Jaunt

Feasibility Study of Alternative Fueled Buses

Advisory Committee Meeting 2: September 22, 2022

Jaunt
WHERE CAN WE TAKE YOU?

Kimley»Horn
Expect More. Experience Better.

Today's Objectives

Understand the potential impacts of alternative propulsion technologies to Jaunt.

Generate ideas to leverage the highest-value opportunities and work around barriers.

Agenda

- Project Goals Refresher
- Background and Analysis
  - Project Status to Date
  - Current System and Service Area
  - Assumptions and Range Analysis
- Technology Opportunities and Barriers
  - Battery Electric (EV)
  - Hydrogen Fuel Cell (FCEV)
  - Compressed Natural Gas or Renewable Natural Gas (CNG or RNG)
- Questions & Discussion
- Next Steps

Project Goals

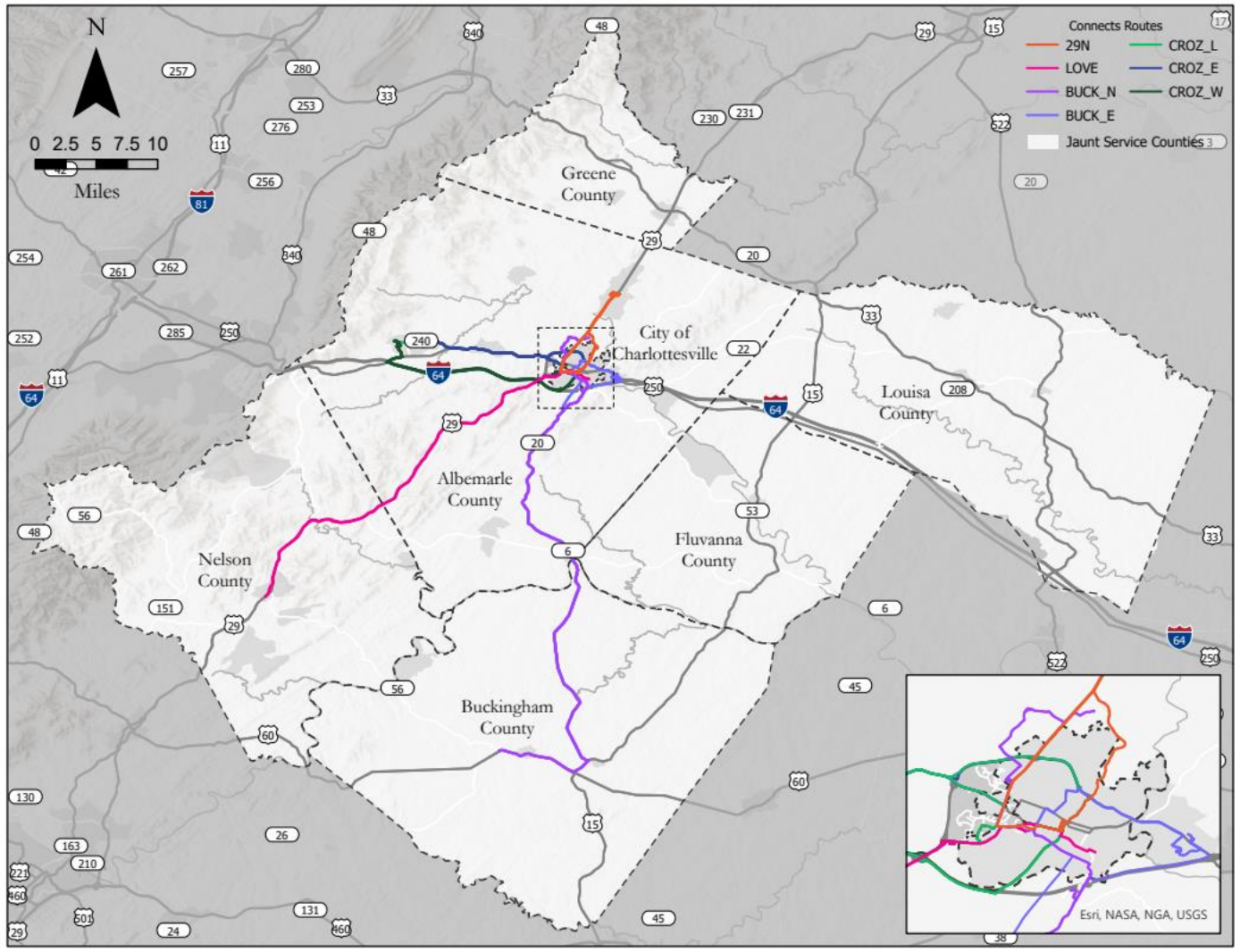
- Achieve **45%** GHG reduction by 2030; net zero by **2050**
- Determine a preferred cleaner fuel type for Jaunt
  - Consider trade-offs including operating and capital cost, emissions impact, and operational viability
  - Balance the current level of service with practicality of low or no emissions vehicles (minimize impact to operations)
  - Consider well-to-wheel impact of propulsion technology on emissions
- Determine high level implementation strategy and timeline of the preferred fuel type

Background and Analysis

Status to Date

- More than halfway through the feasibility study
- Conducted interview with two peer agencies: SARTA and SunLine
- Conducting interviews with utility providers
- Developing scenarios and cost analysis
- Preparing lifecycle greenhouse gas emissions

Jaunt's Current System

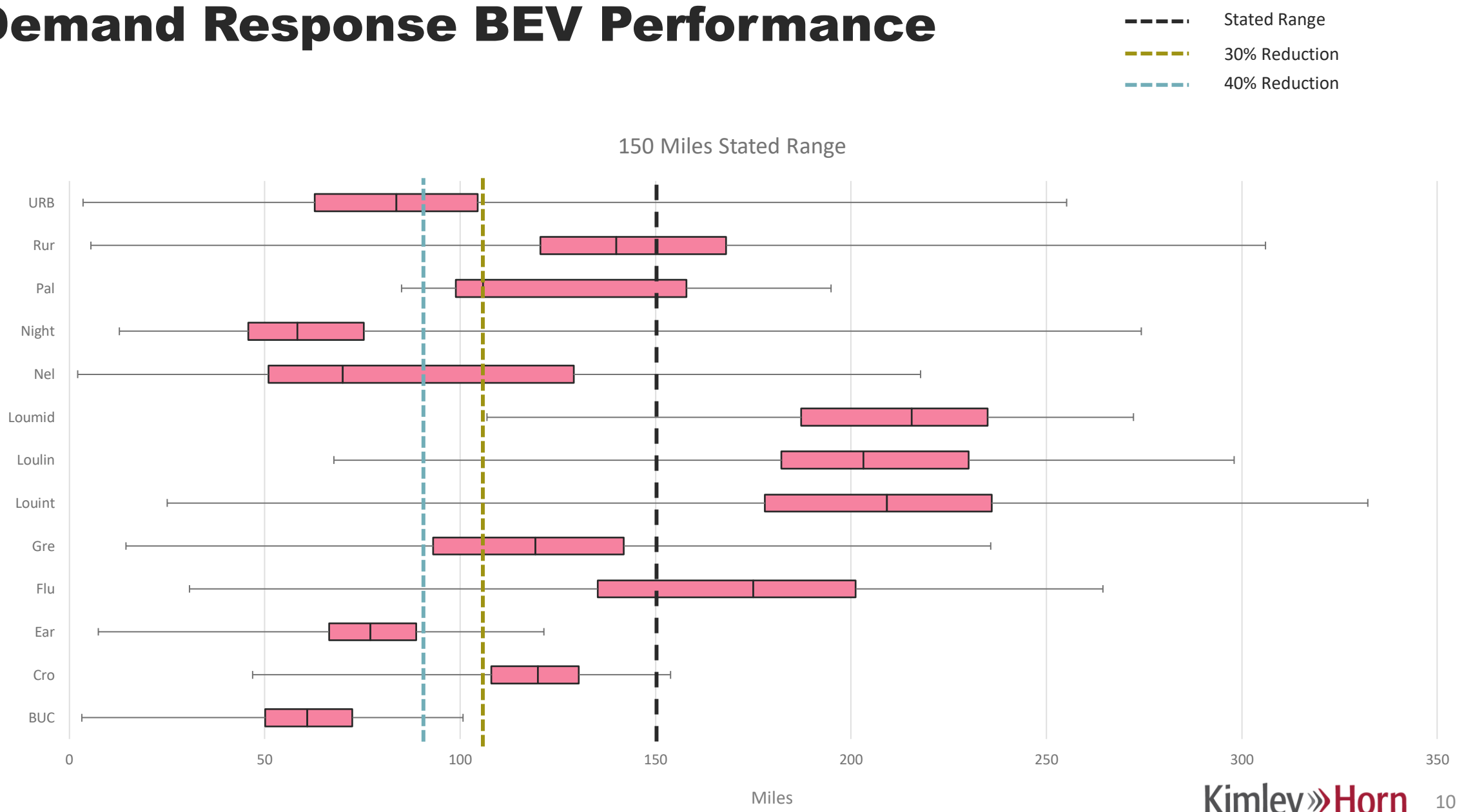


- Serves Charlottesville and six surrounding counties
- 7 fixed-route commuter service lines
- 19 demand response run classes
  - ADA Service
  - Links from the counties to Charlottesville
  - Circulator services within counties

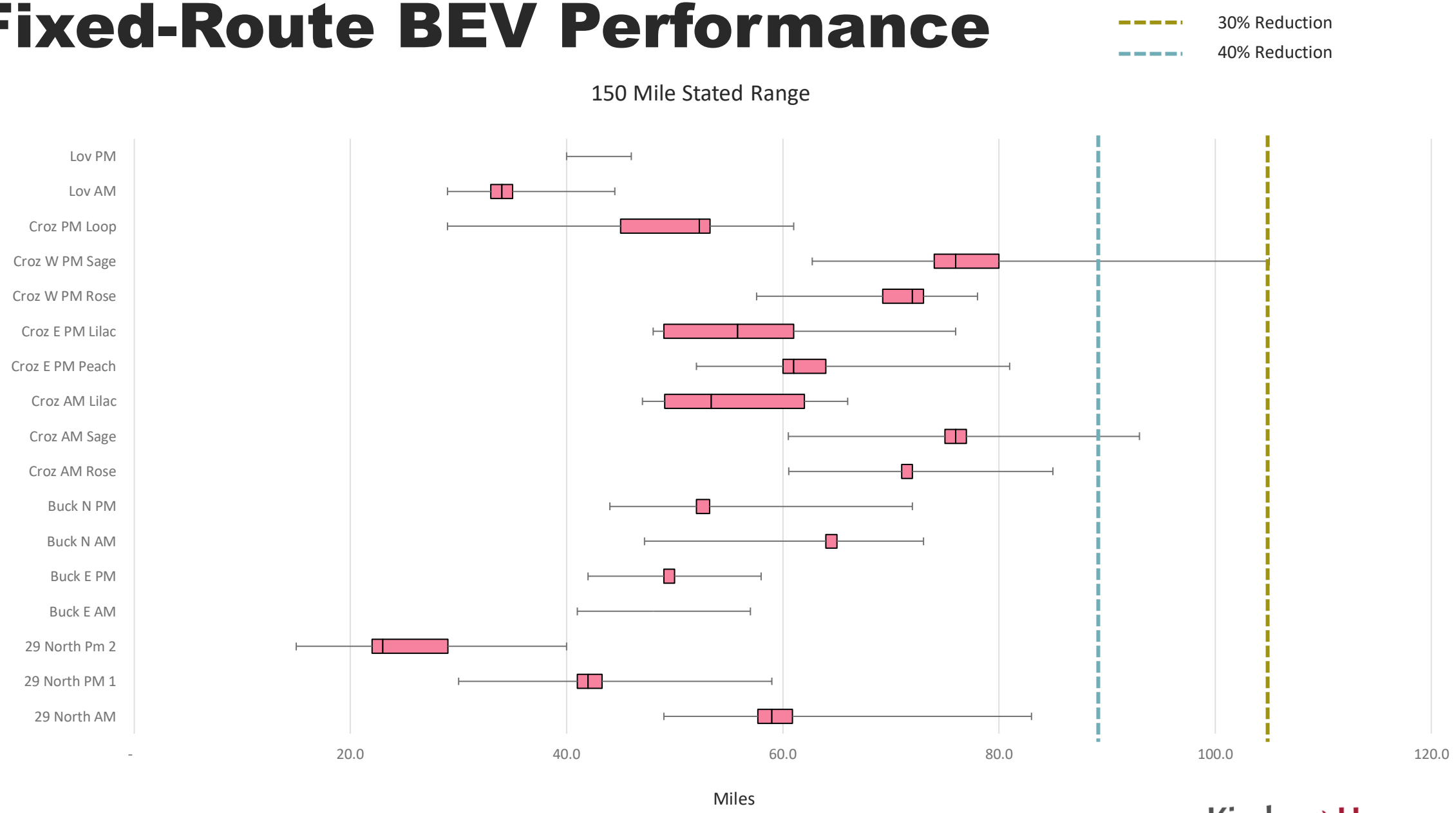
Analysis Assumptions

- Analysis was based on Jaunt's 2021/2022 existing conditions
  - 2022 Fleet and Run Classes
- Assumptions based on 2022 market trends and technology capabilities
- Analysis Assumptions
  - EV range of 100-150 miles
    - 30% and 40% reductions in range were used as benchmarks
    - Reductions were determined through industry standards and literature reviews
  - CNG and FCEV range of 300 miles

Demand Response BEV Performance



Fixed-Route BEV Performance



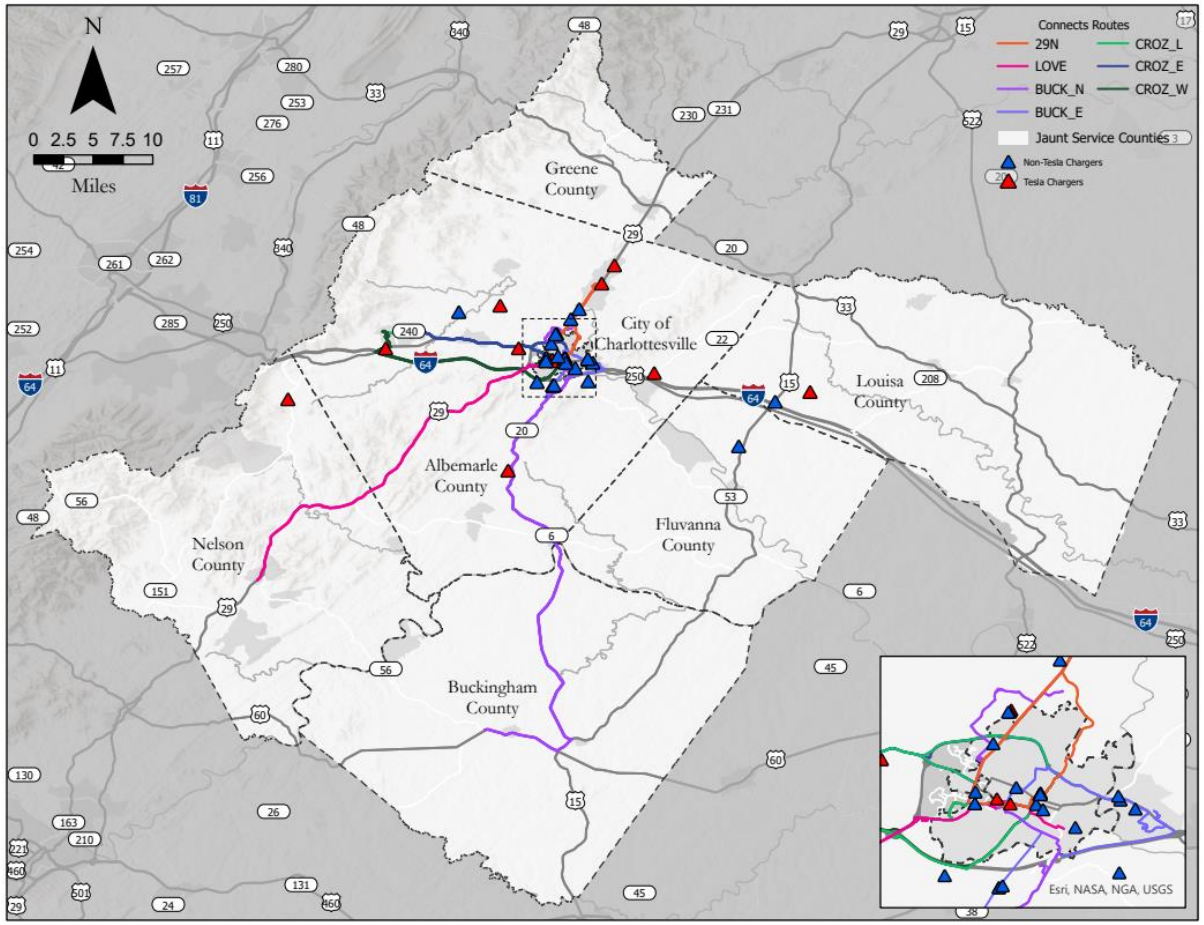
Technology Opportunities and Barriers

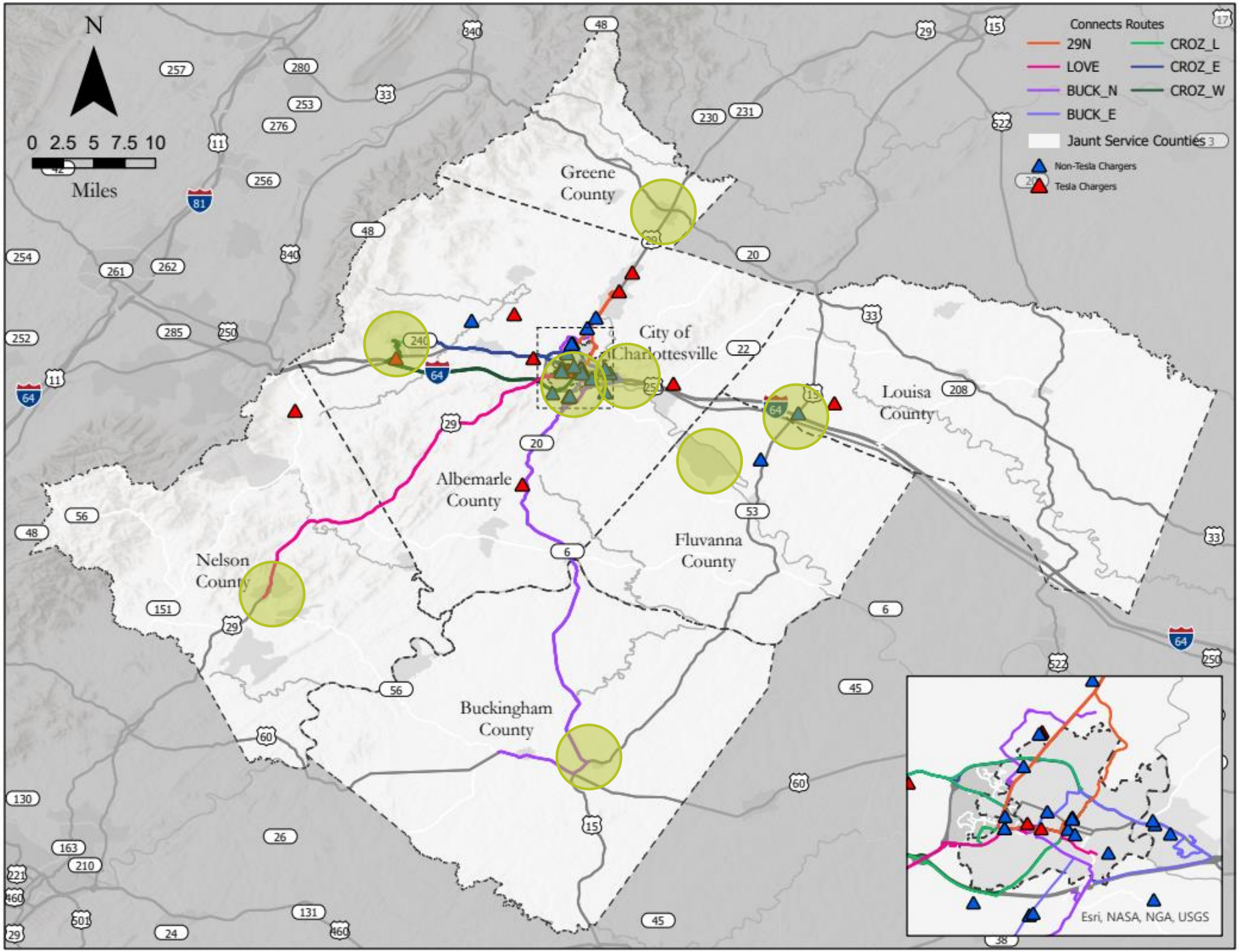
Battery Electric Vehicles

- Opportunities
  - Most (if not all) *fixed route* service could be accommodated with commercially-ready EVs
  - Technology is scalable to number of vehicles deployed
- Barriers
  - Range - Most *paratransit* service would **not** be completed with the same number of vehicles as today
  - Charging operations would require additional space and staff oversight
- <u>Items for Discussion</u>
  - What are opportunities for on-route charging locations and/or additional depots in each service area?
  - What is the desire to procure additional vehicles?

Battery Electric Charging Locations

- 28 public, non-Tesla charger locations
  - 64 Total Chargers
    - 5 Level One chargers
    - 40 Level Two chargers
    - 19 DC Fast Chargers
- Centered around the City of Charlottesville
- Most are available 24 hours a day





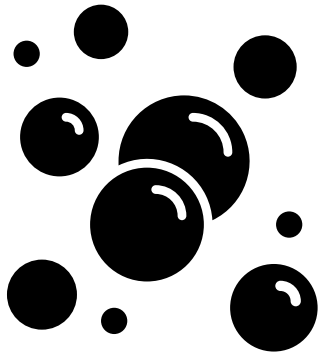
Potential Charging Locations

Jaunt County	Community
Albemarle -- west	Crozet
Albemarle -- east	Pantops (west of I-64/US250)
Buckingham	Dillwyn (Highway 20/US15)
Fluvanna	Lake Monticello
Greene	Ruckersville
Louisa	Zion Crossroads (I-64/US15)
Nelson	Lovingston
Charlottesville (City)	Jaunt HQ

Hydrogen Fuel Cell Electric Vehicles

- Opportunities
  - All fixed-route and demand response service could be accommodated with FCEVs
  - Hydrogen deployment is more cost-effective for systems with more vehicles
- Barriers
  - Sourcing – no distributors or commercial fueling stations in the Charlottesville area
  - Cost – hydrogen has a significant upfront costs with fueling/storage infrastructure and vehicle procurement
  - Upstream Emissions – Not all hydrogen production methods have zero carbon footprint and most commercial sources use natural gas reformation
- Items for Discussion
  - Could Jaunt or partners accommodate a local hydrogen production plant?
  - Is the hydrogen vehicle market mature enough for implementation?

Compressed and Renewable Natural Gas



- Opportunities
  - All fixed-route and demand response service could be accommodated with CNG vehicles
  - CNG is a widely-adopted technology
  - There may be renewable sources which could have *negative* carbon emissions
- Barriers
  - CNG is not zero emissions
  - Most renewable natural gas is mixed into the distribution network
- Items for Discussion
  - What is the perception of using natural gas as a fuel?
  - Would near-term deployment be worth installation if equipment could be later converted for hydrogen?

Comparison of Technologies

Scenario	Number of Vehicles	Emissions Reduction		Vehicle Costs	Facility Costs	Operational Costs (Fuel+Maintenance)
Current	108	-		$	-	$$
Battery Electric	157	●●●●●	●●●●	$$$$	$$$$	$
Battery Electric w/ Fast Charging	108-114*	●●●●●	●●●●	$$$	$$$$$	$$
Hydrogen	108	●●●●●	●●●	$$$	$$$	$$$
CNG/RNG	108	●●●●	●●	$	$$	$$

*Assumes standby vehicle in each County

Near-term

Long-term

Questions & Discussion

Questions for Discussion

- Which opportunities seem most feasible to act on?
- Which barriers seem the most insurmountable?
- Is Jaunt willing to acquire additional land?
- How could partnerships leverage opportunities or remove barriers?
- Is there an opportunity to use multiple technologies to achieve Jaunt's goals?

Next Steps

- Conduct an interview with Charlottesville Utilities
- Finalize transition scenarios
  - Develop numerical Greenhouse Gas emission comparison
  - Develop relative cost comparison
- Prepare initial prioritization
- Return to the Advisory Committee in November* for Prioritization and Recommendations