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MASSACHUSETTS LEADING BY EXAMPLE PROGRAM

PUBLIC LEADERSHIP, STEWARDSHIP, COMMITMENT

LBE Executive Order 594: Clean Transportation

June 16, 2021

Executive Order 594 Overview

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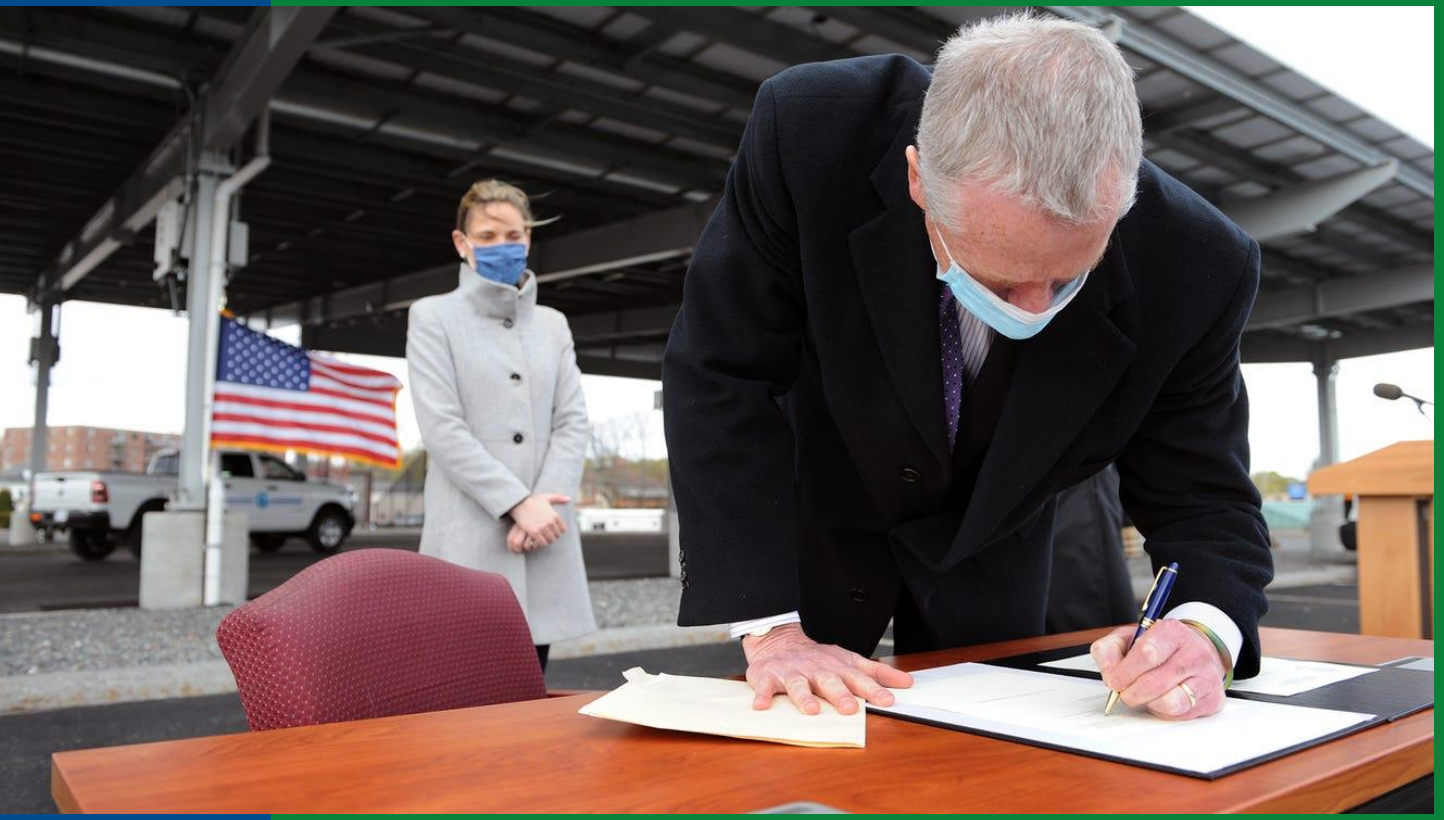
Leading by Example Executive Order 594

Decarbonizing and Minimizing Environmental Impacts of State Government



- Signed by Governor Baker on April 22, 2021
- Effective date: July 1, 2021
- Supersedes LBE EO 484
- Applies to all executive branch agencies and public institutions of higher education
- Fleet targets + requirements also apply to MBTA non-revenue fleet

Key EO 594 Strategies

Prioritize highest emitting sectors: buildings & vehicles

Target onsite fossil fuel combustion

Innovation to address complex facilities & fleets

Accelerate transition to ZEVs

New construction performance

Clean & renewable energy deployment

Incorporate long-range planning

Expand transparency and participation

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Targets for State Facilities

Objective	Baseline	Current Progress	2025	2030	2040	2050
Reduce emissions from onsite fossil fuels	2004	-16%	**-20%**	**-35%**	**-60%**	**-95%**
Zero emission vehicles (ZEVs) in state fleet	N/A	<1%	**5% of fleet**	**20% of fleet**	**75% of fleet**	**100% of fleet**
Reduce fuel oil use	2004	-85%	**-90%**	**-95%**	**TBD**	**TBD**
Energy use intensity (EUI) reduction	2004	-13%	**-20%**	**-25%**	**TBD**	**TBD**
EV charging stations at state facilities	N/A	235 stations	**350 stations**	**500 stations**	**TBD**	**TBD**

These targets apply to entire LBE portfolio, recognizing that individual partners may have unique opportunities or challenges in meeting the various targets depending on operational needs

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Vehicle / Fleet Targets and Requirements

State Entities Subject to Section 5 of EO 594

- All vehicles owned or leased and operated by executive branch agencies and institutions of higher education
- All non-revenue vehicles under the jurisdiction of the MBTA

Marked and unmarked police cruisers are exempt from the requirements of Sections 5, but public safety agencies are encouraged to meet these requirements where such vehicles meet operational needs.

EO 594 Fleet Policies and Requirements

- Overall state fleet electrification targets
- State Fleet ZEV acquisition requirements
- EV charging station targets & requirements
- Minimum biofuel requirement
- OSD & Green Fleet Committee policies

Fleet Electrification Targets

Zero emission vehicles (ZEVs) as portion of total state fleet	Current Progress	2025	2030	2040	2050
	<1%	5% of fleet	20% of fleet	75% of fleet	100% of fleet

- ZEV targets apply to portfolio as whole
- State fleet includes all on-road vehicles & vehicles replacing traditional on-road options
- Fleet variability means different agencies will achieve goals at different rates
- Vehicle turnover & increasing EV availability means bulk of transition will happen post-2025
- ZEVs include battery-electric, fuel-cell electric, and plug-in hybrid electric technologies

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Vehicle Electrification Requirements

ZEV new acquisition requirements	FY 2023	FY 2025	FY 2030
	All ZEVs for GVWR ≤8,500lbs	All ZEVs for GVWR ≤14,000lbs	All ZEVs for GVWR >14,000lbs

- Agencies shall acquire ZEVs as per the chart above, when ZEVs are “readily available, not cost-prohibitive and can meet agency needs…”
- All entities shall prioritize acquisition of ZEVs without internal combustion engines, including battery electric and fuel cell vehicles
- When ZEVs are deemed not feasible, agencies shall select the most efficient vehicles available for their operational needs
- Applies to purchased and leased vehicles

EV Charging Station Targets

EV charging stations at state facilities	Current Progress	2025	2030	2040	2050
	235 stations	350 stations	500 stations	TBD	TBD

- Target will double the number of EV charging stations at state facilities by 2030
- Agencies shall work with all appropriate funding, contracting and oversight agencies to support deployment, and consider & prioritize EV stations during relevant construction
- This includes stations intended for public, workplace, and fleet charging

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Vehicle Biodiesel Requirement

Minimum Biodiesel Requirement

As of July 1, 2021, All agencies that purchase and store diesel fuel at their own facilities shall ensure that any diesel fuel purchased for use in motor vehicles owned and operated by Commonwealth agencies shall consist of **at least 5% biofuels**

- Biofuels must meet the minimum fuel content specifications outlined in LBE guidance
- Agencies shall work with LBE to identify opportunities to increase biodiesel portion of vehicle fuel consumed as is practicable and strive to utilize biodiesel fuels in other equipment as appropriate
- Agencies may be exempt if said biodiesel is not readily available or is cost-prohibitive, or if a specific performance constraint is identified

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Proposed LBE Guidance for Biodiesel

Eligible fuels

- ✓ Provide 50% reduction in lifecycle GHG emissions compared to conventional diesel
- ✓ Registered in EPA's Renewable Fuel Standard
- ✓ Organic waste feedstocks
- ✓ Meet applicable ASTM quality standards

- Use higher bio-blends whenever possible
- Consider use of biodiesel in other applicable assets (e.g., off-road equipment, buses, tractors, etc.)

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OSD and Green Fleet Committee

OSD to develop and enforce fleet acquisition & management policies in support of EO:

- Acquiring **zero emission vehicles**;
- Acquiring **new vehicles that are sized appropriately** for the intended agency task(s);
- Acquiring the **most fuel-efficient vehicle models** that serve agency needs;
- Conducting **fleet optimization evaluations** to identify vehicles for removal or replacement;
- Identifying opportunities to **reduce vehicle miles traveled** among state-owned vehicles; and
- Educating employees on **efficient driving practices** that help to increase fuel economy.

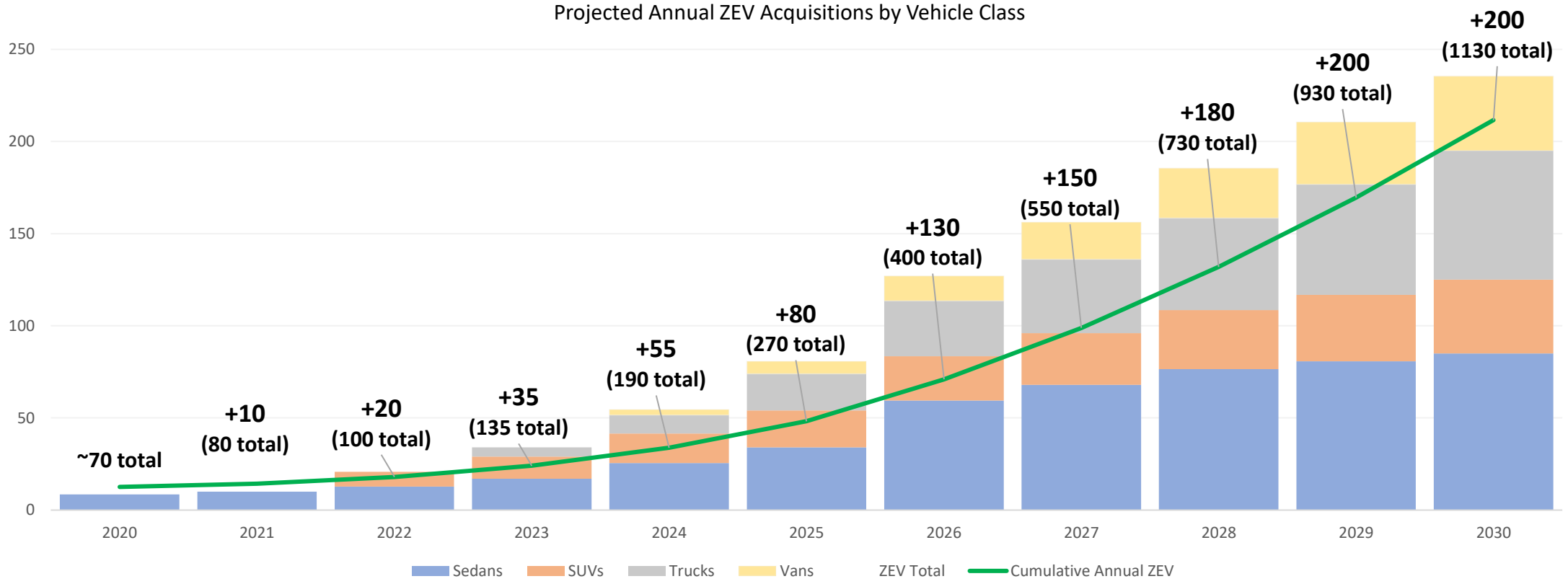
Green Fleet Committee to oversee implementation of Fuel Efficiency Standard

- OSD and DOER co-chair in collaboration with MassDEP and other agencies

Implementation Considerations

ZEV Acquisition Projections

- ZEV acquisition requirements starting in 2022 and 2024
- Annual ZEV increases will vary depending on types of vehicles acquired and available ZEV models
- ZEV acquisitions expected to ramp up significantly starting in 2025, but need to start now



What Can State Entities Start Doing Now?

- Conduct fleet analyses to inform fleet decarbonization roadmap
- Prioritize electrification when acquiring vehicles (target BEVs)
- Increase operational efficiencies whenever possible
- Plan for and install EV charging for fleet vehicles
- Leverage available funding (MassEVIP, MOR-EV, make-ready)
- Join the Mass*EVolves* EV Purchase Challenge!

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Fleet Evaluation

Step 1:
Fleet Evaluation

- Assess current fleet prior to start of fiscal year
- Define replacement benchmark criteria (age, miles, maintenance spend)
- Categorize by number of criteria met and suggested actions

Example Partner Fleet Replacement Analysis

Number of replacement citeria met & suggested action	# vehicles per criteria ranking
4 - Replace immediately	21
3 - Review for replacement this year	13
2 - Review for replacement this year or next year	10
1 - Review for replacement next 2-3 years	10
0 - Not currently in review	42
Total Fleet	96

4 - Replace immediately	
Make/Model	#
FORD FOCUS	2
TOYOTA PRIUS	2
FORD TAURUS	1
FORD ESCAPE	4
FORD EXPLORER	1
CHEVY TAHOE	1
FORD F150	4
FORD F350	2
RANGER	2
T150	2

Example Fleet Analysis

4 - Replace immediately	
Make/Model	**Strategy**
FORD FOCUS	Replace with BEV
FORD FOCUS	Replace with BEV
TOYOTA PRIUS	Replace with BEV
TOYOTA PRIUS	Replace with BEV
FORD TAURUS	Remove
FORD ESCAPE	Replace with BEV
FORD ESCAPE	Replace with BEV
FORD ESCAPE	Replace with PHEV
FORD ESCAPE	Replace with PHEV
FORD EXPLORER	Down-size to CUV ; Replace with BEV
CHEVY TAHOE	Down-size ; Replace with PHEV
FORD F150	Replace with HEV
FORD F150	Replace with HEV
FORD F150	Replace with HEV
FORD F150	Replace with HEV
FORD F350	Replace with more efficient model
FORD F350	Replace with more efficient model
FORD RANGER	Remove
FORD RANGER	Replace with HEV
TRANSIT 150	Down-size to minivan ; Replace w/ PHEV
TRANSIT 150	Replace with more efficient model

Step 2: Replacement Considerations

1. Are there opportunities to right-size the fleet?
2. Are there opportunities to down-size vehicles?
3. Are BEVs available to order that meet vehicle needs?
4. Are PHEVs available to order that meet needs?
5. Are HEVs/efficient models available that meet needs?

Example Fleet Analysis

PRE-REPLACEMENT	
Make/Model	#
FORD FOCUS	2
TOYOTA PRIUS	2
FORD ESCAPE	4
FORD EXPLORER	1
CHEVY TAHOE	1
FORD F150	4
FORD F350	2
RANGER	2
T150	2
TOTAL VEHICLES	**21**
TOTAL HEVs	**2**
TOTAL ZEVs	**0**

POST-REPLACEMENT	
Make/Model	#
CHEVY BOLT	4
HYUNDAI KONA	2
FORD MACH-E	1
FORD ESCAPE PHEV	3
CHRYSLER PACIFICA	1
FORD F150 HEV	5
FORD F350	2
FORD TRANSIT 150	1
TOTAL VEHICLES	**19**
TOTAL HEVs	**5**
TOTAL ZEVs	**11**

What ZEV Replacements Might Look Like…

Existing vehicle…

Usual replacement…

Consider instead…

Bolt

Cargo

Or…

NEV Options

Or…

Upcoming EV pickup model

But does *not* mean…

Operational Efficiencies

Evaluate fleet assets at least once a year (OVM offers parameters to assess when replacement makes sense)

Conduct fleet and vehicle right-sizing

Telematics

Reduce vehicle miles traveled

Properly maintain, repair and service vehicles

Consider total cost of ownership when choosing vehicles, calculating in the cost of maintenance, fuel, and trade-in value

EV Charging Stations

EVs and chargers ≠ siloed considerations; more and more EVs are coming!

Think about where fleet EVs will be parked and install chargers accordingly

Determine appropriate charger types and features based on expected use cases using fleet analyses

Leverage technical assistance and funding programs

- MassEVIP, utility make-ready programs and fleet advisory services, etc.

Pre-wire for additional EV charging stations for future increased EV adoption

EV Charging Considerations

Fleet

- Where do I have vehicles garaged on a regular basis?
- Which sites are likely to transition to EVs sooner than later?
- What are my site charging needs?

Infrastructure

- What are my installation barriers?
  - Electrical infrastructure
  - Parking/installation close to electricity service
- What level of charging do I need?
- What equipment specifications do I need/want?

Funding

- Are my site(s) in an IOU to access make-ready funding?
- What incentives are available for my charging use case(s)?
- How do I couple funding with procurement?

During Decision-making Process, Keep EO 594 in Mind…

- ★ EV charging station targets
- ★ ZEV acquisition requirements
- ★ Total fleet electrification targets
- ★ Fuel Efficiency Standard *TO BE UPDATED SOON!*

Procurement, Funding Programs, and Resources

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Procurement of EVs and Charging Stations

VEH98 Purchase of Vehicles

Replacement contract coming September!

- Contract User Guide
- ZEV & HEV model list

VEH102 Vehicle Technology Equipment, Supplies and Services

- Contract Used Guide
- Scope of Services template

FAC116 Lawns & Grounds Equipment

- Contract User Guide
- NEV/UEV model list

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Available EV and Charging Funding

Various incentive programs available

- Eversource and National Grid Make-Ready Programs: funding to support EV charging infrastructure work; national grid may also support equipment costs
- MOR-EV Trucks Rebate Program: rebates to support acquisition of medium- and heavy-duty EVs
- Massachusetts Electric Vehicle Incentive (MassEVIP) Program: various funding programs to support EV and EV charging acquisition
- Transportation Climate Initiative Program: implementation begins in 2023, projected $250M annually in revenue for region ($150M for MA) to support transportation decarbonization

Total Cost of Ownership – Sedan Comparison

	2021 Honda Civic Hatchback	2021 Chevy Bolt	2021 Nissan Leaf Plus
VEH98 Bid Price	$22,901	$28,231 - $32,895	$28,295 - $40,041
Bid Price - MassEVIP incentive*	**$22,901**	(-$7,500) = **$20,731 - $25,395**	(-$7,500) = **$20,795 - $32,541**
Range	392 (gas)	259 (electric)	226 (electric)
Fuel/100 Miles	3.7 gallons	29 kWh	31 kWh
Est. annual energy costs	$1,471	$870	$930
Est. annual maintenance costs**	$915	$465	$465
Est. operating costs after 8 years	$19,086	$10,680	$11,160
Est. total cost of ownership after 8 years	**$41,987**	**$31,411 - $36,075**	**$31,955 - $43,701**

Calculation assumptions:

- vehicle driven 15,000 miles/year
- $2.65/gallon of gas
- $0.20/kWh of electricity
- $0.061/mile for maintenance of gas vehicle
- $0.031/mile for maintenance of electric vehicle

	Est. YR-1 Emissions (MTCO2e)	Projected 8-YR Emissions (MTCO2e)
CIVIC	5.0	40.3
BOLT	1.2	10.3
LEAF	1.3	11.1

NOTE: VEH98 bid prices listed for each model represent lowest & highest contract price

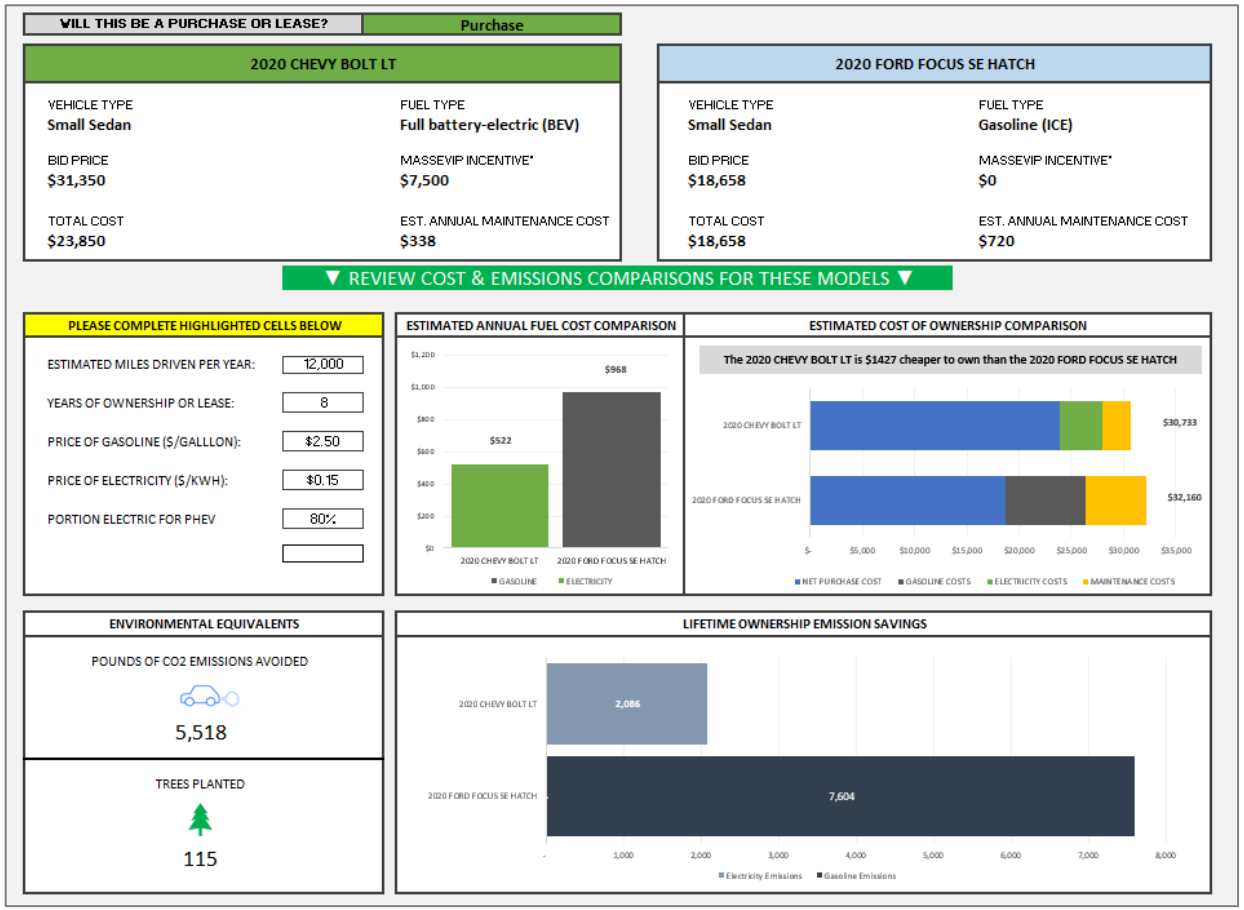
*Assuming $7,500 MassEVIP or MOR-EV grant for trucks is available

**Source: https://advocacy.consumerreports.org/wp-content/uploads/2020/09/Maintenance-Cost-White-Paper-9.24.20-1.pdf

Note: Figures do not include dealer fees, depreciation, financing costs, insurance, or sales/excise taxes.

EV Savings Calculator

- Custom calculator compares EV & conventional models across various metrics, including:
  - *Vehicle specs*
  - *Bid price & MSRP*
  - *EV incentives & costs impacts*
  - *TCO for energy & fuel costs*
  - *Lifetime emissions impacts*
- User can select variety of vehicles to compare on VEH98
- User can select pre-populated utilization & energy cost or input own values



Tools and Resources

LBE Clean Transportation Webpage

- EV & EV Charging Quick Guides
- EV Savings Calculator
- EV Funding & Procurement Roadmap
- VEH102 Technologies to Green Your Fleet
- Available/upcoming models and specs

External resources

- Bolt EV Academy
- Merchants Fleet white papers & infographics

Sign-up Reminder!

2021 EV Purchase Challenge

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Wrap-up and Q&A

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