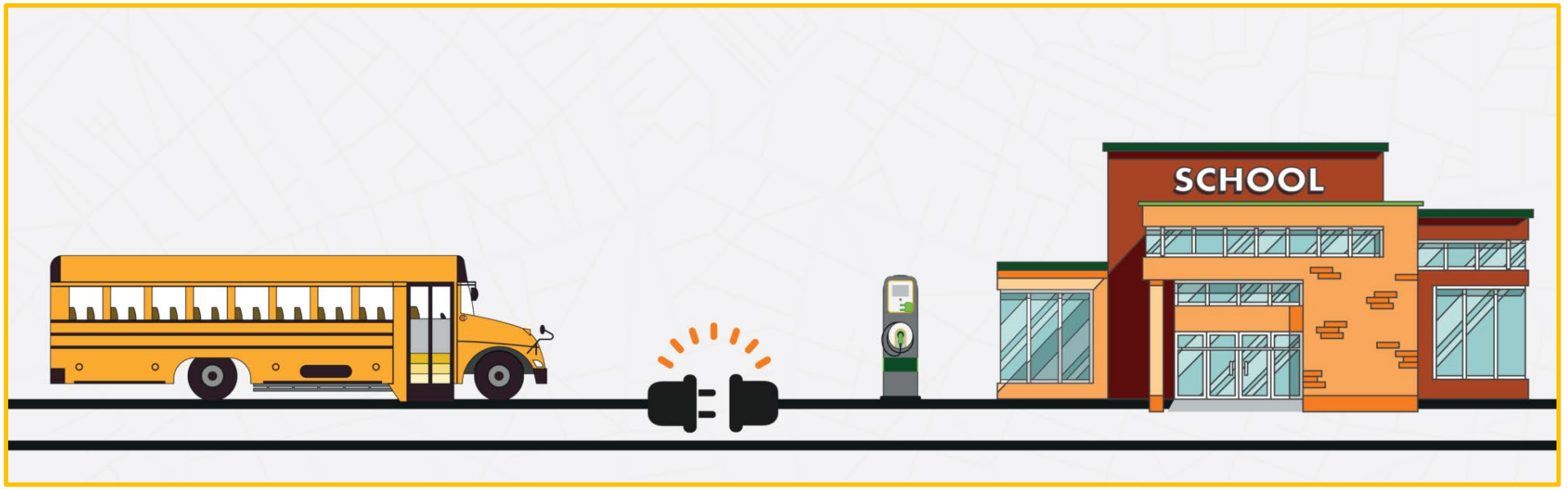

Electric School Buses: A Roadmap

RESOURCE DEVELOPED BY MAPC

MAPC

What is MAPC's Electric School Bus Roadmap?

A guide for school districts and municipalities to start planning for an effective and efficient transition to electric school buses.

- Highlights the essential steps that school districts and municipalities should take.

Provides many links to resources that decision-makers can use to learn more and connect to existing resources about making this transition.

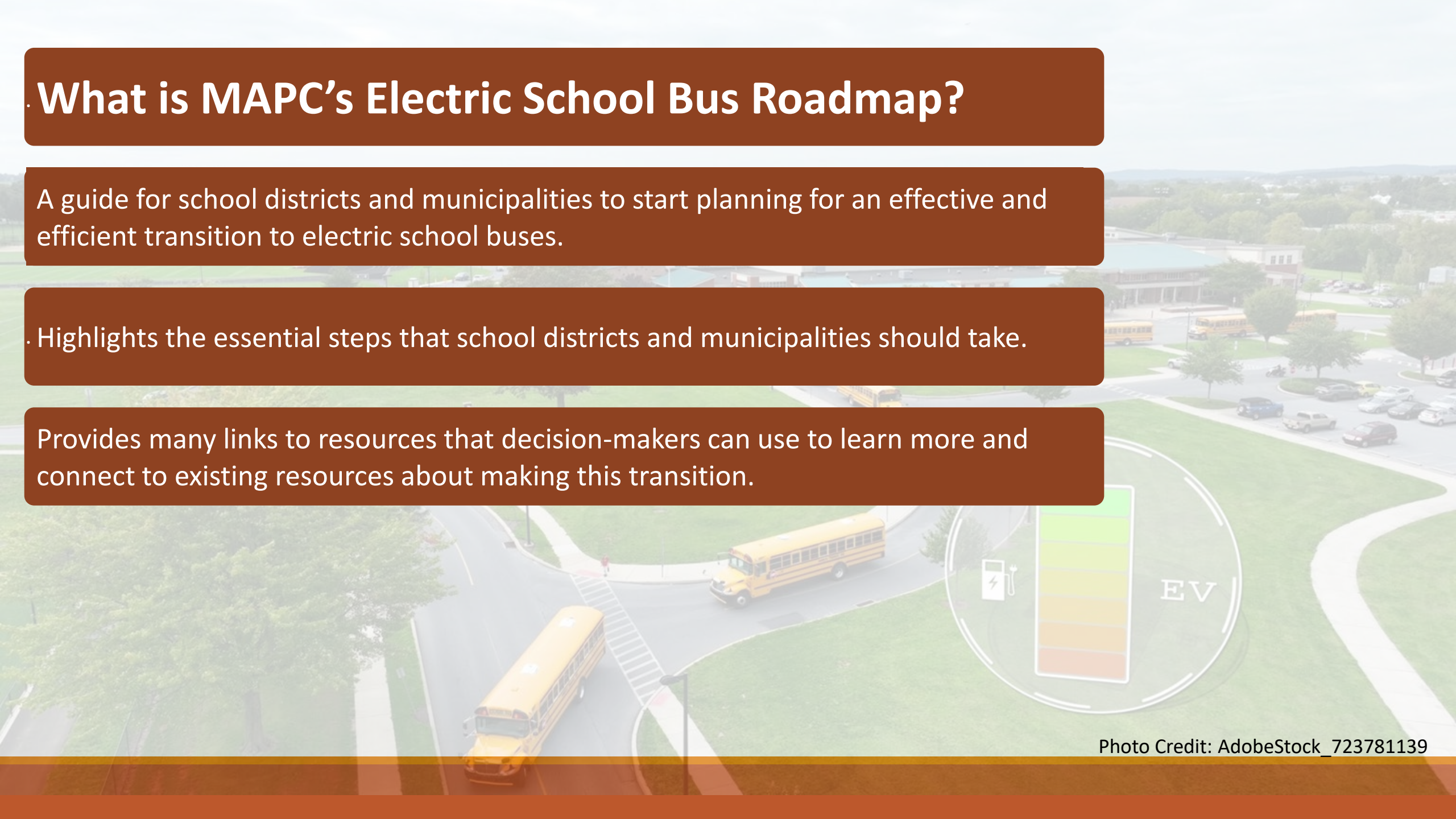

Photo Credit: AdobeStock_723781139

Why Electric School Buses (ESBs)?

Health Benefits

- Children spend 20 minutes to several hours a day on school buses
- Pollution levels inside older diesel buses can exceed surrounding by 5-10x (air quality on school buses not regulated by the EPA)*
- ESBs can reduce cumulative pollution burdens, especially in EJ communities

Greenhouse Gas Reduction

- ESBs produce < half of the GHG emissions of diesel school buses

Operations and Maintenance Savings

- A new ESB can save schools $6,000/yr in fuel and maintenance costs

Market Movement

- 20+ models available from all major manufacturers**

**Data on this page is from WRI's Electric School Bus Initiative, unless otherwise noted*

*** Mass Clean Energy Center*

MetroWest School Fleet Electrification Study

22 School Districts

Acton-Boxborough

Ashland

Concord-Carlisle

Dedham

Dover and Sherborn

Framingham

Harvard

Holliston

Hopkinton

Lexington

Lincoln

Marlborough

Medfield

Millis

Natick

Needham

Northborough and Southborough

Wayland

Wellesley

Westborough

Weston

Westwood

Sections (14) of the Electric School Bus Roadmap

Why Electric School Buses?	Operations, Maintenance, Safety
Electric School Bus Ownership and Operation Models	Total Cost of Ownership
Conducting a Fleet Assessment	Funding and Financing
Working with Utilities	Procurement
Selecting Charging Infrastructure	Connecting with Peers and Experts
Site Selection and Planning	Summary of MetroWest ESB Study
Workforce Training	Future Considerations for ESBs

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Electric School Bus Ownership and Operation Models

80% of buses are owned and operated by third-party bus providers

20% of buses are owned and operated by school districts or municipalities

Own Buses

School district or municipality owns, maintains, and operates the buses and chargers.

Lease Buses

School district or municipality leases the buses and operates the buses; school district or municipality owns, maintains, and operates the chargers.

Charging-as-a-Service

School district or municipality owns, maintains, and operates the buses and contracts with a third-party for charger ownership, maintenance, and operations.

Transportation-as-a-Service

School district or municipality contracts with a third-party to own, maintain, and operate the buses and chargers.

Turnkey Service

School district or municipality contracts with a third-party to own and maintain both the buses and chargers and the school district operates the buses.

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Conducting a Fleet Assessment

A Critical First Step

Low or no-cost fleet assessment options are available, including programs from MassCEC's ACT School Bus Advisory Services Program, Eversource, and National Grid.

A fleet assessment typically includes:

Analyzing Vehicle Needs:. Determining how many buses are needed and their routes

Assessing Site feasibility: Identifying suitable locations for charging infrastructure and electrical capacity.

Estimating Costs: Calculating the total cost of ownership, including fuel, maintenance, and infrastructure.

Evaluating Emissions Impacts: Understanding the environmental impacts of electrification.

Identifying Funding Opportunities: Identifyin g grants, rebates, and other financial incentives.

Engaging Stakeholders: Ensuring all relevant parties are involved in the planning process.

"Do It Yourself" Fleet Assessment Tools and Resources are Available

Working with Utilities

Electrifying a school bus fleet requires a strong partnership with utilities.

Utility involvement must start early in the initial planning process.

Utilities:

- Evaluate grid capacity and identify needed upgrades
- Anticipate future charging needs and avoid costly retrofits
- Provide incentives, rebates, and technical assistance
- Optimize energy use through time-of-use rates and demand management

Photo Credit: MassCEC

Selecting Charging Infrastructure

- “Right-size” charging (Level 2 vs. DCFC) based on route length, schedules, and terrain.
- Ensure buses are compatible with chargers.
- Plan for the vehicles and infrastructure rollout in tandem.
- Use charging software to manage energy use and reduce costs.

Site Selection and Planning

- Select depot sites close to routes with adequate grid capacity and space.
- Plan for charging equipment and future expansion.
- Consider property ownership and lease terms.

Operations, Maintenance, and Safety

- Train staff to safely operate and maintain charging equipment.
- Use cold-weather strategies: indoor storage, battery preheating.
- Address charger, battery, and fire safety protocols.

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Total Cost of Ownership (TCO)

- Electric school buses have higher upfront costs compared to diesel buses, but save on fuel and maintenance. Costs are expected to reach price parity over time.
- Use the Roadmap's TCO calculators to evaluate purchase, operation, and maintenance costs and compare with diesel school buses.

Photo Credit: MassCEC

Funding and Financing

- Grants and programs can offset school bus and infrastructure costs.
- Check which programs can be combined ("stacked").
- Grants and programs change often – verify program details.

Procurement

- The Roadmap explains procurement pathways for municipalities and school districts that own school buses and those that use third-party contractors.

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Connecting with Peers and Experts

The Electric School Bus Forum, organized by the National Renewable Energy Laboratory (NREL) and the Joint Office of Energy and Transportation.

Join the Electric School Bus Network's bi-monthly forums to gain insights, receive updates, and connect with other districts.

Speak with an expert from the World Resources Institute's (WRI) Electric School Bus Initiative to get technical support.

Municipalities and school districts in Massachusetts have already begun transitioning their fleets. The Roadmap shares detailed examples of how municipalities and school districts in Massachusetts are finding success through different approaches:

Arlington
Beverly
Boston
Concord Public Schools
Cohasset Public Schools
Lawrence Public Schools
Worcester Public Schools

Electric School Buses: A Roadmap

https://www.mapc.org/resource-library/electric-school-buses/

We would like to express our gratitude and acknowledgment to the following organizations for their contributions to the development of this resource: *Eversource, Green Energy Consumers Alliance, Highland Electric Fleets, Massachusetts Clean Energy Center (MassCEC), National Grid, Operational Services Division (OSD), and the World Resources Institute.*

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