



Zero Emission Bus Transition Plan

Metropolitan Council
Information Item
January 22, 2025

Agenda

- Overview of legislative requirements
- Guiding Principles
- BEB Progress to date
- Peer agency interviews and lessons learned
- Service Planning and Prioritization
- Garage Capacity
- Community engagement
- Milestones and performance measures
- Barriers, constraints and risks
- Program of Projects
- Proposed Action and timeline

ZEBTP Statutory Requirements

- Under new state statute Council is responsible for developing a Zero-Emission and Electric Transit Vehicle Transition Plan and revising the plan every three years (Minn. Stat. 473.3927)
- The 2024 adopted statute established new minimum requirements with the updated report due on February 15, 2025.
- At a minimum, the plan must:
 - (1) establish policies, guidance, and recommendations to implement the transition to a transit service fleet of exclusively zero-emission and electric transit vehicles, including for recipients of financial assistance under section 473.388;
 - (2) establish a bus procurement transition strategy so that beginning on January 1, 2035, any qualified transit bus purchased for regular route transit service or special transportation service under section 473.386 by the council is a zero-emission transit bus;
 - (3) consider methods for transit providers to maximize greenhouse gas reduction in addition to zero-emission transit bus procurement, including but not limited to service expansion, reliability improvements, and other transit service improvements;

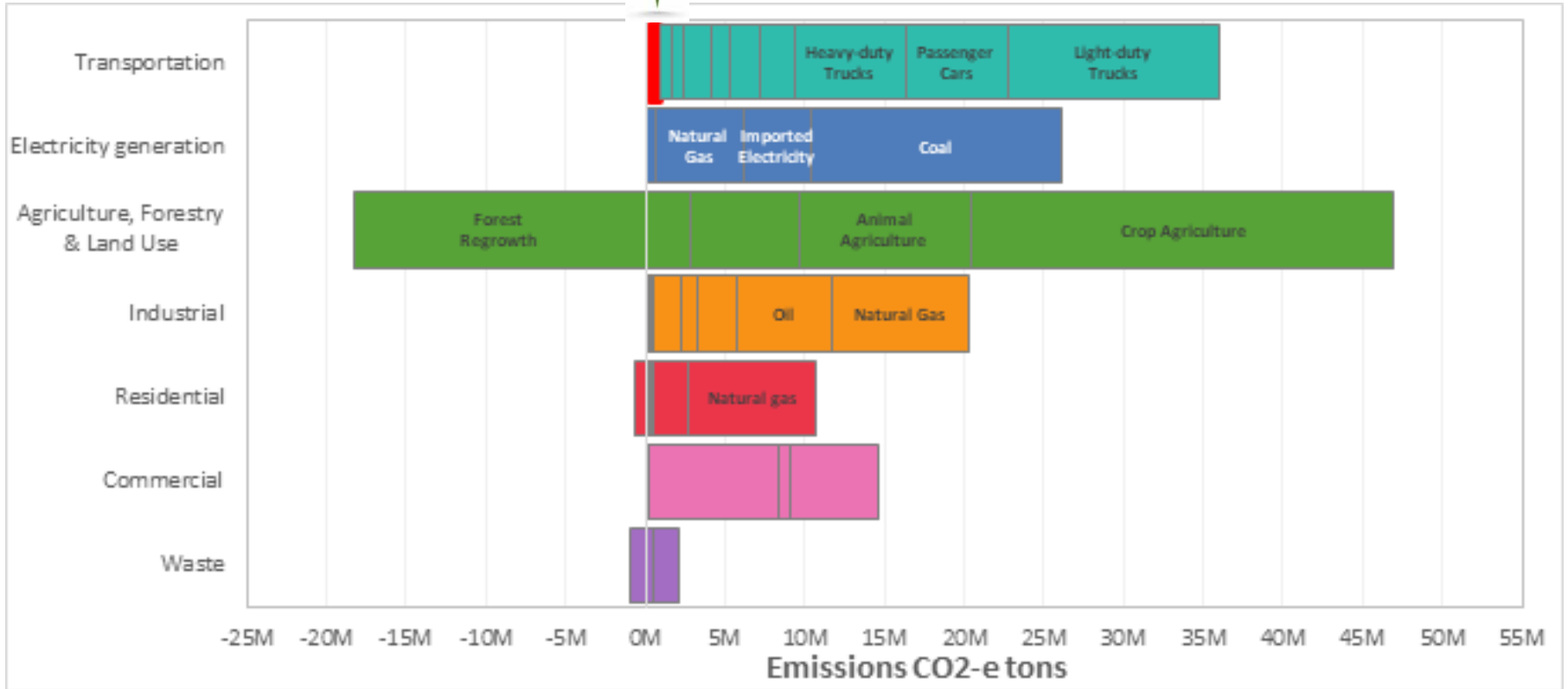
ZEBTP Statutory Requirements

- At a minimum, the plan must: *continued*
 - (4) analyze greenhouse gas emission reduction from transit improvements identified under clause (3) in comparison to the zero-emission transit bus procurement strategy under clause
 - (5) set transition milestones or performance measures, or both, which may include vehicle procurement goals over the transition period in conjunction with the strategy under clause (2);
 - (6) identify barriers, constraints, and risks, and determine objectives and strategies to address the issues identified;
 - (7) consider findings and best practices from other transit agencies;
 - (8) analyze zero-emission and electric transit vehicle technology impacts, including cold weather operation and emerging technologies;
 - (9) prioritize deployment of zero-emission transit buses based on the extent to which service is provided to environmental justice areas, as defined in section 116.065, subdivision 1;
 - (10) consider opportunities to prioritize the deployment of zero-emissions vehicles in areas with poor air quality;

ZEBTP Statutory Requirements

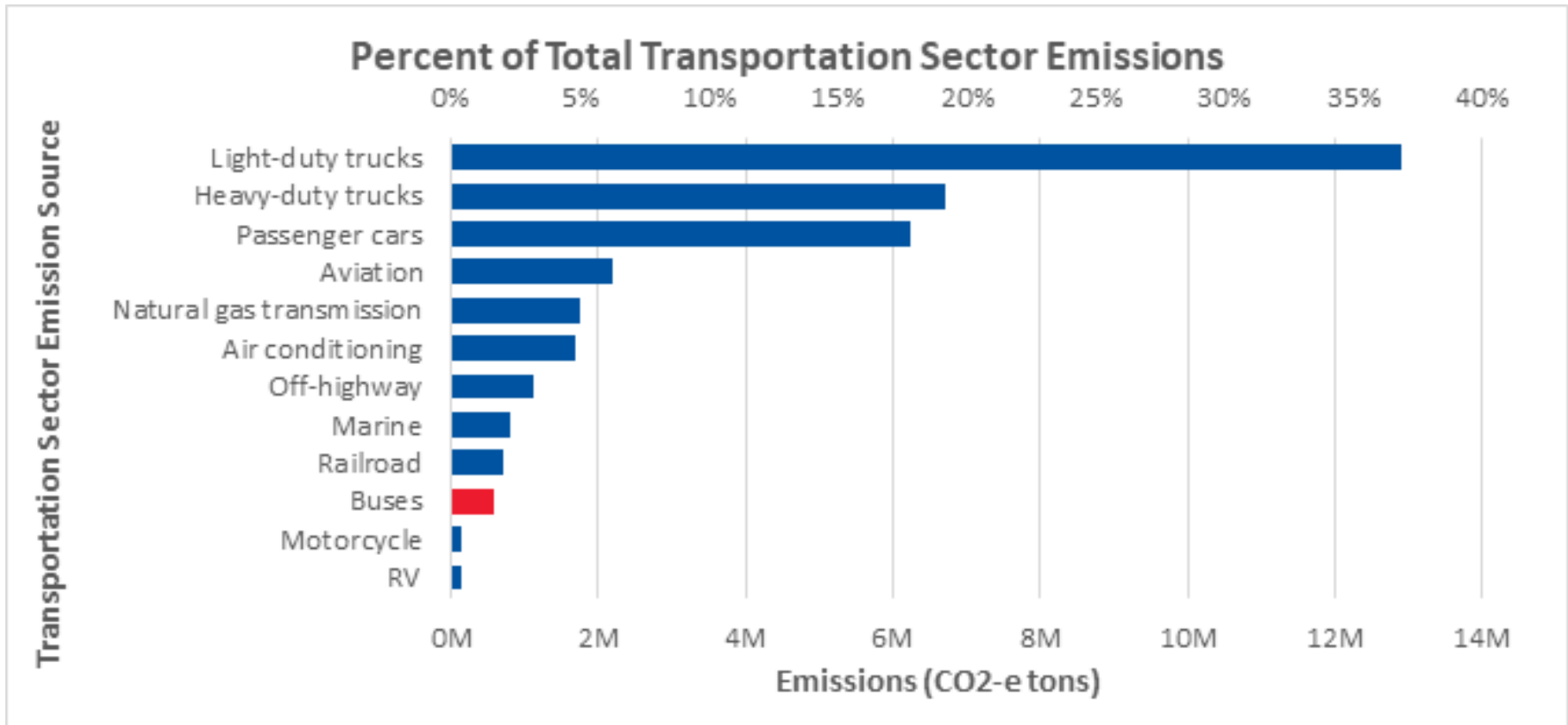
- At a minimum, the plan must: *continued*
 - (11) consider opportunities to prioritize deployment of zero-emission transit buses along arterial and highway bus rapid transit routes, including methods to maximize cost effectiveness with bus rapid transit construction projects;
 - (12) provide detailed estimates of implementation costs to implement the plan and achieve the transition under clause (2), which, to the extent feasible, must include a forecast of annual expenditures, identification of potential sources of funding, and a summary of any anticipated or planned activity to seek additional funds; and
 - (13) examine capacity, constraints, and potential investments in the electric transmission and distribution grid, in consultation with appropriate public utilities;
 - (14) identify methods to coordinate necessary facility upgrades in a manner that maximizes cost effectiveness and overall system reliability;
 - (15) examine workforce impacts under the transition plan, including but not limited to changes in staffing complement; personnel skill gaps and needs; and employee training, retraining, or role transitions; an
 - (16) summarize updates to the plan from the most recent version.

Sources of GHG Emissions and Storage in Minnesota



Source: [MPCA Data Services GHG Emissions Data](#), MPCA, 2020

Minnesota Transportation Sector GHG Emissions by Source



Source: [MPCA Data Services GHG Emissions Data](#), MPCA, 2020.

Guiding Principles



Technical Viability

Strive to achieve a level of service where ZEBs and diesel buses are referred to as just "buses" rather than by their propulsion type



Technical Viability

Partner with Xcel Energy to assess and upgrade electrical infrastructure for bus operations and maintenance facilities



Equity & Environmental Justice

Implement and prioritize ZEB service reflecting transparent fact-driven community engagement and education



Equity & Environmental Justice

Target ZEB investment in communities where air pollution, racial, and socioeconomic disparities are greatest while also balancing the challenges of new technology



Fiscal Impact

Deploy ZEBs in a fiscally efficient manner in order to maximize use of vehicles and infrastructure



Fiscal Impact

Operate and invest within fiscal means by planning for and optimizing capital and operating expenditures while pursuing new funding streams

Investments to date

- 13 60-foot New Flyer BEBs (8 C Line (start 2019) + 5 Gold Line (anticipated 2025))
- 20 40-foot BEBs (anticipated 2026)
- 30 150-kilowatt plug-in chargers (the first 8 were replaced under warranty in 2021)
- 4 mobile chargers to be used for maintenance
- 2 on-route overhead conductive chargers at Brooklyn Center Transit Center (BCTC) (decommissioned in 2023 due to safety and reliability concerns)

Learning from Our Peers

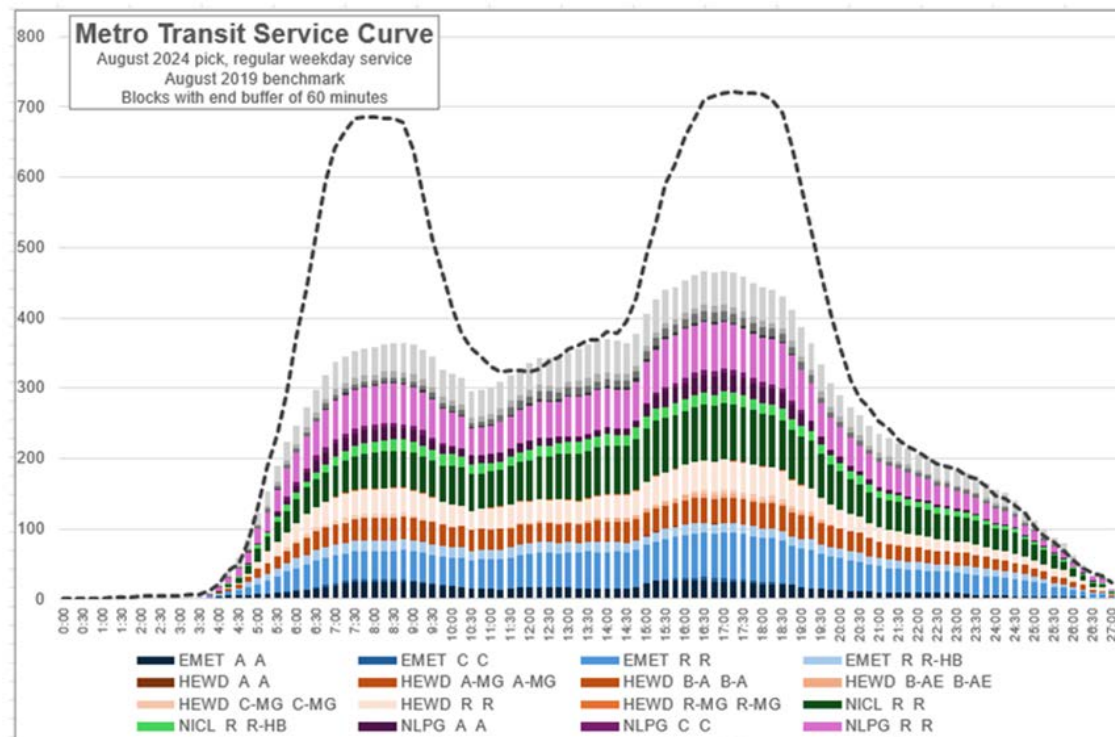
- Plan for longer ZEB/charger repair times with contingency operations
- Bring flexibility into ZEB planning and implementation to accommodate technology advancements
- Consistent range is critical for reliable operation through all seasons; plan for bad weather days
- Develop strong contractual language; include performance metrics where possible
- When conducting an equity analysis, consider impacts to service reliability with emerging technologies
- **What's changed**
 1. Expanded experience has shown BEB availability and range challenges can persist
 2. Some peers are utilizing FCEB pilot programs to better achieve 1 for 1 replacement

Service Planning & Prioritization

Technical Viability

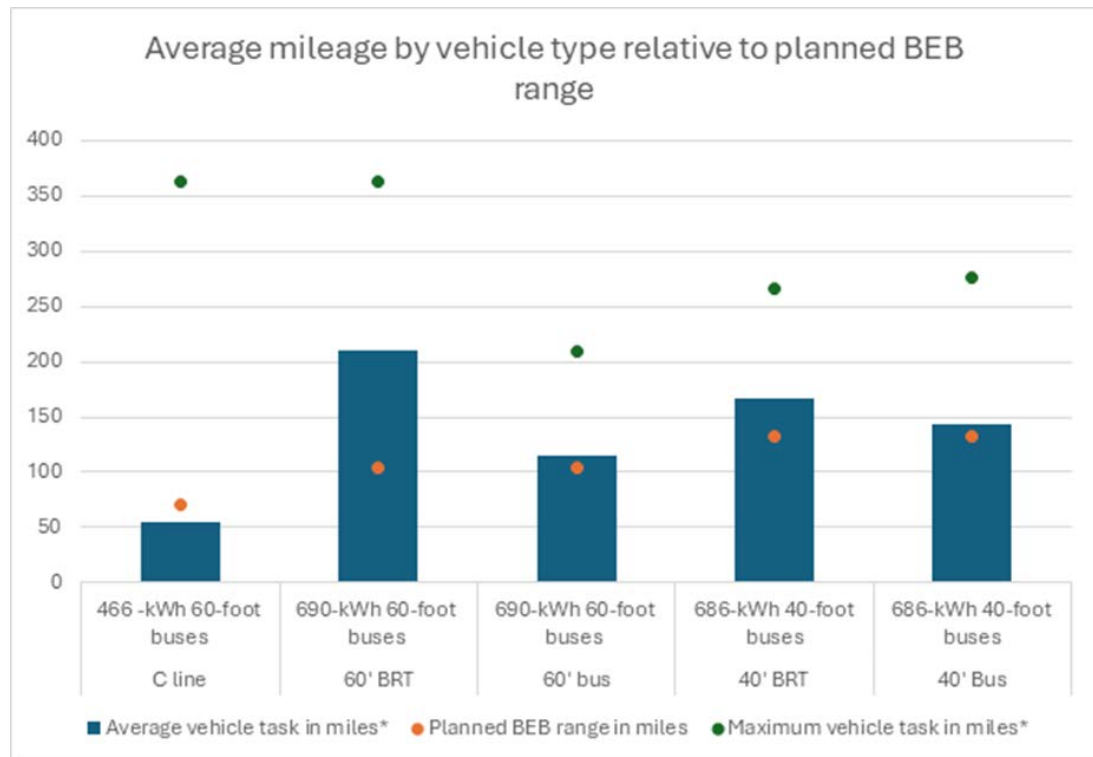
Strive to achieve a level of service where ZEBs and diesel buses are referred to as just "buses" rather than by their propulsion type

- What hasn't changed:
 - Battery capacity assumption methodology
 - EEJ Prioritization for BEB deployment
- Reduction of peak-only service levels **-limited opportunities for BEBs to replace diesel buses at a 1 to 1 ratio**



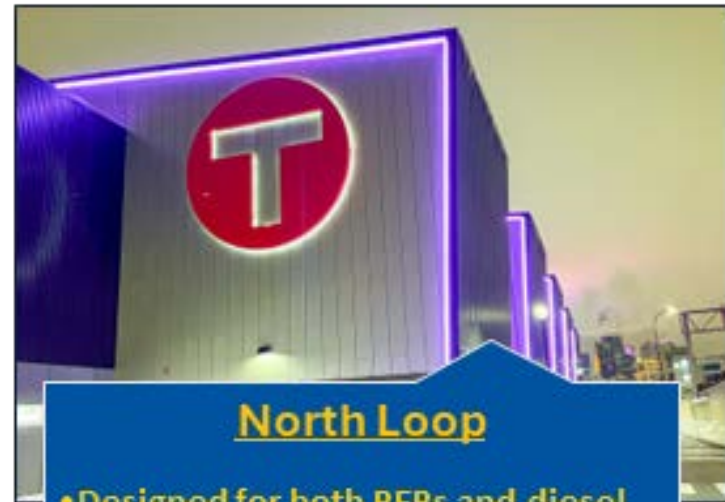
Service Planning & Prioritization

- Due to range limitations, C Line BEB vehicles operate a small fraction of C Line diesel BRT miles
- Service Expansion – Draft Network Now plans to grow bus service by 35 percent through 2027
- Prioritizing between adding service and deploying BEBs creates new conflicts



Garage Readiness

- Progress to date
- Garage capacity
 - Service Expansion
 - Storage constraints
- Xcel coordination and timelines
- Electrical capacity for full transition



North Loop

- Designed for both BEBs and diesel buses
- Storage capacity for 192 BEBs
- Additional 10MW needed for full electrification

Outreach and Engagement

- Targeted known interested stakeholders due to compressed time frame for engagement
- Focus on Internal engagement
 - Frontline staff, bus operators and mechanics
- UofM Electroposium
- Annual updates to TC
- Annual Public Summit



Barriers, Constraints, Risks

- Operator & Mechanic Shortages
- Battery Reliability
- BEB Production; Supply Chain Constraints
- Fire Hazards
- Electrical Grid Capacity
- Service Delivery
- Speed of innovation
 - Technology obsolescence and minimum life requirements

Program of Projects

- Fire Hazard Assessment and Mitigation
- Service Analysis
- Propulsion Type Performance and Alternatives Analysis
- Fleet Replacement Plan

Milestones

- **Vehicle Procurement**

1. Short term: 20% of 40-foot bus replacement procurements to be BEBs from 2025-2030.
2. Long term: provided in future updates based on realized experience in the short term and industry advancements.

- **Infrastructure Procurement**

1. Procure from multiple manufacturers and evaluate performance of BEB chargers to inform future procurement decisions.

Performance Measures

- **Fleet Mileage** – how many miles vehicles are driven annually
- **Bus Availability** - % of calendar year ready for service
- **Infrastructure Availability** - % of calendar year infrastructure available for use
- **Bus Reliability** – mean distance between road calls
- **Charger Reliability** – warranty ticket volume
- **Cost/mile** – energy cost per mile driven
- **Environmental Impact** – emissions reduction

Summary

- Why are we doing this?
 - Advance sustainability efforts; Reduce greenhouse gases
- How - While Maintaining Service Expectation
 - Gain incremental firsthand experience
 - Apply lessons learned
 - Proceed with measured advances
- Areas for continued study
 - Service Evaluation, Garage Capacity
- Providing accessible, reliable, fast, and frequent transit service to more people will have the greatest role in reducing Minnesota's GHG emissions by attracting people to transit instead of driving their personal vehicles

Council Timeline & Proposed Action

- January 22 – Council Information Item
- January 27 – Transportation Committee Business Item
- February 12 – Full Council Business Item
- February 15 – Submit ZEBTP to MN legislature
- **Proposed Action BI 2025-34:** That the Metropolitan Council approve the updates to the adopted Zero Emission Bus Transition Plan for submittal to the MN State Legislature as required by Minnesota Statute 473.3927.