EV's – the Biggest Opportunity Since the Light Bulb?

Presented by Katherine Stainken, Policy Director
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So much to talk about!

- Introduction to Plug In America
- The EV Market 101
- EV Adoption Rates
- EV Policies: Nationwide
- EV Policies: State level
- Charging Infrastructure Principles
- Utility Commission Activity
- Hot Topics

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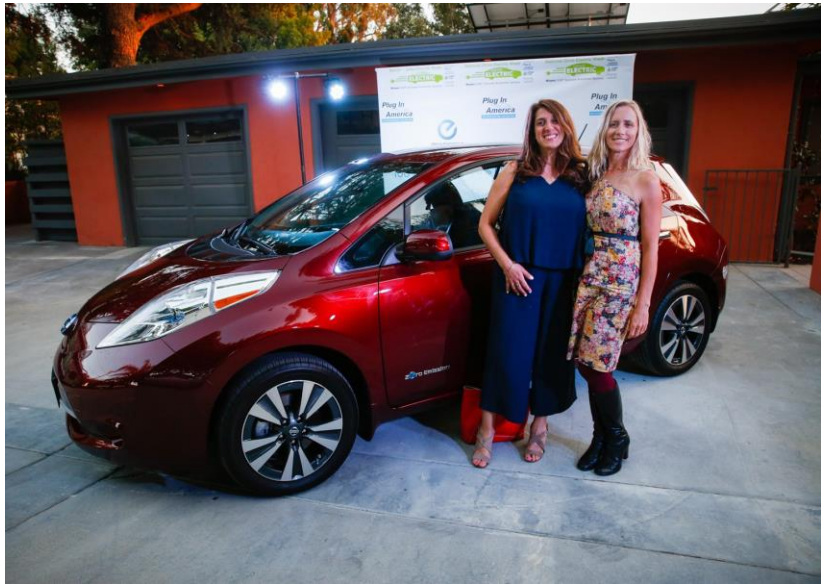
Intro to Plug In America

- We're the voice of the current EV driver and future EV driver!
- Focus on:
  - Education and Outreach
  - Policy
  - Customer Experience (dealers, website, quiz, incentives database)
  - Research
- Lead organizer of National Drive Electric Week



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The EV Market 101

- Consumer preference increasing
  - Affordability on the rise, range on the rise
- Autos making more models available
  - Nearly all major automakers producing a line of EVs by 2020, or switching entirely to EVs
  - Over 50+ makes available today
- Utilities getting involved
  - Big transportation electrification programs in CA, OR
  - Open dockets or discussions in MD, MI, WA, MA, NJ, FL, KS, MO, NY, OH, RI
- Internationally: phase-out of ICEs in new vehicle sales by 2040 – France, Great Britain, China, Netherlands, Norway

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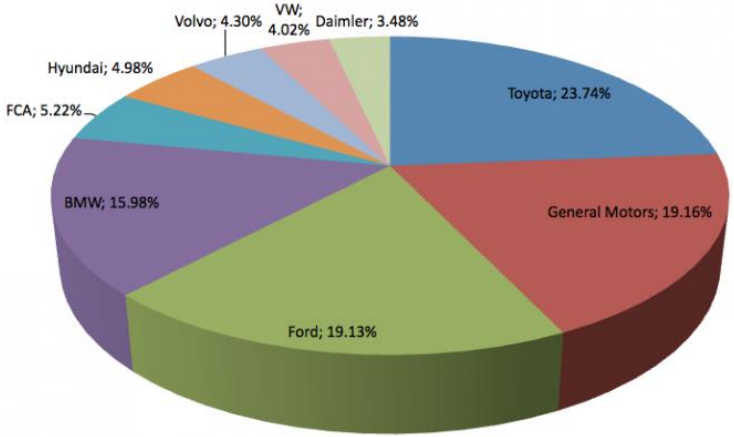
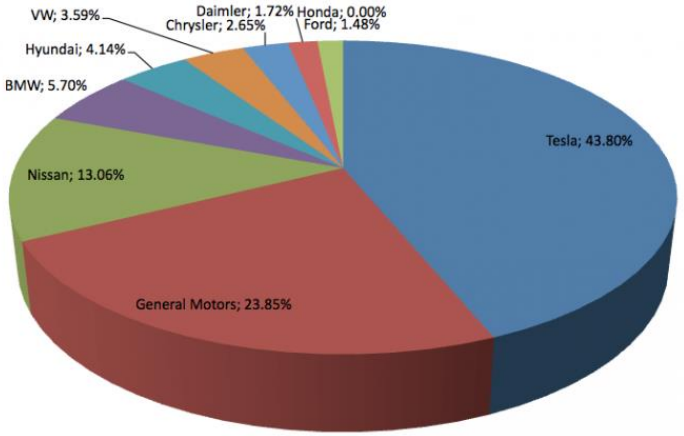
EV Adoption Rates

- Plug-in Hybrids sold in the U.S. (August 2017): 7,668
  - GM/Chevy Volt, Ford Fusion Energie
- Battery Electrics sold in the U.S. (August 2017): 8,835
  - Tesla Model S, GM/Chevy Bolt, Nissan Leaf



PHEVs



BEVs

Source: hybridcars.com

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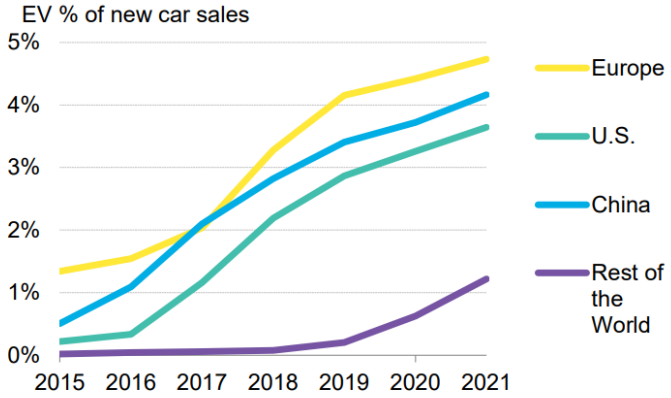
EV Adoption Rates

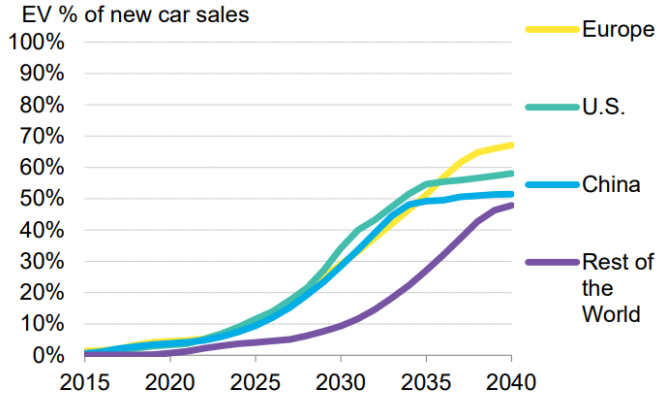
- How fast is the market growing?
  - Sales at near zero in 2010, now at 680,000 cars sold

Figure 5: Short-term EV sales penetration by country



Source: Bloomberg New Energy Finance

Figure 6: Long-term EV sales penetration by country



Source: Bloomberg New Energy Finance

EV Policies: Nationwide

- Need different policies depending on the driver:

Current EV Drivers

1. More abundant EV charging
2. Test drive events
3. Better financial incentives
4. Better media coverage
5. Electric car rentals
6. Electric-only dealerships
7. EV access to HOV lanes, bus lanes, and toll roads (for free)
8. Electric carsharing

Potential EV Drivers

1. Better financial incentives
2. More abundant charging
3. Test drive events
4. Better media coverage
5. Electric car rentals
6. EV access to HOV lanes, bus lanes, and toll roads (for free)
7. Electric carsharing
8. Electric buses
9. Electric-only dealerships

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EV Policies: Nationwide

- National goal of 1 M EVs by 2020
- State targets:
  - ZEV Mandate: credit program, likely to achieve 15% of new vehicle sales to be ZEVs by 2025 (CA, NY, NJ, CT, OR, VT, ME, MD, RI, MA) = 40% of the car market
  - CA Governor Goal: 1.5 M ZEVs on the road by 2025
- Optimal policy package:

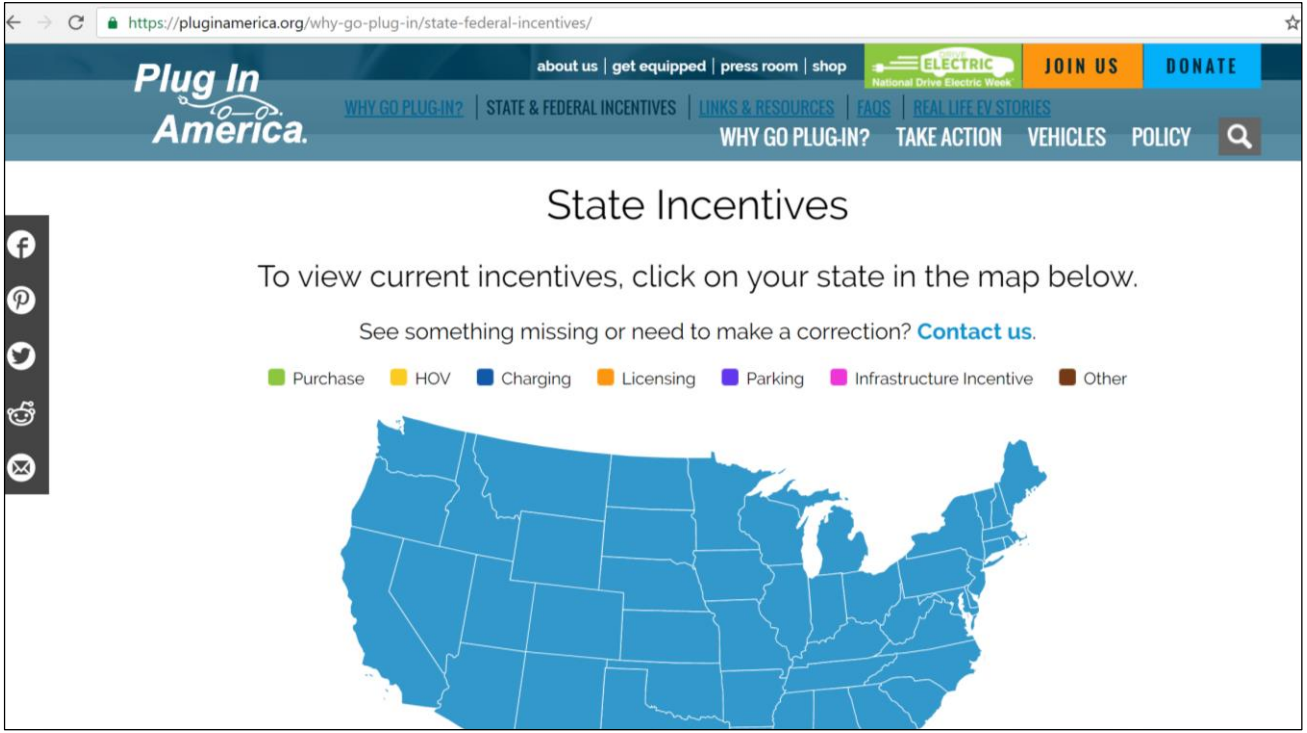
Policy	Yes / No
Purchase Incentive	✓
HOV or Tolls Incentive	x
Licensing Incentive	✓
Parking Incentive	X
Charging Infrastructure Incentive	✓
Government Leading by Example	✓
Charging Rates	X
Vehicle Miles Travelled Discussion	X
Other	X

EV Policies: Nationwide

- Federal Level:
  - Section 30D tax credit: the New Qualified Plug-in Electric Drive Motor Vehicles
    - Base credit of $2,500, another $5,000 based on battery size
    - Capped at 200,000 vehicles per OEM
  - Section 30C tax credit: Alternative Fuel Vehicle Refueling Property Credit
    - Expired 12/31/2016
    - EVSE tax credit up to 30% of the cost of the property, not to exceed $30,000 for those properties subject to an allowance for depreciation, and $1,000 for all other properties
  - Charging at Rest Stops: Allow for EV charging stations to be included within the definition of allowable commercial activity at rest stops. “Vending machine” definition.
  - Alternative Fuels Corridor Program: under the Federal Highway Administration, provides funding for EVSE signage
  - EPA, NHTSA Standards
- Opportunities for tax credits:
  - Tax reform?
  - Transportation infrastructure package?
  - Extenders package?

EV Policies Part 1: Nationwide

- Most current set of incentives on our website



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EV Policies: State level

- **AchiEVe: Transition to EVs Policy Toolkit** provides examples of states and cities with effective policies

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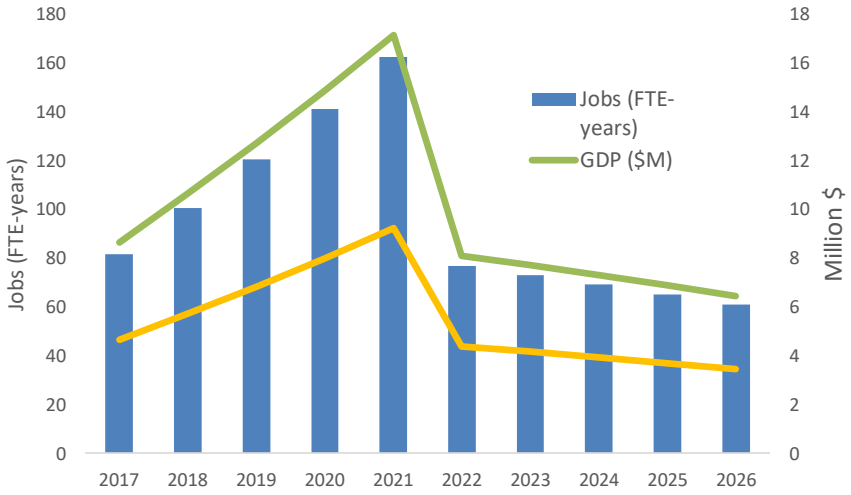
EV Policies: State level - Georgia

- Add $2,500 NEW tax credit
  - Battery electric and plug in hybrids
  - Limited to sales and one vehicle per person
  - Sunset after 5 years
- Reduce user fee from $200 to $50 annually
- Analysis by The Greenlink Group



REDUCED ANNUAL LICENSE FEE AND $2,500 TAX CREDIT

$54 MILLION
INCREASED INCOME

951
FULL TIME JOBS

$100.4 MILLION
GAINS FOR GDP

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Charging Infrastructure Principles

1. Charging infrastructure should include a mix of L1, L2 and DCFC, but is best installed in the following order to save costs: L1 and L2 at homes and workplaces, DCFC, and finally L2 in other public places.
2. Consumers and workplaces need support for DCFC.
3. Utilities should be allowed to deploy charging infrastructure.
4. Charging rates should be kept low for ratepayers.
5. Demand response programs should include EVs, as a precursor to V2G.
6. Building Codes should include requirements that all new buildings and associated parking lots are “made ready” up to the conduit.
7. Consumer protection principles should be adhered to.

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Snapshot of Commission Activity

- CA: PG&E, SCE, and SDG&E approved pilots, additional TE proposals pending
- WA: Avista approved pilot; commission policy guidance for future proposals
- MA: Eversource, National Grid proposals pending
- OR: Portland General Electric, PacifiCorp proposals pending
- MD: Public Conference 44 stakeholder process
- MI: Aug. 2017 Technical Conference leading to guidance
- OH: AEP proposal as part of smart cities program
- UT: Rocky Mountain Power approved for incentive program
- NV: NV Energy may propose incentive programs
- RI: Beneficial Electrification discussion
- NJ: stakeholder discussion
- NY: part of REV process
- DE, FL… TBD

Hot Topics

- V2G: demand response first, V2G second
- Addressing equity issues
- Consumer protection principles
  - Interoperability Standards
- Vehicle miles travelled vs. EV Road Usage Fee
- Rate design, specific charging rates
- “Phase out of gas” announcements
- Transportation electrification programs
- AVs

Addressing Equity

How can we increase adoption in low income communities?

- Put money back in consumer pockets
  - Sales tax exemption, rebates
- Make the upfront investment affordable
  - Offer a financing package: OEM credit enhancement through lease/loss reserves
- Make their lives easier
  - HOV lane access – longer commutes
- Provide security to make the investment
  - Battery replacement funding programs
- Strategically place charging infrastructure
  - Multi-unit dwellings
- Make the EV lifestyle easy to understand
  - EV experience centers in low income areas

Consumer Protection Principles

- Open Access – can I get a charge?
  - This is defined as the ability to get a charge at any public charger - including L1, L2 and DCFC - either via a credit card swipe or mobile app to enable the charge.
- Transparency – what's the price?
  - The price of a charge should be clear when the PEV driver connects to the charger.
- Interoperability – one EV club!
  - This is a key principle for the entire charging infrastructure ecosystem. Currently, many companies have their own card or key, which means drivers must either join multiple "clubs" or risk being unable to charge.
  - NEMA EVSE 1.2-2015 EV Charging Network Interoperability Standard Part 2: A Contactless RFID Credential for Authentication (UR Interface)
- Mapping data and signage – where is the charger?!
  - All electric vehicle service providers (EVSPs) should provide mapping data for charging locations, including costs for charging (both in and out of network).

Questions?

Thank you!

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Charging Station Basics

- L1 – SAE J1772 Connector
  - Also called trickle charging
  - L1 ~ 1.65kW [(15 Amp X 110 Volts/1000]
- L2 – SAE J1772 Connector
  - Uses vehicle built in charger
  - 80 Amps @240 Volts (19.2kW) is the maximum for L2, but many EVSE only use 30-40 Amps (7.2kW)

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Charging Station Basics

- DCFC – bypasses the vehicle charger and gives energy directly into the battery
  - DCFC Typical: 50 kW; Max: 240 kW; Tesla Supercharger: 120 kW
  - Three competing standards:
    - Japanese (CHAdeMO)
    - European / American (SAE Combo)
    - Tesla (Supercharger)