SAN JOAQUIN RTD

Zero-Emission Bus Rollout Plan

San Joaquin Regional Transit District

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Recurring Action Items	Responsibility	Frequency
1. Review guidance from California Air Resources Board to ensure compliance.	Operations Superintendent—Facilities	As needed
2. Update plan as neccesary based on changes in technology affecting bus purchases	Operations Superintendent—Facilities	As needed

Approval Signature

Elaine J. Salazar 6/19/2020

Chief Executive Officer (CEO) Date

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Introduction

In accordance with the California Air Resource Board's Innovative Clean Transit (ICT) regulation, the following plan serves as RTD's Zero-Emission Bus (ZEB) Rollout Plan to transition its bus fleet to 100% ZEB by 2040.

Background

The ICT regulation became effective October 1, 2019, and requires all public transit agencies to gradually transition their bus fleets to zero-emission technologies. The ICT regulation applies to all transit agencies that own, operate, or lease buses with a gross vehicle weight rating (GVWR) greater than 14,000 pounds. It covers standard, articulated, over-the-road, double decker, and cutaway buses. The ICT regulation requires a percentage of new bus purchases to be zero-emission buses (ZEBs). The ZEB percentage increases gradually with time. The ZEB purchase requirements begin in 2023 for large transit agencies.

RTD is considered a large transit agency by the ICT regulation's definition (13 CCR§ 2023(b)(30)) because it meets the following criteria: RTD operates more than 65 buses in maximum annual service in the San Joaquin Valley Air Basin. Starting 2029, 100% of all transit agencies' new bus purchases must be ZEBs, with a goal of complete transition to ZEBs (all buses in each transit agency's fleet to be ZEBs) by 2040.

Scope

This Rollout Plan is a living document and a guide to the implementation of RTD's zero-emission bus fleets. The plan provides estimated timelines based on RTD's Fleet Replacement Plan that aims to transition its bus fleet to all battery electric. As outlined in the ICT guidance, the following sections are included as required:

Section A: Transit Agency Information
Section B: Rollout Plan General Information
Section C: Technology Portfolio
Section D: Current Bus Fleet Composition and Future Bus Purchases
Section E: Facilities and Infrastructure Modifications
Section F: Providing Service in Disadvantaged Communities
Section G: Workforce Training
Section H: Potential Funding Sources
Section I: Start-up and Scale-up Challenges

Section A: Transit Agency Information

- Transit agency's name: San Joaquin Regional Transit District (RTD)
- Mailing address:
  San Joaquin Regional Transit District
  P.O. Box 201010
  Stockton, CA 95201
- RTD's air district: San Joaquin Valley Air Pollution
- RTD's air basin: San Joaquin Valley Air Pollution
- RTD is not part of a Joint Group

Section B: Rollout Plan General Information

RTD's Rollout Plan has a goal of full transition to zero-emissions technology by 2040 that avoids early retirement of conventional transit buses ((13 CCR§ 023.1(d)(1)(A)) and is detailed in its Fleet Replacement Plan.

RTD's board of directors originally committed to all-electric bus fleet for the City of Stockton by 2025. Because of emerging technologies, RTD amended its resolution to include an expanded commitment for zero-emission technology as adopted on June 19, 2020 (Resolution number: 5928); A copy of the board-approved resolution is attached to this Rollout Plan submitted to CARB (13 CCR§ 023.1(d)(2)).

Section C: Technology Portfolio

RTD plans to deploy zero-emission buses through 2040. RTD's Fleet Replacement Plan outlines the future purchases of battery-electric buses, overhead in-route charging, and depots chargers.

Section D: Current Bus Fleet Composition and Future Bus Purchases

1. Table 1 below contains information on each individual bus in RTD's current bus fleet, with fuel type identified per ICT guidance.

Table 1: Individual Bus Information of Current Bus Fleet

Number of Buses	Engine Model Year	Bus Model Year	Fuel Type	Bus Type	Charging Technology
1	2000	2001	Diesel	Over-the-Road (OTR)	
2	2003	2003	Gasoline	Cutaway	
2	2006	2006	Gasoline	Cutaway	
4	2005	2006	dHEB	Standard	
1	2008	2008	Diesel	OTR	
5	2010	2010	dHEB	Standard	
2	2011	2011	dHEB	Standard	

6	2011	2012	dHEB	Standard	
2	2012	2012	Electric	Standard	Depot and in-route
20	2012	2013	dHEB	Standard	
2	2012	2013	Diesel	OTR	
6	2013	2014	dHEB	Articulated	
10	2016	2016	Electric	Standard	Depot and in-route
6	2016	2016	Diesel	Cutaway	
22	2017	2017	Gasoline	Cutaway	
5	2018	2018	Electric	Standard	Depot and in-route
12	2017	2018	dHEB	Standard	
14	2019	2019	Gasoline	Cutaway	

2. According to the zero-emission bus purchase requirements, RTD must purchase or operate a minimum number of zero-emission buses as determined by the below schedule in any given calendar year:
   - By January 1, 2023: 25% of the total number of new bus purchases in each calendar year must be ZEB
   - By January 1, 2026: 50% of the total number of new bus purchases in each calendar year must be ZEB
   - By January 1, 2029: All new bus purchases must be ZEB

Per ICT's ZEB requirements, purchase of a cutaway, OTR bus, double-decker, or articulated bus is not considered to be new bus purchases for the purpose of calculating the minimum number of ZEB required in a given calendar year (until the latter of either January 1, 2026 or criteria specified in section 2023.1(c) have been met).

1. In the chart below, RTD will purchase a ZEB vehicle in this category if the technology can meet our range requirements. If not, RTD will purchase gasoline powered vehicles.

Table 2: Future Bus Purchases

Timeline (Year)	Total Number of Buses to Purchase	Number of ZEB Purchases	Percentage of Annual ZEB Purchases	ZEB Bus Type(s)	ZEB Fuel Type(s)	Number of Conv. Bus Purchases	Percentage of Annual Conv. Bus Purchases	Type(s) of Conv. Buses	Fuel Type(s) of Conv. Buses	Charging Technology
2021	13	9	70%	Standard	Electric	4	30%	Cutaway	Gasoline	Depot only
2022	4	4	100%	OTR & Standard	Electric					0
2023	7	7	100%	Standard	Electric					Depot/in-route
2024	20	6	30%	Standard	Electric	14	70%	Cutaway	Gasoline	Depot/in-route
2025	46	24	52%	OTR & Standard	Electric	22	48%	Cutaway	Gasoline	Depot/in-route
2026	6	6	100%	Articulated	Electric					Depot/in-route
2027	0	0	0%	n/a	n/a					n/a
2028	0	0	0%	n/a	n/a					n/a
2029	10	10	100%	Standard	Electric	0	0%			Depot/in-route
2030	12	12	100%	Standard	Electric					Depot/in-route
2031	6	0	0%			6	100%	Cutaway	Gasoline [1]	n/a
2032	24	2	8%	Standard	Electric	22	92%	Cutaway	Gasoline [1]	Depot/in-route
2033	1	1	100%	OTR	Electric	0%	0%			Depot only
2034	14	0	0%			14	100%	Cutaway	Gasoline [1]	n/a
2035	6	6	100%	Standard	Electric					Depot/in-route
2036	2	2	100%	Standard	Electric					Depot/in-route
2037	6	6	100%	Standard	Electric					Depot/in-route
2038	2	2	100%	Standard	Electric					Depot/in-route
2039	58	22	38%	Standard, OTR, & Cutaway	Electric	36	62%	Cutaway	Gasoline [1]	Depot/in-route
2040	10	10	100%	Standard	Electric					Depot/in-route

3. According to the zero-emission bus purchase requirements:

Table 3: Range and Estimated Costs of Future ZEB Purchases

Timeline (Year) (Same as in Table 2)	Number of ZEBs	Bus Type(s)	Required BEB[7] Range/ On-Board H_2 Storage	Estimated Cost of Each Bus
2021	9	Standard	300 Miles/660 Kwh	$950,000
	9	Standard	300 Miles/660 Kwh	$950,000
	4	Cutaway	N/A	$75,000[1]
2022	1	OTR	300 Miles/660 Kwh	$1,200,000
	3	Standard	300 Miles/660 Kwh	$950,000
2023	5	Standard	300 Miles/660 Kwh	$950,000
	2	Standard	300 Miles/660 Kwh	$950,000
2024	6	Standard	300 Miles/660 Kwh	$950,000
	14	Cutaway	250 miles/550 Kwh	$75,000 [1]
2025	2	Standard	300 Miles/660 Kwh	$950,000
	20	Standard	300 Miles/660 Kwh	$950,000
	2	OTR	300 Miles/660 Kwh	$1,200,000
	22	Cutaway	250 miles/550 Kwh	$125,000 [1]
2026	6	Articulated	300 miles/660 Kwh	$950,000
2027	0	0	0	0
2028	0	0	0	0
2029	7	Standard	300 Miles/660 Kwh	$950,000
	3	Standard	300 Miles/660 Kwh	$950,000
2030	12	Standard	300 Miles/660 Kwh	$950,000
2031	~~6~~	Cutaway	250 miles/550 Kwh	$125,000 [1]
2032	2	Standard	300 Miles/660 Kwh	$950,000
	22	Cutaway	250 miles/550 Kwh	$125,000 [1]
2033	1	OTR	300 Miles/660 Kwh	$1,200,000
2034	~~14~~	Cutaway	250 miles/550 Kwh	$125,000 [1]
2035	6	Standard	300 Miles/660 Kwh	$950,000
2036	2	Standard	300 Miles/660Kwh	$950,000
2037	6	Standard	300 Miles/660 Kwh	$950,000
2038	2	Standard	300 Miles/660 Kwh	$950,000
2039	20	Standard	300 Miles/660 Kwh	$950,000
	2	OTR	300 Miles/660 Kwh	$1,200,000
	6	Articulated	300 Miles/660 Kwh	$950,000
	36	Cutaway	250 Miles/550 Kwh	$125,000 [1]
2040	10	Standard	300 Miles/660 Kwh	$950,000

[1] RTD will purchase a ZEB vehicle in this category, if current technology can meet its range requirements. If not, RTD will purchase gasoline powered vehicles.

4. RTD is not considering converting some of the conventional buses in service to zero-emission buses.

Table 4a: Schedule of Converting Conventional Buses to Zero-Emission Buses

Timeline (Year)	Number of Buses	Bus Type(s)	Removed Propulsion System	New Propulsion System
n/a	n/a	n/a	n/a	n/a

Section E: Facilities and Infrastructure Modifications

Table 5: Facilities Information and Construction Timeline

Division/ Facility Name	Address	Main Function(s)	Type(s) of Infrastructure	Service Capacity	Needs Upgrade? (Yes/No)	Estimated Construction Timeline
Regional Transportation Center (RTC)	2849 Myrtle St. Stockton CA 95205	Bus maintenance and fueling	5 depot chargers	5 buses	Yes	2021: 8 depot chargers; 1 in-route charger 2025: 7 depot chargers
County Transportation Center (CTC)	120 N. Filbert St. Stockton, CA 95205	Bus maintenance	No fueling sources at this time	None	Yes	2027: 5 depot chargers; 2034 8 depot chargers 2039*: 8 depot chargers
Downtown Transit Center (DTC)	421 E. Weber Ave. Stockton, CA 95202	Bus transfer	2 in-route chargers	17 buses as needed	Yes	2023: add 2 in-route chargers 2028: upgrade 2 existing in-route chargers
Union Transfer Station (UTS)	1505 S. Union St. Stockton, CA 95206	Bus transfer	2 in-route chargers	17 buses as needed	Yes	2025: upgrade 2 existing in-route chargers
Hammer Transfer Station (HTS)	7735 Lower Sacramento Rd, Stockton, CA 95210	Bus transfer	No fueling source at this time	None	Yes	2025: add 1 in-route charger

* This assumes an electric vehicle in this category will be available for purchase and additional depot chargers will be needed.

Section F: Providing Service in Disadvantaged Communities

Based on the cities listed in the latest version of CalEnviroScreen, all of RTD's current service areas falls within disadvantaged communities. Therefore, RTD's Fleet Replacement Plan aligns with its service.

In Fiscal Year 2021 through Fiscal Year 2022, RTD will have a Service Redesign Study performed by a consultant firm that will incorporate a plan on how to deploy zero-emission buses in disadvantaged communities based on the new recommended design.

Section G: Workforce Training

RTD will use the training provided by the bus and charger manufacturers for the training of bus operators and maintenance staff on zero-emission bus technologies.

Section H: Potential Funding Sources

RTD has been successful in obtaining funds for its existing zero-emission fleet and infrastructure from the funding sources listed below. Although there are no dedicated funding streams for this endeavor, RTD plans to pursue these discretionary funding sources in the future:

- California Hybrid and Zero-Emission Truck and Bus Voucher Program (HVIP) (California Air Resources Board)
- Section 5339(c) Low and No Emissions Bus Deployment Program (Federal Transit Administration)
- Congestion Mitigation and Air Quality Improvement (CMAQ) Program (Federal Highway Administration)
- Heavy Duty Truck and Bus Program (California Air Resources Board)
- State Transit Assistance Program (CA State Transit Development Act: Diesel Fuel Tax)
- Transit and Intercity Rail Capital Program (CA State Greenhouse Gas Reduction Fund)
- Enhanced Transportation Strategies-Public Benefit Grant (San Joaquin Valley Air Pollution Control District)
- Measure K Local Sales Transportation Tax
  (San Joaquin Council of Governments
- Alternative and Renewable Fuel and Vehicle Technology Program (California Energy Commission)

Section I: Start-up and Scale-up Challenges

As advance technologies related to ZEB continue to evolve, many variables related to ZEB are unknown. It is difficult to predict what different components may look like by 2040.

RTD has identified the following potential challenges:

- Changes in electrical charging infrastructure.
- Availability of electric cutaway buses (there are currently no sources). RTD is assuming by the purchase dates the technology will exist; however, there is no evidence so far that manufacturers are pursuing this option.
- Uncertainty of available power from electricity provider (Pacific Gas & Electric).
- Performance of depot charger not running as promised.