



REGIONAL TRANSPORTATION COMMISSION

Metropolitan Planning • Public Transportation & Operations • Engineering & Construction

Metropolitan Planning Organization of Washoe County, Nevada

APTA Expo – Hydrogen 101





RTC Overview



RTC is MPO, Transit Authority, and Regional Road Engineering / Construction for Reno NV.

Public Transportation

- RTC RIDE (fixed-route service)
 - 21 routes (2 BRT), 65 buses
 - 15,000 trips a day
- RTC ACCESS (paratransit)
 - ADA service for people whose disability prevents them from using fixed-route transit service
- RTC FlexRIDE
 - Curbside-to-curbside transit service available in select areas of Sparks/ Spanish Springs, Somerset/Verdi, and in select areas of North Valleys
- RTC VANPOOL
 - 320 vans
- Fuels used
 - Battery Electric, Hybrid (biodiesel-battery), CNG, Hydrogen Fuel Cell



Technology Overview



- Culture of innovation
 - Vehicles, software, services
- Early adopter of BEB buses
 - 4 – 2013 Proterra
 - 17 – 2018 Proterra
 - 2 – 2020 Proterra
 - 4 – Proterra on order (trade)
 - Both garage and on-route charging (at transit centers)



BEB Benefits (Pros)



- Lower power costs
- Lower expected maintenance costs
- Zero emissions
- Health benefits
- Quieter



BEB Cons



- Electrical infrastructure upgrades
- Demand charges and energy Management
- Supply chain issues
- Limited range / range anxiety
- Limited areas for application



BEB Application



- BRT routes are all-electric
- Other routes have limited usage
 - Seasonal changes in range
 - Hill vs non-hill routes
 - Carson City service
 - Short routes / long layovers
- Maxed out of routes where it is a one-to-one bus replacement
- Designing schedules to meet vehicle capacity vs improving driver efficiency or meeting customer needs



Why Hydrogen?



- Vehicle range
 - 90m BEB (125-150m newer generation)
 - 300m HFCE
 - 400m diesel hybrid
- Scalability
 - Generally, HFCE buses have more upfront cost and less incremental costs than BEB
- Fueling time
 - 7-10 minutes vs. overnight charging (4 to 5 hours)



RTC Plan - Funding



- 2021 Federal Low-No grant
 - 2 buses
 - Fueling infrastructure for up to 10 vehicles (5 per hour)
 - \$6,800,000

- 2023 Federal Low-No Grant
 - 6 buses
 - Fueling expansion for up to 50 vehicles (10 per hour)
 - VR training platform
 - \$8,800,000

- Facility to be located at our current ACCESS/Facility Maintenance Sutro facility



RTC Plan - Partners



- New Flyer (vehicle manufacturer)
- Ballard Power Systems (fuel cell)
- Krueger Transport (consultant)
- Air Products (fuel provider)
- Marathon (facility construction)



What's Next?



- First vehicles end of year
- Fueling facility finished early next year
- Battery reuse study
- Long term – combined facility
- Mixed fleet of hydrogen and electric moving forward



Thank You!

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of Washoe County

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Your RTC. Our Community.



RTS: Pivoting to Hydrogen Fuel Cell

APTA Hot Topics – Learning Zone



Hydrogen
Fuel Cell Bus
Council

Presented by Rusty Korth, Vice President of Zero-Emission Strategies

October 10, 2023





RTS Overview



- The Rochester-Genesee Regional Transportation Authority (branded as Regional Transit Service):
 - Public transit for the City of Rochester, Monroe County and 7 surrounding counties
 - 11 separately incorporated business units, 1000+ employees
 - Fixed-route, on-demand, paratransit and deviated fixed route service
 - In 2022 over 8M rides and over 10M revenue miles
- **RTS Connect**
 - Fixed-route: 200 40' and 60' buses (20 battery-electric)
- **RTS OnDemand**
 - On-demand: 25 vans and cutaway buses
- **RTS Access**
 - Paratransit: 53 cutaway buses
- **RTS Regionals (7 regional operations)**
 - Deviated fixed-route: 130 cutaway buses



connect



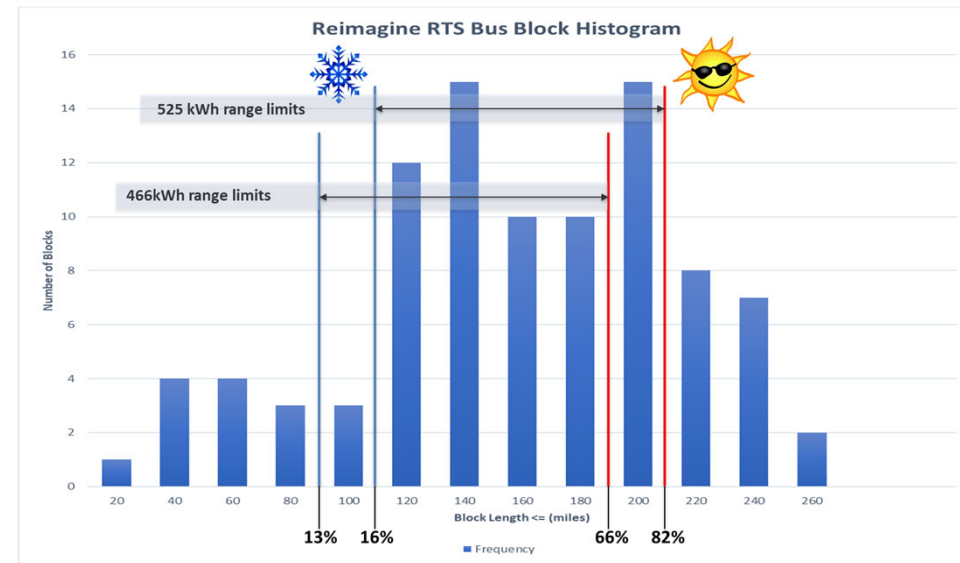
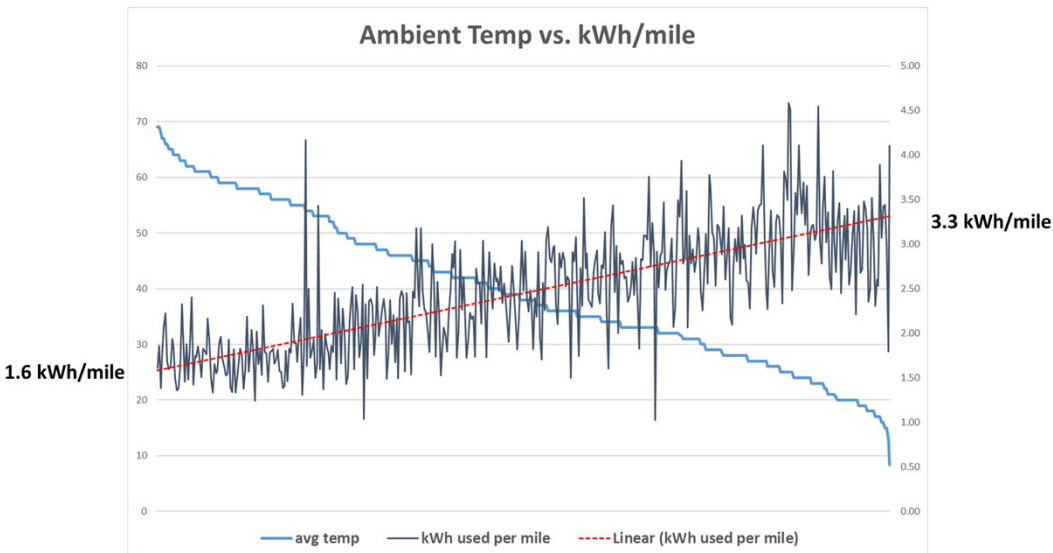
ONDEMAND



ACCESS

ZE Initial Steps – Battery Electric

- 20 battery-electric buses
 - 10% of the fleet is zero-emission
 - Cannot accommodate additional battery-electric buses for the foreseeable future given cold-weather range limitations



ZE – Pivot to Hydrogen Fuel Cell

Attribute	Hydrogen Fuel Cell	Battery-Electric
Range - moderate weather	> 300 miles ✓	180 - 250 miles
Range - cold weather	250 - 300 miles ✓	80 - 125 miles
Time to fuel	6 - 12 min ✓	3 - 5 hours
Fueling complexity	simple ✓	complex
Payload impact	minimal ✓	significant
Infrastructure cost/space - initial	more expensive/larger	less expensive/smaller ✓
Infrastructure cost/space at scale	less expensive/smaller ✓	more expensive/larger
Vehicle cost	more expensive	less expensive ✓
Fuel cost/mile (moderate weather)	\$0.66	\$0.19 ✓
Grid resiliency	better ✓	worse

Hydrogen fuel cell technology provides a zero-emission solution that operationally performs much more closely to a diesel bus than battery-electric: longer range, quicker fueling times, and fueling infrastructure that is more scalable.

Hydrogen Fuel Cell Buses and Vans



REV GROUP



EIDorado Axess EVO-FC (3)



NEW FLYER OF AMERICA



New Flyer Xcelsior CHARGE FC (2)



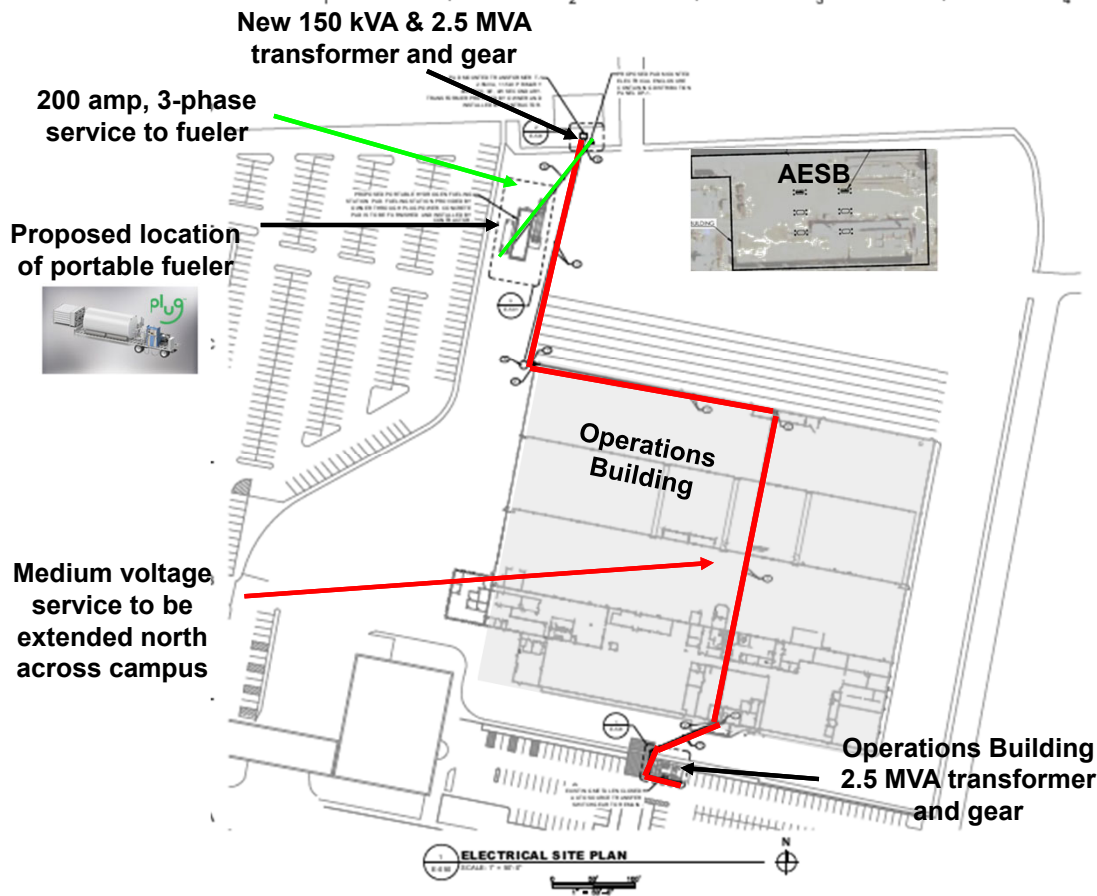
Ford Transit Fuel Cell Van (5)

Initial Hydrogen Fueling Solution



Capacity: 1,600 kg of liquid hydrogen
Max Fill Rate: 3.6 kg/min

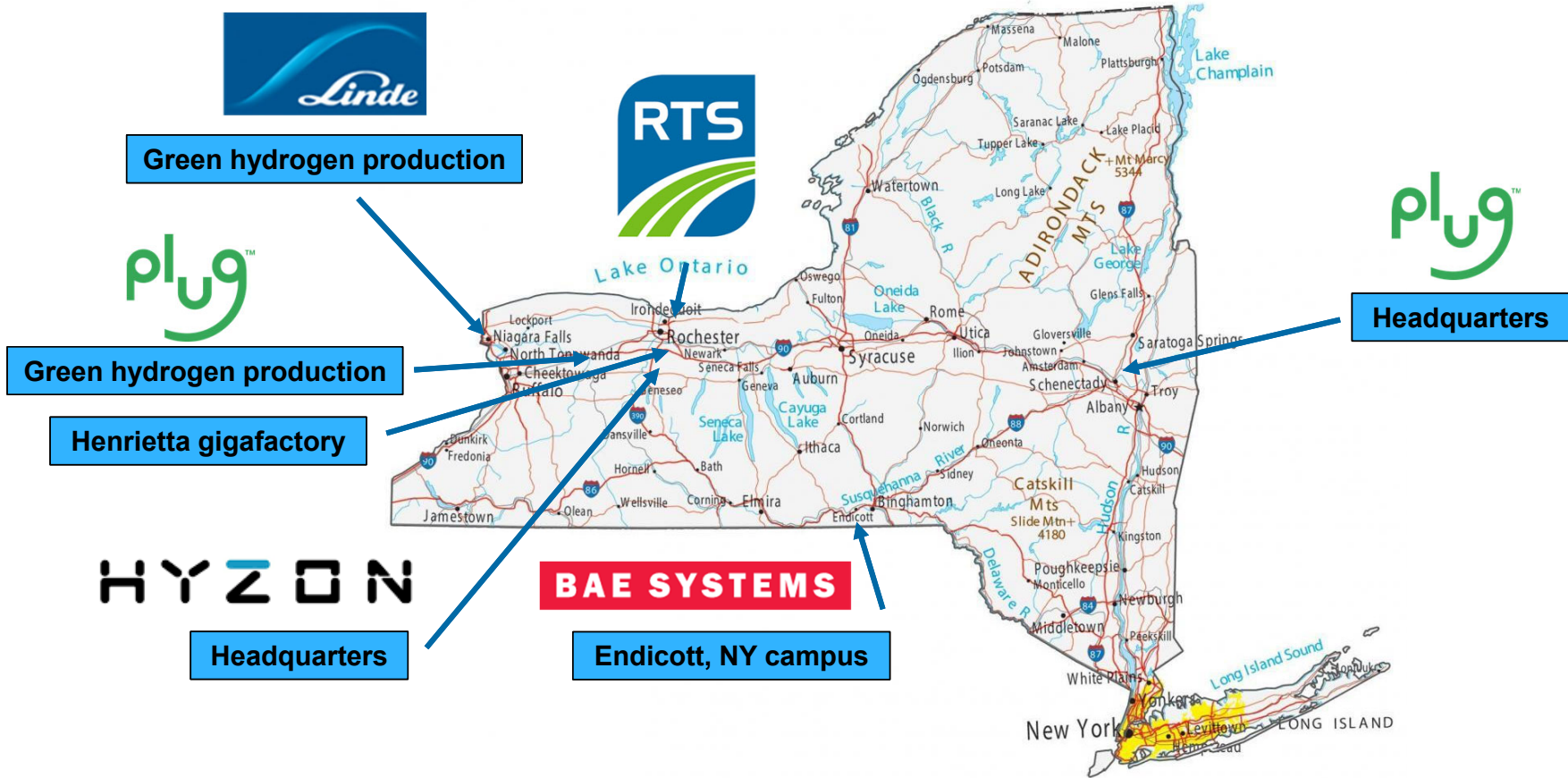
Current Design of Fueler Electrical Service



We will be extending medium voltage service from the south side of the campus to the north side and installing a new 2.5 MVA transformer.

The new transformer will be sized to power the portable fueler in the near-term and the Advanced Environmental Service Building and a permanent hydrogen fueling station in the long-term.

Western New York Hydrogen Ecosystem





HYDROGEN FUEL CELL

The Energy of Tomorrow
Powering SARTA Today.



SARTA Hydrogen Fueling Station

- Designed in 2016, there is 9,000 gallons of gaseous storage capable of refueling the fleet of nineteen (19) hydrogen buses (14-40' Eldorado and 5 Ford Transit vehicles). This storage tank will be upgraded to 15,000 gallons in December 2023 to allow for the continued expansion of our hydrogen fleet.



Why Canton, Ohio

- Ohio provides a true test of the fuel cell's ability to handle the extreme heat and humidity, below zero temperatures and cold. If the technology is going to be successful it needs to be able to work in every environment providing reliability to the agencies and comfort to the passengers.

Borrow the Bus Program

- Alexandria, Virginia one of many transit agencies that has borrowed a SARTA hydrogen bus to conduct demonstrations in their communities. This tour included visits to not only Virginia, but it also conducted educational demonstrations at the U.S. Capital and Department of Transportation and Department of Energy.





Educational demonstration for the House of Representatives and Senators at the Ohio State House. The need to continue educating those making the decisions is essential.

Thank You