



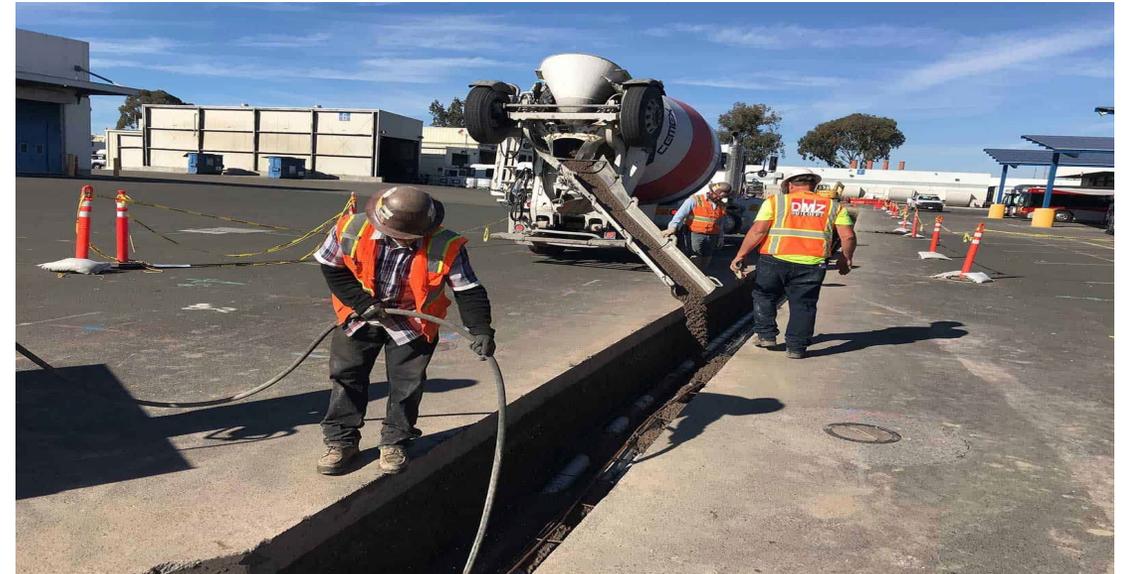
# **Electric Bus Implementation**

Board Transportation Committee Meeting  
June 29, 2021

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Fairfax County Department of Transportation

# Zero Emission Bus (ZEB) Implementation

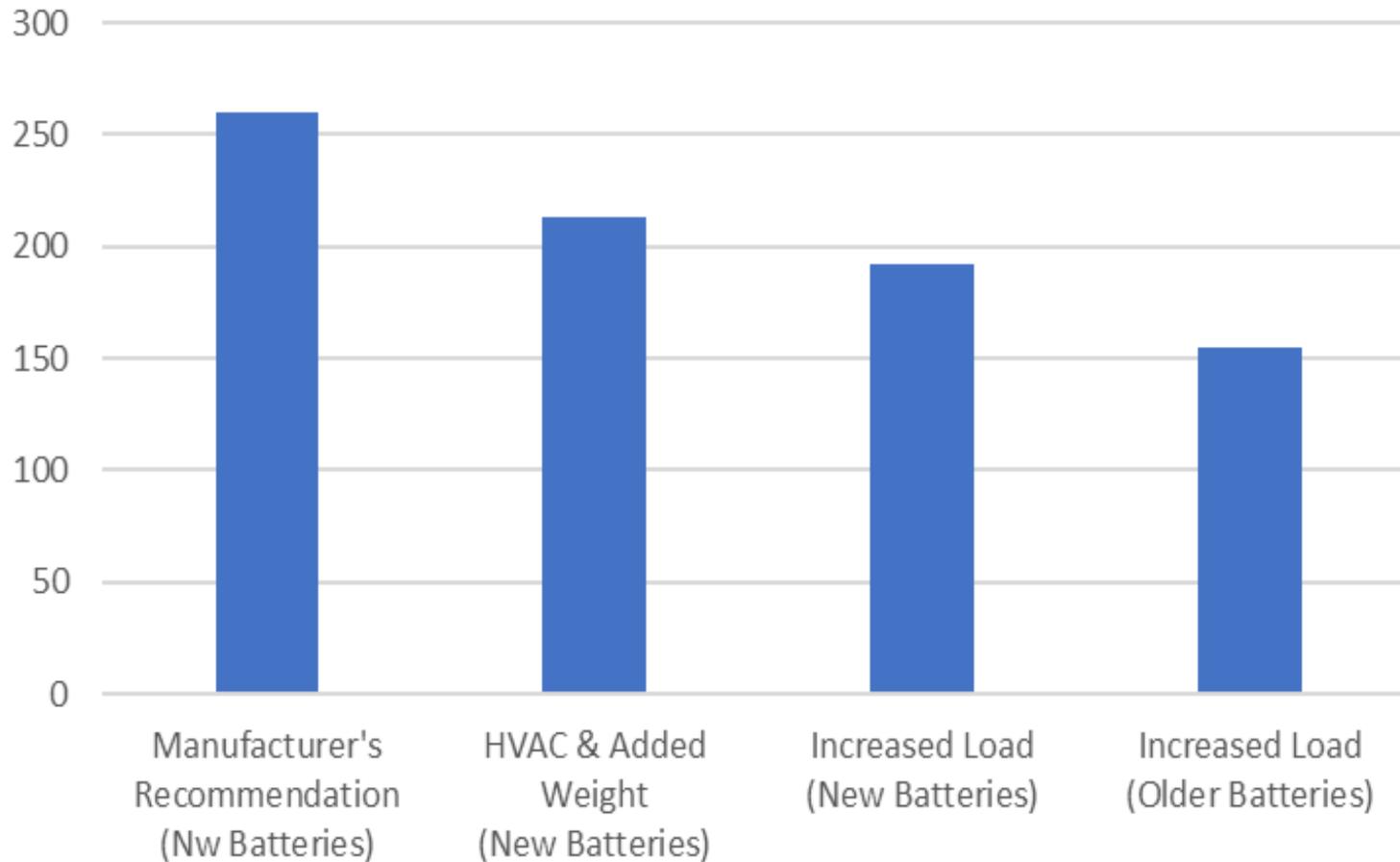
- Staff supports the Board motion on JET recommendations and is working to exceed them
- Steps include:
  - Planning
  - Engineering analyses related to charging equipment
  - Construction and phasing plans
  - Utility coordination
- Life cycle costs determination
- Funding identification (fleet and infrastructure)
- Bus performance analysis during Phase 1



# Implementation Challenges

- Vehicles may not provide 1:1 ratio for replacement
- Vehicle storage and charging space limitations – 2 of 3 bus garages are at capacity
- Engineering and design for infrastructure limited by facility constraints
- Range decreases as energy storage degrades over time
- Bus manufacturer's capacity to meet growing demand
- Utility's ability to meet large supply requirements from the electrical grid
- Resiliency/Electric grid reliability; back-up power source required
- Rate structures and demand charges must be negotiated
- Workforce development
- Funding for upfront capital (approximately \$550K vs. \$950K per bus) + infrastructure. Some savings will likely be achieved in on-going maintenance.

Battery Electric Bus Ranges  
(miles)



- Source: New Flyer, based on Federal Transit Admin. Altoona Bus Testing Cycle
- Range calculations do not account for:
  - Cold weather operation (w/o an auxiliary diesel-powered heater)
  - Impact of terrain
  - Reduced regenerative braking (longer distances between stops)
- Battery degradation of 3% per year over five years
- Operating range: 155 miles
- Consistent with local experience

## Summary of Fairfax Connector Routes by Vehicles Miles

	Percentage of Routes Operating less than 150 miles / vehicle / day	Percentage of Routes Operating more than 150 miles / vehicles / day
Huntington Division	20%	80%
Herndon Division	64%	36%
West Ox Division	<u>24%</u>	<u>76%</u>
System	37%	63%

# Current FCDOT Activities to Ensure Successful Transition to Zero Emission Bus Technology

- Staff attending ZEB training, virtual conferences and participating in various committees of the American Public Transportation Association
- Networking with peers locally and nationally
- Ongoing dialogue with ZEB manufacturers
- All electric autonomous pilot test project (Mosaic)
- Funding applications (one grant awarded and one grant anticipated)
- Studying electrification of Richmond Highway Bus Rapid Transit
- Preparing for Phase 1 Implementation (8 buses at West Ox bus division)
- Identifying most efficient procurement method
- Participating in local effort to establish maintenance technician training program

# Current/Future Actions to Ensure Successful Transition to ZEB

- Developing scope of work for technical expertise
  - Feasibility study
  - Infrastructure study
  - Transition plan
  - Phase 1 analysis
- Evaluation of Utility Grid & Develop Charge Management Strategy
- Estimated timeline: 18-24 months



# Diesel Bus Purchases During Phase 1

- Maintain Connector service reliability
- Connector currently extending 12 year buses to 15-16 years
- Many buses reaching useful life cannot be extended without major costs and time
- Private contract bid on replacement schedules
- Fleet maintenance costs will increase dramatically
- Workforce development
- Technology advancements





## Expedite Timelines-Road to Success

- Exploring used bus purchases
  - 10 identified so far
  - Seeking others
- Advancing Phase 1 schedule with other bus OEM
- Completing BRT electrification study in 2021
- Advancing RFP timeline to begin engineering analysis
- Option: do not extend buses past 12 years if funding and infrastructure aligns
- Seeking ways to advance schedule
- Ensuring the Board receives regular updates

# Board Motion on JET Recommendations

- Staff is comfortable with Board motion on JET recommendations and will work to exceed them
  - No diesel bus purchases after FY2024 without further Board discussion
  - Goal of non-carbon emitting transit fleet by 2035
  - Work with local, state, and federal governments to ensure a continuous and interconnected connected transit system
  - Improve mobility options for safe walking and biking
  - Encourage alternative transit options for students, residents, and workers
- Identify ways to transition to electric buses more quickly!

# Discussion

