CEC / OEM workshop for EPIC funding:

Areas of Research Interest

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Background:

- Retail Market – Ford continues to see growth in hybrids and plug-in hybrids. In 2013, Ford sold nearly 90,000 electrified vehicles (HEV, PHEV, BEV). In terms of industry figures, the industry was at roughly 1.0% electrified sales in 2011. Today, the industry is selling about 3.9% electrified sales.

- For Ford customers, this translates into over 100M all-electric miles driven – and rapidly increasing at over 500,000 all electric miles per day. Most importantly, we know that nearly 36M of the 100M miles are powered by carbon free grid electricity – with a positive environmental impact.

- To date, Plug-in Vehicles have experienced measured growth. A stronger value proposition can be achieved by leveraging additional opportunities.

- To support the next phase of electrification/growth, our view is the following applied research areas will be the most impactful:
  1. Utilization of plug-in vehicles as a grid asset (VGI)
  2. Lower obstacles for Vehicle Time of Use Rate (Sub-Metering)
  3. Data/Analytics to support optimal network of chargers and renewable integration
  4. Research aimed at whole home energy management and vehicle integration (MyEnergi Lifestyle)
  5. Daytime/Workplace Charging Business Frameworks

Vehicle-Grid Integration (VGI)

- As it was articulately described in the CPUC paper (VGI Oct 2013) PEVs are well-positioned to serve as grid resources because of the intrinsic design and usage-
  1. Operational flexibility (load and generator)
  2. Embedded communications which moderate/mitigate their elemental mobility
  3. Actuation/control technology to start, stop, throttle charging
  4. Low capacity utilization- mostly parked (96% of time)

- This capability of plug-in vehicles to help the electric grid also creates an opportunity that can help move PEVs toward cost parity with gasoline vehicles, by lowering total cost of ownership through incentives for grid ancillary services.

- The collaboration of eight OEMs and EPRI to develop a standards-based, scalable communication platform that facilitates vehicle-grid integration is a major effort that will help to unlock the benefits for all stakeholders – customers, utilities, OEMs, infrastructure providers, etc. – called OEM Central Server.

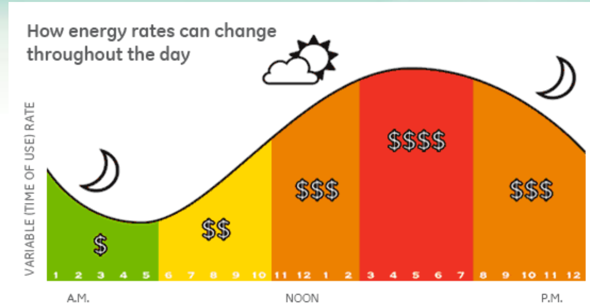
- Phase 1 (summer/fall 2014) of the Central Server pilot will demonstrate the necessary bi-directional communications between vehicles and the utility participants. In Phase 2 (2015), the OEMs intend to 'scale up' this platform and project in order to move to the next level of implementation.

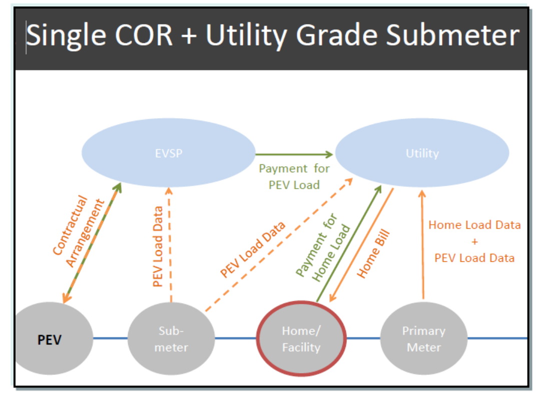
- California, with its emphasis on VGI development, and significant base of PEVs is an ideal place to help this integrative approach and "lead the way".

Sub-Metering Opportunity:

•Goals of PEV submetering are:

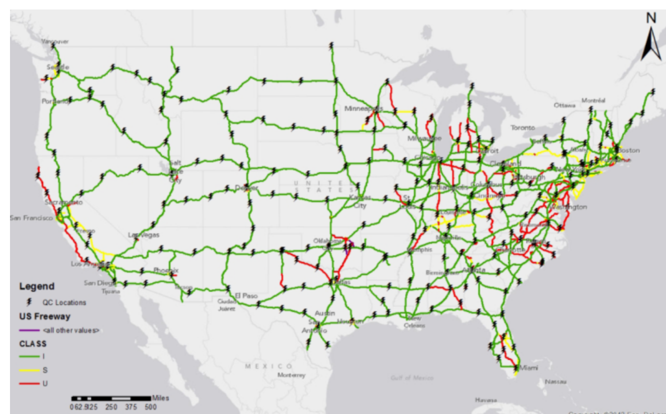
– Reduce metering, infrastructure, and billing costs for PEV customers.
– Allow PEV customers to access PEV-specific tariffs while maintaining non-PEV loads on tiered tariffs.
– Allow multiple EVSPs and PEVs to operate under a single primary meter.
– Maintain utility disconnection capabilities





Data Analytics Opportunity:

– We need better data collection from vehicles to build an optimal network of chargers and plan for vehicle to grid/ renewables integration.



My Energi Lifestyle & Workplace Charging

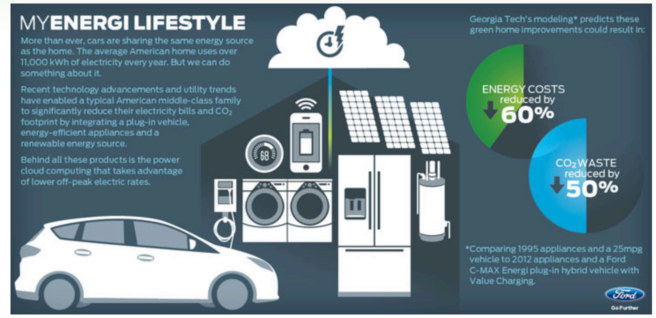
MyEnergi Lifestyle:

❑Ford, along with Georgia Tech, has teamed up with cross industry partners on a project that shows our strong commitment to sustainability and a strong interest in improving the environment.

❑By retrofitting a home with an EV, new appliances, solar panels, and other home devices, we have identified significant energy savings, CO2 improvements, and home owner cost savings.

❑Results from two homes achieved: predicts a 60% reduction in energy costs and over 8,000kg of CO2 saved from a single home. (~56% improvement)

❑If every home in the US were to implement our proposed energy saving technologies, it would be equivalent to eliminating 26 million homes from the US electric grid. The basis for MyEnergi Lifestyle is coordination and optimization of load and generation. More can be done as energy devices become connected.



Workplace Charging:

❑In order to promote Employee Electric Vehicle purchases and maximize EV miles driven, Ford has committed to installing EV charge stations at a majority of Ford-owned and Ford-leased facilities.

❑PlugInsights survey showed that 90% of current plug-in owners own a "backup" gasoline vehicle. A potential enabler to getting greater BEV adoption is to offer optimally placed, high power fast charger networks.

Workplace Charging: They also found that with a DC fast charging network conveniently placed, affordable or free to use, and reliable and uncrowded, this is true

42% say they would give up their ICE "back-up" vehicles*

55% say they would take their MBEVs on trips longer than 200 miles

33% say they would take their MBEVs on trips longer than 300 miles