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Ford’s approach to VGI

• Ford sees VGI as a critical element of the value creation made possible by EVs
  - Grid resource for Utilities to manage EV load (shift, shape, shave)
  - EV driver can and should earn incentives, lowering TCO and spurring greater EV adoption
  - Potential for value streams for equity-based programs

• Our approach to scaled VGI is through the OVGIP (Open Vehicle-Grid Integration Platform)

• Delivering V1G in several large pilots across the US
  - Customer enrollment (OEMs leverage multi-channel, direct connections with customer)
  - DR
  - Virtual TOU
  - Day-ahead hourly pricing
  - M&V

• Primary focus has been to leverage the embedded communications and controls in EVs to provide the most cost-effective load management with broadest reach

• V2H/V2B/V2G are next up
OVGIP – Open Vehicle-Grid Integration Platform

Utilities
Get **Data** and **Energy** services for resource planning, load balance, renewable integration

** ✓ Solves the Many-to-Many problem**
** ✓ Enables Business Efficiency for OEMs and Utilities**

**OVGIP**
EV-Grid Services Platform

Single interface point for Utilities to gain access to widest base of EVs as grid resources

**Ford and OEMs**
Enroll EV drivers and dispatch charging schedules to EVs

**EV Driver**
Paid financial rewards by Utility; no impact to daily mobility needs
**Ford Intelligent Backup Power Overview**

**Ford F150 Lightning**  
(Vehicle Backup Power Activation)

- **19.2kW AC**  
  (100A to 20A breaker)
- **10.0 kWh DC**

**Ford Charge Station Pro**

- **10.0 kWh DC**

**Home Integration System**

- **Inverter**
- **Dark Start Battery**
- **Transfer Switch (200A MID)**
- **Critical Load Panel**
- **Cellular Service (5 years)**

**Sunrun is Ford’s Preferred Installer**

<table>
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<tr>
<th>Vehicle Type</th>
<th>Included</th>
<th>Purchase @ Sunrun</th>
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<tr>
<td><strong>Extended Range Vehicle</strong></td>
<td>Included</td>
<td>($3,895)</td>
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</table>
| **Standard Range Vehicle**| Paid Activation @| ($1,300)  
  Ford (3-year Ford Warranty)* |
|                            | Purchase @ Sunrun| ($3,895)  
  (10-year Sunrun Warranty)* |

(*) - Extended warranty and service available with other offers, including solar leases
Barriers to Widespread VGI

• Get the basics right
  o More infrastructure - make-ready, MUD, low-income/disadvantaged communities, workplace. EVs can’t help the Grid unless they’re plugged in.
  o Communication standards to promote interoperability
  o Consumer education on the benefits of EVs in general

• The lack of EV specific rate structures - maximize the value of owning an EV through EV TOU
  o Placing whole home on TOU for the sake of EV charging is not a good solution for many.
  o How can EV TOU be enabled without pushing more costs onto customer for separate/sub-metering?
  o EV-based metering and telematics can potentially provide a cost-effective solution (see Alliance for Automotive Innovation reply comments to CPUC Submetering ruling)

• V2x Regulatory Issues for Customers and the Grid
  o Interconnection – simplify and streamline process for customers
  o Rates/Incentives to enable EVs to perform as a grid resource (helps to offset higher cost of bi-directional system)
  o Regulatory approvals and funding support for large pilots or programs
    o Expose more customers to the benefits of VGI (helps to increase EV adoption and can make EVs more affordable); learnings/data to quantify EV value to grid
Thank you!

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