Metro Transit Electric Bus Overview

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Why Metro Transit?

- Metro Transit is a national leader in clean-fuel technologies. Since 2001, Metro Transit has a track record at partnering with bus manufacturers to advance bus electrification to the benefit of the national transit industry.
  - Biodiesel
    - 2001: Started testing
    - 2005: B2 (2%)
    - 2006: B5 (5%)
    - 2007: B10 (10%)
    - 2018: B20 (20%)
  - Hybrid-electric buses
  - “Super” hybrid pioneers

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Policy and Community Benefits

- Supports 2040 Transportation Policy Plan and THRIVE MSP 2040 goals
- Reduces harmful emissions along routes
  - Criteria pollutants (VOC's, CO, NO_x, $PM_{10}/PM_{2.5}$)
  - Greenhouse Gases (CO_2, CH_4, N_2O)
  - 16 ton annual CO_2 emissions reduction globally per bus when switching from diesel to electric, and 58 tons at the tailpipe
- Equity & Public Health
  - Reduces exposure to emissions released by diesel powered buses.
  - Affords greater Socioeconomic and Environmental Justice to ACP's and ACP50's than diesel buses.
  - Reduces exposure to heart & lung disease causing pollutants

Go GREENER

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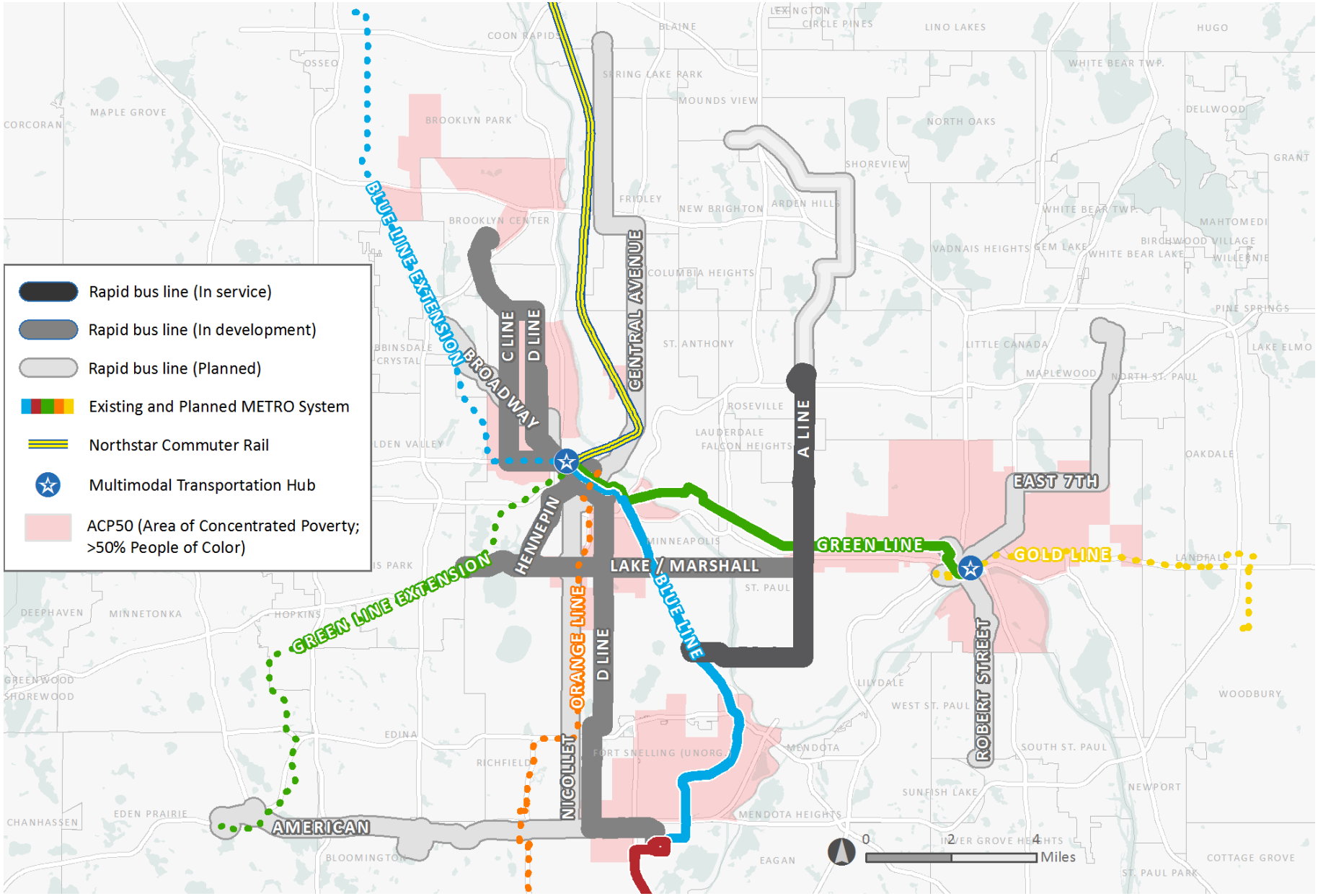
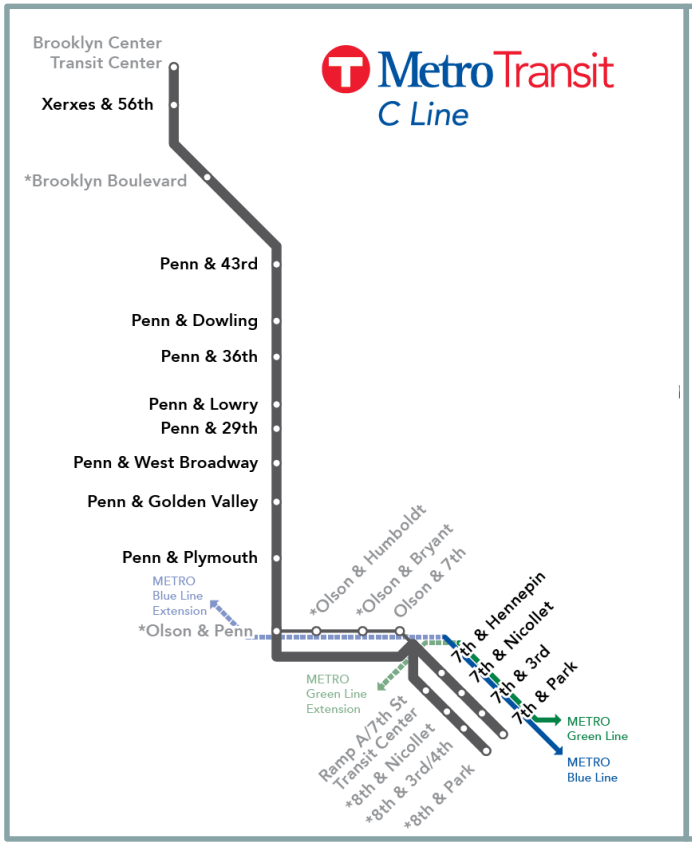
Environmental Justice & ACP50's



Arterial Bus Rapid Transit – Upcoming Projects



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Operational Benefits

- Anticipated longer service life
- Lower operations & maintenance costs due to:
  - Better reliability, fewer moving parts
  - Fuel savings
- Reduces bus garage HVAC costs
  - Fewer diesel engines idling in garages reduces expensive winter heating & ventilation needs
- Quiet, smooth propulsion providing a ride experience approaching that of an LRV (depending on the manufacturer)

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Technology Status

- Propulsion: technology is proven and improving
  - Builds on our experience with 133 hybrid-electric buses in-service today
- Battery: technology is rapidly advancing
  - Current vehicle range: 100-170 miles per charge on average
  - Predicted vehicle range 2020: 200-500 miles per charge on average
- Charging Protocol: Combination of On-Route and In-Garage charging, Standardization is anticipated to be finalized in 2017
- Winter Heating (Northern Climates): small diesel heaters needed for cold winter days to preserve range
- Service: As range increases, more existing route blocks become suitable for electric buses

ROI Info

- Current 40-foot electric bus price range: $700,000-$800,000
- Standard 40-foot diesel cost: $450,000
- Current 60-foot electric bus price range: $1.2 m - $1.3 m
- Current 60-foot diesel cost: $800,000
- Based on a 16-year life cycle cost analysis including a premium for electric buses:
  - Fuel cost savings
  - Maintenance cost savings
  - = 12-14 year simple payback
- Factoring in $32 per metric ton for the social cost of carbon* further improves the ROI
- This ROI only gets better as technology improves

*Metro Transit Social Cost of Carbon Data

Funding Opportunities & Next Steps

2017

- Supplemental funding opportunities: 2017 FTA LoNo & Met Council Thrive Grant awards
- Continue development of partnerships and support
- Issue RFP for Electric Buses (Including options for additional buses)

2018

- Metro Transit begins to take delivery of initial fleet of electric buses
- VW Settlement monies available for additional battery electric bus purchases

2019

- Metro Transit deploys electric buses into service operation on C Line
- Refine RFP for future electric bus purchases

Questions?

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