

METROWEST SCHOOL FLEET ELECTRIFICATION STUDY

June Workshop

June 11, 2024

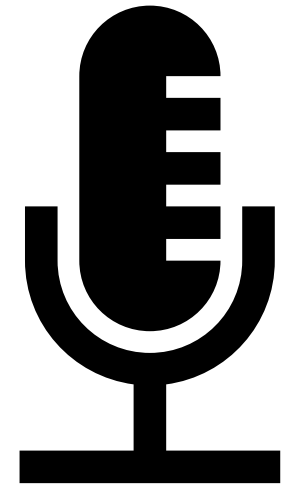


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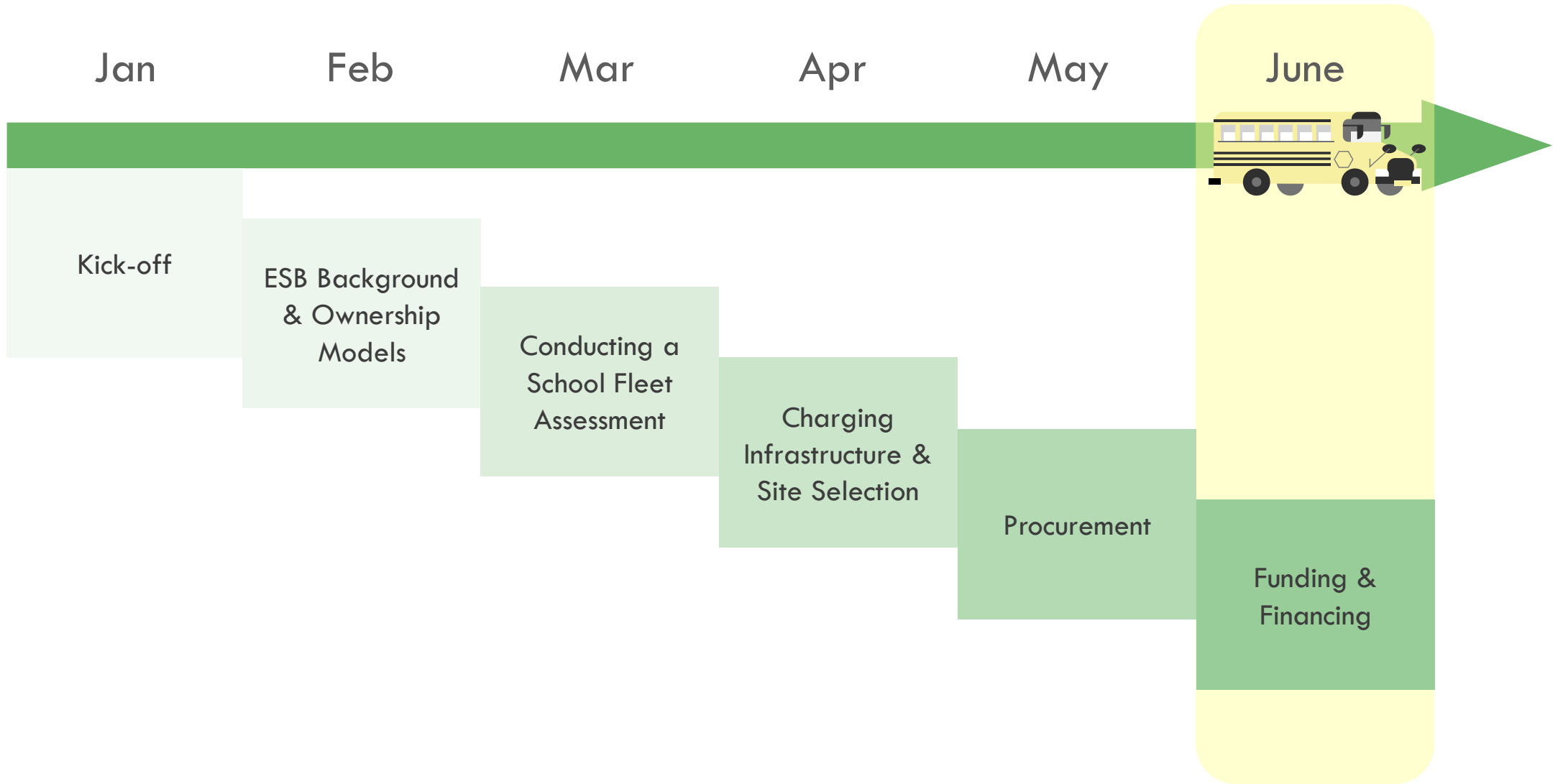
METROWEST SCHOOL FLEET ELECTRIFICATION STUDY

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Workshop Schedule



Today's Agenda

12:00-12:05	Welcome
12:05-12:15	Federal Funding & Total Cost of Ownership, WRI
12:15-12:25	State Funding & Technical Assistance, MassCEC
12:25-12:35	Case Study: Upper Cape Technical School
12:35-12:45	Discussion and Q&A
12:45-1:00	Wrap-Up



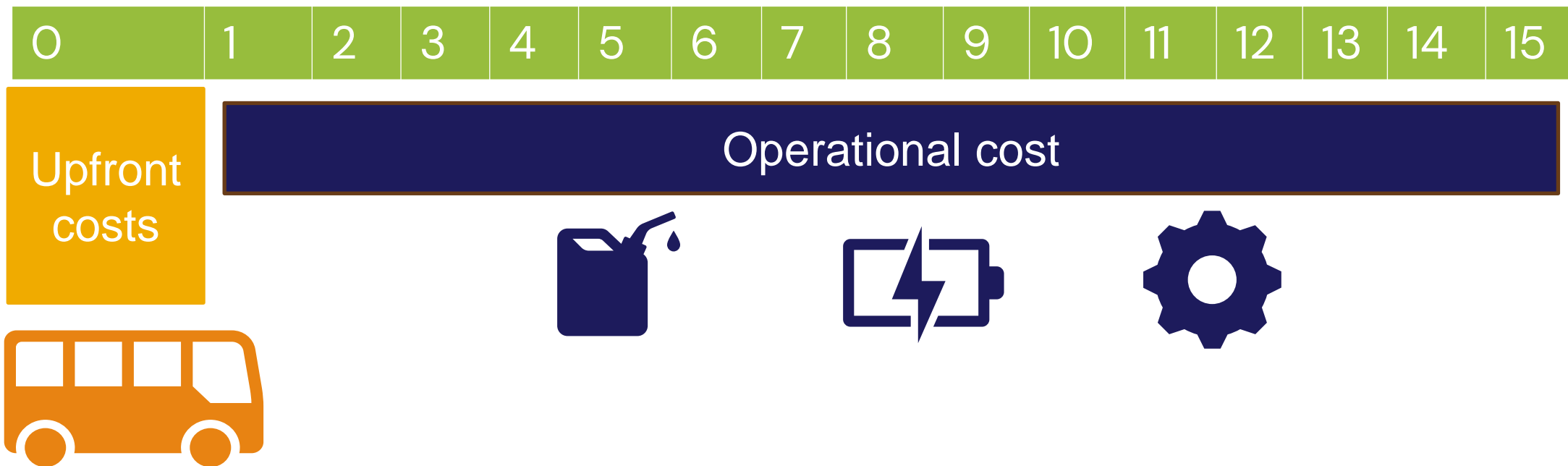


**Electric
School Bus**
INITIATIVE

**ELECTRIC SCHOOL BUS
TOTAL COST OF OWNERSHIP +
FEDERAL OPPORTUNITIES
FOR MASSACHUSETTS**

WHAT IS TOTAL COST OF OWNERSHIP?

Total Cost of Ownership (TCO) is the sum of all current and future capital and operating expenses associated with the ownership of an asset. It's an important consideration when purchasing a new school bus.

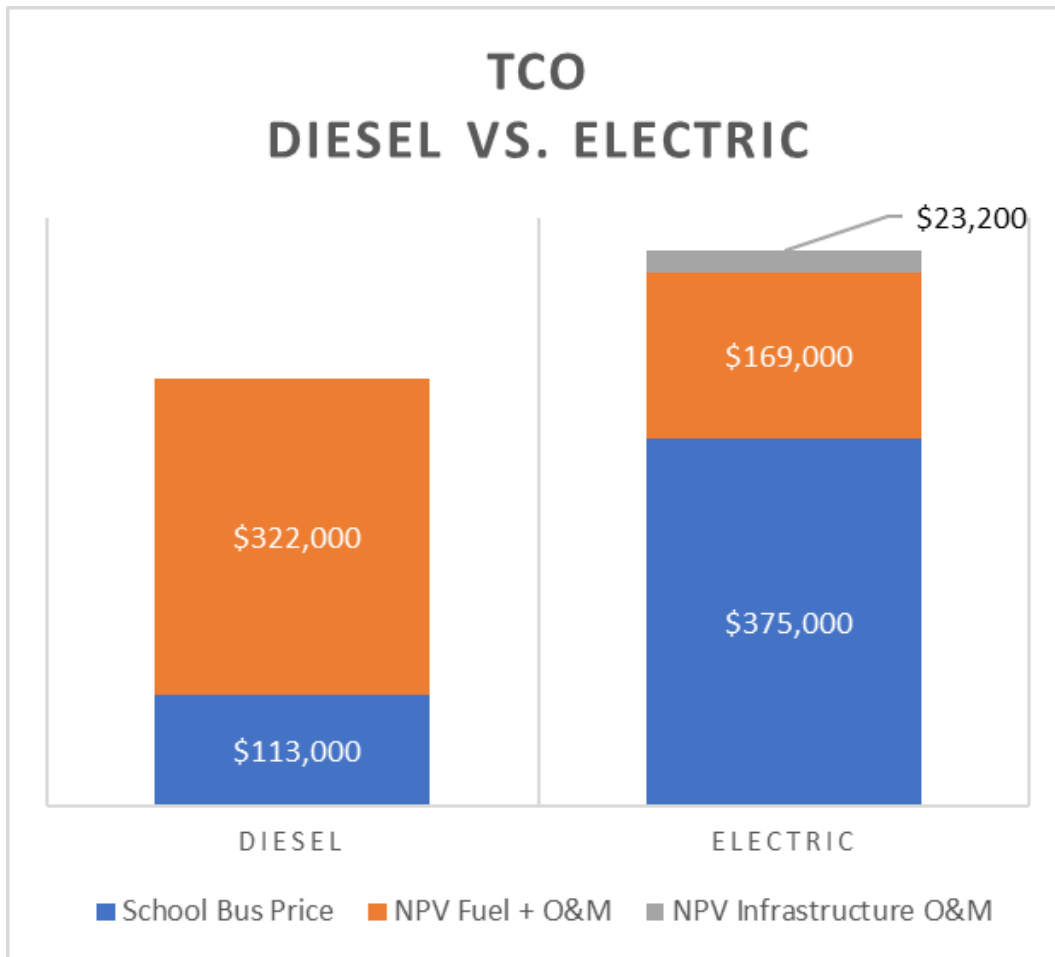




ELECTRIC VS. DIESEL BUS ASSUMPTIONS

Fuel Type	Electric	Diesel
Expected Vehicle Lifetime (Years)	14	
Annual Vehicle Mileage (VMT/Year)	14,084	
Vehicle MSRP	\$375,000	\$113,000
EVSE and Installation	\$10,475	N/A
Average Fuel Economy (Weighted 55% city/45% highway)	22.4	6.63
Fuel prices	0.085/kWh	\$4.51 /gallon
Full Coverage Annual Cost to Insure (\$/yr)	\$6,770	\$6,770
Overall Average Maintenance & Repair Cost (\$/Mile)	\$0.34	\$0.60
EVSE Maintenance & network fees (\$/year)	\$991	N/A
Discount Rate for NPV Calculations (%)	3%	

TOTAL COST OF OWNERSHIP



TCO ESB = \$567,000

TCO Diesel = \$435,000

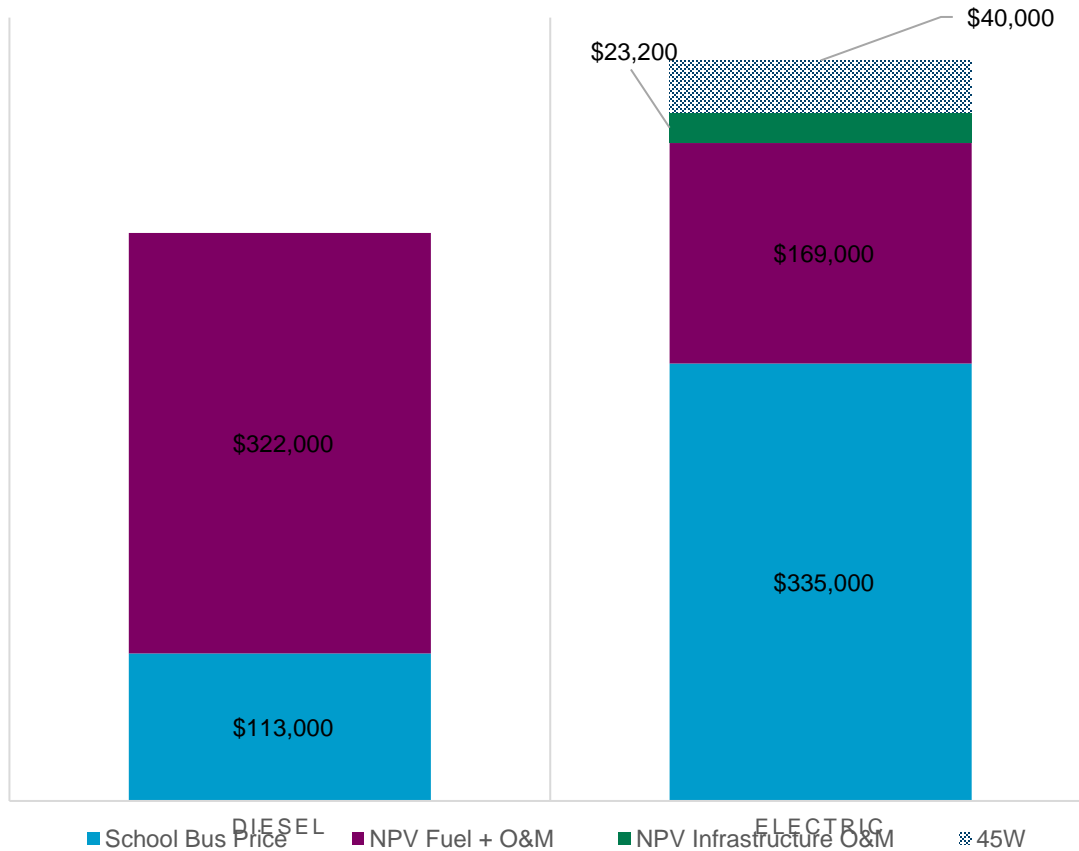
Upfront Premium = \$262,000

Lifetime Premium = \$132,200

Operational savings = \$153,000

TOTAL COST OF OWNERSHIP

TCO WITH 45W



TCO ESB = \$527,000

TCO Diesel = \$435,000

Upfront Premium = \$222,000

Lifetime Premium = \$92,200

Operational savings = \$153,000

OPERATIONAL SAVINGS

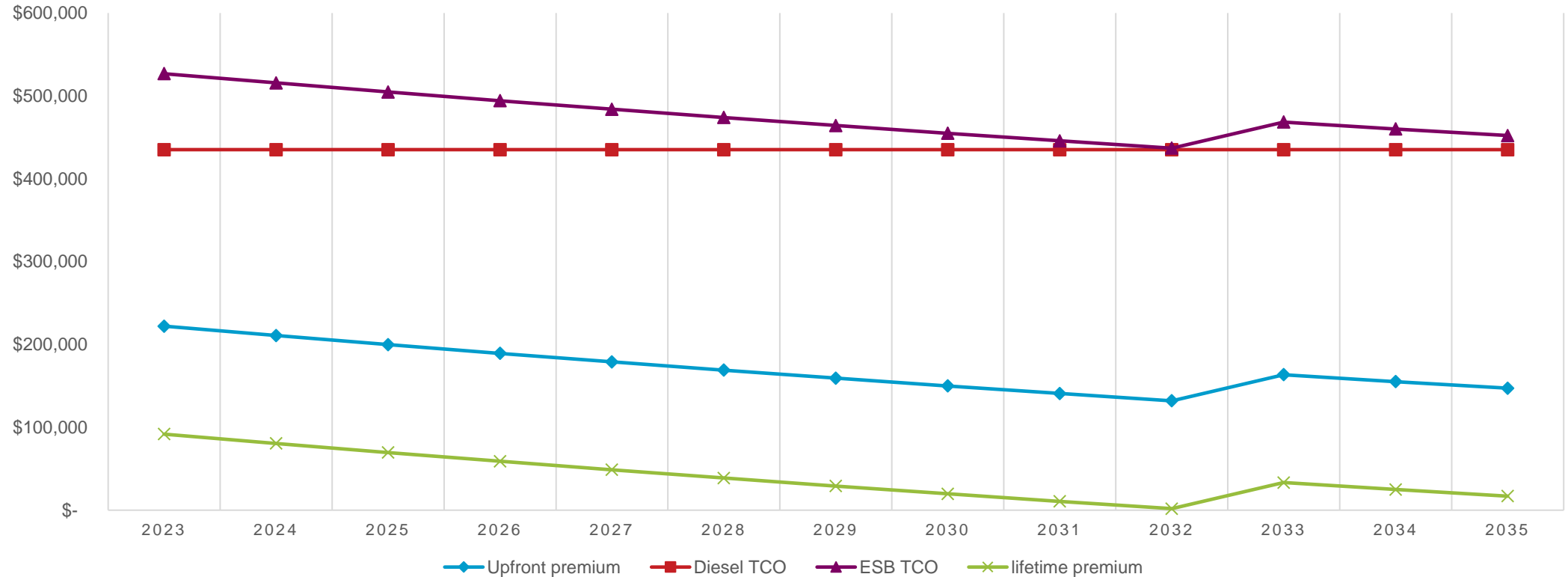
FUEL & OPERATIONAL COSTS

■ NPV Fuel + O&M ■ Operational Savings



EXPECTED TCO PARITY

TCO EXPECTATIONS



Parity is expected to be reached by 2032, meaning that the lifetime cost of ESBs and diesel school buses will be the same.

FLEET ELECTRIFICATION COSTS

- Fleet size
- Amount covered by a potential program
 - Full upfront cost, upfront premium, or lifetime premium
- Definition of disadvantaged communities
- Replacement rate
- Set asides for workforce development and technical assistance

Funding

1. \$5B EPA Clean School Bus Program
 - Three rounds awarded so far
2. EPA's Clean Heavy-Duty Vehicle Program – open now!
3. Other federal programs: DERA, USDA
4. State programs
5. Tax credits
 - Qualified Commercial Clean Vehicles: up to \$40,000/ ESB
 - Alternative Fuel Refueling Property: up to \$100,000/ charging infrastructure installation



INFLATION REDUCTION ACT: ELECTIVE PAY

- The Inflation Reduction Act (IRA) – enacted in August 2022 – established new and expanded tax credits for clean energy and climate investments.
- The IRA also established a new provision known as **elective pay** that allows tax-exempt entities to access tax credits for clean energy and climate investments through a direct payment.
- Tax-exempt entities:
 - School districts
 - State and local governments
 - Tribal governments
 - & others!

INFLATION REDUCTION ACT: CREDITS

- The Inflation Reduction Act (IRA) – enacted in August 2022 – established new tax credits for clean energy and climate investments, such as:
 - **Section 45W*** (ESBs) = provides up to \$40,000 per electric school bus (over 14,000 lbs)
 - **Section 30C*** (chargers) = provides up to \$100k per charging infrastructure installation for school districts located in a "low-income community" OR "nonurban area"

**Eligible for direct/elective pay*

QUALIFIED COMMERCIAL CLEAN VEHICLE CREDIT (45W)

- Tax credit amount is calculated by the lesser of the two, with a maximum of \$40,000 per ESB (over 14,000 lbs):
 - 30% of the cost basis of the electric vehicle, or
 - Incremental cost against that of a comparable vehicle
- No geographic restrictions – available to all entities that purchase a qualifying electric school bus
- [Notice 2023-9](#): IRS published a "safe harbor" provision for incremental cost, but entities will be able to make independent determinations for incremental cost if not using DOE's safe harbor determinations

	GVWR (lbs)	Battery EV
Class 4-6	14,001-26,000	\$34,500
Class 7	26,001-33,000	\$93,500
Class 8	> 33,000	\$297,500

ALTERNATIVE FUEL REFUELING PROPERTY CREDIT (30C)

- Qualified projects: electric charging infrastructure (to include bidirectional charging equipment)
- Base of 6% of project costs with a maximum of 30% of project costs (if prevailing wage & apprenticeship requirements are met), **up to \$100,000 per charging unit**, for school districts located in “**low-income communities**” or “**non-urban areas**”
 - Check your eligibility using U.S. Dept. of Energy’s [30C Tax Credit Eligibility Locator tool by Argonne National Labs](#)
- Note: credit applies to **each charging unit**, rather than the entirety of the investment at a single location

NEW: ALL ABOUT ESB TAX CREDITS

The All About Electric School Bus Tax Credits page is now live!

WRI's Federal Electric School Bus Tax Credits 101 recording will be available shortly.

All About Electric School Bus Tax Credits

School districts can access federal tax credits to offset electric school bus costs. Learn more!



CHDV PROGRAM OVERVIEW

- CHDV opened on April 24; applications due July 25
- CHDV will award nearly \$1 billion to replace Class 6 and 7 vehicles with zero-emission options
- At least \$400 million will support projects serving NAAQS nonattainment areas
- 70% of funds will be awarded under the School Bus Sub-Program, and 30% under the Vocational Vehicles Sub-Program
- States, U.S. territories, municipalities, school districts, Tribes and nonprofit school transportation associations are eligible to apply – no for-profit applicants!
- Priority status is based on multiple factors including equity screening tool indicators and air quality measures
- EPA expects to make 40-160 awards, with at least 15 for Tribes and territories



CONTACT US

Clean Heavy-Duty Vehicles Program



The Inflation Reduction Act invests \$1 billion to replace existing Class 6 and Class 7 non-zero-emission heavy-duty vehicles with zero-emission models.

Through the new 2024 Clean Heavy-Duty Vehicles Grant Program, the EPA will improve the lives of millions of Americans by reducing pollution in neighborhoods where people live, work, play, and go to school. The program will accelerate environmental justice efforts in communities overburdened by pollution, help tackle our biggest climate challenges, and create high-quality clean energy jobs.

ENGAGE WITH ESBI

- Visit our [Tools page](#)
 - Our website has the tools and resources you need for your electric school bus journey
- Join our [weekly office hours](#)
 - Free, one-on-one support
- Sign up for our [email updates](#)
 - Periodic emails with details on funding programs, webinars and new resources



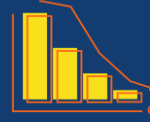
2024

State Funding and Technical Assistance

ORLY STROBEL

Mission:

The Massachusetts Clean Energy Center's mission is to accelerate the clean energy and climate solution innovation that is critical to meeting the Commonwealth's climate goals, advancing Massachusetts' position as an international climate leader while growing the state's clean energy economy.



Getting Massachusetts to Net-Zero

Today's technologies, applications, and business models are insufficient to reach our climate goals. MassCEC is uniquely positioned to identify, support, demonstrate, and accelerate clean energy and climate solutions to the market.



Reducing Costs by Engaging Private Markets

Targeted public sector investment in cutting-edge climate solutions de-risks and attracts private sector investment, reducing the cost of achieving net-zero for all energy users.



Making Massachusetts a World-Class Cleantech Hub

When Massachusetts supports early-stage ideas and innovations from companies with a worldwide market, it increases our state's future competitiveness, economic prospects, and global impact.



Optimizing Policy Implementation and Outcomes

Positioned at the intersection of industry and policy, MassCEC can iterate and optimize future policy solutions, accelerating policy outcomes and improving cost-effectiveness.



Massachusetts Electric School Bus Landscape

Current School Bus Landscape

8,000 school buses operating in Massachusetts

300+ school districts

70% leased, 30% owned and operated

3 to 5-year contracts with fleet operators
5-year contracts with fleet operators

Electric School Buses in Massachusetts

- ▶ 200+ electric school buses operating or procured in Massachusetts
- ▶ 10+ school districts have deployed or are in the process of deploying electric school buses
- ▶ 50% leased, 50% owned and operated
 - 3 to 5-year contracts with fleet operators
 - Some electrification-as-a-service contracts of 10+ years

State Funding Opportunities



➤ **ACT School Bus** (Massachusetts Clean Energy Center – MassCEC)

- Grant and technical assistance
- **Goal:** to accelerate ESB adoption in Massachusetts and amplify EPA's Clean School Bus Program



➤ **MOR-EV Class 3-8** (Department of Energy Resources – DOER)

- Rebate Program
- **Goal** to reduce air pollution emissions in Massachusetts by increasing the use of medium duty and heavy duty on-road electric vehicles, including trucks, buses and vans.



➤ **Utility Programs** (National Grid, Eversource)

- Off-peak charging programs
- Incentives for EVSE and turnkey installation



MOR-EV Class 3-8

Value Block 1

Vehicle Class	GVWR (lbs.)	Incentive Amount	Vouchers per Block
3	10,001 – 14,000	\$15,000	Total Vouchers: 200 Remaining Vouchers: 169
4	14,001 – 16,000	\$30,000	
5	16,001 – 19,500	\$45,000	
6	19,501 – 26,000	\$60,000	
7	26,001 – 33,000	\$75,000	
8	33,001+	\$90,000	



MOR-EV
Massachusetts Offers Rebates
for Electric Vehicles

Applicant Eligibility

The following individuals and entities are eligible to receive MOR-EV Trucks – Class 3-8 rebates:

- ✓ Massachusetts residents
- ✓ Private businesses licensed to do business in Massachusetts
- ✓ Non-profit organizations licensed to operate in Massachusetts
- ✓ Educational institutions, such as schools, colleges and universities
- ✓ Local, Municipal and State governments and departments

Make Ready Programming

Available Incentives and Eligibility:

Incentive Level	Eligible Project Criteria
Up to 100%	Publicly available DCFC projects with standardized plug types located within Disadvantaged Communities.
	L2 projects at multi-unit dwellings located within Disadvantaged Communities.
Up to 90%	Publicly available L2 and DCFC projects with standardized plug types located outside of Disadvantaged Communities. Includes municipal pay-to-park and free parking locations.
	Publicly available L2 and DCFC projects including proprietary plugs must have an equal number of standardized plugs of an equal or greater charging capacity to the proprietary plugs (outside of Disadvantaged Communities).
Up to 50%	Non-public L2 and DCFC projects, such as workplaces with restricted access and privately-owned pay-to-park lots.
	Public and non-public L2 and DCFC projects consisting only of proprietary plugs.
	Public and non-public L2 and DCFC projects where proprietary plugs are not co-located with an equal number or greater number of standardized plugs of equal or greater charging capacity.

Table is provided for illustrative purposes. National Grid reserves the right to make determinations regarding incentive-level eligibility based on its best interpretation of the proposed project and available information at the time of review.

* Customer is responsible for charger costs, annual maintenance cost, and ongoing electricity costs.

Available through

nationalgrid

Eversource update for MHDV Make Ready: Available funding for FY24 is expended and we anticipate that funding for FY25 will be renewed.

ACT School Bus Mission



To further promote electric school bus adoption in Massachusetts and amplify EPA's Clean School Bus Program by providing necessary technical assistance and electrification planning as well as additional deployment funding to school districts and school bus fleets.



Increase access to clean transportation technologies and decrease health impacts and related burdens from the existing transportation system



Demonstrate replicable deployment and road-mapping projects



Demonstrate effective program delivery, community partnership, and implementation models



Represent school districts across Massachusetts and at various stages in the electrification process

ACT School Bus Programs:

ADVISORY SERVICES PROGRAM

- ▶ Free electrification planning for up to 25 school bus fleets.
- ▶ Includes preparation for districts to access additional or future funding opportunities
 - Feasibility designs, financial models, procurement plans
- ▶ One round of programming, rolling enrollment
- ▶ Consultant: **VEIC**

Currently Recruiting

FLEET DEPLOYMENT PROGRAM

- ▶ Upcoming third round of program:
 - Up to \$2 in flexible funding and optional technical assistance available for 1-3 public school bus fleets.
 - Complementing the EPA FY23 Clean School Bus Grant Program
- ▶ Two current rounds of programming ongoing with **ERG** as the consultant
- ▶ Round 3 Consultant: **Frontier**

Application Closes June 24th 2024

ACT School Bus Advisory Services



➤ Free Fleet Electrification Planning Program

- Support for up to **25** school bus fleets in accessing additional funding opportunities
- Creates customized feasibility designs, financial models, and procurement plan
- School districts OR 3rd party school bus fleets (in partnership with school districts) may directly apply to receive free electrification advisory services
- EPA Priority Districts and their project partners are given preference
- Goal of geographic and ownership model diversity

9 slots remaining in Advisory Services!

Eligible applicants are welcome to apply for Deployment and participate in Advisory Services

Deployment Program – Round 1

➤ Round One of programming:

- Awarded in December 2022 – read [the press release](#) and [the award memo](#)
- MassCEC is currently providing **\$9,480,490** in funding to complement federal EPA Clean School Bus FY22 Rebate Program

➤ 6 Massachusetts public school districts supported by 2022 ACTSB Deployment funding:

Fall River

\$2M to deploy 10 buses

**Lower Pioneer Valley
Educational Collaborative:**

\$2M to deploy 25 buses

Lawrence:

\$1.7M to deploy 35 buses

New Bedford:

\$2M to deploy 14 buses, 4
vans

Quincy:

\$355K to deploy 4 buses

**Upper Cape Cod Technical
Regional School:**

\$1.5M to deploy 3 buses

Deployment Program – Round 2

- ▶ Round Two of programming:
 - Awarded in – read [the press release](#) and [the award memo](#)
 - MassCEC is currently providing **\$4,248,527** in funding, in part to complement federal EPA Clean School Bus FY23 Grant Program
- ▶ 5 Massachusetts public school districts supported by 2023 ACTSB Deployment funding:

Fall River

\$150K to deploy 10 buses

Boston

\$2.5M to deploy 52 buses

Worcester

\$750K to deploy 15 buses

New Bedford:

Assistance to deploy 10
buses

Highland/Holyoke

\$850K to deploy 5 buses

Future of ACT School Bus

Continuing Advisory Services

- Hope to continue the Advisory Services Program in the future

Deployment Program – Round 3

- Round Three of Deployment programming:
 - Read the RFP [here](#) - applications are due **June 24th**
 - Round 3 will complement the federal [EPA Clean School Bus FY23 Rebate Program](#)
 - Award up to \$2M per school

Other Upcoming Opportunities

[Clean Heavy-Duty Vehicle Program](#): hope to support this new EPA Program

- Applications to the CHDV Program are open until July 25th

Case Study: Upper Cape Technical School



Q&A / Discussion



Wrap-Up



Next Steps



Near-Term

Publish an “Electric School Bus Roadmap” on MAPC’s website

- Steps, information, resources for school districts in MA to electrify their bus fleets
- Target date: September-October



Long-Term

We want to continue to help school districts electrify their buses!

- What are your next steps toward electrifying your buses?
- What do you anticipate needing help or technical assistance with? What programs and/or resources would be helpful?

Resources

Funding & Financing

The World Resources Institute, Electric School Bus Initiative webpage [All About Funding and Financing Options for Electric School Buses](#). The webpage includes:

- [All About Total Cost of Ownership \(TCO\) for Electric School Buses](#) overview of electric school bus TCO considerations and assumptions, illustrative TCO scenarios, and TCO analysis tools.
- [Total Cost of Ownership Calculator for Electric School Buses](#) allows to estimate an approximate TCO for electric school buses and compare with the TCO for diesel-burning school districts.
- [Clearinghouse of Funding and Financing opportunities](#) for Electric School Buses and Infrastructure.

Cost Savings

Replacing diesel school buses with electric school buses may yield up to \$247,600 in climate and health benefits per individual bus, according to a [new study](#) by researchers at Harvard T.H. Chan School of Public Health.



Resources (continued)

Federal Tax Credits

[30C Alternative Fuel Vehicle Refueling Property Credit](#)

This resource provides guidance to assess if your business or facility is in an eligible location for tax credits that could save up to 30% off the cost of installing EV charging infrastructure.

[Qualified Commercial Clean Vehicle Tax Credit \(45W\)](#)

One page summary of a tax credit for qualified commercial clean vehicles, including Electric School Buses.

[Massachusetts Funding Opportunities for Electric School Buses](#)

Link to [Green Energy Consumers Alliance article and webinar](#)

