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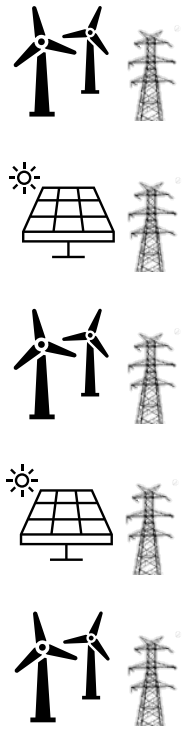
CEC VGI Workshop

July 28, 2022

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

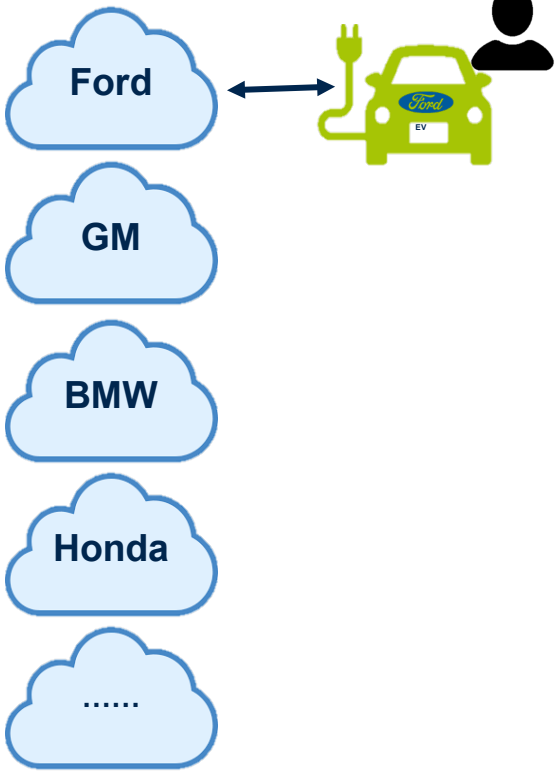
Get *Data* and *Energy* services for resource planning, load balance, renewable integration

OVGIP
EV-Grid Services Platform

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

✓ **Solves the Many-to-Many problem**

✓ **Enables Business Efficiency for OEMs and Utilities**



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)

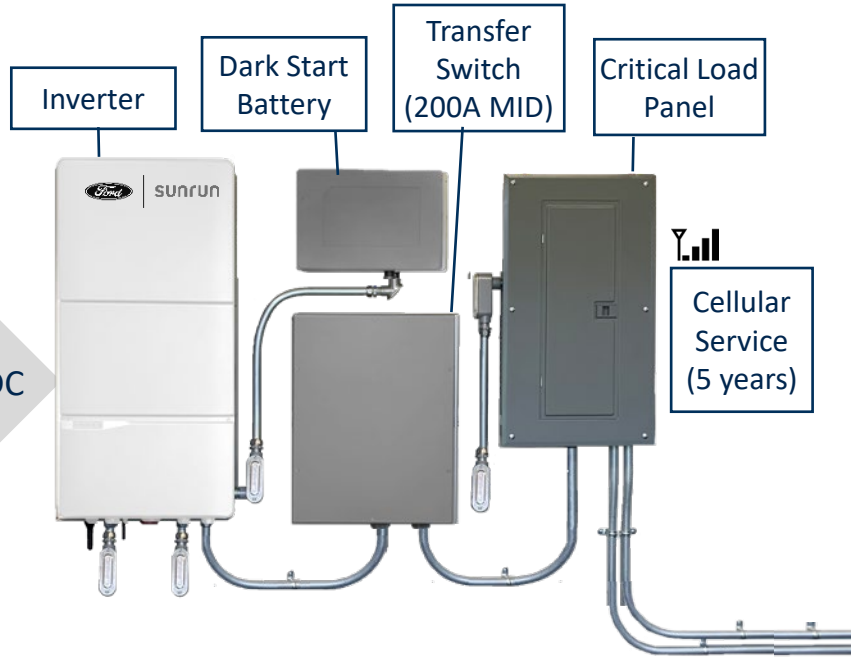
CCS Type 1 Coupler

10.0 kWh DC

Ford Charge Station Pro

10.0 kWh DC

Home Integration System



Ford Pass Customer Settings & Controls

In-Vehicle Customer Settings & Controls

Charge Station & Backup Power Setup App

Supports:
Total AC export of 9.6 kW AC
- EV – 10 kW DC
- Solar – Up to 14.4 kW DC
- 2x Stationary Storage – 10kW DC

MID (microgrid interconnect device):
- Installations will be grid tied
- V2H limited to islanded/outages
- Solar & storage will operate normally

		Sunrun is Ford's Preferred Installer	
Extended Range Vehicle	Included	Included	Purchase @ Sunrun ($3,895)
Standard Range Vehicle	Paid Activation @ Ford	Purchase @ Ford ($1,300)	Purchase @ Sunrun ($3,895)
		(3-year Ford Warranty)*	(10-year Sunrun Warranty)*

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

Barriers to Widespread VGI

- Get the basics right
  - More infrastructure - make-ready, MUD, low-income/disadvantaged communities, workplace. EVs can't help the Grid unless they're plugged in.
  - Communication standards to promote interoperability
  - 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
  - Placing whole home on TOU for the sake of EV charging is not a good solution for many.
  - How can EV TOU be enabled without pushing more costs onto customer for separate/sub-metering?
  - 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
  - Interconnection – simplify and streamline process for customers
  - Rates/Incentives to enable EVs to perform as a grid resource (helps to offset higher cost of bi-directional system)
  - Regulatory approvals and funding support for large pilots or programs
    - 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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