

The Bay Area's Transition to a Zero- Emission Bus Fleet

MTC Programming and Allocations Committee
November 10, 2021



Innovative Clean Transit Rule



- California Air Resources Board (CARB) rule adopted in 2018
- Requires public transit agencies to gradually transition to 100% zero-emission bus (ZEB) fleet
- Large operators (>100 buses in max. service):
 - Rollout Plan due in 2020
 - ZEB percentage of total new bus purchases must be 25% starting in 2023, ramping up to 100% in 2029
 - Regionally: SFMTA, AC Transit, SamTrans, VTA
- Small operators (<100 buses in max. service):
 - Rollout Plan due in 2023
 - ZEB percentage of total new bus purchases must be 25% starting in 2026, and 100% in 2029
 - Regionally: Remaining Bay Area bus operators

Bus Technology

Non-ICT Compliant:

- Diesel
- Diesel-Electric Hybrid – typically uses onboard technology to power an electric motor, reducing emissions and increasing fuel efficiency

ICT Compliant:

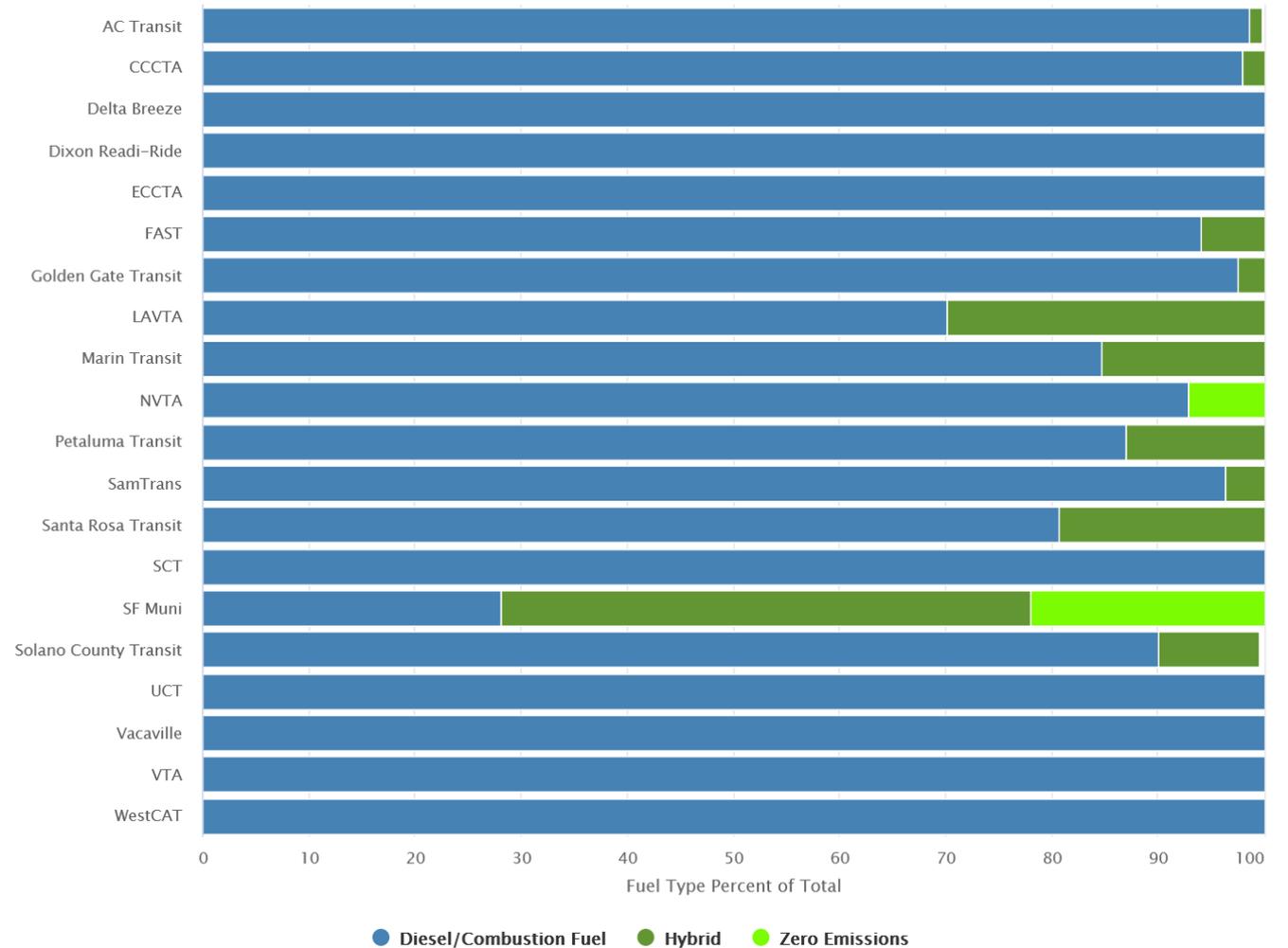
- Battery Electric Bus (BEB) – powered by onboard electric motor, charged at a depot or en-route
- Fuel Cell Electric Bus (FCEB) – powered by onboard fuel cell, fueled with hydrogen at depot



Current Bay Area Fleet

- Majority of buses in service are diesel or diesel hybrid (non-plug-in)
- Agencies have already begun to transition to ZEBs

Fleet Breakdown by Fuel Type



Rollout Plans

- Large operators have submitted Rollout Plans to map their transition to zero-emission fleet
- Bus replacement schedules and technology choices
- Facilities and infrastructure
- Cost estimates

- *Not an instant transition:* bus market realities, infrastructure and facilities considerations, cost, and keeping fleet in state of good repair mean some diesel bus purchases in the transition period

Ongoing Issues with Zero-Emission Fleet Transition

- ZEB market and performance
- Range
- Fleet size
- Infrastructure and facilities
- Cost

Total Costs

- The all-in incremental cost of transitioning to a zero-emission bus fleet is likely to be in the low **billions of dollars**.
- Significant factors that will determine the total cost:
 - Improvements in ZEB technology – 1:1 replacements, or more needed?
 - Evolution of bus market and cost – will prices drop?
 - Choice of FCEB vs. BEB, and depot vs. en-route charging

Funding Plans – Rolling Stock

- The Transit Capital Priorities program includes ZEB technology in the bus pricelist
- In recent call for projects (FY21-FY25), of over 900 buses requested in the region, more than half are ZEBs, ahead of ICT regulation
- Other common funding sources for buses include state Cap and Trade programs and federal Bus & Bus Facilities / Low and No-Emission grants programs

Vehicle Type	Total	Federal/MTC	Local	Federal/MTC %	Local %
Minivan Under 22'	72,000	57,600	14,400	80%	20%
Cut-Away/Van, 4 or 5-Year, Gas	103,000	82,400	20,600	80%	20%
Cut-Away/Van, 4 or 5-Year, Diesel	116,000	92,800	23,200	80%	20%
Cut-Away/Van, 4 or 5-Year, CNG	133,000	106,400	26,600	80%	20%
Cut-Away/Van, 7-Year, Gas	116,000	92,800	23,200	80%	20%
Cut-Away/Van, 7-Year, Diesel	164,000	131,200	32,800	80%	20%
Cut-Away/Van, 7-Year, CNG	218,000	174,400	43,600	80%	20%
Transit Bus 30' Diesel	533,000	426,400	106,600	80%	20%
Transit Bus 30' CNG	608,000	486,400	121,600	80%	20%
Transit Bus 30' Hybrid	797,000	637,600	159,400	80%	20%
Transit Bus 30' Battery	917,000	733,600	183,400	80%	20%
Transit Bus 35' Diesel	589,000	471,200	117,800	80%	20%
Transit Bus 35' CNG	699,000	559,200	139,800	80%	20%
Transit Bus 35' Hybrid	851,000	680,800	170,200	80%	20%
Transit Bus 35' Battery	929,000	743,200	185,800	80%	20%
Transit Bus 40' Diesel	564,000	451,200	112,800	80%	20%
Transit Bus 40' CNG	623,000	498,400	124,600	80%	20%
Transit Bus 40' Hybrid	863,000	690,400	172,600	80%	20%
Transit Bus 40' Battery	1,109,000	887,200	221,800	80%	20%
Transit Bus 40' Fuel-Cell	1,241,000	992,800	248,200	80%	20%
Over-the-Road 45' Diesel	671,000	536,800	134,200	80%	20%
Over-the-Road 45' CNG	882,000	705,600	176,400	80%	20%
Over-the-Road 45' Battery	1,167,000	933,600	233,400	80%	20%
Articulated 60' Diesel	905,000	724,000	181,000	80%	20%
Articulated 60' Hybrid	1,289,000	1,031,200	257,800	80%	20%
Articulated 60' Battery	1,389,000	1,111,200	277,800	80%	20%
Articulated 60' Fuel-Cell	1,572,000	1,257,600	314,400	80%	20%
Double-Decker Diesel	1,069,000	855,200	213,800	80%	20%
Notes:					
1. Prices escalated 1.887% over FY2020-21 Pricelist Survey responses, rounded to the nearest \$1,000. If survey responses were not available for a given Vehicle Type, the adopted FY20 Pricelist Total was used as the baseline.					
2. For buses with dual-side doors, add \$50,000 to the total (\$40,000 Federal, \$10,000 Local).					
3. For vehicle procurements over 20, 5% of the cost of the buses can be added to the pricelist amounts to account for soft costs.					



Funding Plans – Infrastructure

- Harder to fund
- Facilities and infrastructure are lower-scoring under Transit Capital Priorities program
- Staff working with Bay Area Air Quality Management District on exploring investment options to accelerate fleet and infrastructure transition to Zero Emission technology
- In coordination with transit partners, staff advocating for inclusion of ZEB related infrastructure as a priority for upcoming 2022 Transit and Intercity Rail Capital Program Cycle, consistent with adopted MTC framework

Next Steps

- Federal infrastructure bill and new surface transportation authorization may include significant new discretionary funding well suited to ZEB transition
- Federal budget reconciliation bill may include additional ZEB-focused funding
- Continue to explore state level investments in partnership with transit agencies and the Bay Area Air Quality Management District
- Significant funding gap is likely to remain without new resources at all funding levels
- MTC can play a role in directing funding toward fleets and infrastructure, facilitating information exchange among transit operators, and advocating for increased funding at all levels