Agenda

• Welcome and Announcements
• Public Comments
• Prince George’s County TheBus Electrification Presentation
• Hydrogen Fuel Cell EVs Market Development Update
• Social Media, Maryland EV, and Outreach Updates
• 2021 Annual Report
• Utility Updates
• State Agency Updates
• Closing Remarks
Welcome and Announcements

Deputy Secretary Lewis, MDOT
Public Comments
Prince George’s County: TheBus Electrification

Efon Epanty & James Turner
Prince George’s County DPW&T Bus Electrification Program

• Funding
• Battery Lease
• Charging Infrastructure
• Retrofit Existing Bus Facilities
• Battery Electric Bus Testing and Training
TheBus
Battery Electric Buses (BEB)
From Proterra
FTA Low-No Program Awards and Maryland Volkswagen Mitigation Funds

DPW&T is leasing four (4) batteries per bus from Proterra (OEM).

FY2019, a total of $2.2 million in federal funding to purchase four (4) electric buses and associated charging equipment.

FY2019, the County was awarded $2.4 million in Volkswagen Mitigation funding to purchase 8 battery electric buses; anticipated arrival June 2022.

FY2021, a total of $5.1 million by the FTA to procure 4 additional electric buses, 3 plug in chargers, and 1 pantograph charger.

The estimated cost of full fleet and infrastructure transition is $78,146,460 with an additional $6,670,000 (est.) for workforce development.
Additional Funding Is Needed To Transition to Low- and Zero-Emissions Vehicles and To Build Necessary Infrastructure

Bipartisan Infrastructure Investment and Jobs Act provides funding for zero-emission public transportation options ($5.25 billion in competitive grants) to adopt low- and zero-emissions buses.

Additional funding support is needed to build the necessary electric bus infrastructure and retrofit existing facilities.
Battery Lease from Proterra

- DPW&T is leasing four (4) batteries to be paid for in annual increments over the 12-year life of the bus
- Proterra replaces the batteries under the lease agreement after six (6) years of being in service
D'Arcy Road Bus Facility

Installation of Charger Stations and Gate Controllers at the D'Arcy Bus Facility

- Gate System from Long Fence
- Battery Electric Bus Chargers
- Retrofitting existing bus facilities
Bus Charging Station Construction at D'Arcy Road in Forestville

Construction, Drainage and Lighting Enhancements
Multi-Dispenser Charging System ("Charging System")
Retrofitting Existing Bus Facilities
Operator training on the new electric transit buses is scheduled to be completed on October 13 and October 14.

Additional testing is planned for later this fall as the County preps the buses for revenue service.
Summary of DPW&T Battery Electric Bus Electrification Project

Operational Constraints
Construction Process
Challenges
Open Items
Lessons Learned
Q&A
Hydrogen Fuel Cell EVs Market Development Update

Joe Alfred & Emanuel Wagner
Business Model DMV Cluster

An approach to build the zero-emission DMV infrastructure needed to go from gasoline to green.
WHY IS HYDROGEN RELEVANT?

AN IMPORTANT WIDELY AVAILABLE FUEL

• Hydrogen also has the highest energy density of any common fuel by weight (about three times more than gasoline)
• Hydrogen is by far the most abundant element in the universe, totaling 73% of all mass. Hydrogen exists on Earth in compounds, like water.
• 10 million metric tons of hydrogen are currently produced in the U.S. 70% of this hydrogen is used in the petroleum refining industry and 20% goes into fertilizer production.

ENVIRONMENTAL BENEFITS

• Hydrogen used in fuel cells generates zero GHG emissions and criteria pollutants.
• Hydrogen-based synthetic fuels, hydrogen combustion engines, and blending hydrogen into existing fuels can also reduce or eliminate emissions across a variety of applications.

ADVANTAGES AS AN ENERGY CARRIER

• For transportation: Fast refueling, long range, no change in fueling behavior, supports heavy duty drive cycles, can replace diesel with same performance and behavior, little impacted by environmental factors
• For stationary power: Large-scale, long-term energy storage possible, transportable, easily scalable
• For production: Can be produced from a vast variety of domestic resources, allows for energy independence
WHAT CAN IT DO? - SEVEN ROLES IN THE ENERGY TRANSITION

Enable the renewable energy system → Decarbonize end uses

1. Enable large-scale renewables integration and power generation
2. Distribute energy across sectors and regions
3. Act as a buffer to increase system resilience
4. Decarbonize transportation
5. Decarbonize industry energy use
6. Help decarbonize building heating and power
7. Serve as feedstock, using captured carbon

SOURCE: Hydrogen Council
FUEL CELL ELECTRIC VEHICLES

Toyota Mirai (2nd Generation) Range: 420 miles
MSRP: $49,500
Toyota announced FCEV Corolla and FCEV Prius for 2023

Honda Clarity FCEV (1st Generation) Range: 360 miles
MSRP: $59,485

Hyundai Nexo (2nd Generation) Range: 380 miles
MSRP: $58,935
Hyundai announced FCEV option for every vehicle by 2028
HYDROGEN FUELING STATIONS DEVELOPMENTS

Lake Forest (2016): 1 dispenser, 1 car ~120 kg capacity - fully refuel 22 cars

2020 Grant Awards (GFO-19-602): 114 stations receive $115M = $1M of grant funding per station (average capacity 1000+kg)

2014 Grant Awards (PON-13-607): 28 stations receive $46M = $1.6M per station (average capacity 120kg)

Oakland (2019): 2 dispensers, 2 cars ~ 800 kg capacity – fully refuel 145 cars

Sunnyvale (2021): 4 dispensers, 4 cars ~ 1600 kg capacity – fully refuel 290 cars
“private industry had previously begun development on 8 stations without any request of State grant funds and an additional 15 stations have since been announced through fully private financing (for a total of 23 stations planned or under development with fully private financing).”

https://ww2.arb.ca.gov/resources/documents/annual-hydrogen-evaluation

https://cafcp.org/by_the_numbers
FUEL COST (CA)

- New stations sell hydrogen at $13.11 per kilogram including taxes * 5.6 kg = $73.42 today for 420 mile range (Mirai)
- $4.40 per gallon at 27 mpg for new gas car for 420 miles = $68.44
- 90% of hydrogen dispensed in California for transportation is **renewably sourced** due to CA’s LCFS program without any bans of production pathways
- DOE Hydrogen Shot Program seeks to reduce hydrogen cost from $5/kg today to $2/kg by 2025 and $1/kg by 2030
Meanwhile, the California Air Resources Board determined that an additional $300M in the next few years will lead to self-sufficiency in the market, effectively allowing a business case for hydrogen in which no additional government funding is necessary.

# Policy Support for Zero Emission Options

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<thead>
<tr>
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<th>CA - BEV</th>
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<tr>
<td>Infrastructure Grants</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Infrastructure Tax Credits/Rebates</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Rate Basing Infrastructure</td>
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<td>Vehicle Purchase Tax Credit/Rebate</td>
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<td>Fuel Sales Tax Exemption</td>
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<td>Yes</td>
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<tr>
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<td>No</td>
<td>No</td>
<td>N/A</td>
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* capped
** capped at too low a level to provide an incentive
POLICY RECOMMENDATIONS FOR MARYLAND

Stations:
- Development of a comprehensive Low Carbon Fuel Standard program modeled after CA’s LCFS program
- Rate Base Hydrogen Infrastructure For Gas Utilities
  - Hydrogen Blending or Dedicated Hydrogen Pipeline Conversion
  - Hydrogen Infrastructure for LD, MD and HD Fueling
- Create State Tax Credits for Hydrogen Fueling Infrastructure
- Create limited funding program for initial infrastructure rollout to develop core fueling station network
- Remove Sales Tax from Hydrogen Fuel

Vehicles
- Waive the Excise Tax for ZEV Purchases
- Adopt FCEV Bulk Purchase programs
  - (e.g. FCE Bus Program for Transit Agencies, FCE Truck Program for HD Fleets, FCEV Program for LD State Fleets)

Hydrogen Production
- Offer Wholesale Access Rates to Hydrogen production via electrolysis
- Incentivize Renewable Hydrogen Production via Tax Credit or Renewable Gas Standard (RGS)
One significant advantage of fuel cell trucks in comparison to battery-powered is the weight of the fuel itself.

A fuel cell for long-haul truck loses about 1,000 pounds of cargo capacity compared to a diesel engine (assuming a maximum weight of 80,000 pounds).

A battery to power a long-haul truck (even with a battery mass of 4 kg/kWh, which has yet to be achieved for heavy-duty vehicles) would lose around 5,000 pounds of capacity. With current battery masses, the capacity loss would be closer to 10,000 or 15,000 pounds.

FUEL CELL ELECTRIC TRUCKS

- Toyota Kenworth FCET (T680)
- Cummins FCET
- Hyundai FCET (XCIENT)
- Mercedes-Benz FCET (GenH2)
- PACCAR FCET
- HYZON FCET
OTHER FUEL CELL ELECTRIC VEHICLE OPTIONS

BMW iX5

Hyzon Class 2-3 FCEV

Sierra Northern Railway H2 Switcher Locomotive

CMB.TECH Hydrogen Excavator

Hydrogen FCEV Ferry Boat (SeaChange)

Hydrogen FCEV UPS Delivery Can (Linamar)
Many of the slides are sourced from the CHBC 2021 Hydrogen Industry Slide Deck: www.californiahydrogen.org

FCEV Sales, FCEB, & Hydrogen Station Data - https://cafcp.org/by_the_numbers


2020 Hydrogen Station Network Self-Sufficiency Analysis per Assembly Bill 8: https://ww2.arb.ca.gov/sites/default/files/2020-11/ab_8_self_sufficiency_report_draft_ac.pdf


Social Media, Maryland EV, and Outreach Updates

Carrie Giles, ICF
Maryland EV Website Analytics

August 1 – August 31, 2021

Top Referral Traffic:
1. bge.com: 23%
2. pepco.com: 19%
3. Facebook.com: 16%
4. Firstenergycorp.com: 11%
5. Sharpco.maps.arcgis.com: 9%
6. Mdot.Maryland.gov: 6%
7. delmarva.com: 4%
8. Blog.feedspot.com: 3%

Top Pages Visited:
1. Incentives: 1,193 (38%)
2. Homepage: 881 (28%)
3. Charging: 351 (11%)
4. The-ev-journey: 182 (6%)
5. ev-101: 135 (4%)

I'm not pumped, I'M CHARGED!

Make the switch to electric and get charged about driving! Choose an electric vehicle that's right for you and your lifestyle. Save on fuel, maintenance, and taxes, all while contributing to a cleaner environment.

New to EVs? Start Here!
Maryland Electric Vehicle
August 2 • ️

Maryland continues to innovate in the world of EVs. A startup from Hyattsville, MD is developing refueling stations for hydrogen fuel cell vehicles. Read the article here: https://technical.ly/.../07/13/ally-power-hydrogen-stations/

Additionally, you can learn more about hydrogen powered EVs at our website.
https://marylandev.org/hydrogen-101/... See More

Maryland Electric Vehicle
August 9 • ️

According to a recent press release, “The Montgomery County Department of Transportation (MCDOT) is installing 42 electric vehicle (EV) charging station wayfinding signs in Bethesda, Silver Spring and Wheaton to make drivers aware that they can easily find opportunities to charge their environmentally friendly vehicles.”

See the press release here:
https://www2.montgomerycountymd.gov/mcgp.../Press_Detail.aspx...
Maryland EV Social Media Post Examples

Maryland Electric Vehicle
August 20

Want to suggest a new charging station location? Scroll through our interactive Maryland EV Journey to make a suggestion.
https://marylandev.org/the-ev-journey/
#MarylandEV #EV #EVCrarging

Maryland Electric Vehicle
August 23

Get excited for more EV charging solutions in Central Maryland! Tritium (Tritium) has partnered up with Greenlots (Greenlots) and Baltimore Gas and Electric (MyBGE) to enhance charging infrastructure in the Baltimore area by installing charging stations at retail centers, airports, government parking lots, and libraries.
Learn more here (Business Wire):
https://www.businesswire.com/.../Tritium-Partners-With-Greenl......
See More
National Drive Electric Week Events

• Annapolis – September 26
• Clarksville – September 25
• Frostburg – September 25
• Poolesville – September 18
## 2021 Annual Report – Important Dates

<table>
<thead>
<tr>
<th>Date</th>
<th>Task</th>
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<tbody>
<tr>
<td>October 1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>ZEEVIC Member Text Due</td>
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<tr>
<td>October 31&lt;sup&gt;st&lt;/sup&gt;</td>
<td>Program Numbers Cutoff</td>
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<tr>
<td>November 5&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Program Numbers Due</td>
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<tr>
<td>December 1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>Report Due</td>
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Utility Updates
## Utility EVSE Program Metrics

Through August 31, 2021

<table>
<thead>
<tr>
<th></th>
<th>Residential Rebates</th>
<th>Multifamily Rebates</th>
<th>Public EVSE</th>
<th>EV TOU Rate Program</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BGE</strong></td>
<td>1,276 applicants</td>
<td>65 ports rebated</td>
<td>422 EVSE installed or planned (150 energized)</td>
<td>507 participants</td>
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<td></td>
<td></td>
<td>40 BGE-owned</td>
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<tr>
<td></td>
<td></td>
<td>claimed</td>
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<td><strong>PHI</strong></td>
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<tr>
<td><strong>Potomac Edison</strong></td>
<td>129 applicants</td>
<td>0 applicants</td>
<td>16 Level 2 EVSE 4 DC Fast EVSE</td>
<td>152 participants</td>
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<tr>
<td><strong>SMECO</strong></td>
<td></td>
<td></td>
<td>9 Level 2 EVSE (dual port)</td>
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<tr>
<td>BGE Program</td>
<td>Modification Description</td>
<td></td>
<td></td>
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<tr>
<td>Education &amp; Outreach 1</td>
<td><strong>REVISED:</strong> Education and Outreach budget be increased from 5% to 10%.</td>
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</tr>
<tr>
<td>Residential 1</td>
<td><strong>REVISED:</strong> BGE has issued all 1,000 residential rebates; requests an additional 2,500 residential rebates plus implementation costs.</td>
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<tr>
<td>Residential 2</td>
<td><strong>REVISED:</strong> Rebate re-structure: Original $300 upfront rebate then ongoing $50 annual credits for staying enrolled in TOU rate or charging off-peak 90% of the time. Includes implementation estimate.</td>
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<tr>
<td>Residential 3</td>
<td><strong>NEW:</strong> Low Income customers are provided with a $1,000 rebate for the purchase and installation of a smart charger. Includes implementation estimate.</td>
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<tr>
<td>Multifamily 1</td>
<td><strong>REVISED:</strong> Additional 100 L2 EV chargers to be installed and operated by BGE on Multifamily properties.</td>
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<tr>
<td>Multifamily 2</td>
<td><strong>REVISED:</strong> Change the current multifamily rebate structure from $25,000 per site to $30,000 per site providing rebate recipients the opportunity to install two DCFC units (up to $15,000 each)</td>
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<tr>
<td>Multifamily 3</td>
<td><strong>NEW:</strong> A 25% discount for multifamily tenants to utilize BGE’s public DCFC stations.</td>
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<tr>
<td>Multifamily 4</td>
<td><strong>NEW:</strong> Provide 1 EV and 1 L2 charger at 15 multifamily properties serving limited-income customers within BGE’s territory.</td>
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<tr>
<td>Public 1</td>
<td><strong>NEW:</strong> Maintenance contract with Greenlots to provide 98% uptime for BGE’s public charging network for remaining 2.5 years of the program.</td>
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<tr>
<td>Public 2</td>
<td><strong>REVISED:</strong> From an 80:20 split of L2:DCFC to a 60:40 split, resulting in 100 more 50kW DCFCs and 100 less L2 chargers for the same total of 500 chargers.</td>
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<tr>
<td>Public 3</td>
<td><strong>NEW:</strong> Purchase of 100 150kW DCFC instead of 50kW DCFCs (assume the 60:40 split in “Public 2”)</td>
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<tr>
<td>Fleet/Workplace 1</td>
<td><strong>NEW:</strong> Provide a fleet calculator tool on BGE’s website.</td>
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<tr>
<td>Fleet/Workplace 2</td>
<td><strong>NEW:</strong> Provide a 50% rebate on the cost of equipment, warranty and installation for eligible Level 2 chargers. Customers can receive up to $5,000 per charging port and $30,000 per sites</td>
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</tr>
<tr>
<td>Fleet/Workplace 3</td>
<td><strong>NEW:</strong> 100 technical assessments for all different types and sizes of fleets in Maryland.</td>
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</tr>
<tr>
<td>Fleet/Workplace 4</td>
<td><strong>NEW:</strong> Convene a working group focused on fleets to offer suggested programs by Q2 2022.</td>
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Potomac Edison: EVSE Pilot Program Changes

- Residential Program Enhancements
  - Increase customer education, marketing, and outreach from 5% to 10% of the program budget
  - Request approval to utilize the Residential Off-Bill Credit program in lieu of an EV-only TOU rate or, in the alternative, increase the budget to reflect implementation of the EV-only TOU rate.

- Multifamily Program Enhancements
  - Install utility-owned Level 2 chargers at multifamily locations

- Public Charging Program Enhancements
  - Allow Level 2 chargers to be installed on gated government properties
  - Co-term EV Pilot and Storage Pilot project end dates at Urbana Park and Ride

- Fleet Program Enhancements
  - Convene a Work Group to develop Fleet EV Programs
SMECO: EVSE Pilot Program Changes

• Allow, on a case-by-case basis, public facing Level 2 EVSEs to be placed in locations that close the property to the public for relatively short durations of the night.

• Increase SMECO’s ability to install stronger DCFC’s.

• Future Programs:
  • SMECO intends to file with the Commission a program to implement Residential Rebates for EVSE installations.
  • SMECO intends to file with the Commission to offer a program for EVSE installation at multi-unit dwellings.
State Agency Updates
MDE Program Updates

Volkswagen Settlement Updates

• On August 26th the Governor's Office issued a press release regarding the announcements of awardees for the first round of funding under the Maryland VW EVSE Programs.
• All Agreements/MOU's, for both the CAGP and ECGP, have been sent out to awardees for review and signatures
• Goal is to have all Agreements in place by the end of October
• MDE/MEA accepting comments on both VW EVSE Programs until September 30th.
• Goal is to open Round Two of funding in late November/early December
MEA Program Updates

• MEA has processed $295K worth of rebates, totaling 311 chargers
  • $152,387 for 272 residential EVSE
  • $142,178 for 39 commercial EVSE
  • Program support on the way- 2 energy specialists expected to begin by the end of the month

• Clean Fuels Incentive Program (CFIP)
  • FY22 program opened 9/1, closes 12/31
  • Up to $80K/vehicle for MHD BEVs
  • More time for project completion, equity now considered in evaluation criteria

• Clean Fuels Technical Assistance (CFTA) Program
  • Anne Arundel County final report almost done
  • Will evaluate program and plot next steps later this fall
Additional State Agencies

- MDOT
- MDP
- Commerce
- DGS
Closing Remarks – Deputy Secretary Lewis

• Next Meeting November 2021