New Flyer Xcelsior *CHARGE*™

XE35, XE40 and XE60 Battery Electric Buses

AMERICAN PUBLIC TRANSPORTATION ASSOCIATION

2018 Public Transportation & Universities Conference

June 26, 2018

NEW FLYER OF AMERICA


Transportation currently accounts for up to one third of air pollution in urban areas.

NEW FLYER®

NFI Group

North America's Leading Bus Manufacturer

- **87 Years** of Bus Experience
- **> 5,900** Employees
- **32 Locations** throughout North America
- Manufacture approximately **4,200** buses and coaches, annually*
  - Delivered **45%** of North American heavy-duty transit buses in 2016
  - Delivered **39%** of North American motor coaches in 2016
- Support **41%** of heavy duty transit buses in service
  - Supply **33%** heavy duty transit bus parts
  - Supply **40%** motor coach parts
- Publicly traded on TSX under the symbol NFI.TO

NEW FLYER

MCI MOTOR COACH INDUSTRIES

ARBOC Specialty Vehicles

nfi.parts

* Equivalent Units, including ARBOC 2017 estimated deliveries

Xcelsior Heavy-Duty Transit Buses

Transforming Your University Community with Sustainable, Clean Transit Technology

LOW EMISSIONS

- Clean Diesel
- Natural Gas
- Hybrid-Electric

ZERO EMISSIONS

- Electric-Trolley
- xcelsior CHARGE™
- Hydrogen Fuel Cell

Proven Heavy-Duty Bus Platform

- Superior Performance at Altoona
- Quietest Ride
- Built for Accessibility
  - Expanded front door widths
  - 1:7 wheelchair ramp ratio (an industry best)
- Designed for Maintainability
- BRT Styling & Optional Features

xcelsior CHARGE™

XE60
Long Range &
Rapid Charge

XE35/XE40
Long Range &
Rapid Charge

New Flyer's Next-Generation Battery-Electric Transit Bus

- Builds on the proven Xcelsior® transit bus platform
- Extended range battery technology designed in America
- Industry-leading gradeability
- Highest passenger load-carrying capacity, ensuring best passenger capacity
- Interoperable, compliant with developing OppCharge, CharIn and SAE Standards
- Available in 35, 40, and 60-foot bus rapid transit articulated models

Advancing Innovation in Transit

North America's First Designed and Built Zero-Emissions 60-foot Electric Bus (Equipped with a Fuel Cell Range Extender)

Testing Complete

Active and Upcoming ZEB Projects

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Workforce development and training on electrification will is a key priority for OEM's, APTA, transit agencies and universities

- Electrical engineers
- Battery / powertrain assembly technicians
- Electric powertrain maintenance
- Bus operators
- Safety personnel & first responders

NEW FLYER®

VIC | VEHICLE INNOVATION CENTER

Our Vision:

To be North America's leader in the exploration and advancement of bus and coach technology connecting people to places.

Our Mission:

1. **Explore** and advance bus and coach technology through sustainable research and development, fresh innovation, progressive manufacturing, and bold thinking;
2. **Foster** dialogue through discussion, education, and training on the latest zero-emission, connected and autonomous driving vehicle technologies;
3. **Engage** learning through current and interactive exhibits, simulation and hands-on experiences, and observations;
4. **Generate** energy and commitment to clean air quality, safety, and economic benefits for people, communities, and business;
5. **Harness** the positive influence of collaboration, environmental stewardship, and social change to advance smart mobility solutions.

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VIC | VEHICLE INNOVATION CENTER

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Anniston, Alabama

- 30,000 sq. ft. facility
- Interactive Technology Lab
- Demonstrator Buses
- Manufacturing Lab
- Classroom Training
- Hands-On Training Bay
- Engineering Test Lab
- Battery Assembly Area

World's Most Advanced Electric Bus Simulator

Driver Training Improves Regenerative Energy Recovery up to 20%

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VIC | VEHICLE INNOVATION CENTER

DAY 1 of 2 Curriculum	Start	End
Welcome to Vehicle Innovation Center (Training Room)	7:30 AM	7:40 AM
Overview of 2-Day Program / Objectives	7:40 AM	7:50 AM
New Flyer Electric Bus Experience & Technology Road Map (Learning Lab / Training Room)	7:50 AM	8:30 AM
Ride and Drive - Battery-Electric Demo Bus	8:30 AM	9:15 AM
High Voltage Safety – (Training Room)	9:15 AM	10:00 AM
Break / Refreshments	10:00 AM	10:15 AM
Introduction to Lithium-Ion Battery Technology (Learning Lab)	10:15 AM	10:45 AM
Power Conversion, Inverters and Motors (Learning Lab)	10:45 AM	11:30 AM
Lunch	11:30 AM	12:45 PM
Tour of Anniston Manufacturing Battery String Assembly	12:45 PM	1:45 PM
Break / Refreshments	1:45 PM	2:00 PM
Electric Accessories (Learning Lab)	2:00 PM	3:00 PM
Steering		
HVAC		
Air Compressor		
Electric Doors		
Instrument Panel		
Charging Strategies / Infrastructure	3:00 PM	4:30 PM
Dinner TBD	6:00 PM	

DAY 2 of 2 Curriculum	Start	End
Day 2 Welcome and Overview (Training Room)	7:30 AM	7:40 AM
New Flyer CONNECT Electrical Bus Telematics	7:40 AM	8:40 AM
Service Diagnostic Tools Overview	8:40 AM	9:30 AM
Preventative Maintenance	9:30 AM	10:15 AM
Break	10:15 AM	10:30 AM
Electric Bus Driving Simulator	10:30 AM	12:00 PM
Lunch	12:00 PM	1:00 PM
Energy Consumption Assumptions / Route Modeling	1:00 PM	2:00 PM
CTE/ CALSTART/ Alabama Power		
Q&A, Handouts, Participation Certificates	2:00 PM	2:30 PM
End of Training		2:30 PM

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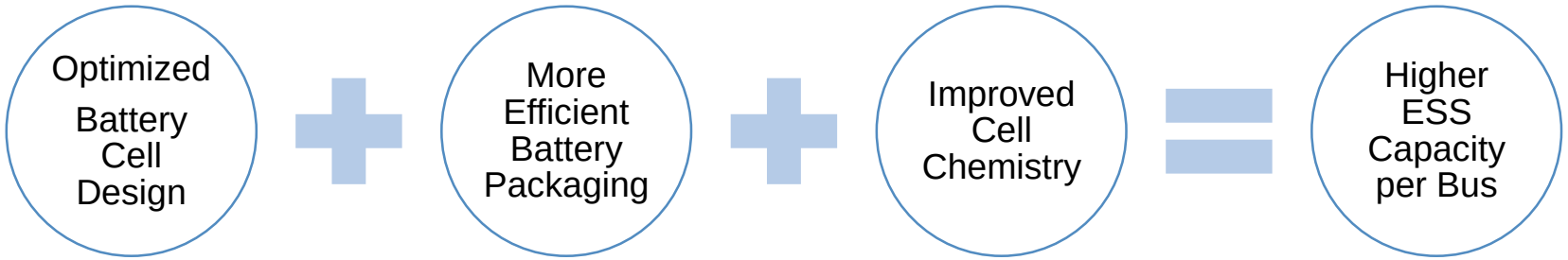
Battery Capability Continues to Improve



U.S.A Based Battery Supplier

Quality and Manufacturing Designed for the Transit Industry's Rigorous Duty Cycle

XALT Energy

Headquarters: Midland, Michigan

The World's Most Advanced Manufacturing

XALT Energy's fully-automated facility is one of the first of its type in the nation: designed and built from the ground up to ensure safe, efficient manufacturing to the highest standards of quality control. Our high-end robotic stacking and vision systems, supported by class 1,000 and class 10,000 clean rooms, enhance quality, reliability and consistency.

This world-class facility is matched by best practices at every step of the process:

- **Design and Development**: in-house, single-source engineering using carefully defined GD&T, DFMEA, CTQ and DFA/DFM systems
- **Supply Chain**: materials are tested, confirmed and tracked through the entire process, ensuring quality and traceability
- **Change Management**: data-driven change management process accelerates necessary changes while minimizing impact on cost and delivery

XALT Energy's R&D Facility in Michigan incudes:
Wet chemistry lab
Process R&D Lab
Dry-room cell assembly
Cell testing and quality assurance labs

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New Flyer Leading Efforts Towards Standards and Interoperable Charging Equipment

SAE Standards Committees, CUTRIC, EPRI and OppCharge

Electrifying Transit

Charging infrastructure – with interoperability, everyone wins

By Lindy Norris and David Warren

Battery-electric buses are gaining fast ground in traditional transit fleets. A key success factor in deploying electric propulsion lies within the deployment of the charging infrastructure.

Charging infrastructure can vary significantly in type. This includes the power type (AC – alternating current, or DC – direct current) and the power transfer type (conductive, using a plug or connector, or inductive, based on wireless transmission). Whatever charging infrastructure is pursued, successful public investment must focus on interoperability.

What is interoperability? Regardless of the bus manufacturer, and regardless of the charging equipment supplier, electric buses of all makes should be capable of charging with equipment available from multiple equipment suppliers. Charging infrastructure also needs to operate as simply, effectively, and as safely as a fuel nozzle for a diesel or compressed natural gas (CNG) bus.

Interoperability achieves four important objectives:

- Reduces likelihood of charging equipment becoming obsolete, leaving transit agencies with stranded assets (assets with premature write-downs or devaluations)
- Lessens upfront and ongoing costs using a collaborative approach for developing enhancements to ensure forward and backward compatibility
- Simplifies operations in terms of preventative maintenance, service, and parts
- Supports intelligent smart charging systems to reduce energy costs

As the only manufacturer of all four electric bus propulsions (battery-electric, fuel cell-electric, trolley-electric, and diesel-electric), New Flyer anticipates a future filled with electric propulsion as the bus of choice. As such, joining and supporting charging standards committees and organizations is a key priority.

New Flyer does not design or manufacture charging equipment; that is not the company's business model or an approach used by recognized electric vehicle manufacturers. Instead, New Flyer supports interoperable charging, which is supported by key stakeholders including other OEMs, transit agencies, the Federal Transit Administration, charging equipment manufacturers (including Siemens, ABB, and ChargePoint), the American Public Transportation Association, the Society of Automotive Engineers, and non-profit organizations including the Center for Transportation and the Environment and CALSTART.

New Flyer's preference for interoperable charging solutions evolves around long-range and short-range buses.

Long-range buses utilize plug-in charging and typically charge overnight. New Flyer uses direct current systems based on SAE J1772 and SAE J3068. SAE J1772 connectors are widely used by electric car manufacturers. DC charging, as opposed to AC charging, completes the power conversion for the batteries off the vehicle, in protective cabinets. DC charging requires fewer components on the bus for enhanced reliability. DC charging has also attained wide adoption as the ubiquitous pubic charging system of choice. These systems can be shared between cars, buses, and trucks.

When pursuing charging infrastructure, successful public investment must focus on interoperability.

OppCharge is on-route rapid charging used for short-range buses, and is currently in service throughout many European countries. The system has high consideration for inclusion in the forthcoming SAE J3105 standard. OppCharge established a common interface for charging electrical vehicles with interoperability as the key objective. The system uses an overhead pantograph to transfer power to the bus, based on technology developed for train, light rail, and trolley-bus applications. OppCharge is currently available from leading charging equipment suppliers such as Siemens and ABB, is Buy America compliant, and is also UL Certified. Further, New Flyer OppCharge projects are already underway or planned in the U.S., including the cities of New York, Los Angeles, Portland, Salt Lake City and Minneapolis.

New Flyer chooses technology that is capable of ensuring charging equipment purchased using public funds can achieve a high return on investment. Non-proprietary and interoperable charging systems available from multiple suppliers will be a key success factor in the adoption of electric transit buses. With interoperability, everyone wins.

For more information on OppCharge, visit oppcharge.org.

David Warren *is director of sustainable transportation for New Flyer. Lindy Norris serves as director of marketing communications, also for New Flyer. Visit* www.newflyer.com *for more information.*

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SAE INTERNATIONAL

EPRI ELECTRIC POWER RESEARCH INSTITUTE

OPPCharge

CHARIN

CUTRIC CRITUC

FASTER • SMARTER • GREENER RAPIDE • INTELLIGENT • VERT

SAE J3068: Published

(AC Plug-in for high-power AC&DC)

SAE J1772 CCS: Published

(Plug-in for high-power DC)

SAE J3105: Early 2019

(Overhead Fast Charge)

SAE J2954-2: Late 2019

(In-Ground Inductive / Wireless)

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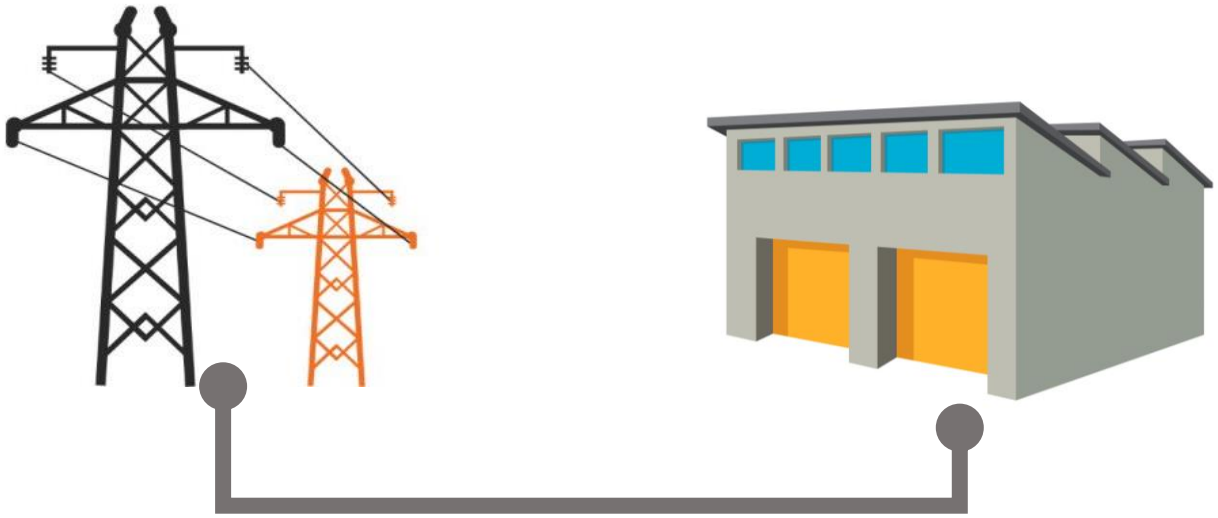
Depot Charging - Upgrading Electrical Infrastructure Will Likely Be Necessary



“Make Ready” Upgrades:

- Dedicated service meter, panel, conduits and wiring
- New transformer (if the existing transformer does not have sufficient capacity)

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OPPcharge

On-route Charging

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Infrastructure Roles & Responsibilities

Key stakeholders include:

- **Transit Bus Operations**
- **Transit Facilities**
- **New Flyer of America Inc.**
- **Charger Equipment Supplier**
- **Power Provider / Utility Company**

Finalization of the Roles and Responsibility matrix should be undertaken in a soon to be held follow-up meeting with stakeholder representatives.

Infrastructure Deployment Approach

- Phase 1: Site Visit
- Phase 2: Assessment of Utility Service
- Phase 3: Design and Engineering
- Phase 4: Upgrade of Utility Service
- Phase 5: Installation of Charger System
- Phase 6: Charger Testing & Commissioning

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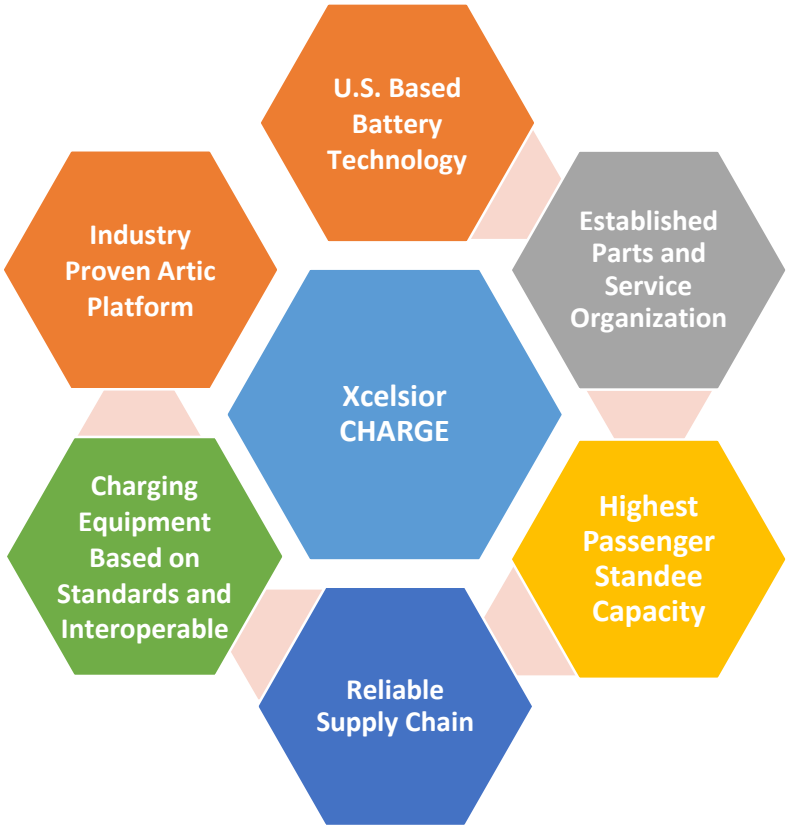
The Complete Solution.



NEW FLYER OF AMERICA

It's bright ahead.

Innovation to RELY ON.

- **Technology that Works**: Transforming your University and Community with Sustainable Clean Technology
- **Investment in Our Communities:** Leading Transit with Investment in American Jobs
- **Progressive, but Prudent Innovation:** Supporting Smart Cities with Technology, Training and Collaborative R&D

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Built to **RELY ON.**