transit agencies can participate at any time
Participation is voluntary and results are public

The template is not a form or required format

The template will be provided in an Excel format for easy data management

Participating transit agencies are encouraged to submit continued data collection on ZEB performance and O&M costs monthly

Participating transit agencies should conduct quality control of data before monthly submittal, e.g. correct reading of odometer, parts costs, labor hours, etc.
CONTACT INFORMATION

- Innovative Clean Transit https://arb.ca.gov/msprog/ict/ict.htm

- Yachun Chow, Manager
  yachun.chow@arb.ca.gov
  (916) 322-7450

- Shirin Barfjani, Lead Staff
  shirin.barfjani@arb.ca.gov
  (916) 445-6017
Airport Shuttle Regulation
ZERO-EMISSION AIRPORT SHUTTLE REGULATION
<table>
<thead>
<tr>
<th>Regulated Airports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Los Angeles (LAX)</td>
</tr>
<tr>
<td>San Francisco (SFO)</td>
</tr>
<tr>
<td>San Diego (SAN)</td>
</tr>
<tr>
<td>Burbank (BUR)</td>
</tr>
<tr>
<td>Oakland (OAK)</td>
</tr>
<tr>
<td>Ontario (ONT)</td>
</tr>
<tr>
<td>Santa Ana (SNA)</td>
</tr>
<tr>
<td>Sacramento (SMF)</td>
</tr>
<tr>
<td>San Jose (SJC)</td>
</tr>
<tr>
<td>Fresno (FAT)</td>
</tr>
<tr>
<td>Long Beach (LGB)</td>
</tr>
<tr>
<td>Palm Springs (PSP)</td>
</tr>
<tr>
<td>Santa Barbara (SBA)</td>
</tr>
</tbody>
</table>
AIRPORT SHUTTLE PROPOSAL: ZEV TRANSITION

2022: No-backsliding
2023: Fleets start annual reporting
2026: Vehicle MY comply with ZEPCert
2027: 33% ZEV
2031: 66% ZEV
2035: 100% ZEV
COMPLIANCE FLEXIBILITIES

- Shuttles designated as “reserve” may operate up to 3,000 miles per year
- Fleets may apply to EO for extensions due to facility infrastructure limitations or extenuating circumstances
- Emergency usage is exempt
- Exempt transit vehicles subject to the Innovative Clean Transit regulation
Funding for airport-owned and airport-controlled fleets

Zero-emission vehicles and charging infrastructure

Up to 50% of total cost
QUESTIONS

Please contact:

Anthony Poggi, Lead Staff
anthony.poggi@arb.ca.gov
(916) 324-9424

Web Page: https://ww2.arb.ca.gov/msprog/asb/asb/htm

Sign up for the Airport Shuttle Bus list-serve to receive updates!
Regional Coordination and Funding Opportunities
### Significant State Incentives Available

<table>
<thead>
<tr>
<th>Program</th>
<th>Description</th>
<th>FY 17-18</th>
<th>FY 18-19</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HVIP</strong></td>
<td>Low NO\textsubscript{X} engines, ZEVs, advanced technology, &amp; infrastructure</td>
<td>$125M</td>
<td>$130M</td>
</tr>
<tr>
<td><strong>VW</strong></td>
<td>Zero-emission transit, school, &amp; shuttle bus replacements</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Carl Moyer</strong></td>
<td>Cleaner engines &amp; ZEVs up to $80,000/bus plus fueling infrastructure</td>
<td>$79M</td>
<td></td>
</tr>
<tr>
<td><strong>AB 617</strong></td>
<td>Engine replacement &amp; infrastructure in DAC</td>
<td>$245M</td>
<td></td>
</tr>
<tr>
<td><strong>LCTOP</strong></td>
<td>Expanded bus or rail services, &amp; multimodal facilities</td>
<td>$146M*</td>
<td></td>
</tr>
<tr>
<td><strong>TIRCP</strong></td>
<td>Rail, bus, and ferry transit improvements</td>
<td>$291M*</td>
<td></td>
</tr>
<tr>
<td><strong>Utility Programs</strong></td>
<td>Charging infrastructure service upgrades and electricity rates (SB350)</td>
<td>&gt;$575M</td>
<td></td>
</tr>
<tr>
<td><strong>LCFS</strong></td>
<td>Credits for using low carbon transportation fuels</td>
<td>~$10,000/BEB/yr</td>
<td></td>
</tr>
</tbody>
</table>

Guest Speakers
HYBRID AND ZERO-EMISSION TRUCK AND BUS VOUCHER INCENTIVE PROJECT (HVIP)

- Established in 2010: ~7,500 vouchers and $380M committed
- HVIP-eligible on-road vehicles – 5,001 GVWR and up
  - Transit, school and shuttle buses; utility and delivery trucks
- Over 30 OEMS and 125 models in hybrid, zero-emission and low NOx options currently eligible
- Demand exceeds available funds
- Board to consider program changes this October
- CaliforniaHVIP.org
- Allocation for Zero-Emission Transit, School, Shuttle Buses is $130 M, will be administered in at least two funding cycles at least two years apart
- Statewide program administrator is San Joaquin Valley APCD
LOW CARBON FUEL STANDARD (LCFS)

- Originally adopted in 2009, last amended in 2018
- Goal is to reduce carbon intensity (CI) of transportation fuel pool by at least 20% by 2030
- Transit agencies dispensing eligible low-carbon fuels can participate and generate credits in the LCFS
  - Credits do not expire, have monetary value and can be traded in the LCFS credit market
- Electricity, Hydrogen, and Natural Gas used as transportation fuel are eligible for LCFS credits

![Graph showing percent reduction in carbon intensity over time with historic compliance targets and projected future targets. Fuels above the standard generate deficits, while fuels below the standard generate credits.]

- Historic Compliance Targets (black solid line)
- Reported % CI Reduction (green line)
- Future Compliance Targets (black dotted line)
LCFS CREDITING OPPORTUNITIES FOR TRANSIT OPERATORS

- Owner of the Fueling Supply Equipment (FSE) is the default credit generator, but can designate another entity on its behalf
  - Must create account in the LCFS Reporting Tool (LRT)
  - Must register FSE
- Credits are generated based on quarterly reporting of dispensed fuel quantities and carbon intensity of fuel
- Conservative carbon intensity (Lookup Table value) available with no or minimal application
- Option to apply for low or ultra-low carbon intensity values from specific projects
- Book-and-claim matching of environmental attributes with dispensed electricity, hydrogen, and natural gas is allowed for enhanced crediting*

OTHER RELEVANT PROVISIONS IN LCFS

- Proceeds from credits generated using electricity pathways must be used to promote transportation electrification and benefit EV customers
- Fossil CNG currently generate credits in the LCFS but will become a deficit-generating fuel starting 2024
- All CNG, LNG, and LPG fueling stations, including transit fleets, are now required to participate in the LCFS and report quantities of fuel dispensed every quarter
  - CNG stations with throughput <150,000 GGE are exempt until Jan 1, 2024 (voluntary participation allowed)
  - Fossil CNG/LPG used in school buses purchased before Jan 1, 2020 is not required to be reported
### ESTIMATED LCFS VALUE (FOR 2019)

<table>
<thead>
<tr>
<th>Vehicle</th>
<th>Fuel Pathway</th>
<th>Carbon Intensity (gCO2e/MJ)</th>
<th>Energy Economy Ratio</th>
<th>Assumed Fuel Efficiency</th>
<th>Estimated LCFS Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery Electric Bus (BEB)</td>
<td>CA Avg. Grid Electricity</td>
<td>81.49</td>
<td>5.0</td>
<td>0.5 mi/kWh</td>
<td>$10.47</td>
</tr>
<tr>
<td></td>
<td>Zero-Cl Electricity</td>
<td>0</td>
<td>5.0</td>
<td>0.5 mi/kWh</td>
<td>$12.66</td>
</tr>
<tr>
<td>Fuel Cell Electric Bus (FCEB)</td>
<td>Hydrogen (via SMR of Fossil CNG)</td>
<td>117.67</td>
<td>1.9</td>
<td>6.5 mi/kg</td>
<td>$1.65</td>
</tr>
<tr>
<td></td>
<td>Hydrogen (via SMR of Landfill Biomethane)</td>
<td>99.48</td>
<td>1.9</td>
<td>6.5 mi/kg</td>
<td>$2.14</td>
</tr>
<tr>
<td></td>
<td>Hydrogen (via Electrolysis with Zero-Cl electricity)</td>
<td>10.51</td>
<td>1.9</td>
<td>6.5 mi/kg</td>
<td>$4.53</td>
</tr>
<tr>
<td>CNG Bus</td>
<td>Fossil CNG</td>
<td>79.21</td>
<td>0.9</td>
<td>3.0 mi/DGE</td>
<td>$0.15</td>
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<tr>
<td></td>
<td>Landfill Biomethane</td>
<td>43.71</td>
<td>0.9</td>
<td>3.0 mi/DGE</td>
<td>$1.10</td>
</tr>
</tbody>
</table>

*Note - Credit price of $200 assumed; CIs listed above are subject to change*
Contact
Arpit Soni, Arpit.Soni@arb.ca.gov, (916) 323-2661
Jordan Ramalingam, Jordan.Ramalingam@arb.ca.gov, (916) 322-7186

Program information
https://ww3.arb.ca.gov/fuels/lcfs/lcfs.htm
Roundtable Discussions
DISCUSSION TOPICS

- What are the challenges does your fleet face to start deploying ZEBs?
- For fleets that have deployed ZEBs, what are your advices to ensure synchronization of vehicle procurement, infrastructure construction, workforce readiness, and fuel cost management?
- For fleets that have deployed ZEBs, what could have been done differently if you could start over?
- What is your transit agency’s plan on conducting the Rollout Plan
- What are the challenges does your transit agency face to scale up the deployment of ZEBs?
- What type of information you’d like to receive to help ZEB deployment?