

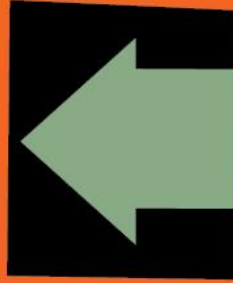


BUSES & BUSES & BUSES!

+ technology + networking + education

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INDIANA CONVENTION CENTER
INDIANAPOLIS





Duluth Transit Authority

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DTA Electric Bus Program

- Originally planned for six fast charge Proterra Catalyst 40-foot buses
- Evaluation of the system found extended range buses were a better fit
- Required a diesel-fired auxiliary heater to extend the range of the bus in cold weather



DTA Electric Bus Program

- Seven all electric buses 440 kW
- Eight plug in chargers, 50 kW
- 250 kW diesel powered back up generator
- Lessons to date



1. What Fits?

- Some route structures are ideal for fast charging, others are more suited for extended range buses
- Weather has a large impact on range
- Charger location(s) must be convenient, protected, allowable
- Timing of charge cycle is important



2. Plan Early for Infrastructure

- 1-year for infrastructure design and install
- Look for experienced professionals for design
- Include a contingency in the budget estimate
- Build capacity for the future
- Be ready to adapt to rapid innovation



3. Engage with Partners

- Consultants can help with modeling, funding
- Utility company is an important partner
- Don't forget community partners, especially schools and nonprofits for support
- Local governmental leaders who have an interest in sustainable initiatives



4. You Will Need New Procedures

- Who connects the chargers, disconnects them?
- Is it on the pretrip checklist?
- Who monitors state of charge for route decisions?
- Towing and emergency response procedures will change
- Track energy usage, driver behavior has a big impact



5. Distribute the Risk

- Redundant charger(s)
- Emergency generator capacity
- Off-site charger on different grid
- Charger in maintenance shop, or portable charger?



6. Stay Informed

- Watch for opportunity announcements
- FTA, U.S. Department of Energy, NREL report on the state of the industry
- Requests for comments from DOT, Public Utility Commissions
- Become a resource, sharing what we know helps everyone succeed

