



# MARYLAND ZERO EMISSION

## Electric Vehicle Infrastructure Council

September 17, 2020

# Agenda

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- Welcome and Announcements
- Introductions
- Public Comments
- MDE Update
- Fuel Cell EV Market and Trends: Perspectives
- Medium- and Heavy-Duty ZEV MOU
- Legislative Update
- Communications Working Group Update
- State Agency Updates
- Utility Updates
- Closing Remarks

# Welcome and Announcements

Deputy Secretary Lewis, MDOT



# Introductions



# New ZEEVIC Member

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Joe Alfred

*President, Ally Power Inc.*

*Fuel Cell EV Infrastructure Equipment Manufacturer*



# New ZEEVIC Member

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David Edmondson

*City of Frederick, MML urban/suburban region*

# New ZEEVIC Member

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Nina Forsythe

*City of Frostburg, MML Rural Region*

*EVSE in Downtown Frostburg*



# New ZEEVIC Member

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Jeff Shaw

*Vice President, Distributed Energy & Sustainability  
SMECO - Electric Company*





# New ZEEVIC Member

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Jason Tai

*Tesla/Consultant*

*Plug-In Electric Vehicle Manufacturer*

# New ZEEVIC Member

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**Bob Wimmer**

*Director, Energy & Environment Research, Toyota  
Fuel Cell EV Manufacturer*



# Public Comments



# MDE Updates



# Volkswagen Settlement – EVSE Funding Comment Period Open

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MDE will accept comments on the two proposed frameworks until C.O.B. on **October 12th, 2020**.

Comments may be submitted to [mde.vw@maryland.gov](mailto:mde.vw@maryland.gov)

Volkswagen EVSE Infrastructure program details are available [here](#).



# Fuel Cell EV Market and Trends: Perspectives

Bob Wimmer, Toyota

Joe Alfred, API

# Toyota Electric Drive Vehicle Update

**Robert Wimmer**

**Director, Energy & Environmental Research**

**Toyota Motor North America**

September 2020

# TOYOTA ENVIRONMENTAL CHALLENGE 2050

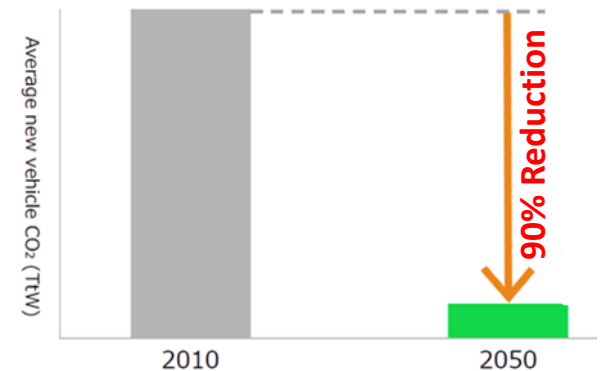


CHALLENGE 1	CHALLENGE 2	CHALLENGE 3	CHALLENGE 4	CHALLENGE 5	CHALLENGE 6
New vehicle Zero CO <sub>2</sub> Emissions Challenge	Life Cycle Zero CO <sub>2</sub> Emissions Challenge	Plant Zero CO <sub>2</sub> Emissions Challenge	Challenge of Minimizing and Optimizing Water Usage	Challenge of Establishing a Recycling-based Society and Systems	Challenge of Establishing a Future Society in Harmony with Nature



## Challenge 1

Tank-to-wheel CO<sub>2</sub> Emissions Compared to 2010





# Toyota Electric-Drive Product Offerings

Compact/  
Medium



Corolla Hybrid

Prius

Prius AWD

Best selling  
PHEV in U.S.



Prius Prime

Coming in 2021



Mirai II FCEV

Large/  
Premium



Camry Hybrid

**Toyota Hybrid**



ES 300h



LC 500h



Venza



Avalon Hybrid

**Lexus Hybrid**



LS 500h

SUV



RAV4 Hybrid



UX 250h



NX 300h



Highlander Hybrid



RX 450h

Best selling  
FCEV



Mirai FCEV



RAV4 Prime

**Plug-In Electric  
Hydrogen Fuel Cell**

Commercial



UNO FC Utility Tractor  
Rig (prototype)



FC Box Truck  
(prototype) (Japan)



Portal FC Truck (prototype)



Sora FC Bus (Japan)

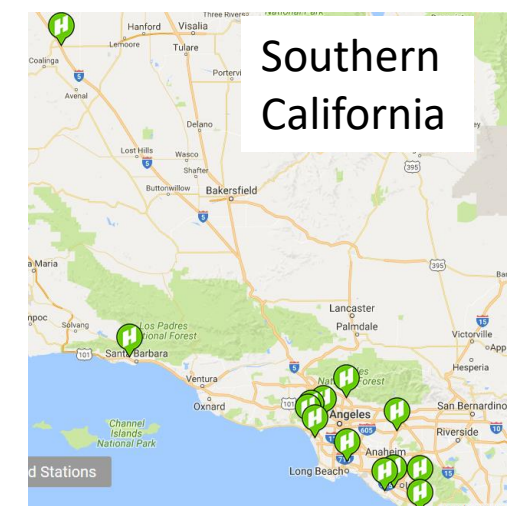
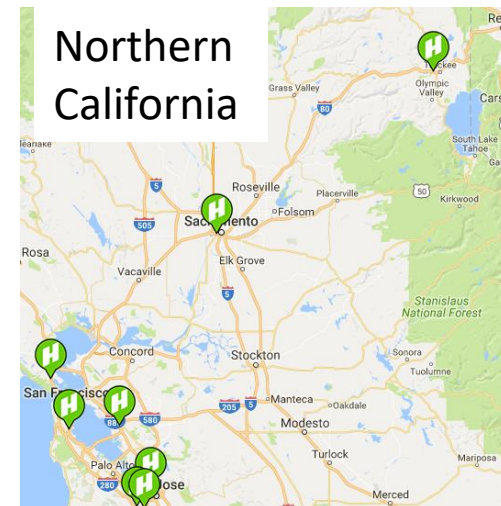
# Light-Duty Vehicle and Station Status



- Latest 4-nozzle, 1200kg/day station in Fountain Valley, CA can refuel 300-400 FCEVs/day
- One fueling standard like gasoline vehicles

## United States

- ✓ 8000+ FCEVs on the road (6000+ Mirai)
- ✓ 42 H<sub>2</sub> stations open in California
  - ✓ 22 under construction or funded
  - ✓ Awards proposed for +120 stations
- ✓ Cost / capacity declining rapidly
- ✓ Stations coming on-line in Northeast





# Toyota Demonstrating HD-FCEV Drayage Application

## \$82M "Shore-to-Store" ZANZEFF\* Project

### Regional & Global Benefits

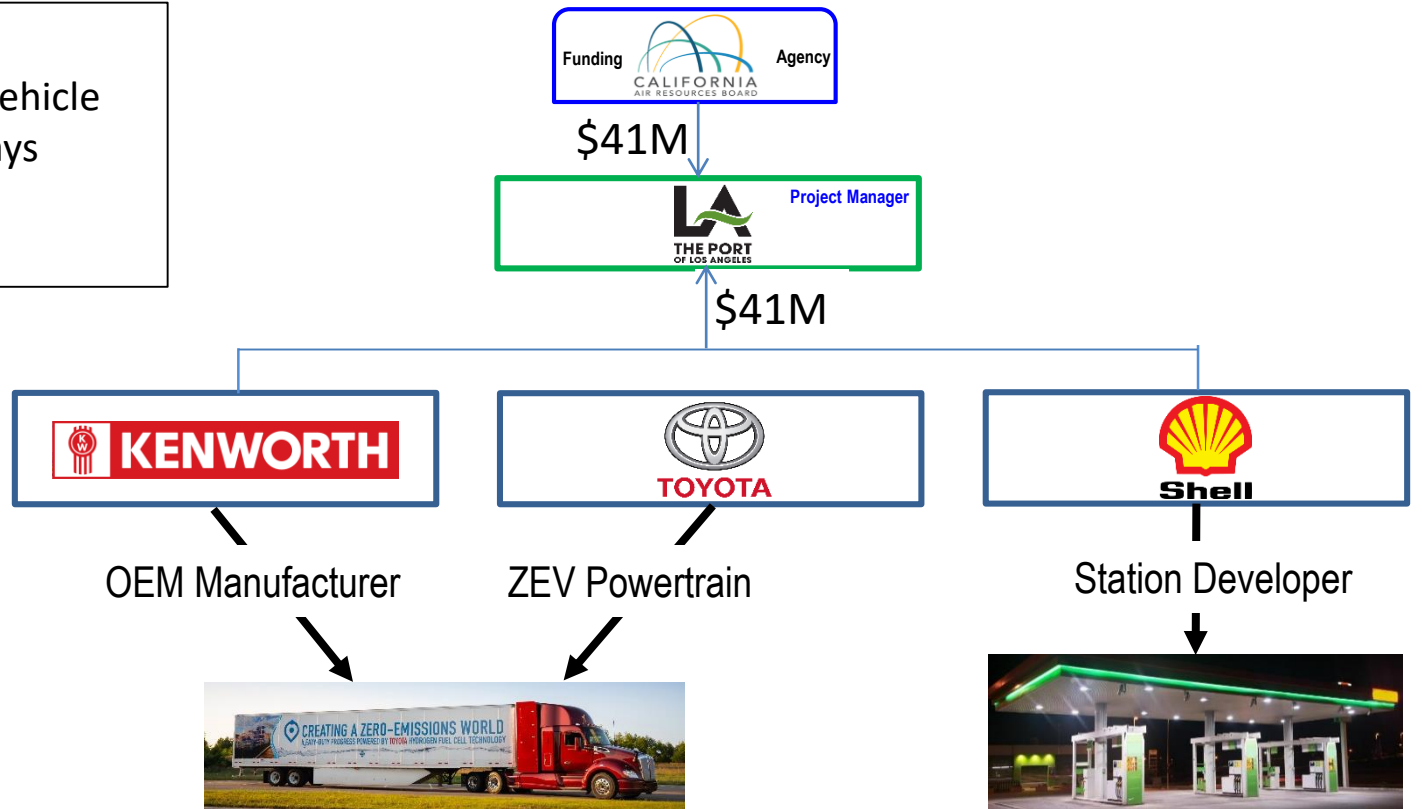
- Elimination of particulate and NOX emissions from vehicle
- Health benefits for communities near port & highways
- Quick refueling
- Low / zero carbon fuel options

### Results to Date

- 3 prototype trucks undergoing real-world tests
- Production truck deliveries beginning soon
- Vehicle learning will reduce future costs
- Development of high capacity refueling equipt.
- Next gen equipment significantly lower cost

### Truck Operators

- Toyota Logistical Services (4)
- United Parcel Service (3)
- Total Transportation Services (2)
- Southern Counties Express (1)



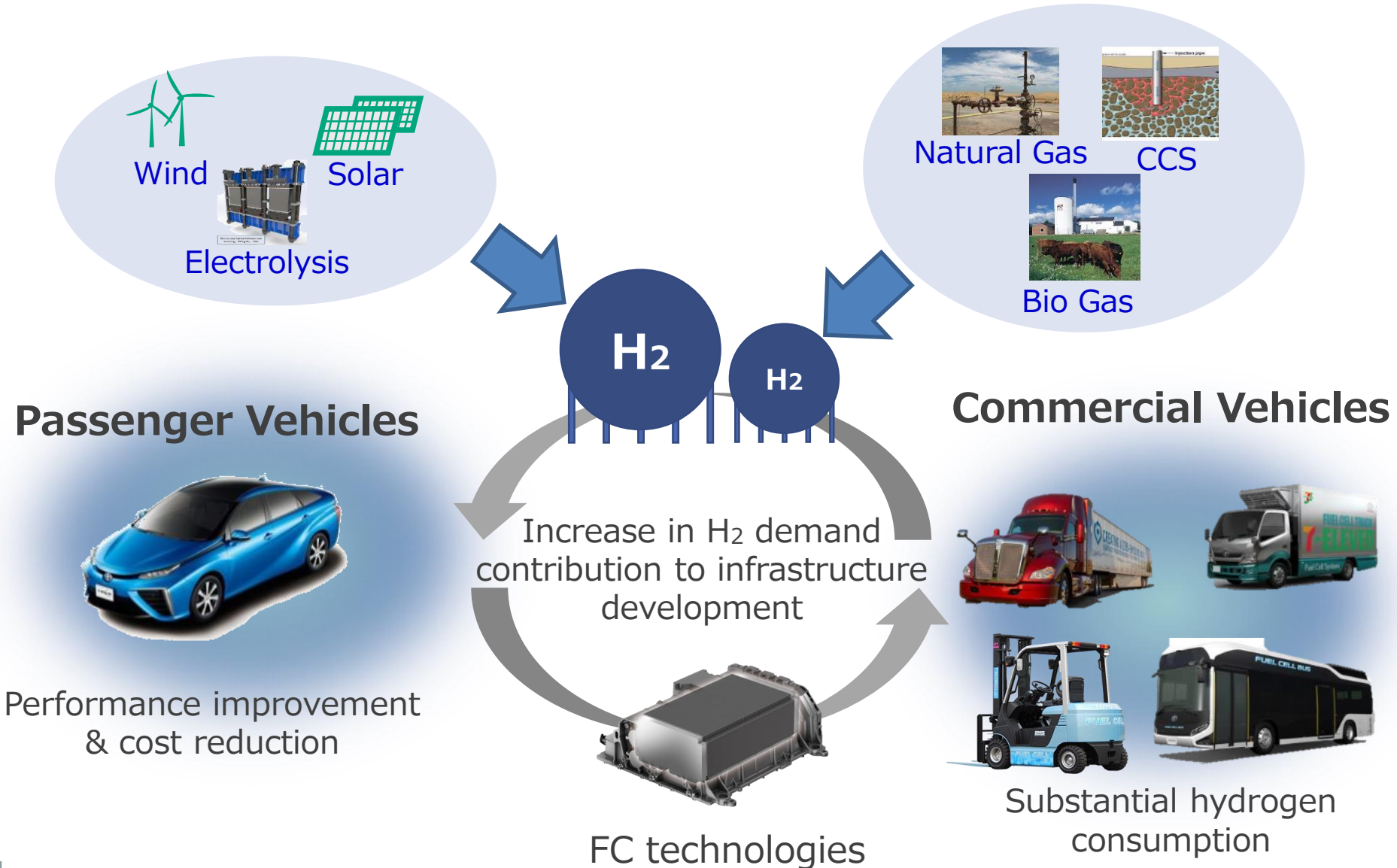
\* 10 FCEV Class 8 On-Road Trucks



\* 2 High Capacity Heavy-Duty Hydrogen Fueling Stations

Video of Prototype FCEV tractor trailer:  
<https://www.youtube.com/watch?v=4hLw38rYsZY>

# Diversification is Necessary for Growth & Success



## Passenger Vehicles



Performance improvement & cost reduction

## Commercial Vehicles



Substantial hydrogen consumption

FC technologies

# NE FCEV Expansion

## Progress

- MA DOT and Boston Fire positive on allowing light-duty FCEVs in Boston area tunnels
- Toyota & Air Liquide developing 10 H<sub>2</sub> stations in Boston area, 4 complete
- TCI (Transportation Climate Initiative) revenues could fund incentives for vehicles and future stations

## Challenges

- Leasing and permitting of new station sites in downtown locations
- Limited state and federal funds for station development
- Need to restart tunnel discussion in NYC metro area

## MD Status

- FCEVs prohibited from using Harbor tunnels. Need to understand MD Tunnel Authority concerns
- State ban on some hydrogen production processes in 2026, problematic for station providers
- Intend to work with TCI to develop funding mechanism for H<sub>2</sub> infrastructure in MD





*2021 Prius*



*2021 RAV4 Hybrid*

***Thank You For Your Attention***



*TS050 Hybrid*



*2020 Mirai*



# Ally Power

Presentation to the Maryland ZEEVIC Meeting

September 2020



**Mission statement:  
*Moving America  
from Gasoline to  
Green***







# Where Are We?

## The State of Hydrogen

- As of August 2020 – 44 publicly available hydrogen fueling stations. Of those 42 are in California





# Where Are We?

## The State of Hydrogen

- There are about 8,000 hydrogen fuel cell vehicles on the road
- Sales peaked in 2018, with a small drop in 2019





Who Are We?

## The State of Hydrogen

Of the major automakers –

- Cummins
- GM
- Honda
- Hyundai
- Mercedes
- Toyota
- Volvo

# The problems - Infrastructure

44 publicly available stations are barely enough to begin to study hydrogen vehicle benefits.

With 40 of those being in CA, the vast majority of vehicle owners probably don't even know that hydrogen vehicles exist.

Until you can drive a vehicle through every one of the contiguous 48 states, hydrogen will not be a viable consumer option.

# The problems - Pollution

As of 2019, 98% of hydrogen is produced by steam methane reforming, which emits carbon dioxide.

Recent Maryland legislation banned the sale of hydrogen produced through steam methane reformation.

The bulk of hydrogen is also transported to fueling stations in trucks, so pollution is also emitted in its transportation.

## The problems - Cost

Hydrogen fuel prices range from **\$12.85** to more than **\$16** per kilogram.

That is roughly the equivalent on a price per energy basis to **\$5.00 - \$6.00** per gallon of gasoline.

Currently, automobile manufacturers and dealers are subsidizing the consumer hydrogen market.

State funding still subsidizes the hydrogen market in California, but the state plans to phase out those subsidies.

## The problems – Supply

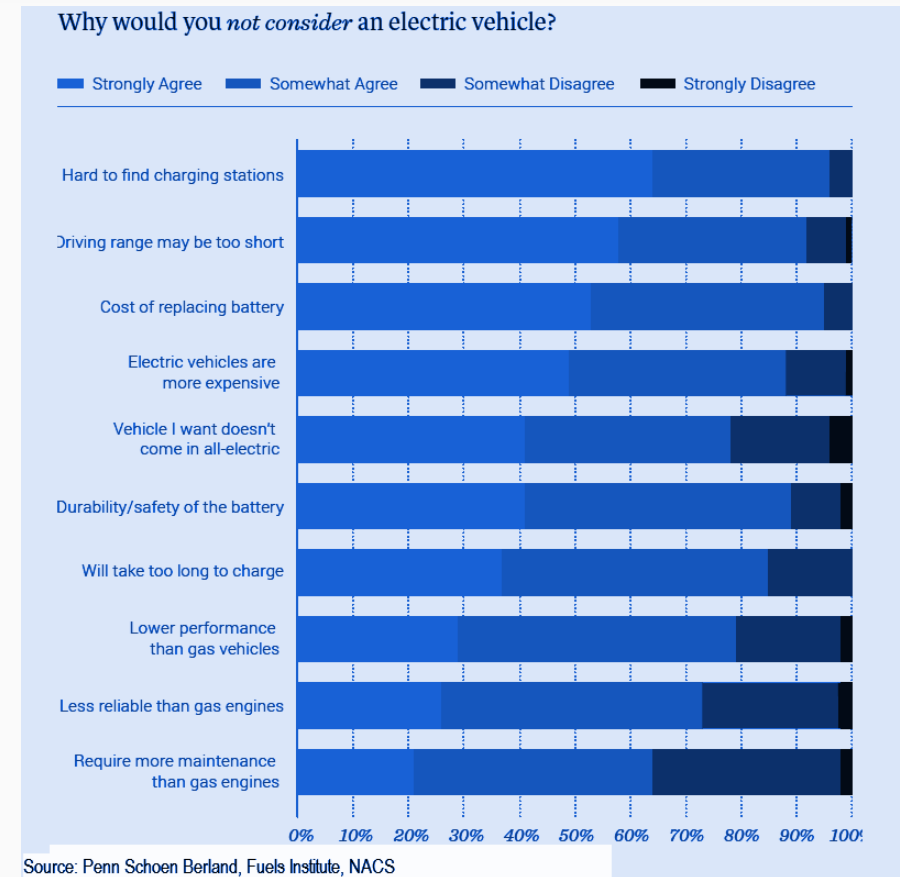
Most hydrogen is produced offsite and delivered by trucks to multiple hydrogen stations.

An interruption at just one production site can shut down several stations, leaving vehicle owners with zero refueling options.

# The problem – American Consumers

American consumers overwhelmingly believe that electric vehicles:

- Don't have enough charging stations
- Don't offer enough driving range
- Are too expensive
- Aren't available in models that they want to buy







solutions

# The solutions - Infrastructure

Experts believe hydrogen fuel cells strengths are in long haul and heavy use truck markets. But that infrastructure needs to be built.

Automakers, green energy companies and other investors are willing to partner with states to build that infrastructure.

Once the trucking infrastructure is built, it will be easy to layer the infrastructure needed to serve passenger vehicle market.

States are moving forward – See CA and WGA ZEV Infrastructure Roadmaps.

# The solutions - Pollution

Companies, like Ally Power, are experimenting with new and old methods of hydrogen production, with varying levels of “green.”

Because of investments of industry and governments, greener options are consistently being brought forward.

# The solutions - Cost

As experimentation drives hydrogen to further down the green scale, it also drives down costs, both of hydrogen and fuel cell vehicles.

Companies like Ally Power are looking to cut the price of hydrogen in half, making the cost comparable to, if not lower than, the price of gasoline equivalent.

## The solutions – Supply

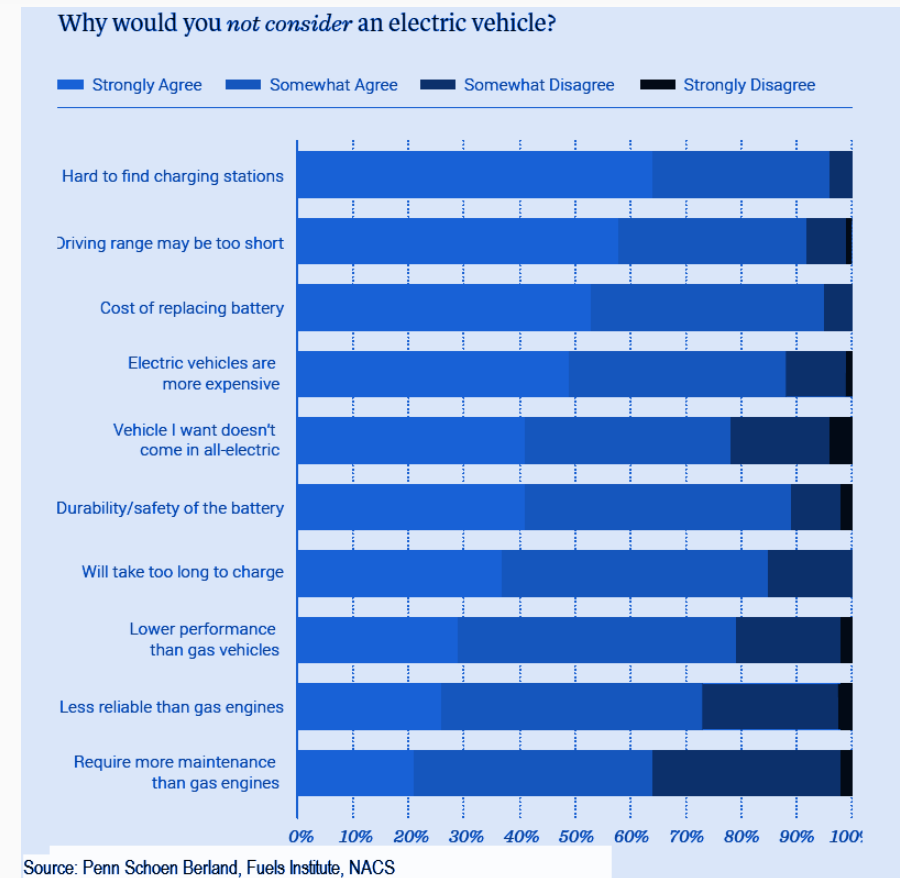
The pipelines that are currently moving natural gas around the country can be used to move hydrogen gas.

Companies like Ally Power are looking at smaller-scale production facilities that will ensure ample supply of hydrogen, and significantly reduce the need for hydrogen delivery.

# The solution – American Consumers

Hydrogen fuel cells reduce some of the most significant barriers consumers give for not considering an electric vehicle: vehicle range and length to charge.

States can invest to help solve the greatest barrier – that it's hard to find stations.





# Medium- and Heavy-Duty ZEV MOU

Deputy Secretary Lewis, MDOT

# Legislative Update

Jeff Tosi, MDOT





A stylized graphic in the top right corner shows two hands, one in red and one in white, holding a globe. The globe is composed of yellow, grey, and white segments. The hands are rendered in a simple, modern style with white outlines and flat colors.

# Communications Working Group Update

Colleen Turner, MDOT

# Website Analytics

August 1 – August 21, 2020

**Page Views:** 1,869

## **Audience Overview:**

Search Traffic\*: 57%

Referral Traffic: 15%

Direct Traffic: 28%

## **Top Referral Traffic:**

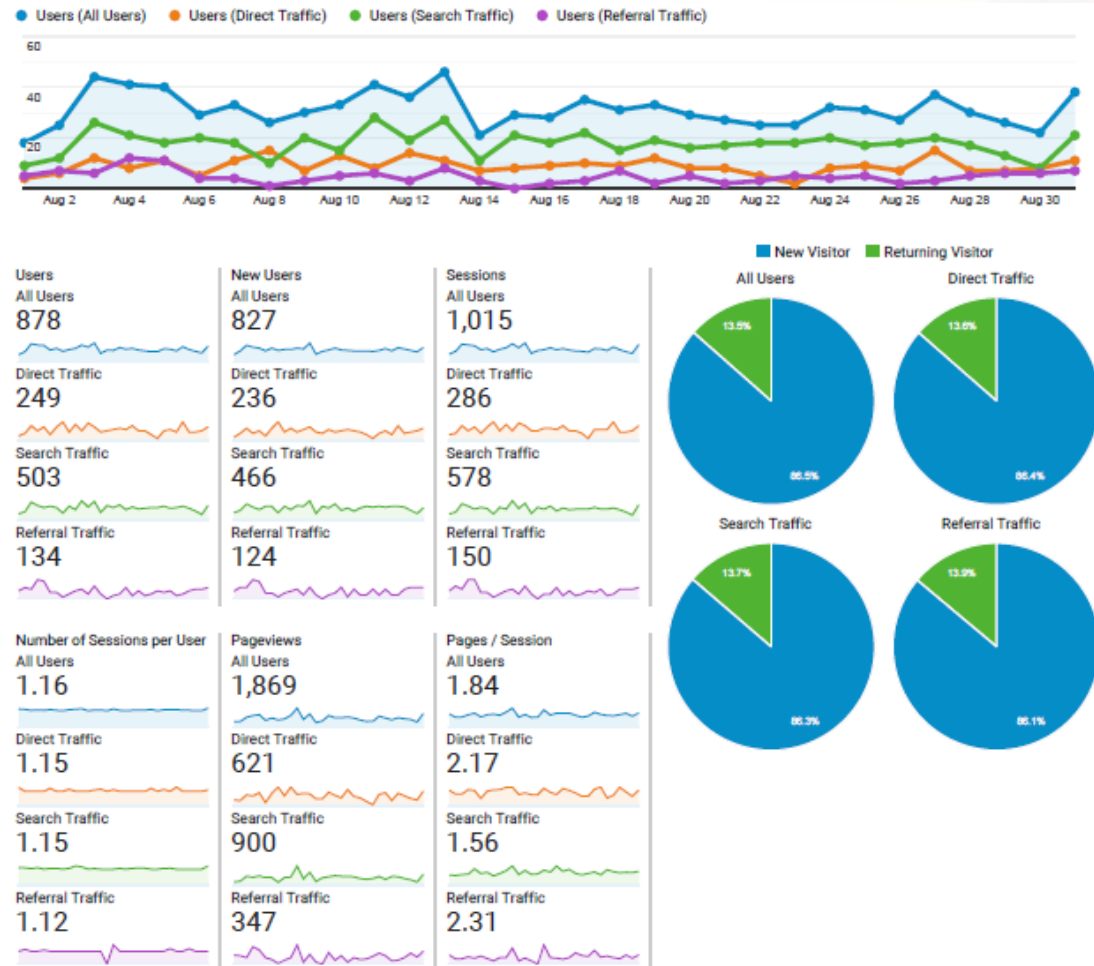
1. bge: 38%
2. pepco: 19%
3. delmarva: 6%
4. firstenergycorp.com: 6%
5. smeco.coop: 4%
6. facebook.com: 3%
7. pinterest.com: 2%
8. solarunitedneighbors.org: 2%

## **Top Pages Visited:**

1. Incentives: 856 (45%)
2. Homepage: 509 (27%)
3. Charging: 163 (8%)
4. ev-101: 115 (6%)
5. hydrogen-101: 64 (3%)
6. resources: 35 (1%)
7. resources/useful-links: 28 (1%)
8. resources/ev-calculators: 27 (1%)

# Website Analytics

August 1 – August 31, 2020



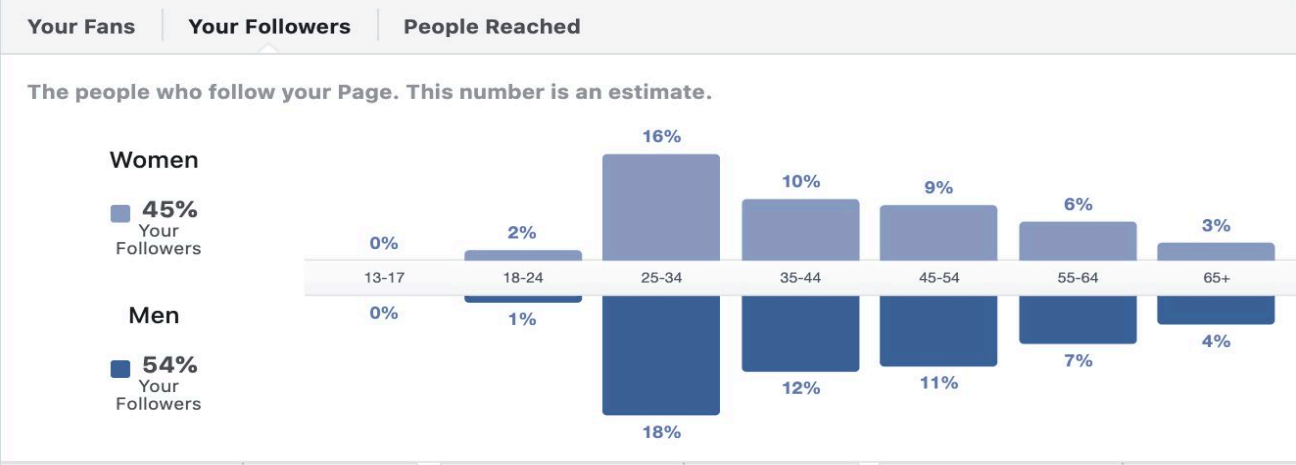
# Social Media Analytics

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## Highlights:

- Total Posts in 28 Day Period: 16
- Post Engagements: 62
- Post Reach: 202

# Facebook Audience Demographics





# Social Media Post Examples

## Facebook and Instagram

**MDEV Maryland Electric Vehicle**  
Published by Sharp & Company [?] · Just now ·

We can all breathe easier knowing that over a 12 year period, Maryland has led all states in reducing harmful emissions. The linked article by [Grist.org](#) highlights a recent study completed by the [World Resources Institute](#) concluding that MD achieved its 1st place status by reducing emissions 38%. What makes this achievement even more impressive was that the state continued to grow its economy. EVs play a key role in further reducing emissions by utilizing the states cleaner energy mix to transport its residents and economy into a greener future. Well done, MD!

Acadia Center U.S. Energy Information Administration #MarylandEV #EV #ClimateChangeMaryland #ActOnClimate #RebuildBetter #PeopleOverPolluters  
<https://grist.org/.../which-states-are-making-the-most-progr.../>

**Time for a change**  
Carbon dioxide emissions, percent change, 2005–2017

State	Change (%)
Washington	+5%
Idaho	+17%
S. Dakota	+9%
Texas	+3%
New Hampshire	-37%
Maine	-33%
Maryland	-38%

CO<sub>2</sub> emissions, 2007 vs. 2005 (% change)

**MDEV Maryland Electric Vehicle**  
Published by Sharp & Company [?] · 1m ·

Did you know that an EV could serve as a backup generator for your home? [Forbes](#) describes how current and future EVs could help solve a myriad of power issues that home owners and utilities currently face. #MarylandEV #EV  
<https://www.forbes.com/.../evs-are-not-a-problem-for-the-el.../>

FORBES.COM  
**EVs Are Not A Problem For The Electric Grid, They Are The Solution**

Like Comment Share

Comment as Maryland Electric Vehicle  
Press Enter to post.

**MDEV Maryland Electric Vehicle**  
Published by Sharp & Company [?] · Just now ·

Looking for a place to charge your EV when away from home? Part of Maryland's Zero Emission's Electric Vehicle Infrastructure Council (ZEEVIC) responsibilities are to promote statewide charging infrastructure. When traveling with your EV, rest assured that there are 708 stations and 2,166 charging outlets in MD to choose from.  
[http://www.mdot.maryland.gov/.../Elect.../About\\_the\\_Council.html](http://www.mdot.maryland.gov/.../Elect.../About_the_Council.html)  
Visit the National repository of EV Station information to find one near your home, work, or travel destination. #MarylandEV #EV #RoadTrip  
<https://afdc.energy.gov/stations/#/find/nearest>

Like Comment Share

Comment as Maryland Electric Vehicle  
Press Enter to post.

**MDEV Maryland Electric Vehicle**  
August 31 at 12:10 PM ·

[Intelligent Transport Systems \(ITS\) Centre](#) notes a new study from [Northwestern University](#) which finds that widespread US adoption of electric vehicles could save approximately \$17 billion annually by avoiding damages from climate change and air pollution. Start driving an EV and become a part of the change. #MarylandEV #EV #ClimateChangeMaryland  
<https://www.intelligenttransport.com/transport-news/104617/widespread-ev-adoption-could-save-u-s-70-billion-annually-study-finds/>

INTELLIGENTTRANSPORT.COM  
**Widespread EV adoption could save U.S. \$70 billion annually, study finds**

76 People Reached 7 Engagements

Like Comment Share

Comment as Maryland Electric Vehicle  
Press Enter to post.



# National Drive Electric Week Events

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- Annapolis Virtual Showcase – October 1
- Annapolis Recovery Zone Exhibition – October 2
- EVADC Virtual Event – October 4
  
- Additional National events are available at [www.driveelectricweek.org](http://www.driveelectricweek.org)



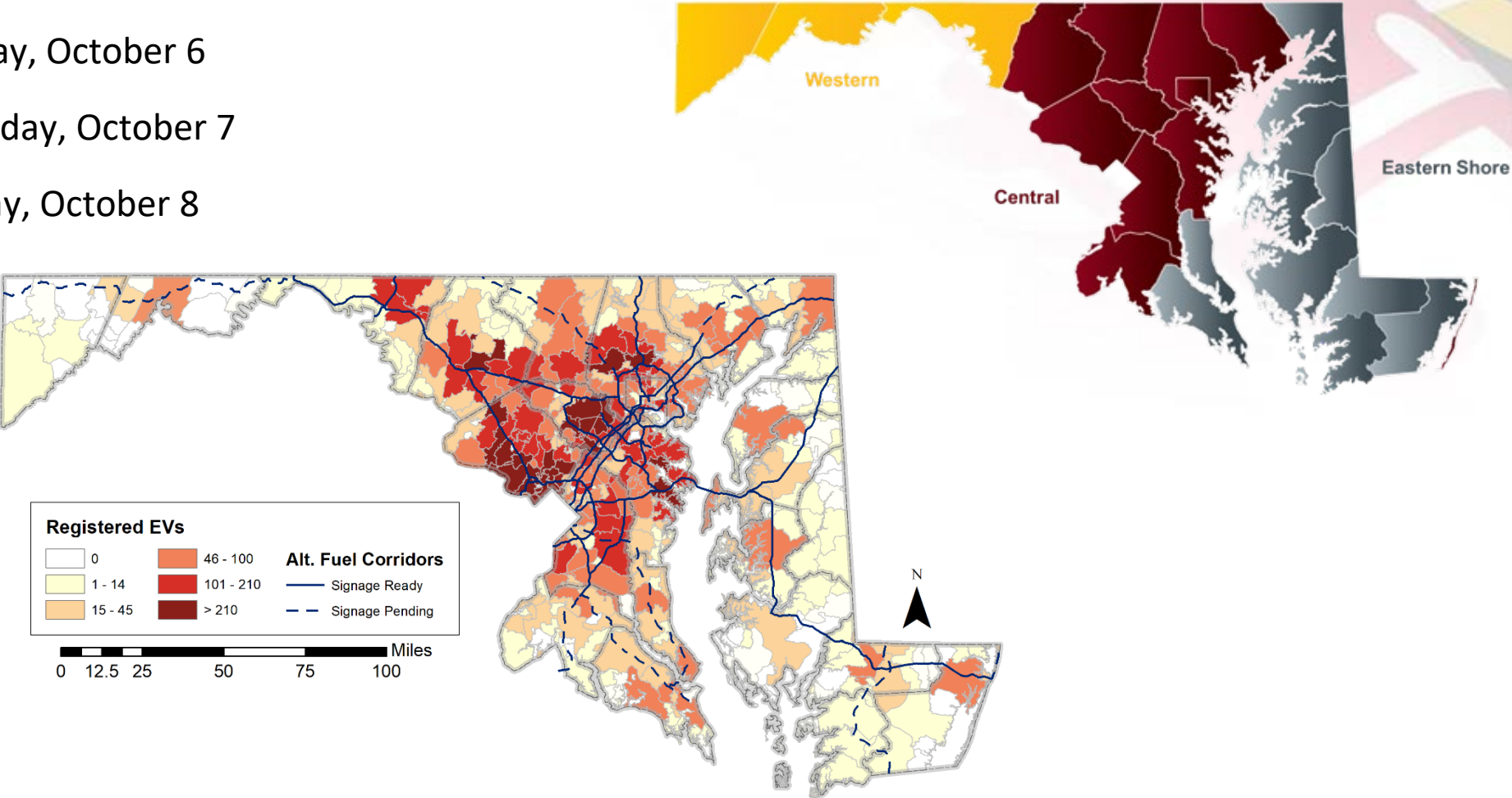
# State Agency Updates

# Local Outreach – ZEV Webinars

Western region: Tuesday, October 6

Eastern Shore: Wednesday, October 7

Central region: Thursday, October 8



# ZEEVIC Annual Report

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## 2019-2020 Existing Priorities

- Maximize the use of grant and alternative funding opportunities for EV and EVSE in Maryland.
- Develop an approach to address the Right to Charge and EV Parking/Anti-Icing.
- Ensure EV readiness through strategic infrastructure planning that focuses on corridors, workplaces, and communities.
- Continue education and outreach coordination with a focus on diversity and equity.

# Utilities Updates



# Closing Remarks – Deputy Secretary Lewis

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- Next Meeting November 2020