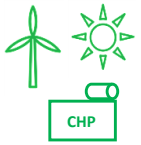
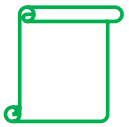
MA Leading by Example Council Meeting

Build a New Tomorrow Here Today:
5 Sustainability Opportunities Available for State Entities

September 15th, 2020

State Government Progress – as of September 2020

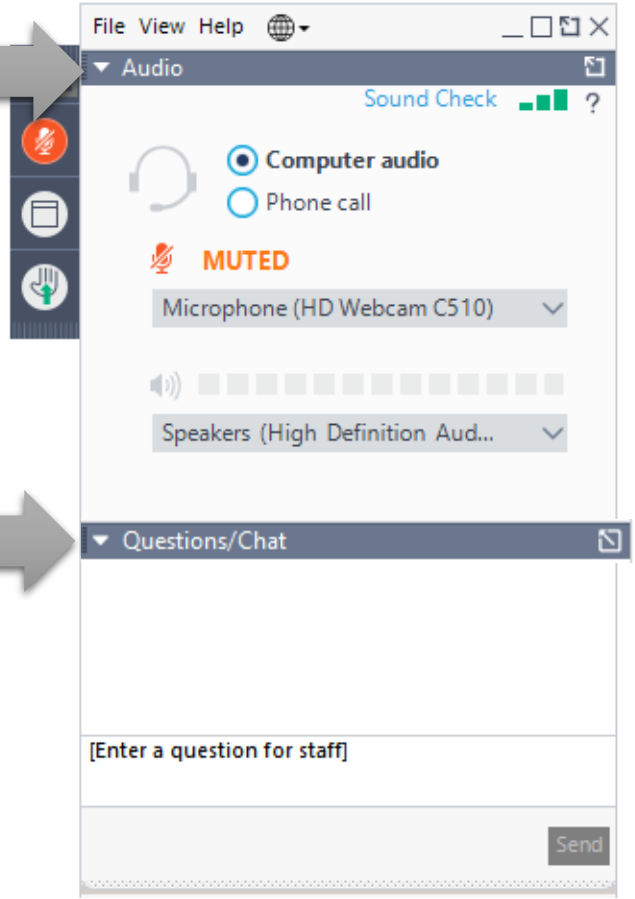
Greenhouse Gas (GHG) Emissions  **↓ 35%** 2004 -2019	**Energy Use Intensity per Square Foot**  **↓ 13%** 2004-2019	**Electricity via Renewable & Onsite Generation**  **20%** In 2019	**Heating Oil Consumption at State Facilities**  **↓ 85%** 2006-2019
28.6 MW Installed Solar PV at State Sites  **20.5 MW** Since 2015	**92 LEED Certified State Buildings**  **55** Since 2015	**210 EV Charging Stations at State Sites**  **159** Since 2015	**Leading by Example Grants Awarded**  **$12.6 M** Since 2015

Using GoToWebinar

Click the arrow to show the control panel

Raise your hand to ask a question over audio

Switch to computer or phone audio



Type in questions for presenters or leave general comments in the "Questions/Chat" tab

What do you do with your pizza boxes?

Vote here:
http://etc.ch/DcZM

See Results

DOER
Massachusetts Department of Energy Resources

PIZZA BOXES ARE RECYCLABLE

. . . pizza is not!
Remove all food
and place your box
in the recycling bin.

paper recycles

Just don't recycle the greasy paper!

- ~3 billion pizza boxes are used in the U.S. every year, ~600,000 tons of highly desired material
- WestRock Industries, one of the world's largest paper and packaging companies, found that grease & cheese typically found on pizza boxes does NOT impact manufacturing
- Visit RecycleSmart.org to see their recent newsletter and helpful resources to spread the word!

Agenda


Welcome and LBE Updates


Say Hello to Bio: Biofuels for Buildings and Vehicles


Keep Safe Cleaning Indoor Space


All the Sun Without the Stumble: Procure Solar, Without the Process


Close the Loop with the Government Recycling Demand Challenge


You CAN Get There From Here: Up-and-Coming Zero-Emission Vehicles


Q&A with Presenters

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LBE Updates

LBE Awards: Nominations Now Open!

Recognizing the outstanding energy and environmental sustainability efforts of Commonwealth agencies, public colleges and universities, and municipalities.

New this year:

- Nominations accepted via online forms
- Nomination questionnaires simplified
- Virtual Awards Ceremony in December *(Business attire still recommended...)*

Apply online!

www.mass.gov/LBEAwards

Nomination Deadline:

Thursday, October 15th

Please reach out to Ryan Kingston with any questions or assistance

Ryan.Kingston@mass.gov

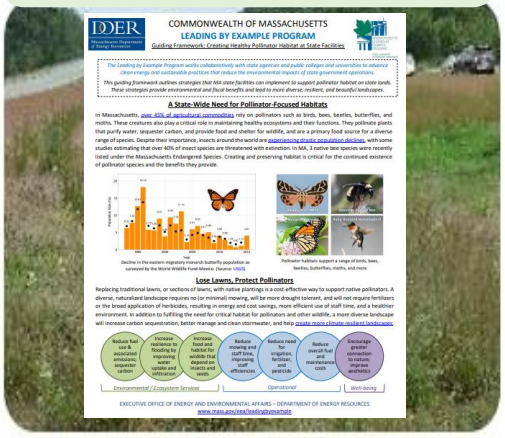
DOER

Massachusetts Department of Energy Resources

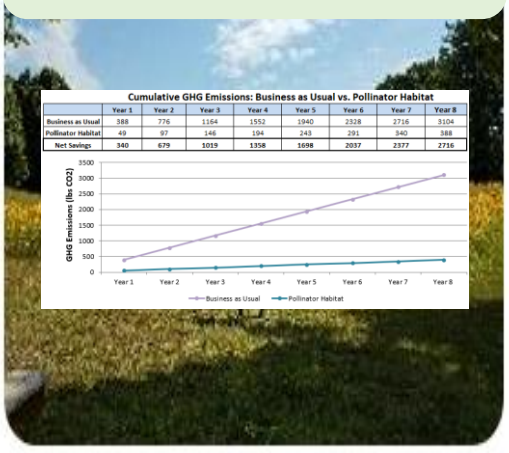
Sustainable Landscaping Website and Resources

- New website will feature guidance and resources to support the creation of pollinator habitats and adoption of battery-powered landscape equipment at state facilities
- Available tools and guidance include:

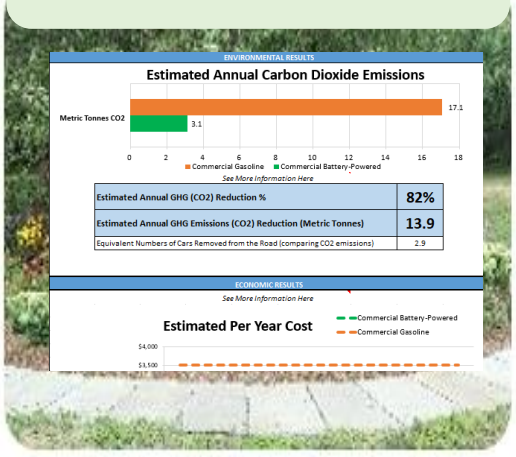
Pollinator Habitat Guiding Framework



Lawn-to-Habitat Savings Calculator



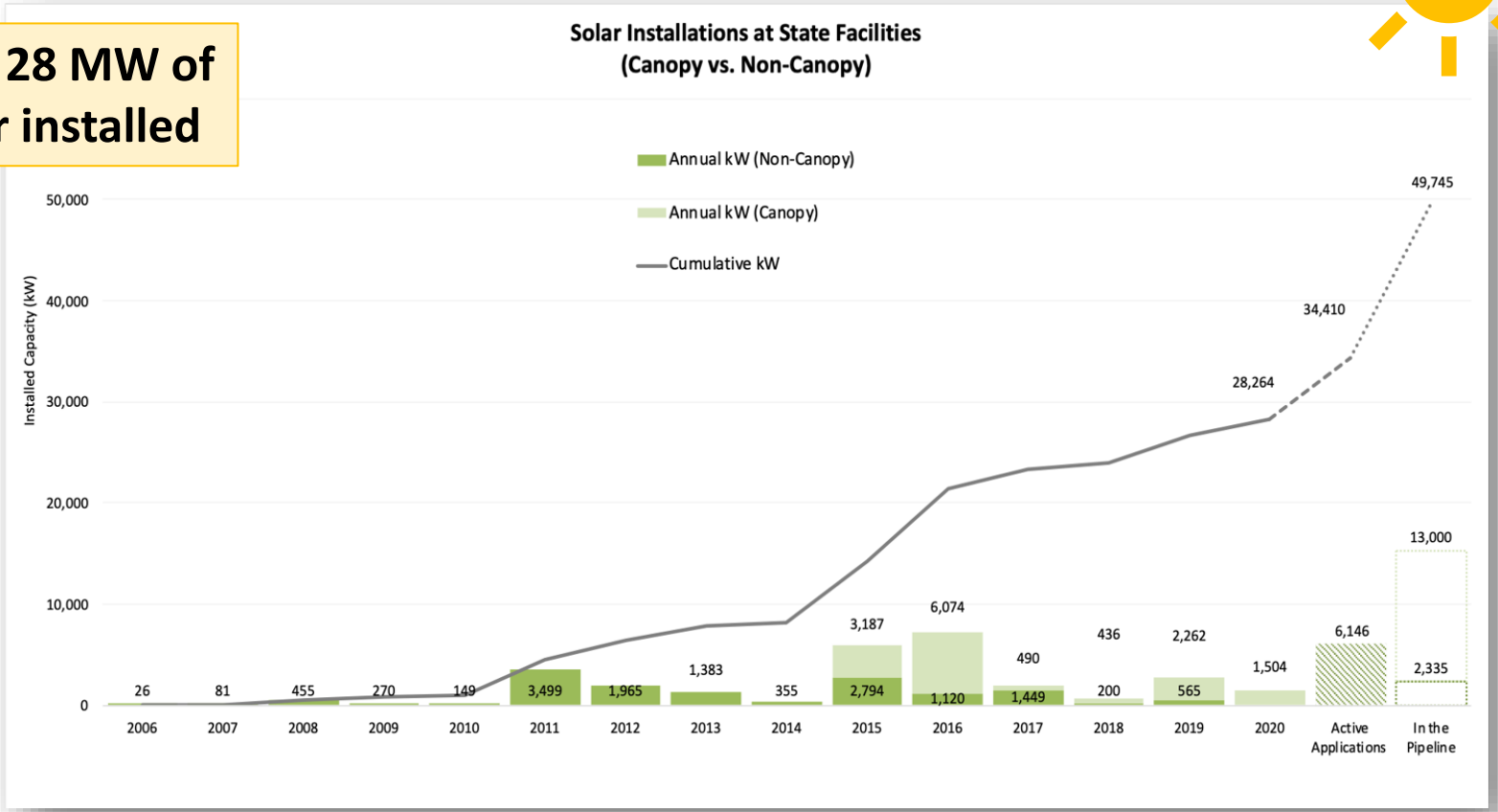
BPLE vs ICE Savings Calculator



The new webpage will be on the Leading by Example website under “LBE Initiatives”

Solar Installations at State Sites

Over 28 MW of solar installed



- Significant progress in solar capacity at state sites; potential 10+ MW in the pipeline
- Mix of Commonwealth-owned and third-party-owned (PPA) systems
- Projects may take advantage of SMART Program incentives, the LBE Solar Grant, and potentially Clean Peak

New Building + Major Renovations Program

- Upcoming **moderated discussion** on revised incentive programs through Mass Save
  - Join program administrators as they introduce the new pathways/goals, engage with LBE partners and answer your questions
- October 7th at 11:00

As previewed at the September LBE Council meeting

Whole Building EUI Reduction

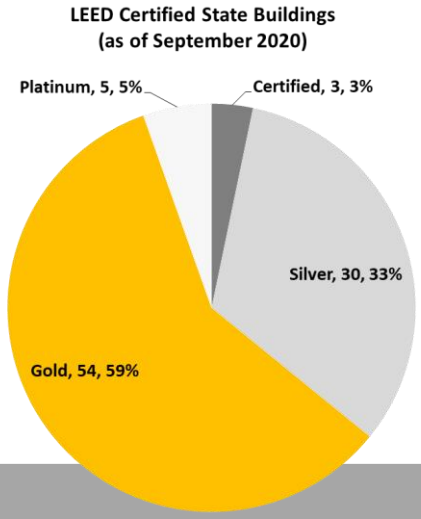
Comprehensive technical expertise and financial incentives for meeting EUI reduction goals.

Zero Net Energy/Deep Energy Savings

Comprehensive technical expertise and financial incentives for ZNE, ZNE Ready, very low EUI, and Passive House projects.

New LEED Buildings

- Currently **92 LEED certified buildings** (65% at Gold & Platinum levels)



Recently Certified Buildings

MassPort's Hanscom ARFF & U.S. CBP Facility

Certification level: **SILVER**

Building features increased daylighting, recycled-content & low-emitting materials, and energy & water efficient systems

Trial Court's Lowell Justice Center

Certification level: **PLATINUM**

Building features include chilled beam HVAC system, PV roof & canopy arrays, & sophisticated building systems controls

- **Coming soon!** "Countdown to 100 LEED Certifications" newsletter

FY20 LBE Tracking Form

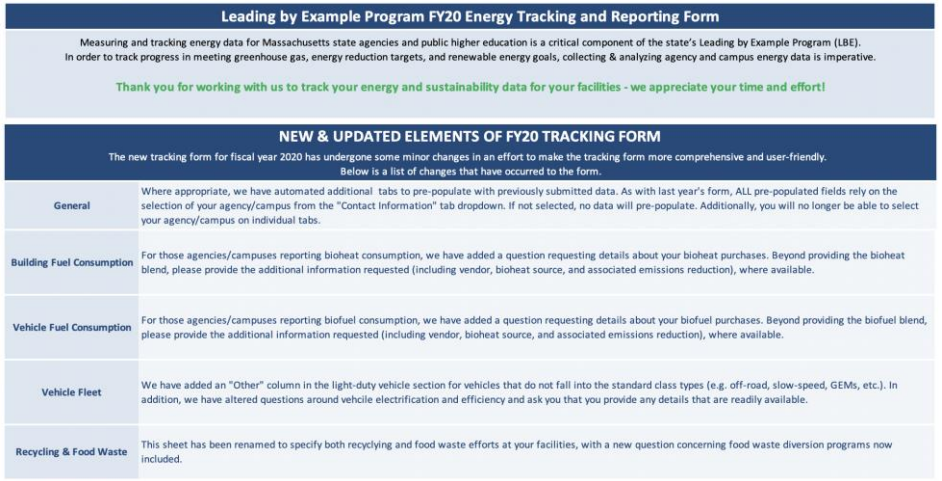
- **Release date: September 4th**

- **Tracking form categories:**
  - Contact info
  - Square footage
  - Utility account verification
  - Electricity consumption
  - Building fuel consumption
  - Vehicle/other fuel consumption
  - Energy efficiency projects
  - Installed clean power
  - Vehicle fleet
  - EV charging stations
  - Recycling & food waste
  - Water use
  - Sustainability
  - Landscaping

- **Due date: December 18th**

★ New/modified elements for FY20:

- Biofuel purchasing info requested for buildings & fleets
- New fleet category for non-road LDVs by fuel type
- New composting/food waste diversion question



Leading by Example Program FY20 Energy Tracking and Reporting Form

Measuring and tracking energy data for Massachusetts state agencies and public higher education is a critical component of the state's Leading by Example Program (LBE). In order to track progress in meeting greenhouse gas, energy reduction targets, and renewable energy goals, collecting & analyzing agency and campus energy data is imperative.

Thank you for working with us to track your energy and sustainability data for your facilities - we appreciate your time and effort!

NEW & UPDATED ELEMENTS OF FY20 TRACKING FORM

The new tracking form for fiscal year 2020 has undergone some minor changes in an effort to make the tracking form more comprehensive and user-friendly. Below is a list of changes that have occurred to the form.

General	Where appropriate, we have automated additional tabs to pre-populate with previously submitted data. As with last year's form, ALL pre-populated fields rely on the selection of your agency/campus from the "Contact Information" tab dropdown. If not selected, no data will pre-populate. Additionally, you will no longer be able to select your agency/campus on individual tabs.
Building Fuel Consumption	For those agencies/campuses reporting bioheat consumption, we have added a question requesting details about your bioheat purchases. Beyond providing the bioheat blend, please provide the additional information requested (including vendor, bioheat source, and associated emissions reduction), where available.
Vehicle Fuel Consumption	For those agencies/campuses reporting biofuel consumption, we have added a question requesting details about your biofuel purchases. Beyond providing the biofuel blend, please provide the additional information requested (including vendor, bioheat source, and associated emissions reduction), where available.
Vehicle Fleet	We have added an "Other" column in the light-duty vehicle section for vehicles that do not fall into the standard class types (e.g. off-road, slow-speed, GEMs, etc.). In addition, we have altered questions around vehcile electrification and efficiency and ask you that you provide any details that are readily available.
Recycling & Food Waste	This sheet has been renamed to specify both recyclying and food waste efforts at your facilities, with a new question concerning food waste diversion programs now included.

Please reach out to Chelsea Kehne with any questions or assistance with the tracking form & THANK YOU!
chelsea.kehne@mass.gov

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Massachusetts Department of Energy Resources

Meeting Spotlight: 5 Strategies to Build a New Tomorrow Here Today

Biofuels for Buildings and Vehicles: Panel Discussion

Moderator: Eric Friedman, DOER

- Samantha Meserve, DOER
- Michael Ferrante, MA Energy Marketers Association
- Paul Nazzaro, National Biodiesel Board
- Bill Watts, UMass Amherst

Photo Credit: Matt Naughton, Mystic River Reservation. 11/17/2016

For more information on biofuels:

- www.biodiesel.org - Biodiesel basics, finding biodiesel in your area, relevant guides
- www.mybioheat.com - Information on biofuels for heating, benefits, news and updates
- Paul Nazzaro, National Biodiesel Board - 978-880-5338
- Michael Ferrante, MA Energy Marketers Association - 781-365-0844

Green Cleaning and Disinfecting

What Does that Look Like?

Jason Marshall, ScD
Toxics Use Reduction Institute
University of Massachusetts Lowell

TURI
TOXICS USE REDUCTION INSTITUTE
UMASS LOWELL

Green Cleaner Evolution

- 15-20 Years ago - hit or miss if they worked
  - Created negative image for green products
    - Still persists today
- Green cleaners of today are much improved
  - On par or exceed traditional products
  - Still need to pilot test products to see if they work for you
    - TURI Lab can help
      - In the lab
      - In the field

So How Do You Go Green

- Work with Third Party Certifiers
  - Performance requirement for their certifications
  - Independent verification of product safety and performance
    - Green Seal www.greenseal.org
    - EPA Safer Choice and Design for the Environment www.epa.gov/saferchoice
    - Ecologo www.ecologo.org/
- Environmentally Preferable Products Lists
  - State generated contract helps take the guess work out of product selection
  - Reduce environmental and public health impact

Cleaning, Sanitizing & Disinfecting, What's the Difference?

- Cleaning
  - Removes dirt/soil from surface
- Sanitizing
  - Reduces (kills) 99.9% to 99.999% of tested bacteria
    - Cannot claim killing viruses or fungi
- Disinfecting
  - Destroys 99.99% of all forms of microbial life, bacteria, virus, but not necessarily their spores
- Cannot Disinfect a Dirty Surface

Safer Disinfecting Chemicals-Processes

- EPA Listed Active Ingredients
  - Citric Acid
  - Caprylic Acid
  - Hydrogen Peroxide
  - L-Lactic Acid
  - Ethanol
  - Isopropanol
  - Peroxyacetic Acid
  - Sodium Bisulfate
- Other Methods/Active Ingredients
  - Dry Steam Vapor
  - Hypochlorous Acid
    - Electrolyzed water
    - NaDCC
  - Aqueous Ozone
  - UVC light
  - All Purpose Cleaners
    - Possible but not validated yet

EPA-DfE Authorized Antimicrobial Pesticide

- Acute Exposure
  - Least-hazardous classes (Category IV, III)
- Chronic Exposure
  - Carcinogenic, endocrine disruptor properties, developmental, reproductive, mutagenic, or neurotoxicity
- Full Product Review
  - Active and inert ingredients
- Personal Protection Equipment
  - Does not require use
- No Unresolved Issues
  - Adverse effects, Performance, Regulatory
- Identical Formulation
  - Matches existing formulation already approved by DfE

https://www.epa.gov/pesticide-labels/design-environment-logo-antimicrobial-pesticide-products

EPA-Regulated Disinfecting Devices

- Instrument used to destroy bacteria and viruses
  - Works by physical means
    - Electricity, light, mechanics or heat
    - https://www.epa.gov/safepestcontrol/pesticide-devices-guide-consumers#1
- Do not require registration
  - But are regulated to prevent “false or misleading claims”
    - Manufacturer must have scientific data to support the claims

Other Options

- Superheated steam vapor device
  - Very effective for cleaning and rapid sanitizing/disinfecting
  - Manufacturers have tested devices and proven effective on
    - Harder-to-kill viruses, such as canine parvovirus
    - Similar human coronavirus, such as coronavirus 229E
      - Kill rates 99.99 under 10 seconds
      - Expected to be effective on Sars-CoV-2 according to the EPA
  - They are not conventional "steam" cleaners or pressure washers
    - They are devices that use only a little water and a little electricity to clean, disinfect, and deodorize most surface

Other Options

- Hypochlorous Acid (HOCl)
  - Can be generated from various starting points
    - Electrolyzed water
    - Tablets (NaDCC)
  - Dominant active ingredient when operated in pH range of 4-6
    - Other ranges will have mixture of chemicals
- TURI testing will look at potential Cl_2exposure during usage

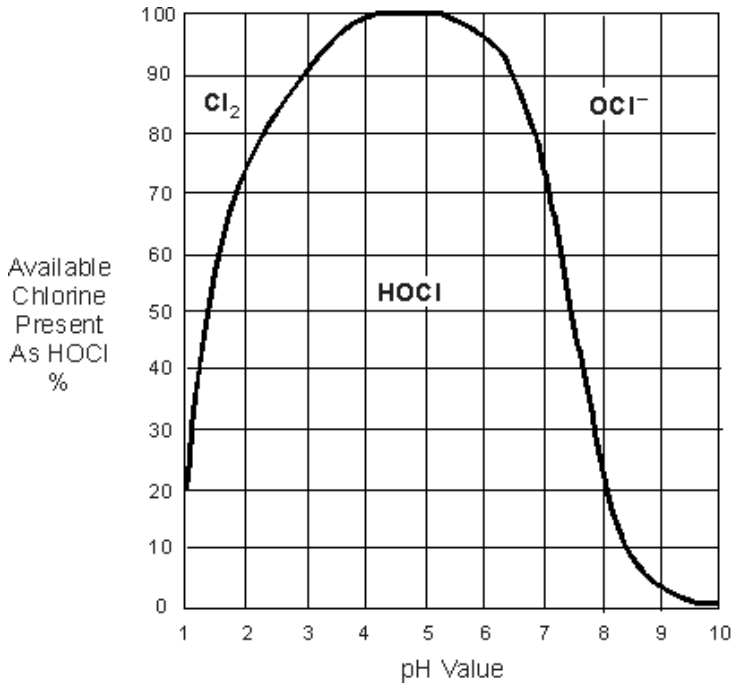


Table 1. Percentages of HOCl and OCl^-

pH	% HOCl 32°F	% OCl^- 32°F	% HOCl 68°F	% OCl^- 68°F
4	100.0	0.0	100.0	0.0
5	100.0	0.0	97.7	2.3
6	98.2	1.8	96.8	3.2
7	83.3	16.7	75.2	24.8
8	32.2	67.8	23.2	76.8
9	4.5	95.5	2.9	97.1
10	0.5	99.5	0.3	99.7
11	0.05	99.95	0.03	99.97

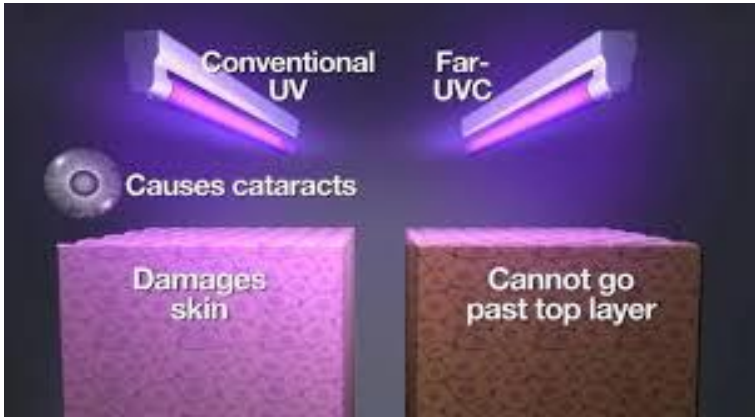
https://www.wcponline.com/wp-content/uploads/2009/06/28-30-1.png

Other Options

- Aqueous Ozone
  - A product of water and air in the presence of an electrical charge
    - Generation of ozone in water (1)
    - Oxidation - attacking organism/soils (2-3)
    - Return to oxygen (4)

  - Aqueous ozone is not stable for long periods of time
    - Some units add stabilizers to extend activity
- TURI testing will look at potential O_3 exposure during generation and usage

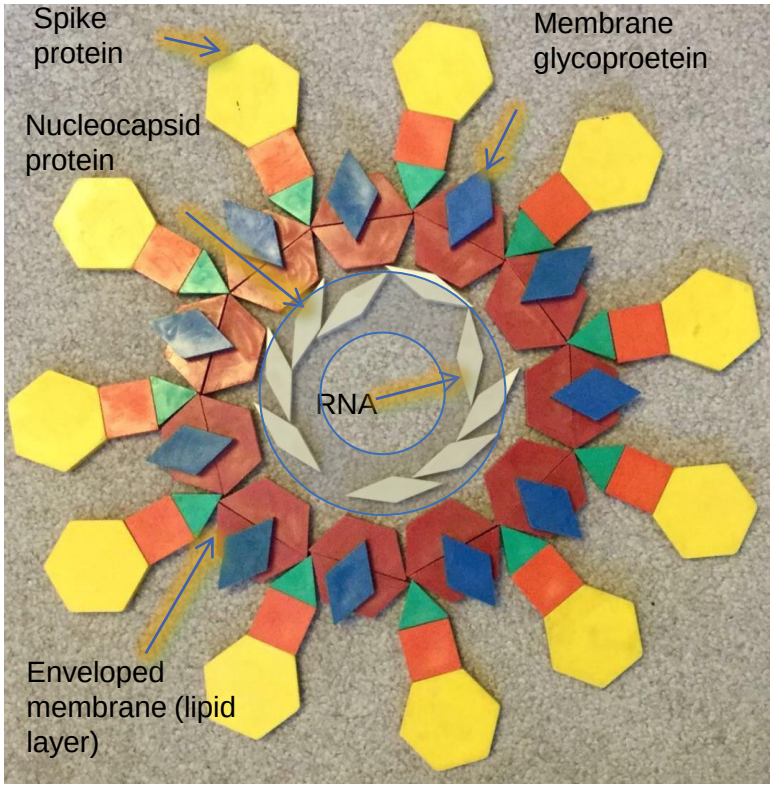
Other Options



- Ultraviolet Light
  - UV light has been used to eliminate pathogens for decades
- Does it work against SARS-CoV-2?
  - It takes the right kind of UV in the right dosage
  - UVC - Wavelength 200-280 nm
    - 254 nm inactivates: H1N1 influenza, Severe Acute Respiratory Virus (SARS-CoV), Middle Eastern Respiratory Syndrome (MERS-CoV)
    - Causes lesions in DNA and RNA
      - Effectively killing/inactivating microorganism or virus

Other Options

- All Purpose Cleaners-Degreasers
  - Does soap work on the SARS-CoV-2 and most viruses?
  - Virus is a self-assembled nanoparticle in which the weakest link is the lipid (fatty) bilayer
  - Theoretically, degreasers should work on dissolving this layer
- Possible but not validated directly yet

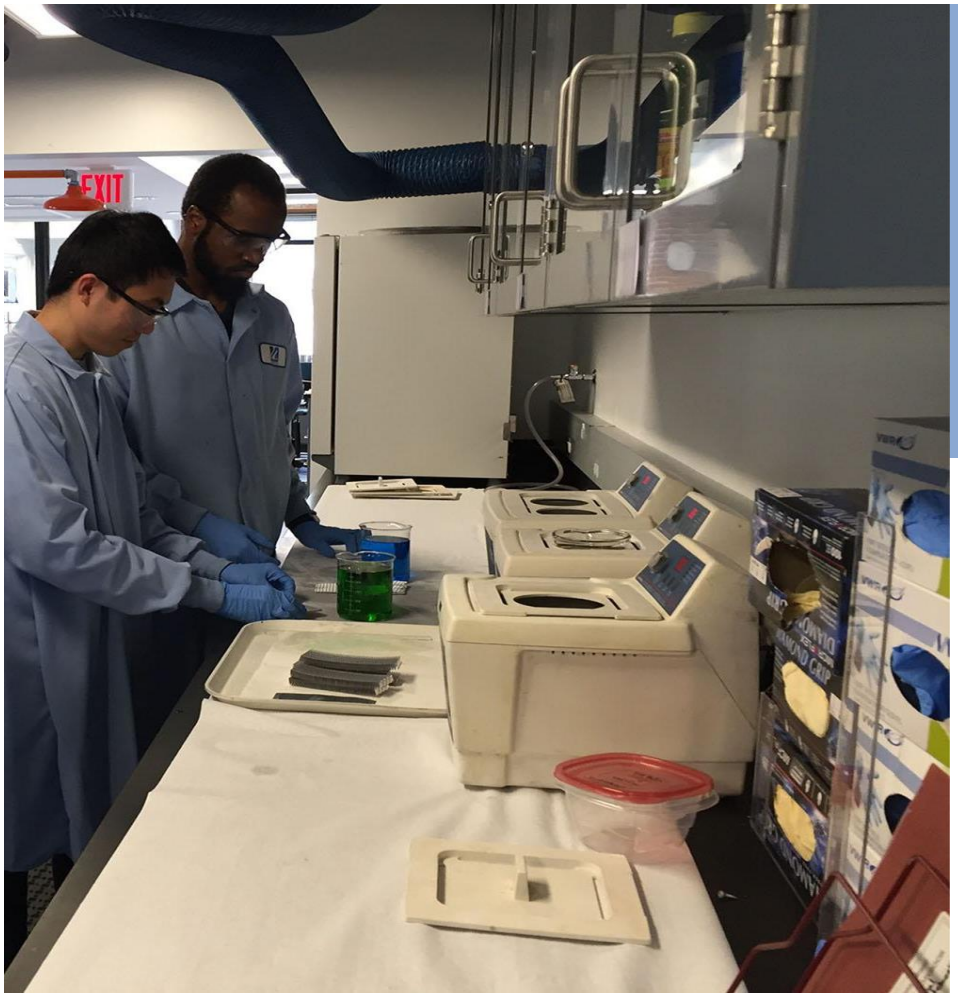


Safety Still Matters

- Use as Directed
  - CLEAN FIRST still applies
  - Recommended concentration
  - Appropriate dwell time
  - Proper PPE
- Disinfectant product's safety and effectiveness may change based on how it is used
- Need EPA approval to add delivery method
  - Electrostatic, fogger, misting

TURI Lab Testing

- Performance assessment for bleach vs hypochlorous acid
  - Products will be evaluated for effectiveness at killing MS2 bacteriophage
    - Products will be assessed for concentration and dwell times
- Exposure assessment
  - Exposure levels to Cl_2
    - Previous tests show Bleach release higher level than HOCl
- Additional products tested for performance
  - Steam, all purpose cleaners, aqueous ozone, probiotic products, UVc



Toxics Use Reduction Institute

www.turi.org

978-934-3275

The Offices at Boott Mills West
126 John Street, Suite 14
Lowell, MA 01852

Jason Marshall, ScD
Jason_Marshall@uml.edu
Laboratory Director
978-934-3133

TURI
TOXICS USE REDUCTION INSTITUTE
UMASS LOWELL

All the Sun Without the Stumble

Procure Solar Without the Process

- Mission driven nonprofit
- A trusted advisor to our members since 1998
- 450+ Members
- 70+ MW Solar
- Programs supplied via rigorous RFP process
- Public entities may participate in programs without conducting own RFP

Somerset Berkley Regional High School

Stonehill College Parking Canopies

Haverhill City Hall

solect energy™

- Founded in 2009
- Headquartered in Hopkinton, MA
- Develop, finance, install, and manage Solar Roofs, Canopies, Ground, Storage in MA, RI, and CT
- 10 years | 550 installations | 125 MW
- 70+ employees
- Service team monitors and manages 650 projects
- PowerOptions RFP Award winner
- DCAMM certified

5 years / 70+ projects / 14+ MW / 5 state projects to date

Salem State University Library

PowerOptions Solar Programs

- Select won competitive RFP
- PowerOptions monitors/approves pricing
- Public entities may participate without RFP (MGL Ch. 164, Sec. 137)
- Ability to move quickly and get the best SMART block possible

CCRTA - Hyannis

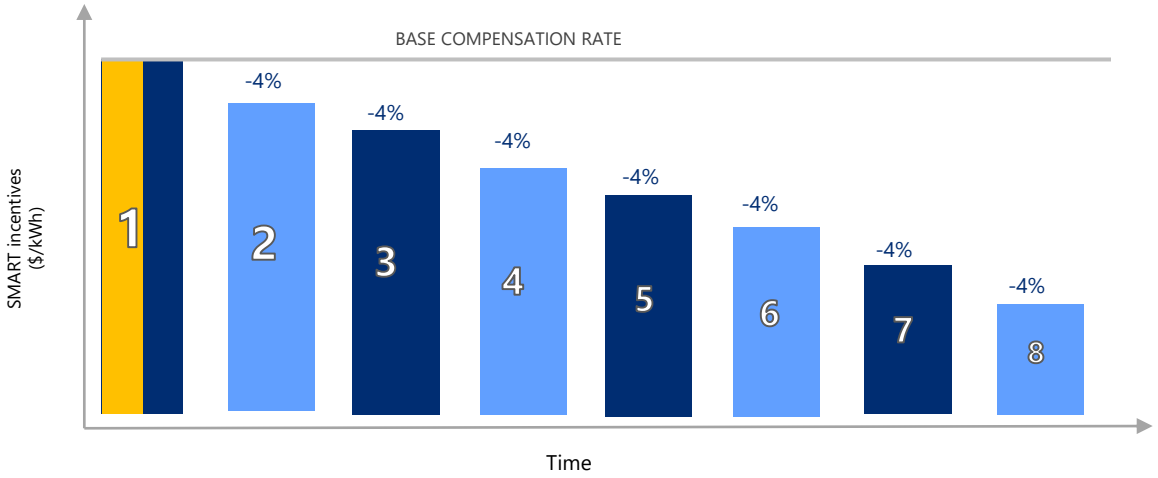
Power Purchase Agreements "PPAs"

- Third party ownership – no operations/maintenance responsibilities
- Savings for 20 years
- Zero upfront cost

Salem State U has installed three solar arrays via a PPA through Select and Power Options. Please feel free to contact Tara Gallagher with any questions at tgallagher@salemstate.edu

The "SMART" Program

- Fixed $/kWh incentive payment to system owner over 20 years
- 8 original "blocks" of capacity – incentives decline as blocks fill up
- Incentive rate **directly proportional** to PPA rate
- Adders for project-specific characteristics
- Incentive levels differ by utility territory



SYSTEM SIZE "MULTIPLIER"
(Capacity-based compensation rate)

ENERGY USER
("Offtaker")

ENERGY STORAGE INTEGRATION

LOCATION

Sample Projects

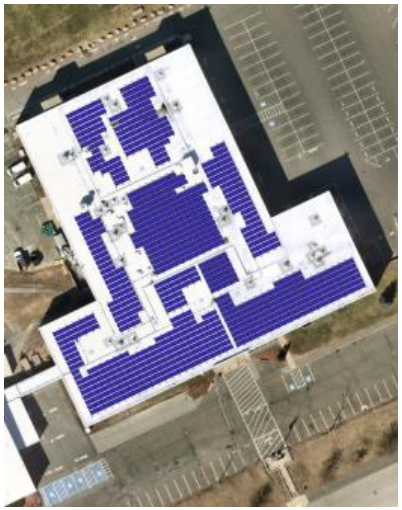
CITY OF WOBURN

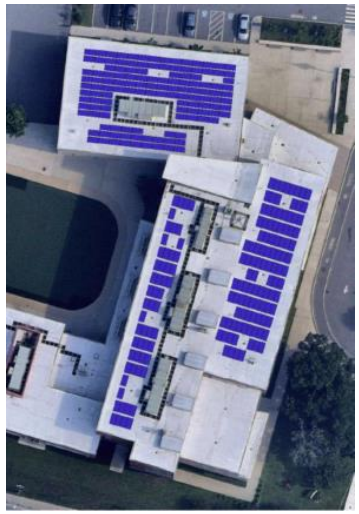
3 Schools:

- Joyce Middle School (315kW)
- Goodyear Elementary (98kW)
- Hurld-Wyman Elementary (100kW)

Projects installed, finalizing close-out paperwork to get systems turned on.

Savings of $40,000 in the first year and over $1MM for the 20-year term.





State Agencies – Working with PO, Solect, LBE and DCAMM

PROCESS AND PATHWAY TO SUCCESSFUL PROJECTS

- Qualify your sites for Solar and Storage – Solect can help qualify, with feedback and electric bills
- Review Savings potential through Solar, or Solar + Storage – Confirm interest and support to proceed
- Verify with DCAMM the site suitability for a 20 or 25-year solar project
- Notify LBE of your interest, work with Solect to devise the Grant Application
- Sign LOI or PPA – allow Solect to apply for SMART incentives, and utility interconnection
- Review, finalize, execute PPA and Lease or Easement. Solect will also apply for a PILOT agreement with town or city
- Project specific development work
  - Ground or canopies, civil and environmental engineering and deign;
  - Structural engineering for rooftop projects;
  - Construction design, conservation commission as applicable, building permits.
- Upon SMART award and utility approval to construct, establish preconstruction plan and schedule for each site
- Install the projects, QA/QC, Inspections, close-out paperwork, utility metering, permission to operate
- Savings begin

Questions?
Contact us

Matt Shortsleeve
VP Development
mshortsleeve@solect.com

Walter Gray
Solar Program Manager
wgray@poweroptions.org

solectenergy
Power Your Tomorrow

PowerOptions

Government Recycling Demand Champions

Lynn Rubinstein
Executive Director
Northeast Recycling Council

Introducing the Government Recycling Demand Champions Program

- Free incentive program to increase government purchasing of products with post-consumer recycled resin (PCR)
- Goals to stimulate & create domestic markets for recyclable plastics, & drive a sustainable plastic recycling industry
- Joint program by NERC & APR, NERC is lead

NERC-APR GOVERNMENT RECYCLING DEMAND CHAMPIONS

Background

- APR Recycling Demand Champions
  - Private sector

Led to . . .

- The NERC-APR Government Recycling Demand Champions
  - Public sector

NERC-APR GOVERNMENT RECYCLING DEMAND CHAMPIONS

Closing the Loop – Supporting the U.S. Plastic Recycling Industry

It's an old adage, but true – close the loop:

- A healthy & financially sustainable recycling industry depends on someone buying what is put in the bin
  - Impacts cost to offer residential recycling
  - Jobs & tax base

NERC-APR GOVERNMENT RECYCLING DEMAND CHAMPIONS

With record low prices for virgin plastic, it has become financially challenging for end-markets to use PCR resin. Consequently, public demand for recycled content is essential to support the industry.

NERC-APR
GOVERNMENT RECYCLING
DEMAND CHAMPIONS

Driving Change through Government Leadership

- Government biggest purchaser in U.S.
  - What you buy impacts marketplace, recycling industry, & sends strong signal to brands about desire to buy products with PCR
  - Committing to purchasing products with PCR sends a message to citizens & constituents
- Cost of residential recycling depends on end-market value

NERC-APR GOVERNMENT RECYCLING DEMAND CHAMPIONS

How to Participate

- ***Champion*** commits to increased purchase of products with PCR within the following 12 months
- ***Advocate*** commits to work over coming year to identify PCR containing products it can purchase, leading to becoming a Champion within the next 12 months
- ***State Recycling Organization Advocate*** commits to promote program to their members and constituents
- **Who can participate:** Any non-federal public sector entity, including state agencies, departments, municipalities, counties, solid waste districts, libraries, public utilities, public & private schools, colleges & universities, and State Recycling Organizations

NERC-APR GOVERNMENT RECYCLING DEMAND CHAMPIONS

The Program Provides

- Free technical assistance, support & training
- Directory of vendors & products
- Certificate of participation
- Recognition

NERC-APR GOVERNMENT RECYCLING DEMAND CHAMPIONS

Examples of Readily Available Products with PCR Content

- Clothes/uniforms
- Flooring
- Furniture – indoor & outdoor
- Landscaping products
- Non-pressure pipes
- Office supplies
- Outdoor lumber
- Plastic bags
- Recycling containers, bins, roll-offs, & compost containers
- Traffic control
- Other, including electronics

Plastic Drainage Pipes Certified to AASHTO M294R rely on PCR HDPE

NERC-APR
GOVERNMENT RECYCLING
DEMAND CHAMPIONS

Vendors of Products Made with Recycled Plastics

Work in Progress Items | Packaging | Film/Consumables | **Government Products** | Other

Company	Contact Information	Recycling/Garbage Containers *(commercial, residential, office)*	Trash Bags	Infrastructure/ Drainage Pipe	Outdoor Products	Other
Advance Drainage Systems Hilliard, Ohio	Dan Figola, Sustainability Director (630) 768-2988 dfigola@ads-pipe.com			X		
Berry Global Evansville, IN	Susan Schlamersdorf, Marketing Communications Manager (574) 975-9936 SusanSchlamersdorf@BerryGlobal.com		X			
EcoGlobal	Steve Gladstone, Product Development Lead steve@ekomats.com					Ground access mats, pallets, walkways, curbing, tactile paving, storm drains, car stops, platforms, beach

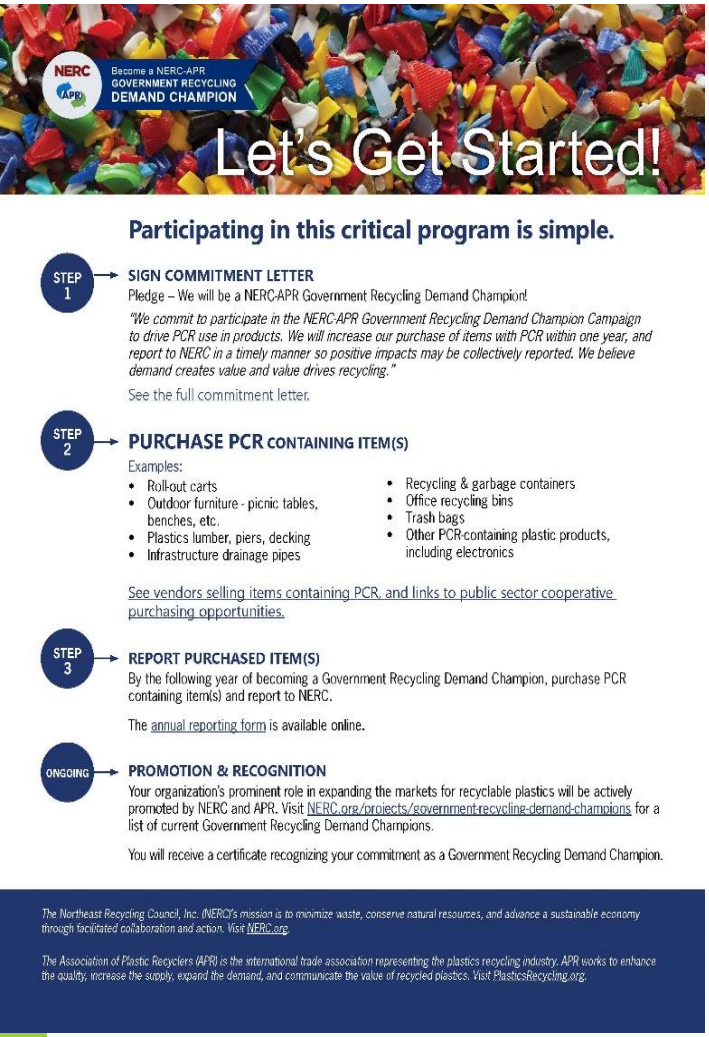
Product Directory

NERC-APR GOVERNMENT RECYCLING DEMAND CHAMPIONS

Cost Impact of Buying PCR Containing Products

Most products will be the same price as products with virgin resin

NERC-APR GOVERNMENT RECYCLING DEMAND CHAMPIONS



Let's Get Started!

1. Sign Commitment Letter
   - *Champions* purchase PCR containing products
   - *Advocates* develop a system & plan to purchase PCR containing products
   - State Recycling Organization Advocates agree to promote the program
2. Report annually
3. Get recognition

NERC-APR GOVERNMENT RECYCLING DEMAND CHAMPIONS

Champions

- Hudson Valley Improvement Authority (NY)
- Maryland Department of General Services

Advocate

- New Hampshire R4 Program

State Recycling Organization Advocate

- Maryland Recycling Network

NERC-APR GOVERNMENT RECYCLING DEMAND CHAMPIONS

Website Resources

- Fact Sheets
  - Champion
  - Advocate
  - State Recycling Organization
- Commitment letters
  - Champion
  - Advocate
  - State Recycling Organization Advocate
- Products and companies with post-consumer resin
- Specification examples
- A Roadmap to Buying Products with Recycled Content
- Third Party Certifications Verifying PCR

NERC-APR GOVERNMENT RECYCLING DEMAND CHAMPIONS

Upcoming Webinars

November 5 – Introduction to the Government Recycling Demand Champion Program

January 2021 - How to Buy Recycled – Training

February 2021 – Introduction to the Government Recycling Demand Champion Program

Webinars can be found at:
nerc.org/news-and-updates/breaking-news

NERC-APR GOVERNMENT RECYCLING DEMAND CHAMPIONS

Join Now! Contact Information

- Lynn Rubinstein

lynn@nerc.org

802-254-3636

- Website

https://nerc.org/projects/government-recycling-demand-champions

NERC-APR GOVERNMENT RECYCLING DEMAND CHAMPIONS

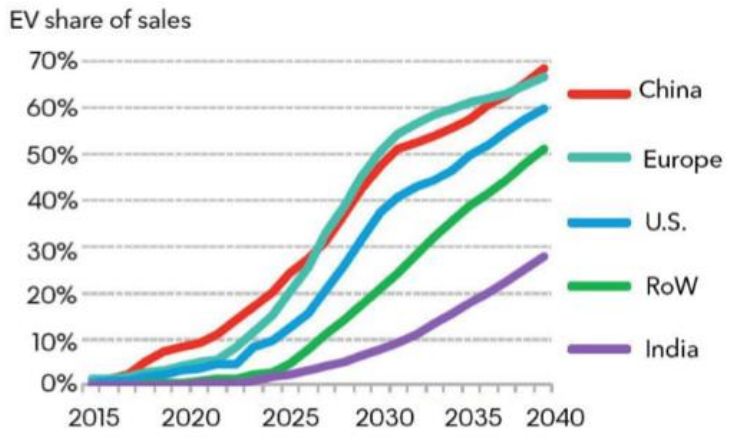
Creating a Clean, Affordable and Resilient Energy Future for the Commonwealth

DOER
Massachusetts Department of Energy Resources

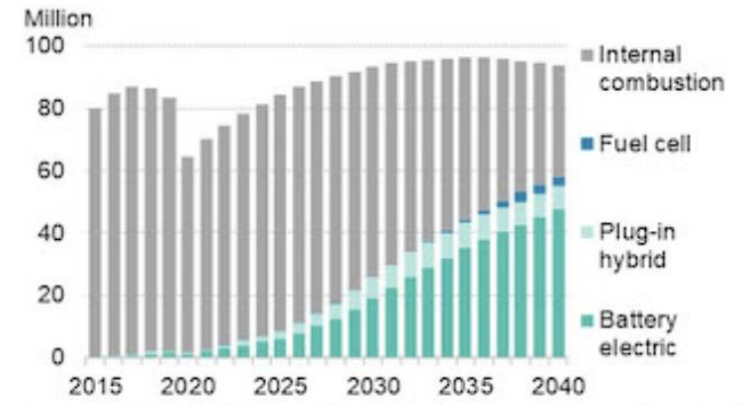
You CAN Get There From Here:

Up-and-Coming Zero-Emission Vehicles

Global Trends and Projections



Global Annual Passenger Vehicle Sales by Drivetrain



Model Availability

- **500 EV models** expected to be available globally by **2022**

Passenger EV Sales

- **2025**: 8.5 million **(10%)**
- **2030**: 26 million **(28%)**
- **2040**: 54 million **(58%)**

Global EV Fleet

- 2020: **8.5** million
- 2030: **116** million

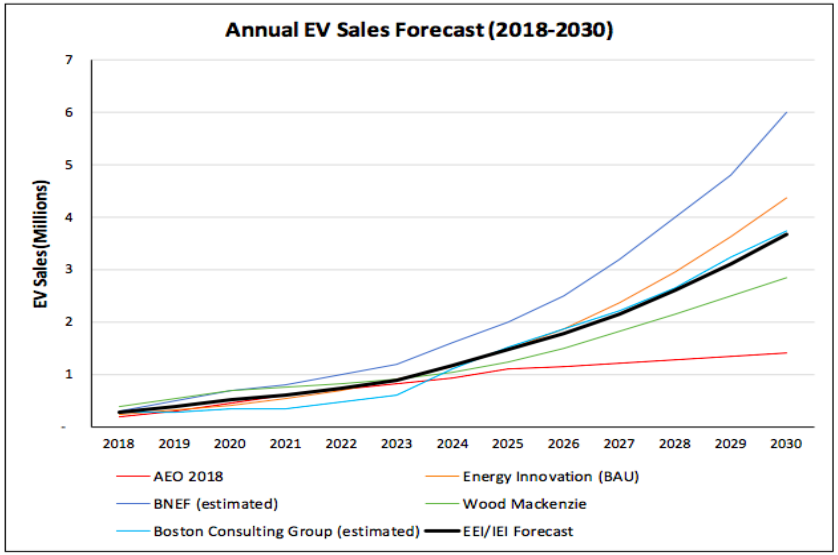
Shared Mobility

- **80%** projected to be EV by **2040**

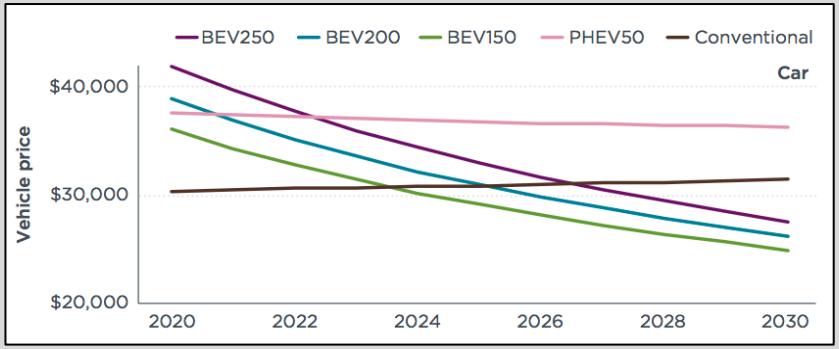
Source: BNEF 2020 Electric Vehicle Outlook; Geotab Electric Vehicle Trends 2020

U.S. Outlook and Projections

- Number of available EV models increasing rapidly
- Pickups coming in 2021-2022; vans coming in 2022-2024
- Significant growth in MD/HD EVs
- Forecast for U.S. EV sales:
  - ~3.5M annually by 2030
  - ~18M EVs on road in 2030
- Passenger EVs likely to reach cost parity with ICEVs by mid-2020's



Source: IEI-EEI 2018 Electric Vehicle Sales Forecast



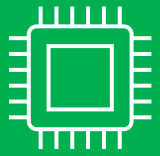
Source: ICCT 2019 Electric Vehicle Costs in the U.S.

EV Market Drivers

Policy

- Fuel economy & emissions regs
- ZEV commitments & quotas
- State & local policies & programs

Technology



- Battery energy density increasing
- New battery chemistries emerging
- EV charging speed increasing

Economics

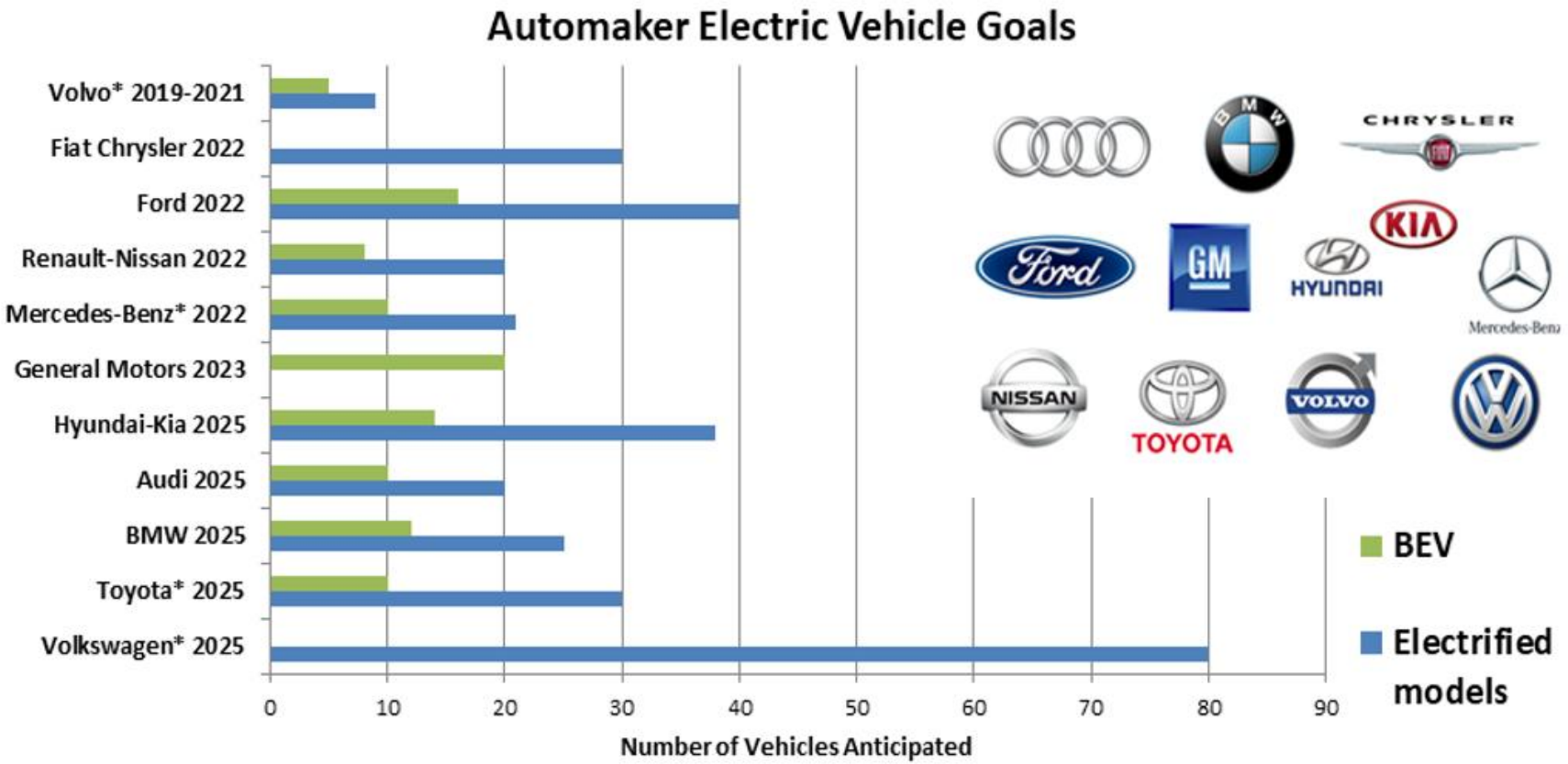
- Battery prices falling rapidly
- EV upfront price parity by 2025
- Impact on oil & electricity demand

Companies

- Manufacturer commitments
- Large fleet orders
- Ride share commitments

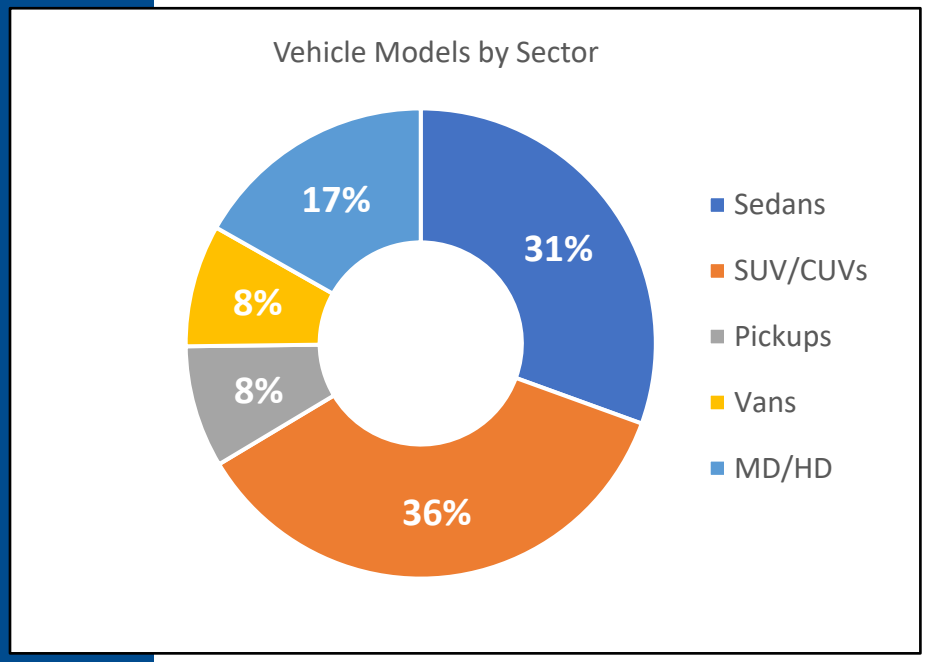
Manufacturer Goals

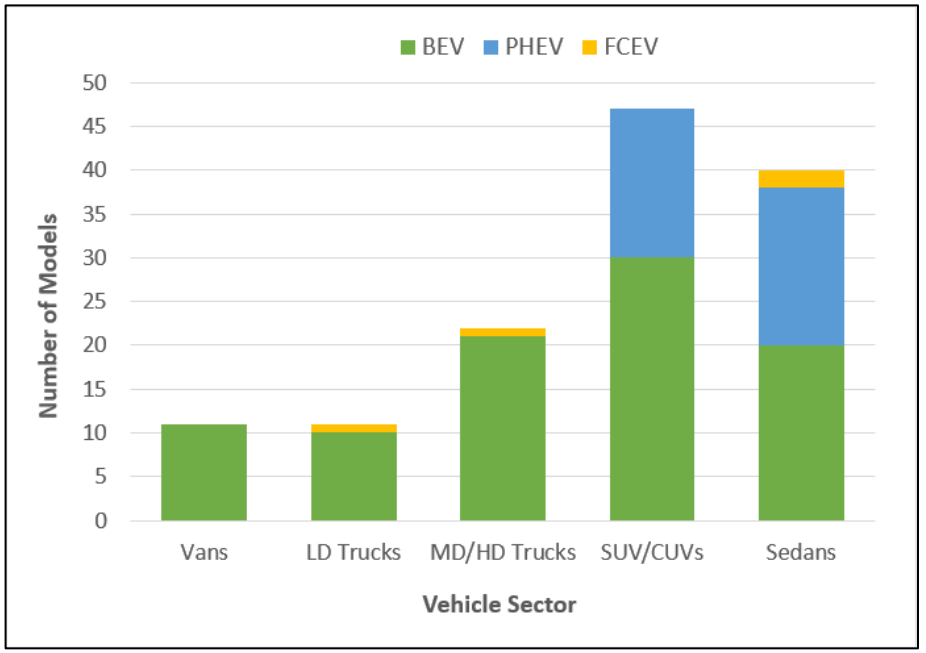
- Manufacturers committing to dozens of new electrified models, full fleet conversions, and ZEV productions quotas through 2030
- Billions of dollars going into research & development of ZEV technologies



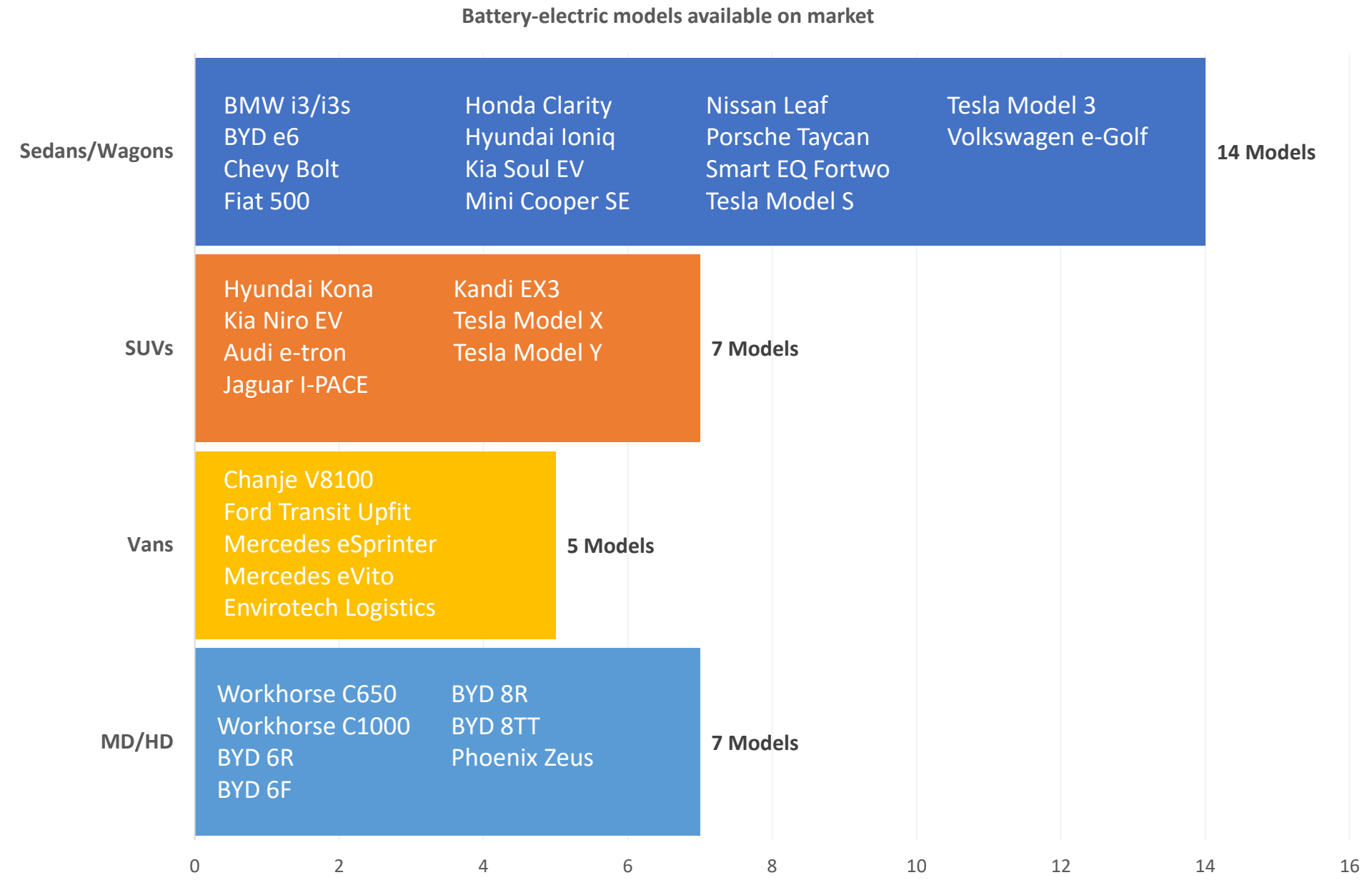
Available & Upcoming ZEV Models by Sector

- Roughly 60 ZEV models currently available, additional 60+ models with available specs expected by 2023 (with more coming every day)
- SUV/CUV sector shows largest growth over next two years
- Pickups & vans show rapid uptick starting in 2022-23

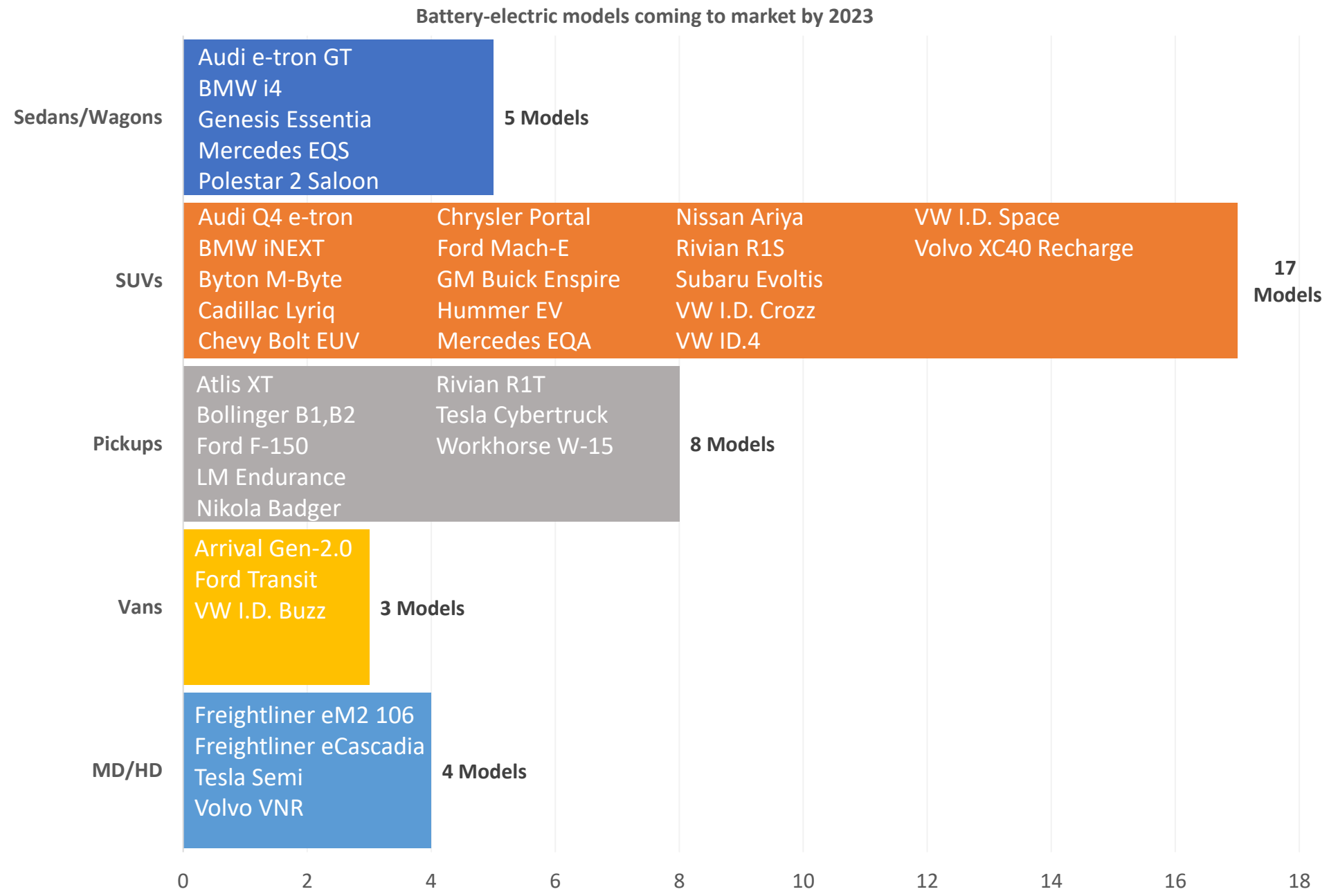




Currently available BEV models (U.S.)



Upcoming 2021-2023 BEV models (U.S.)



What can you do now?

Looking into new vehicles for your fleet?

- Currently 10 PHEV/BEV models available on contract VEH98, with more coming to meet your diverse agency & fleet needs

Worried about charging options?

- Wide array of standard and innovative options offered on contract VEH102 to meet your specific site & charging needs

Need more info?

- Loads of resources for learning about EVs, EVSE, funding, and more… (AFDC, Drive Green, Eversource & NGrid funding programs, MassEVIP)

Coming to a dealer near you…

Nissan Ariya

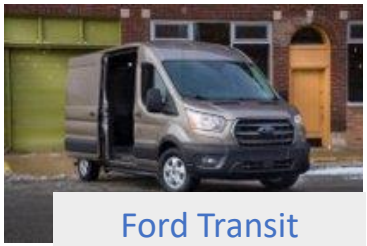
Ford F-150

LM Endurance

Volvo FE Electric

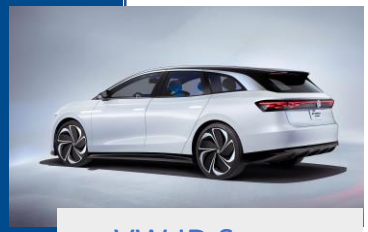
GM Buick Enspire

Rivian



Ford Transit

Phoenix ZEUS 500



VW ID Space

Nikola Badger

Volkswagen ID Buzz

Phoenix ZEUS 400

Rumor Has It…

Jaguar Retro EV?

Battery switch-out stations?

Nissan Energy Share?

Tesla & GM vans for fleets?

Million-mile batteries?

Operational Services Division (OSD)

Find EPP fuels, cleaning/disinfecting products/services, and vehicles by visiting the OSD Contract User Guides:

- ENE45: No. 2 Heating Oil and No.4 & 6 Residual Fuels (Bioheat)
- ENE47 - Ultra Low Sulfur Diesel & Biodiesel Statewide
- FAC81: Janitorial Service, Environmentally Preferable
- FAC85: Environmentally Preferable Cleaning Product, Programs, Equipment and Supplies
- VEH98: Purchase of Vehicles
- VEH102: Advanced Vehicle Technology Equipment, Supplies, and Services

www.Mass.gov/epp

Or contact Julia.wolfe@mass.gov

Statewide Contract Products with PCRC:

- Art supplies
- Binders, plastic envelopes, clipboards, picture frames
- Clothing
- Computer casing
- Entryway and other matting systems
- Landscape Site Furnishings and amenities
- Liners
- Plastic dimensional/composite lumber
- Plastic Fencing/Decking/Railings
- Playground equipment and surfaces
- Recycling/trash containers/carts/roll-offs
- Traffic cones
- Vehicle parts
- And more…check out the Environmentally Preferable Product and Service Guide

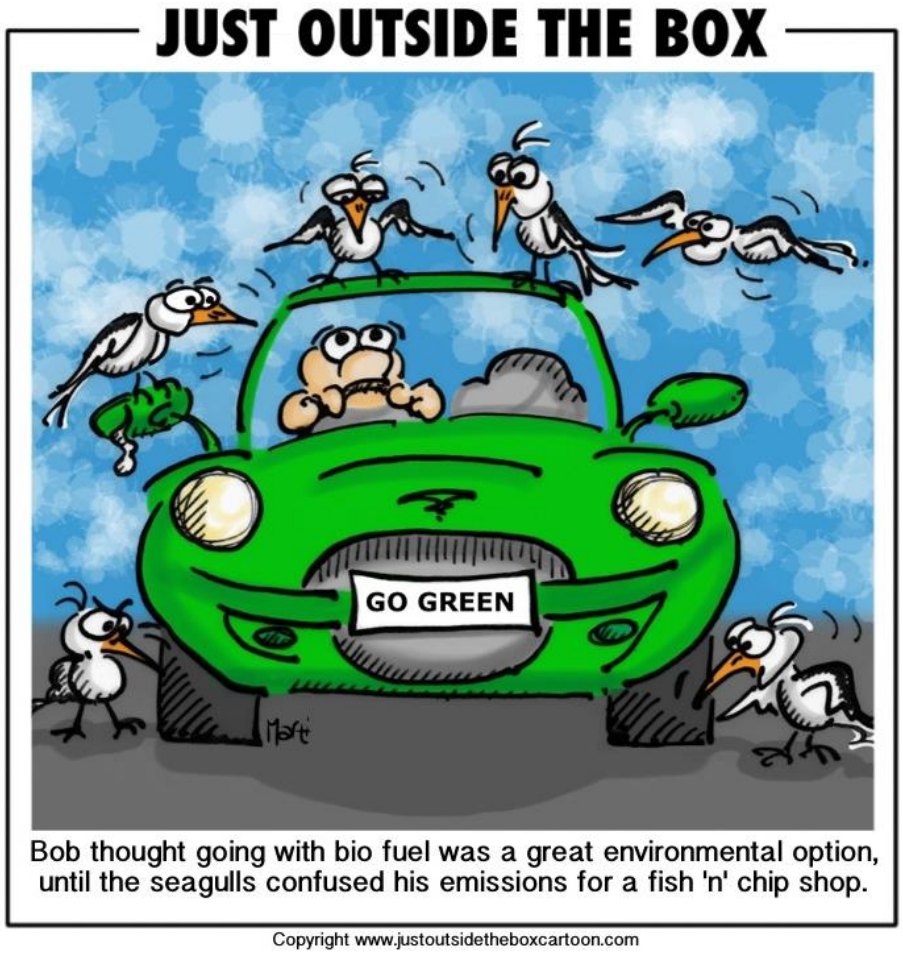
Next LBE Council Meeting

Save the Date!

Tentative: Tuesday, Nov 10, 2020

10:00 am–12:00 pm

Upcoming Tentative Meeting Dates:
Jan 12
March 9
May 11



Creating A Clean, Affordable and Resilient Energy Future For the Commonwealth

DOER
Massachusetts Department of Energy Resources

Presenter Q&A

Question	Answer
How much does B100 cost compared to regular fuel oil?	Samantha Meserve noted that with some incentives, costs can be competitive with regular fuel oil, but with lack of supply costs may be higher. Paul Nazzaro recommends entities work with their suppliers for estimates as costs depend on many factors. He welcomes anyone to reach out with any additional questions.
Do we need to advocate for plastic producers to only sell #1 and #2 plastics, as they have the easiest opportunity for reuse?	Lynn Rubinstein responded that while #1 and #2 plastics have the greatest value (particularly clear #2), there are vibrant markets and plenty of demand for other plastics.
Has been any known exploration of development of biofuels for use as sustainable aviation fuel?	Paul Nazzaro noted that there is indeed work being done on biofuels for aviation, as well as maritime and other applications, particularly out west. There is some helpful information on worldenergy.net and biodiesel.org about these.
Power Options and Solect - What is a typical block IV PPA rate for a 1 MW solar canopy?	Walter Gray responded that there are many factors that affect the PPA rate (utility, interconnection, location, etc) so t's impossible to say. However, Solect and PowerOptions can do an indicative proposal and design to provide an estimate with no obligation. Eric Friedman also noted that LBE has some data on PPA rates from multiple entities that have received LBE Grants. Catie Snyder notes that in general, those entities see a 6-30% savings with a PPA rate compared to their traditional electricity rate.
What happens with the arrays after the 20-year agreement ends?	Walter Gray explained that you have three options: 1) have Solect come remove the system at no cost, 2) extend the PPA upon mutually-agreeable terms, or 3) buy the system at a negotiated price