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Planning for Resiliency in Zero-Emission Bus Deployments

July 15, 2020
California Transit Association

• Represents 250+ transit-affiliated organizations

• Advocates for policies and funding solutions that support and advance public transit

• Active at state- and federal-level
Involvement in Electrification

• Led negotiations on Innovative Clean Transit regulation

• Represent transit industry in:
  – CEC Advisory Committee for Clean Transportation Program
  – CPUC Transportation Electrification Framework
Zero-Emission Bus Task Force

• Chaired by Doran Barnes, Executive Director, Foothill Transit
  – Immediate past-Chair of American Public Transportation Association

• Comprised of 25 Association members, including:
  – Transit agencies
  – OEMs
  – Consultancies
  – Technology Providers
Innovative Clean Transit Regulation

• Adopted by ARB in December 2018

• Requires transit agencies to begin to purchase ZEBs as soon as 2023
  – Aims to convert transit bus fleet (approx. 10k buses) to zero-emission technology by 2040

• Includes requirement that transit agencies prepare “rollout plans”
  – July 1, 2020: Large agencies (> 100 VOMS)
  – July 1, 2023: Small agencies (<100 VOMS)
Status of ICT Regulation

• Strong initial deployments
  – 280 ZEBs in revenue service
  – 470 ZEBs on order
  – Contract execution pending on 80 ZEBs

• Largest ZEB fleets in revenue service
  – AVTA: 49 BEBs
  – Foothill Transit: 33 BEBs
  – San Joaquin RTD: 17 BEBs
Considerations for ZEB Deployments

• Transit agencies are mobility providers first
  – Commitment to zero-emission bus deployment tempered by current limitations
    o Capital costs, operational costs, workforce needs
    o Range, depot space constraints, grid reliability

• Transit agencies play a critical role in emergency response
  – Technology limitations raise serious questions
Considerations for ZEB Deployments

- Approx. 3.0 MW needed to charge 50 buses during nightly window
  - 2.0 MW generator costs approx. $1.5 million
  - Battery storage is possible future option

Source: CALSTART
Transit’s Approach to Resiliency - AVTA

• Currently relies on backup generators for redundancy
  – Provides up to 1.5 MW of power

• Proceeding with microgrid comprised of solar and storage systems
  – Addresses operating cost, sustainability and reliability
    o Duke Energy will own solar and behind-the-meter storage assets and sell energy to AVTA
    o Depot charging costs could be as low as 4.5 cents/kWh
Transit’s Approach to Resiliency – Foothill Transit

• Acknowledges back-up power and power resiliency will be more important in the future
  – Future infrastructure plan includes emergency power infrastructure

• Space for temporary back-up generators has been programmed for the short term
  – Long-term solutions may include mix of FCEBs
Policy Recommendations

• Fund large scale demonstrations
  – Conduct 3rd party analysis, publish best practices

• Increase funding levels for zero-emission buses and charging infrastructure
  – Programs that fund planning should encourage resiliency planning
  – Programs that fund charging infrastructure should be expanded to also fund grid redundant infrastructure – e.g. on-site storage and microgrid development

• Require IOUs to name transit and rail agencies “essential customers”

• Require IOUs to provide transit agencies with earliest possible notice of de-energization events
Contact Us

1415 L St, Suite 1000
Sacramento, CA 95814

(916) 446-4656

info@caltransit.org

caltransit.org
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