



# 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 district
  - 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  $\geq 100$  buses\* during peak operation

- Operates in South Coast or San Joaquin Valley
- Has >65 buses\* during peak operation

### A Small Transit Agency

All other  
transit  
agencies

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

# ZEB ROLLOUT PLAN

- 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 manufacturer 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

Year	ZEB Percentage of Total New Bus Purchases	
	Large Transit Agency	Small Transit Agency
2023	25%	-
2024	25%	-
2025	25%	-
2026	50%	25%
2027	50%	25%
2028	50%	25%
2029 & after	100%	100%

## 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



## BONUS CREDITS

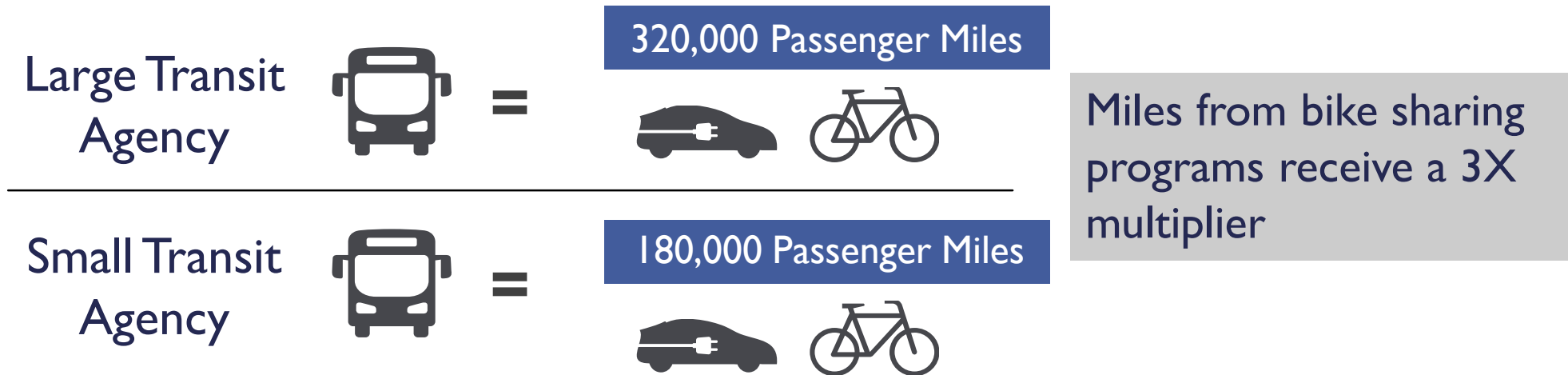
<b>Technology</b>	<b>Vehicle In Service Date</b>	<b>Bonus Credits</b>
<b>Fuel cell electric bus</b>	As of January 1, 2018	2
<b>Fuel cell electric bus</b>	Between January 1, 2018 and December 31, 2022	1
<b>Battery electric bus</b>	As of January 1, 2018	1
<b>Electric trolleybus</b>	Between January 1, 2018 and December 31, 2019	0.1

# TRANSIT AGENCIES MAY COMPLY JOINTLY (OPTIONAL)

- **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

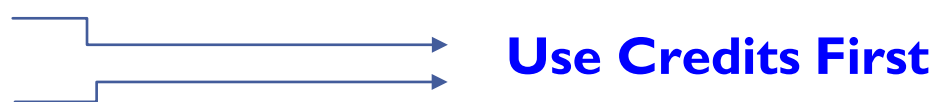
# ZERO-EMISSION MOBILITY (OPTIONAL)

- Zero-emission car sharing, vanpool, micro-transit, active transportation
  - Vehicles with GVWR  $\leq$  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



# 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 30<sup>th</sup> 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

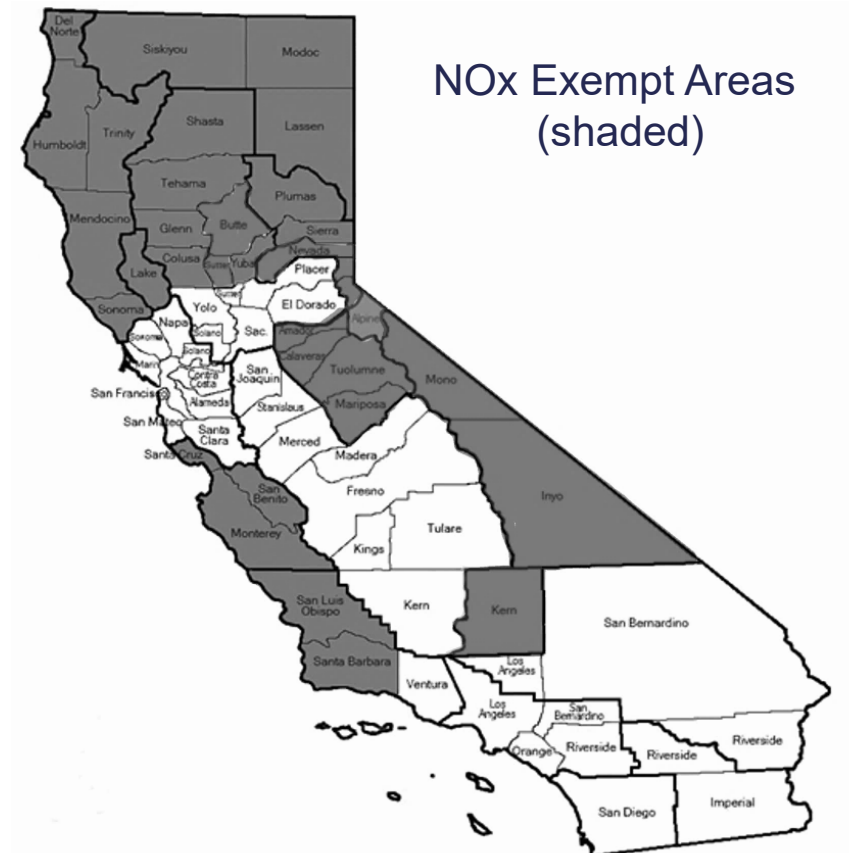


## RENEWABLE FUELS REQUIREMENTS

- 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<sup>st</sup> 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-NOx engine purchases
  - All fuel purchase contracts (large transit agencies)
  - Record of zero-emission passenger miles if using the mobility option

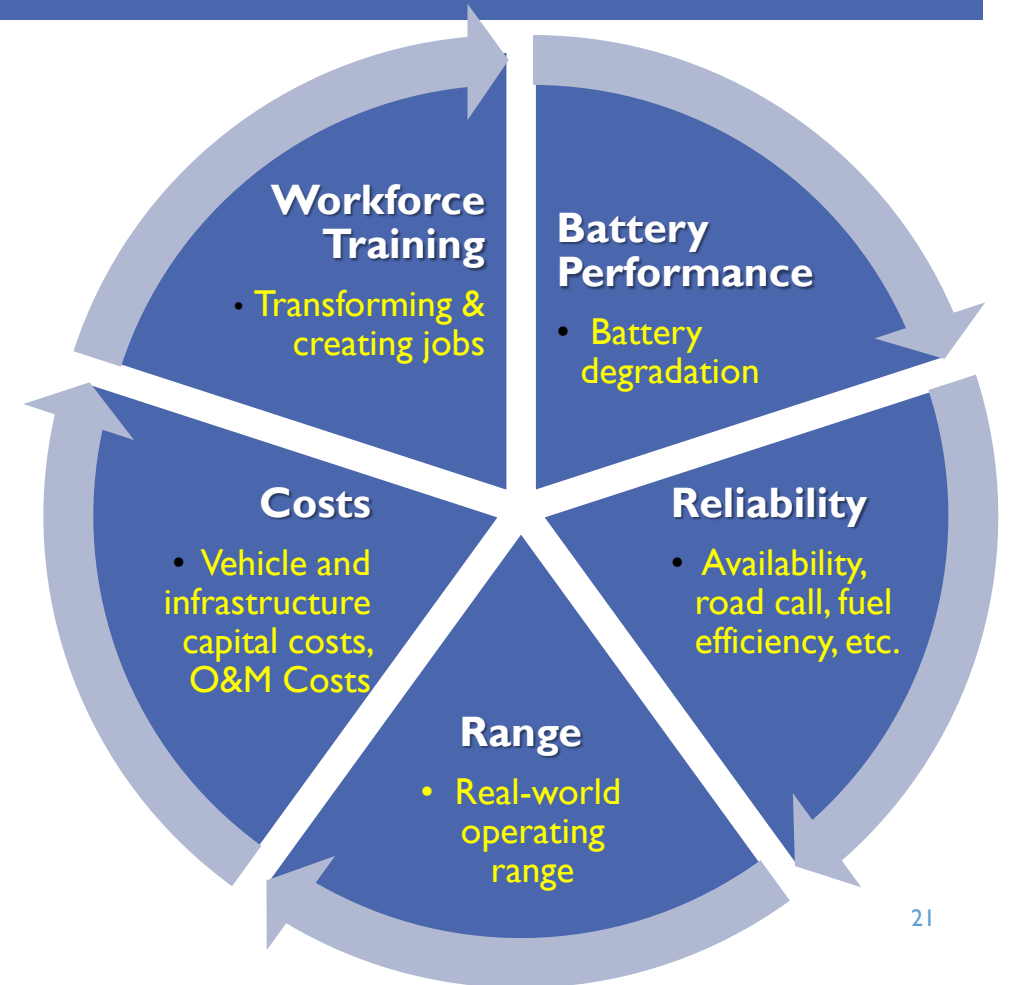


# ICT REGULATION IMPLEMENTATION GUIDANCE

- 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

# STATEWIDE DATA COLLECTION TEMPLATE

- 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](mailto:yachun.chow@arb.ca.gov)  
(916) 322-7450
- Shirin Barfjani, Lead Staff  
[shirin.barfjani@arb.ca.gov](mailto:shirin.barfjani@arb.ca.gov)  
(916) 445-6017





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# Airport Shuttle Regulation

# ZERO-EMISSION AIRPORT SHUTTLE REGULATION



CALIFORNIA  
AIR RESOURCES BOARD

## REGULATED AIRPORTS

- Los Angeles (LAX)
- San Francisco (SFO)

- San Diego (SAN)

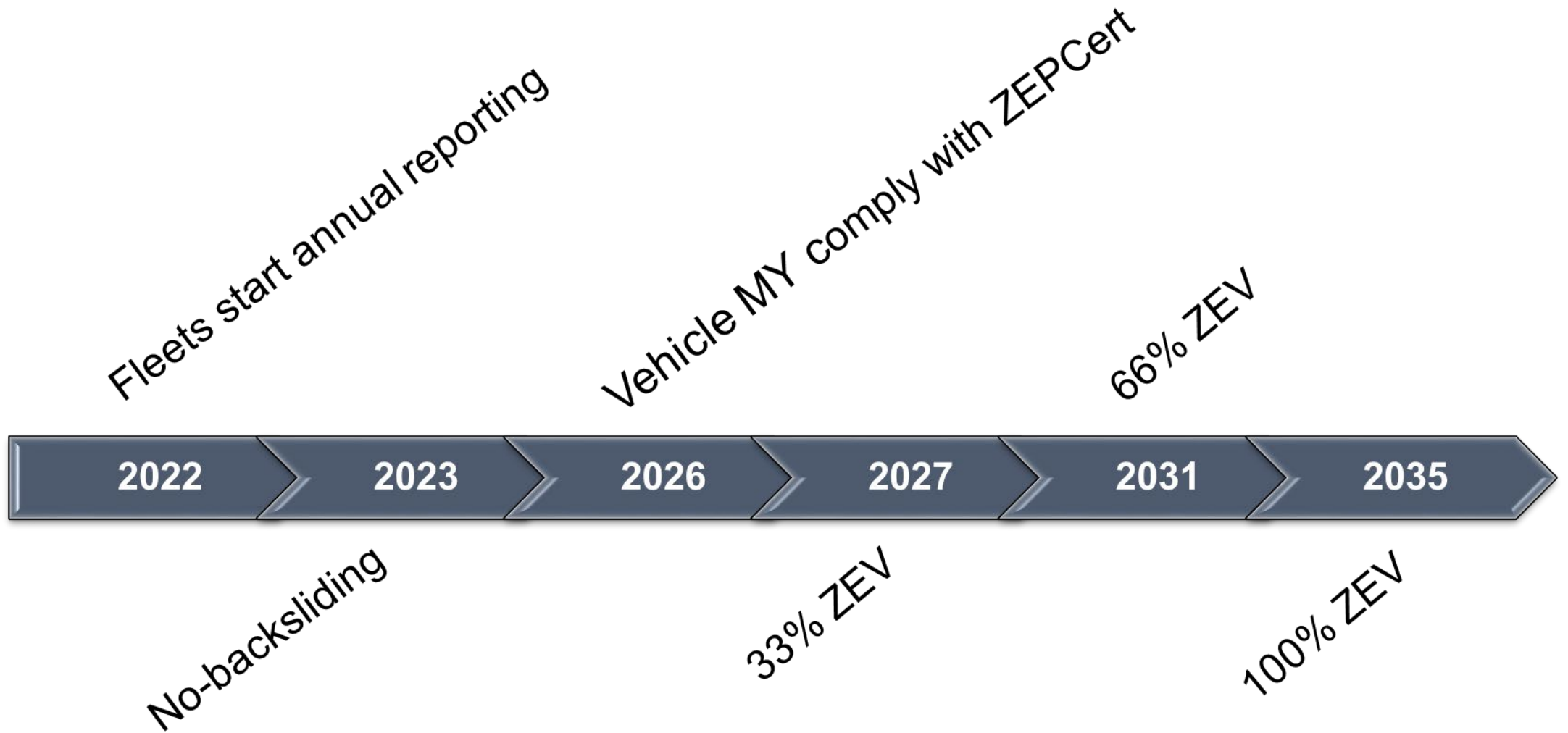
- Burbank (BUR)
- Oakland (OAK)
- Ontario (ONT)

- Santa Ana (SNA)
- Sacramento (SMF)
- San Jose (SJC)

- Fresno (FAT)
- Long Beach (LGB)

- Palm Springs (PSP)
- Santa Barbara (SBA)

# AIRPORT SHUTTLE PROPOSAL: ZEV TRANSITION



## COMPLIANCE FLEXIBILITIES

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

## FAA ZEV AND INFRASTRUCTURE PILOT (AIRPORT SHUTTLES)

- 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](mailto: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

## HVIP

Low NO<sub>x</sub> engines, ZEVs, advanced technology, & infrastructure

**FY 18-19**  
**\$125M**

## VW

Zero-emission transit, school, & shuttle bus replacements

**\$130M**

## Carl Moyer

Cleaner engines & ZEVs up to \$80,000/bus plus fueling infrastructure

**FY 18-19**  
**\$79M**

## AB 617

Engine replacement & infrastructure in DAC

**FY 18-19**  
**\$245M**

## LCTOP

Expanded bus or rail services, & multimodal facilities

**FY 17-18**  
**\$146M\***

## TIRCP

Rail, bus, and ferry transit improvements

**FY 17-18**  
**\$291M\***

## Utility Programs

Charging infrastructure service upgrades and electricity rates (SB350)

**>\$575M**

## LCFS

Credits for using low carbon transportation fuels

**~\$10,000/BEB/yr**

\* Calculated from cap-and-trade auction proceeds listed at [arb.ca.gov/cc/capandtrade/auction/aug-2018/ca\\_proceeds\\_report.pdf](http://arb.ca.gov/cc/capandtrade/auction/aug-2018/ca_proceeds_report.pdf)

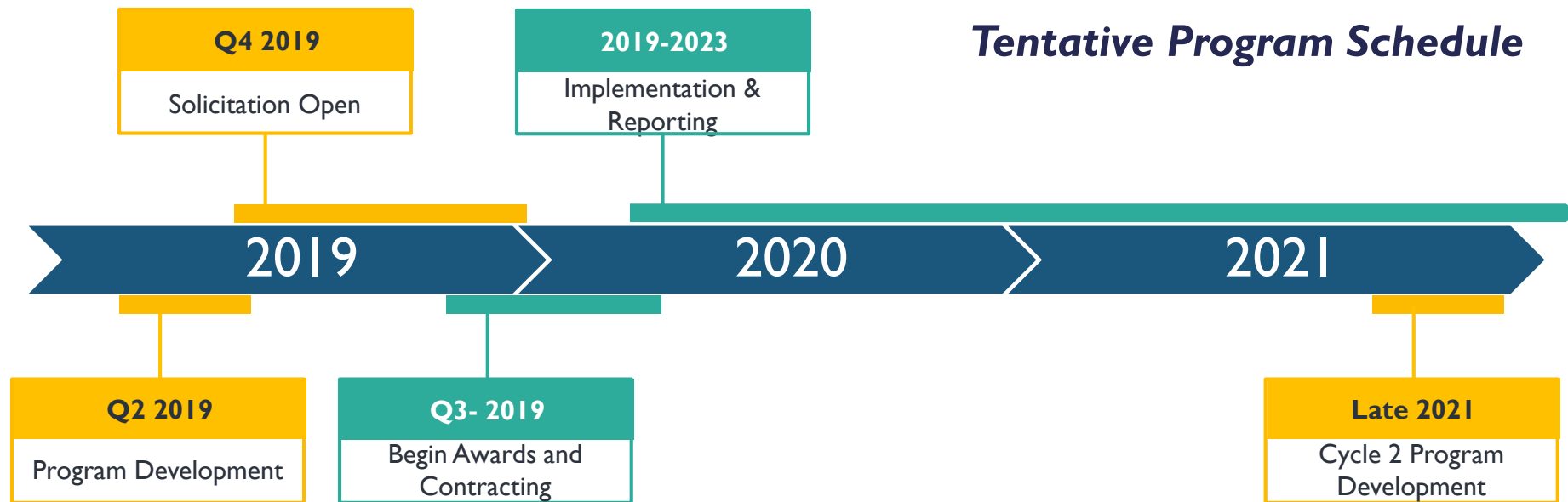
# Guest Speakers

# 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](http://CaliforniaHVIP.org)



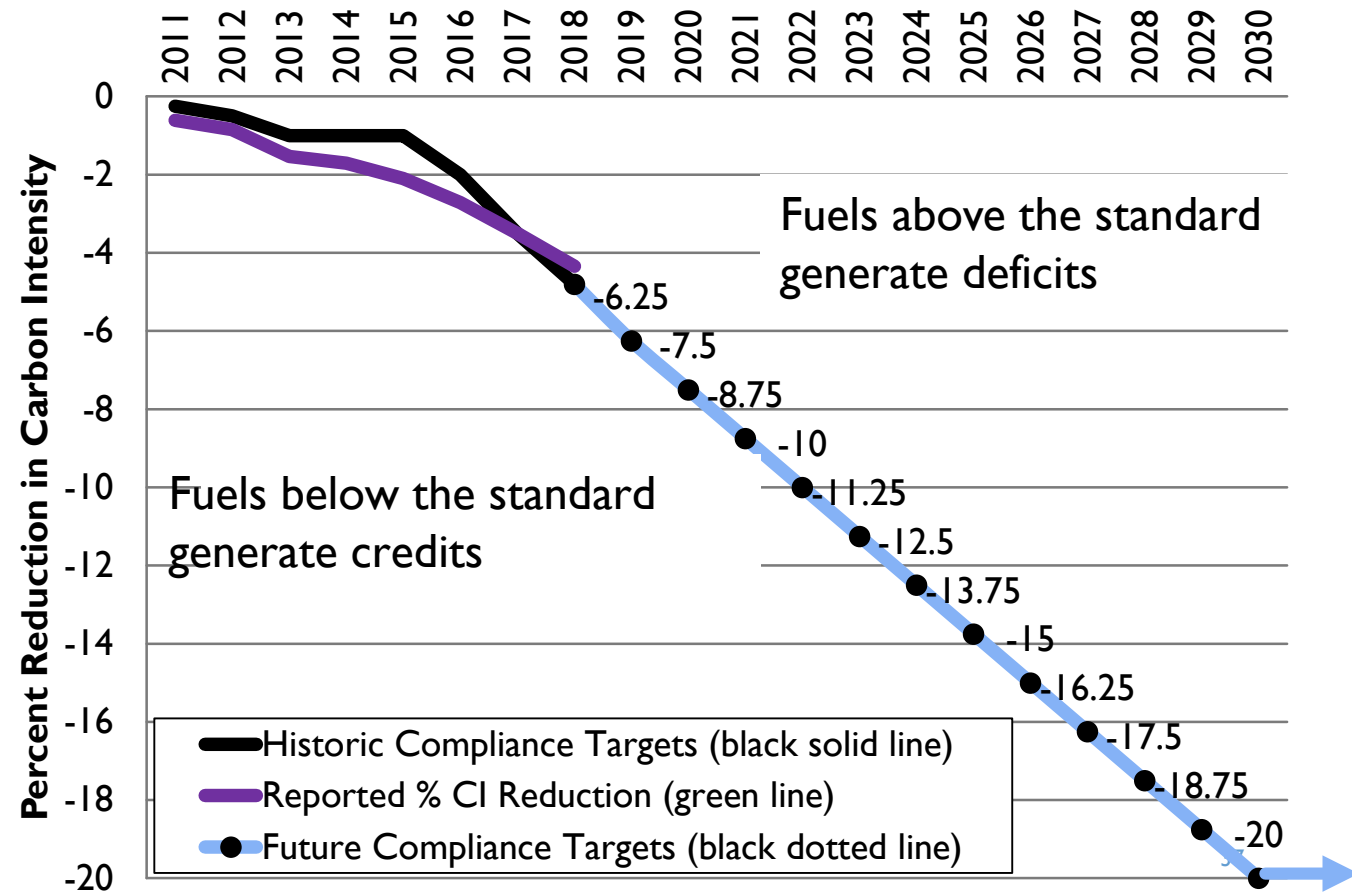
# CALIFORNIA VW MITIGATION TRUST FUNDING



- 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



# 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\*

\* For more information on book-and-claim accounting for low-CI electricity, refer to LCFS Guidance I9-01; and for book-and-claim accounting for biomethane, refer to LCFS Guidance I9-05, available at: <https://ww3.arb.ca.gov/fuels/lcfs/guidance/guidance.htm#guidance>

## 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)

Vehicle	Fuel Pathway	Carbon Intensity (gCO <sub>2</sub> e/MJ)	Energy Economy Ratio	Assumed Fuel Efficiency	Estimated LCFS Value	
					\$/DGE	\$/mile
Battery Electric Bus (BEB)	CA Avg. Grid Electricity	81.49	5.0	0.5 mi/kWh	\$10.47	\$0.56
	Zero-CI Electricity	0	5.0	0.5 mi/kWh	\$12.66	\$0.68
Fuel Cell Electric Bus (FCEB)	Hydrogen (via SMR of Fossil CNG)	117.67	1.9	6.5 mi/kg	\$1.65	\$0.23
	Hydrogen (via SMR of Landfill Biomethane)	99.48	1.9	6.5 mi/kg	\$2.14	\$0.29
	Hydrogen (via Electrolysis with Zero-CI electricity)	10.51	1.9	6.5 mi/kg	\$4.53	\$0.62
CNG Bus	Fossil CNG	79.21	0.9	3.0 mi/DGE	\$0.15	\$0.05
	Landfill Biomethane	43.71	0.9	3.0 mi/DGE	\$1.10	\$0.37

*Note - Credit price of \$200 assumed; CIs listed above are subject to change*



# LCFS PROGRAM CONTACT AND INFORMATION

- Contact

Arpit Soni, [Arpit.Soni@arb.ca.gov](mailto:Arpit.Soni@arb.ca.gov), (916) 323-2661

Jordan Ramalingam, [Jordan.Ramalingam@arb.ca.gov](mailto: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?