Federal Transit Administration

Transit Workforce Center

National Technical Assistance Center for Transit Workforce Development

INTERNATIONAL TRANSPORTATION LEARNING CENTER

ZEB Workforce Transition Plan

Powering Up the Workforce: TWC's Zero-Emission Bus Resources

June 17, 2024

TWC • TRANSIT WORKFORCE CENTER

Webinar Agenda

- Introductory Remarks
- Critical Elements in Zero-Emission Fleet Transition Planning – ZEB Workforce Development Transit Plan – Eights Steps for Development
- Zero-Emission Bus Maintenance Training Standards
- Battery Electric Bus Familiarization Course
- TWC Resources
- Q&A
- Evaluation and Wrap-up

Examples of TWC Programs and Resources Supporting Workforce Development Initiatives

- Trainer and Mentor Development
- American Transit Training and Apprenticeship Innovators Network (ATTAIN)
- #ConnectingMyCommunity — National Transit Frontline Worker Recruitment Campaign Toolkit
- Transit Workforce Data Dashboard
- Information on Workforce Development Funding Opportunities
- Zero Emission Bus transition — workforce preparation and development

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Program Director, International Transportation Learning Center/Transit Workforce Center

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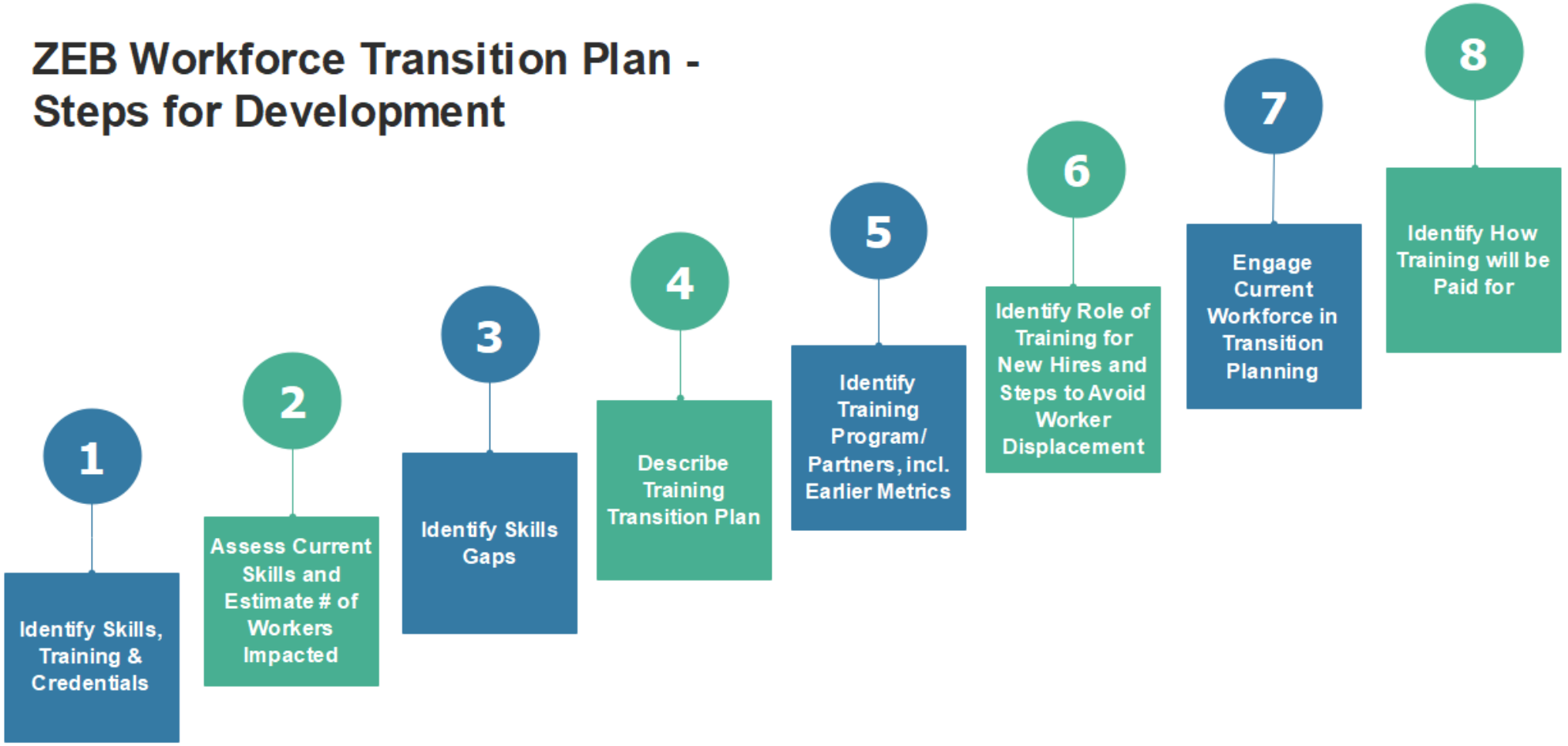
ZEB Workforce Transition Plan

- Required document in FTA's Low-No grant application process
  - Included as Element 6
- Intended to help frontline works make a smooth and successful transition to ZEBs
- Plan applies to both operators and technicians, but focus here will be on technicians due to extent of their preparation
- Transit Workforce Center Resources and Best Practices for a Zero Emission-Workforce Fleet Transition Plan: Detailed Plan

ZEB Workforce Transition Planning



Step #1 - Identify Needed ZEB Skills

- American Public Transportation Association's (APTA) Zero Emission Bus Maintenance Training Standard/Recommended Practice
- This will be discussed later by Lisa Jerram, APTA

ZEB Workforce Transition Plan

Transition Plan is well laid out and easy to follow

- 8-step process
- Includes best practice examples and links to several resources
- Requires effort in the face of several challenges
  - Many agencies lack formal training department
  - Transit facing unpresented workforce shortages
  - Many technicians lack basic electrical skills, an essential prerequisite to high voltage work
- Regardless, adequate preparation is essential
  - Upwards of 800 volts introduces serious safety concerns

Step #2 - Identify Current Skills & Workers Impacted

- Identify technicians with existing electrical/electronic skills
  - Shop-floor supervisors know who “go-to” techs are
  - Hybrid experience a plus
  - So are techs with Automotive Service Excellence (ASE) Certifications
    - Especially ASE H6 - Electrical/Electronic Systems
- Estimate number of workers impacted
  - Depends on agency (generalists vs specialists)
  - Eventually, all will be impacted

Step #3 - Identify Skills Gap

- Gap = Shortfall between what's needed & what exists
- Skills Gap Survey = Useful Tool
  - Asks workers to rate their own skills & understanding on scale
  - Identifies shortfalls
  - Can't be used to punish workers for what they don't know
  - Use instead to direct training to specific areas to fill gaps
  - Joint labor-management participation essential
  - TWC has a ZEB example that includes Basic Electrical

Step #4 - Describe Training Transition Plan

- Purpose: Establish pathway to provide technicians with needed skills
  - Includes strategies & partners to facilitate the transition
    - E.g., In-house training, Train-the-Trainer, Original Equipment Manufacturer (OEM) training, Apprenticeship
  - Third-Party Training (community colleges, private firms, etc.)
- TWC Plan offers several useful resources
  - Recommended training procurement language
  - Apprenticeship Framework, BEB Familiarization Webinar & Course
  - All includes as links in TWC's ZEB Transition Plan
- Identify any additional staff needed

Step #5 - Identify Training Programs & Partners

- Essential to include workforce in transition process
  - Their perspectives will help shape the transition
  - Can provide valuable input into specifications for training procurement
- OEMs & vendors as potential source for ZEB training
  - So are vocational schools, other agencies, TWC & other organizations
  - Explore innovative training technology - gamification, virtual reality, augmented reality
- Measure outcomes & success of training
  - Pre/Post assessments, receiving ASE certification

Step #6 - Identify Training For New Hires

- Aging workforce & shortages necessitate new hires
- New workers will need ZEB training
- Good chance auto technicians have e-propulsion skills
- Transit should be seen as source for good jobs
- Address diversity, equity, and inclusion when hiring
- Ensure new technology does not displace current workers

Step #7 - Engage Workforce in Transition Plan

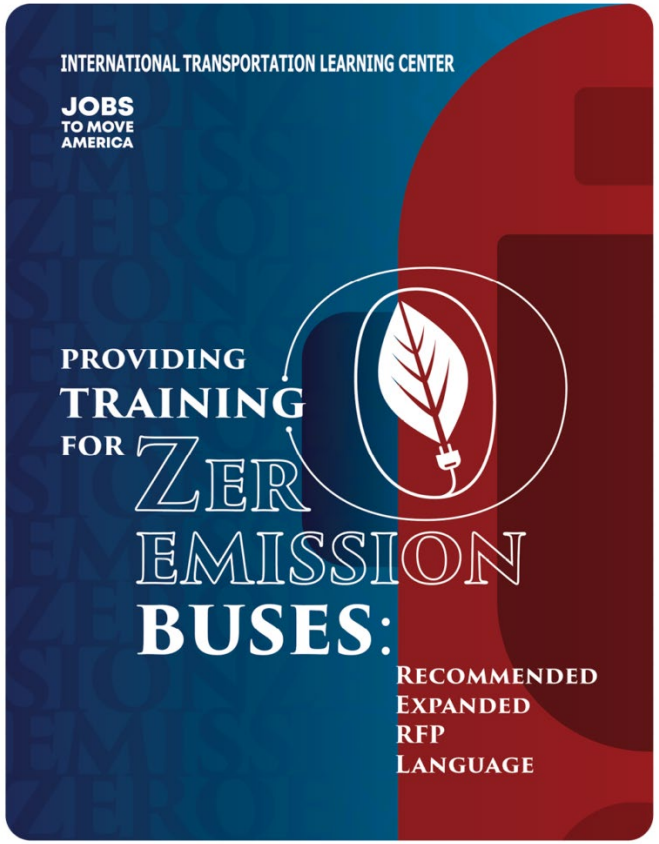
- This step should really come first
- Message to engage frontline workers needs to come from highest levels of management
- Expertise of workers essential to successful transition
- Trained techs minimize use of extended warranties
- Bipartisan Infrastructure Law requires FTA recipients to form Joint Safety Committees (populations of 200,000 or more)

Step #8 - Identify How Training Will Be Paid For

- First establish cost basis to include all training elements
- Take advantage of funding built into the Bipartisan Infrastructure Law
- 0.5 % of certain grant funds can be used for training, an additional 0.5 percent for National Transit Institute (NTI) training
- Full 5% available for ZEB Training
  - $50 K for each $1 M bus (that's above bus cost)
- **See Transition Plan for more details**

TWC ZEB Workforce Development Resources

- National ZEB Maintenance and Training Standards
  - Transit Bus Zero Emissions Bus (ZEB) Skill Survey
- Resources and Best Practices for ZEB Workforce Transition
- Recommended RFP Language for ZEB Training



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Lisa Jerram

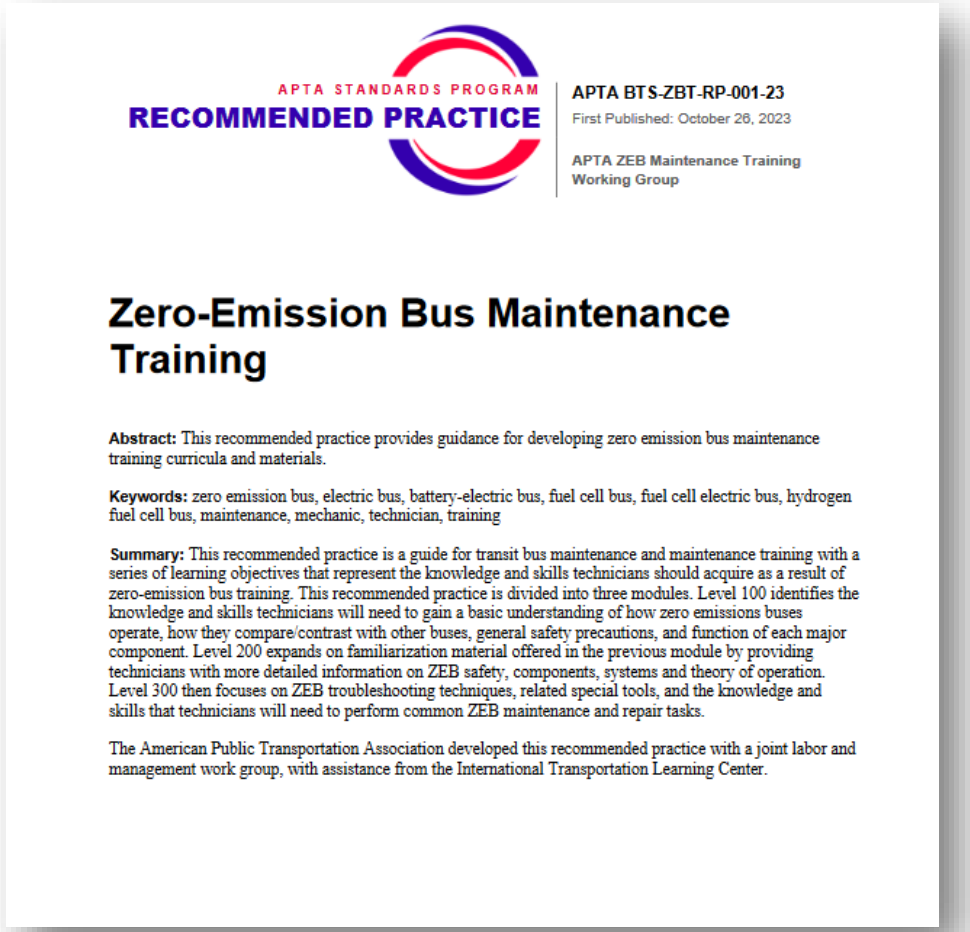
Senior Director, Bus Operations and New Vehicles Technologies, American Public Transportation Association

American Public Transportation Association

ZEB Maintenance Training Recommended Practice

- **Recommended Practice for developing a ZEB maintenance training curriculum**
- **Published October 2023**
- **Developed through APTA's Standards Program, with ITLC as subject matter lead**
- **Working group of transit agencies, labor representatives, and manufacturers, in consensus based process**
- **In use by transit agencies**

[APTA Zero-Emission Bus Maintenance Training Standard]



APTA STANDARDS PROGRAM
RECOMMENDED PRACTICE

APTA BTS-ZBT-RP-001-23
First Published: October 26, 2023

APTA ZEB Maintenance Training Working Group

Zero-Emission Bus Maintenance Training

Abstract: This recommended practice provides guidance for developing zero emission bus maintenance training curricula and materials.

Keywords: zero emission bus, electric bus, battery-electric bus, fuel cell bus, fuel cell electric bus, hydrogen fuel cell bus, maintenance, mechanic, technician, training

Summary: This recommended practice is a guide for transit bus maintenance and maintenance training with a series of learning objectives that represent the knowledge and skills technicians should acquire as a result of zero-emission bus training. This recommended practice is divided into three modules. Level 100 identifies the knowledge and skills technicians will need to gain a basic understanding of how zero emissions buses operate, how they compare/contrast with other buses, general safety precautions, and function of each major component. Level 200 expands on familiarization material offered in the previous module by providing technicians with more detailed information on ZEB safety, components, systems and theory of operation. Level 300 then focuses on ZEB troubleshooting techniques, related special tools, and the knowledge and skills that technicians will need to perform common ZEB maintenance and repair tasks.

The American Public Transportation Association developed this recommended practice with a joint labor and management work group, with assistance from the International Transportation Learning Center.

American Public Transportation Association

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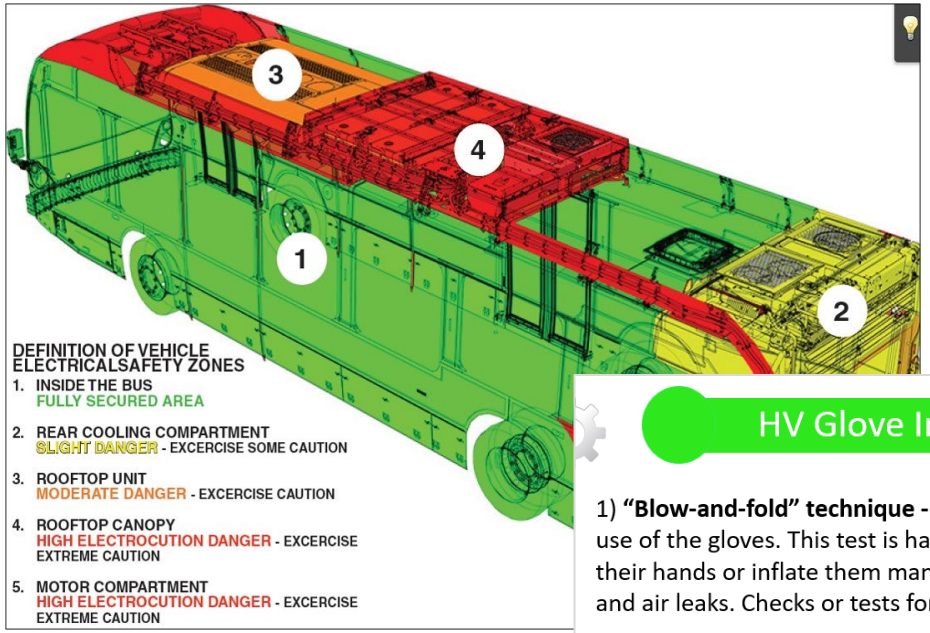
TWC Battery Electric Bus Familiarization Course



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HV Glove Inspection & Testing (79)

1) **"Blow-and-fold" technique -** an inspection procedure prior to any use of the gloves. This test is happens when someone rolls the gloves in their hands or inflate them manually to better expose imperfections and air leaks. Checks or tests for:

- Holes, perforations, tears, cuts, cracks, burn marks, air bubbles, encrusted or bonded material

2) **Use of a specialized glove inflator-** The usual frequency for periodic inspections is between 30 and 90 days. May not be available in all shops

- Do not inflate beyond 1.5x standard size
- Allows for closer inspection of webbing between fingers and gauntlet

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TWC Battery Electric Bus Familiarization Course

- TWC Battery Bus Familiarization Course webpage
- Transportation Learning Network
- Pinellas Suncoast Transit Authority (PSTA) Delivery
- NTI and TWC collaboration

TWC Resource Center

- 50+ resources on transit ZEBs, including:
  - Providing Training for Zero Emission Buses: Recommended Expanded RFP Language
  - Electric Vehicle Maintenance Best Practices
  - Resource Center
- Making Connections 2024 – The National Transit Workforce Conference

Making Connections 2024

The National Transit Workforce Conference

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www.TransitWorkforce.org/mc24

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U.S. Department of Transportation
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NTI National Transit Institute

Introducing: Jason Macumber

Zero Emission Specialist, International Transportation Learning Center/Transit Workforce Center

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Q&A

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Thank You!

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