TODAY’S AGENDA

• Electric vehicles
• EV charging stations
• Questions / Discussion
• Trivia Question
• Next Meeting: February 15, 2023 at 10:00 AM
Vehicle Types

• Internal Combustion Engine (ICE)
• Hybrid Vehicles (HEV)
• Plug-In Hybrid Electric Vehicles (PHEV)
• Battery Electric Vehicles (BEV)
Hybrid Electric Vehicle

- Internal combustion engine (spark ignited)
- Power Electronics Controller
- DC/DC Converter
- Thermal System (cooling)
- Exhaust System
- Fuel Filler
- Fuel Tank (gasoline)
- Traction Battery Pack
- Electric Traction Motor
- Electric Generator
- Transmission
- Battery (auxiliary)
Top 5 selling Hybrid Electrics in 2022

• Toyota RAV4 Hybrid
• Toyota Highlander Hybrid
• Toyota Prius
• Toyota Camry Hybrid
• Honda CR-V Hybrid
Top 5 selling PHEV in 2022

• Jeep Wrangler 4xe
• Ford Escape Plug In Hybrid
• BMW x5 xDrive 45e
• Toyota Prius Prime
• Chrysler Pacifica Hybrid
Top 5 Battery Electric Vehicles in 2022

• Tesla Model Y
• Tesla Model 3
• Ford Mustang Mach E
• Chevy Bolt EV / EUV
• Volkswagen ID.4
<table>
<thead>
<tr>
<th>Vehicle Make</th>
<th>Vehicle Model</th>
<th>Number Registered on Campus</th>
<th>Oldest License Plate Registration Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tesla</td>
<td>Model 3</td>
<td>71</td>
<td>January 2020</td>
</tr>
<tr>
<td>Tesla</td>
<td>Model S</td>
<td>26</td>
<td>November 2014</td>
</tr>
<tr>
<td>Tesla</td>
<td>Model Y</td>
<td>28</td>
<td>July 2021</td>
</tr>
<tr>
<td>Tesla</td>
<td>Model X</td>
<td>12</td>
<td>September 2017</td>
</tr>
<tr>
<td>Ford</td>
<td>Mach E</td>
<td>1</td>
<td>August 2022</td>
</tr>
<tr>
<td>Chevy</td>
<td>Bolt</td>
<td>7</td>
<td>April 2022</td>
</tr>
<tr>
<td>Nissan</td>
<td>Leaf</td>
<td>29</td>
<td>December 2015</td>
</tr>
<tr>
<td>BMW</td>
<td>i3</td>
<td>3</td>
<td>August 2019</td>
</tr>
<tr>
<td>Hyundai</td>
<td>Ioniq 5</td>
<td>2</td>
<td>August 2022</td>
</tr>
<tr>
<td>Volkswagen</td>
<td>ID4</td>
<td>5</td>
<td>August 2021</td>
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</table>
Types of EV Charging

<table>
<thead>
<tr>
<th>Level</th>
<th>Range</th>
<th>Application</th>
</tr>
</thead>
</table>
| Level 1        | 2 to 5 miles of range per hour | • Single Family Homes  
                 |                        | • Multi-Unit Residential  
                 |                        | • Condos               |
| Level 2        | 10 to 30 miles of range per hour | • Single Family Homes  
                 |                        | • Multi-Unit Residential  
                 |                        | • Workplace            |
| Level 3        | 150 to 350+ miles of range per hour | • Fleet  
                 | (Direct Current Fast) | • Public               |
                                           |                        | • Multi-Unit Residential |

Source: https://www.phoenix.gov/sustainabilitysite/Pages/Basics-of-Charging.aspx
Source: https://electrek.co/2021/10/22/electric-vehicle-ev-charging-standards-and-how-they-differ/
Level 1: Charging on Campus in 2017
Level 2 Charging
DC Fast Charging: Tesla Supercharger
DC Fast Charging: Electrify America
DC Fast Charging: EVgo in Norfolk
Tesla Supercharging Network

Source: https://www.tesla.com/en_eu/supercharger
Electrify America Fast Charging Network

Source: https://www.electrifyamerica.com/locate-charger/
EVgo Fast Charging Network

Source: https://www.evgo.com
EV Charging Locations near ODU main campus

Source: https://www.plugshare.com
ODU EV Charger Requirements

- Division of Engineering and Buildings (DEB) and Construction and Professional Services Manual (CPSM) stipulate specific requirements
- Capital Construction projects such as the new Biology building
- Provide both Electric Vehicle Parking Spaces (EVPS) and Electric Vehicle Charging Stations (EVCS). Number of spaces determined by occupancy calculations
- Long Term Planning: New construction projects shall provide capacity and infrastructure for ten (10) year future expansion
- Residential projects require the most (1 per 20 spaces until 2030, then 1 per every ten spaces), Other building occupancy types vary
- Required to be installed IAW Executive Order 45 (Floodplain Management)
### EV charging at other Virginia institutions:

<table>
<thead>
<tr>
<th>Institution</th>
<th>Charging Stations</th>
</tr>
</thead>
<tbody>
<tr>
<td>George Mason University</td>
<td>13</td>
</tr>
<tr>
<td>James Madison University</td>
<td>8</td>
</tr>
<tr>
<td>University of Virginia</td>
<td>2</td>
</tr>
<tr>
<td>Virginia Tech</td>
<td>3</td>
</tr>
<tr>
<td>Virginia Commonwealth University</td>
<td>4</td>
</tr>
</tbody>
</table>
Topic ideas for next meeting?

- Parking Citations, Appeals, Boots, Tows
- Preparing for New Buildings / Capital Projects
- EVMS Integration
Questions?
Next Meeting Date:

Wednesday February 15, 2023
10:00 AM Webb Center – Chesapeake / Porstmouth
Trivia Question:

Where is America’s oldest continuously operating gas station?

Bonus: When did it open?
Answer

Reighard’s station: Altoona, PA

1908