



Why Should Electric Companies Engage in Transportation Electrification Activities?

Webinar Series on Transportation Electrification Sponsored by Edison Electric Institute and the U.S. Department of Energy

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CMKConsulting

About the Webinar Series

- Over the next 6 months, the [Edison Electric Institute](#) (EEI) and the [U.S. Department of Energy](#) (DOE) are sponsoring a series of monthly webinars designed to:
 - Help electric companies learn about transportation electrification (TE);
 - Provide a “how to” on developing, launching, and sustaining an electric company TE program in its region; and
 - Provide a forum for discussions, best practices, and lessons learned.
- These 1- 1.5 hour long webinars will cover;
 - 1) *Why engage in transportation electrification (TE) activities?*
 - 2) *What are the TE markets and where are they going?*
 - 3) *What makes TE markets succeed?*
 - 4) *What are the different roles an electric company could play ?*
 - 5) *What could an electric company TE program look like?*

Building on EEI and U.S. DOE Transportation Electrification MOU...

MOU identifies 3 major activity areas

- Outreach and Education
- Research and Analysis
- Cross-Government Coordination

Signed on June 8, 2015



...And Strong Efforts of Electric Companies Across The Country to Advance PEVs

EEI Fleet Electrification Initiative

- Partnered with White House in 2014
- More than 70 electric companies committed to invest at least 5% of annual fleet budgets in PEVs
 - Spending \$128m in 2016 (13% of total budgets)
 - PEV fleets increased 18% over last year

EEI Employee PEV Engagement Initiative

- Helps Electric Companies to:
 - Assess interest among employees
 - Deploy educational tools to familiarize employees with technology
 - Offer employee incentives and deploy workplace charging to encourage adoption

Builds on numerous individual electric company programs covering PEV readiness, demonstrations, pilots, customer education, customer incentives, and regulatory filings

Why Should Electric Companies Engage in Transportation Electrification Activities?

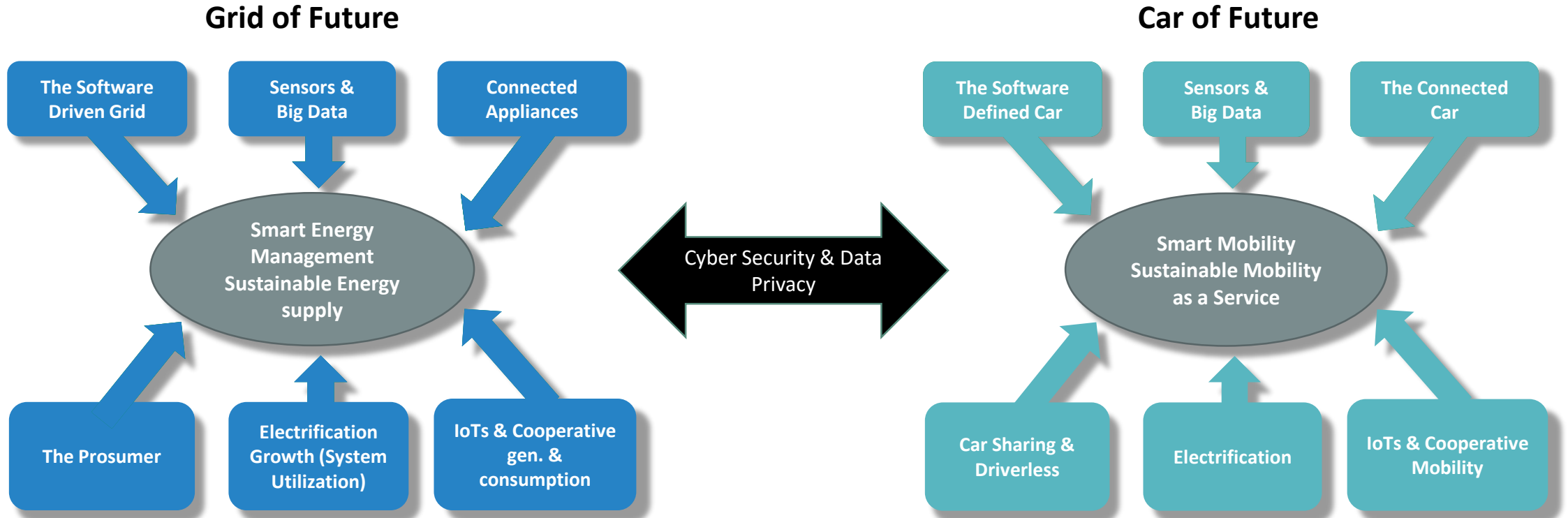
Key subjects we'll cover today

1. Changing electric company landscape
2. PEV market drivers
3. Grid benefits and impacts and engaging with key stakeholders
4. Summary and next steps

Audience Question Prompt

Section 1: The Changing Electric Company Landscape

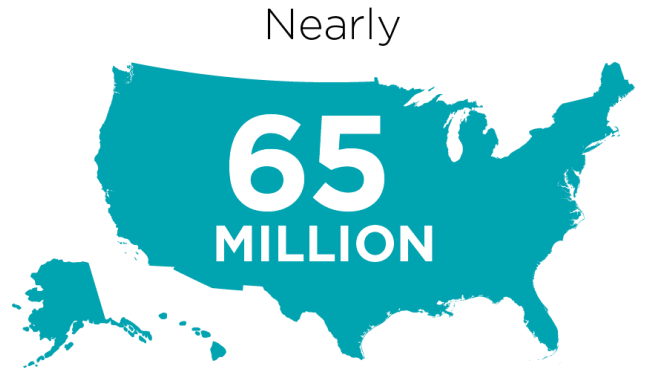
Dealing with Increasing Innovation and Change



Source: ABI Research

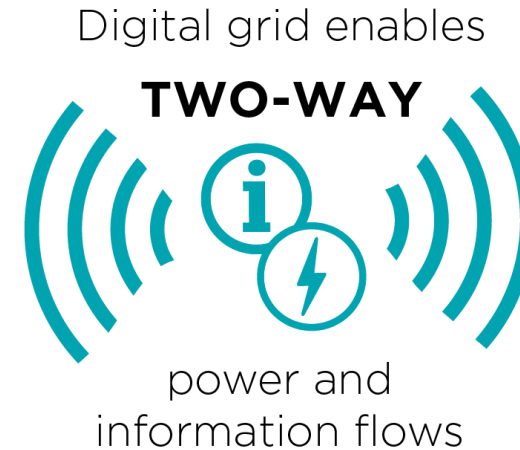
Systems evolving from **analog to digital**. Technology and data moving us from **energy ignorance to energy enlightenment**. We are **less individual consumers** and more part of a **collective system**. **System utilization and socially responsible energy management** are the goals.

Billions Being Invested in U.S. Grid Modernization



SMART METERS
give half of all U.S. households
more control and flexibility

Electric power
companies are
investing
MORE THAN
\$20B
ANNUALLY
in the
distribution grid

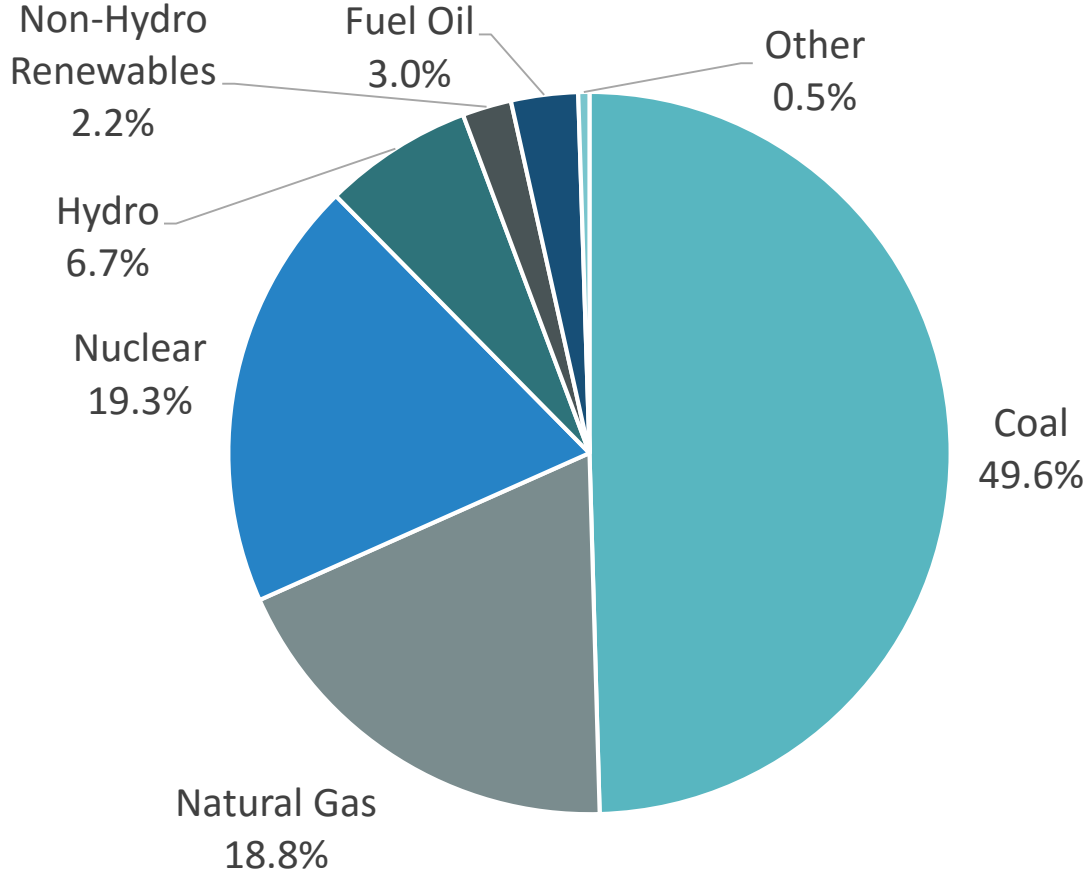


Source: EEI

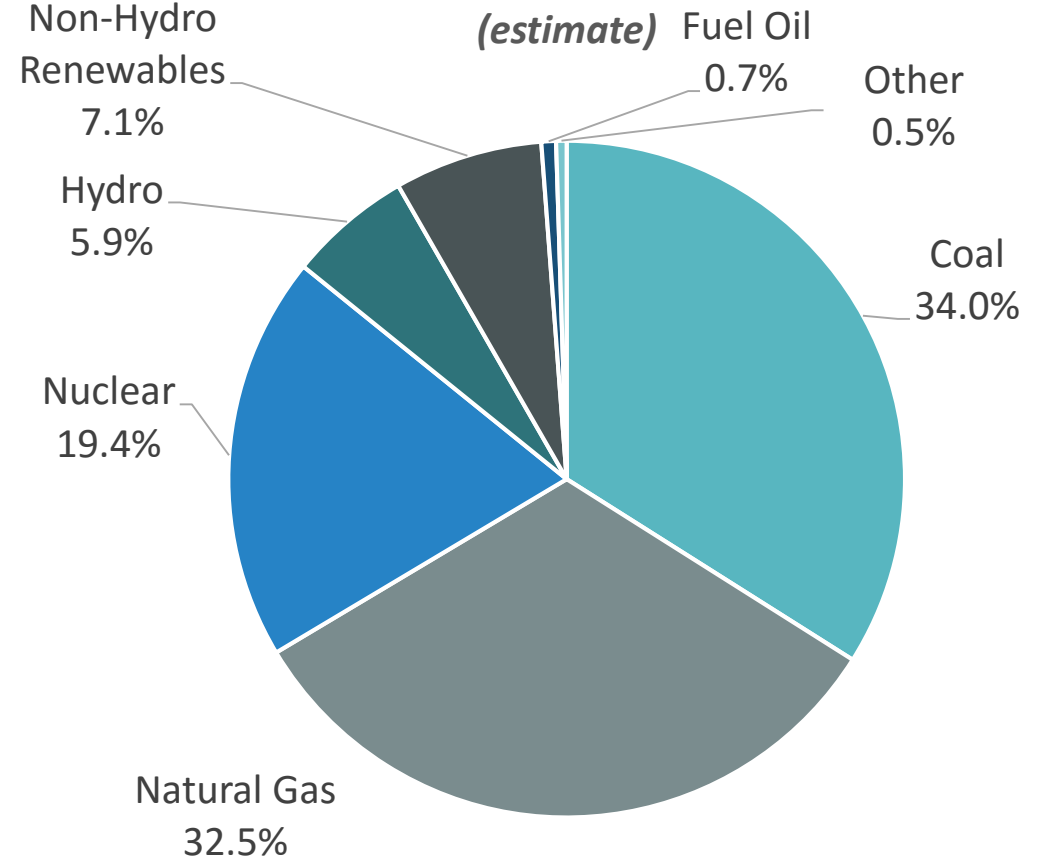
Record \$42 Billion Invested in the Power Grid in 2014

Mix of Resources Used to Generate Electricity Is Changing Dramatically...

2005 National Energy Resource Mix



2015 National Energy Resource Mix

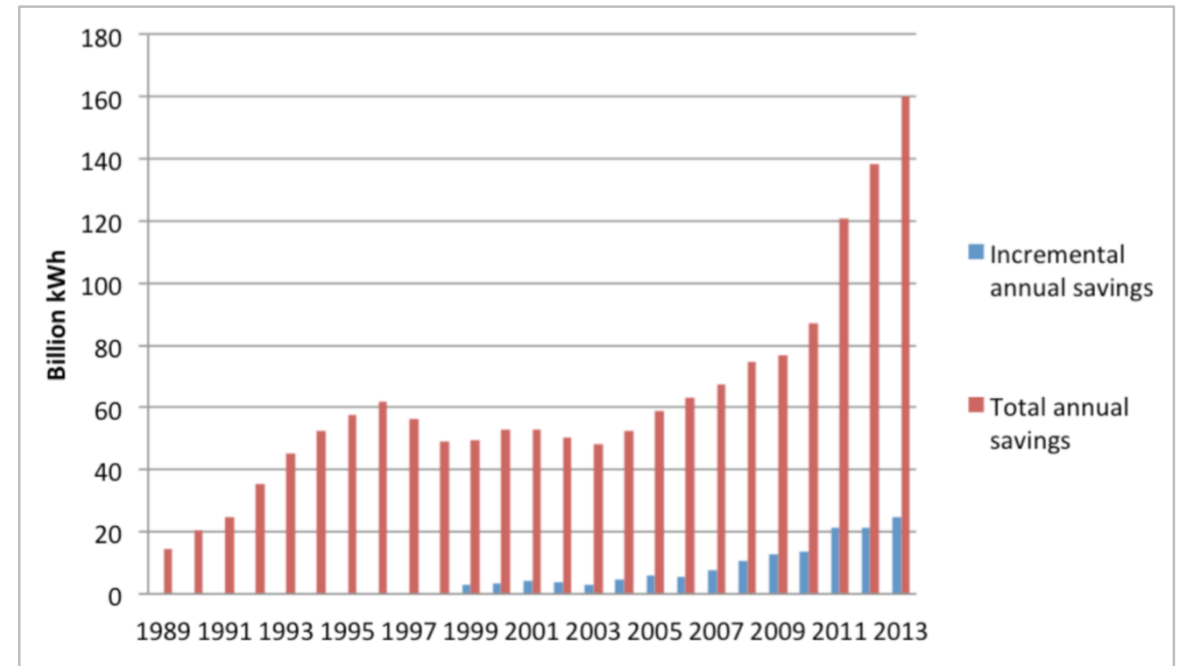


Source: DOE, EIA

Customers and Appliances Becoming More Energy Efficient

Policies driving more efficiency

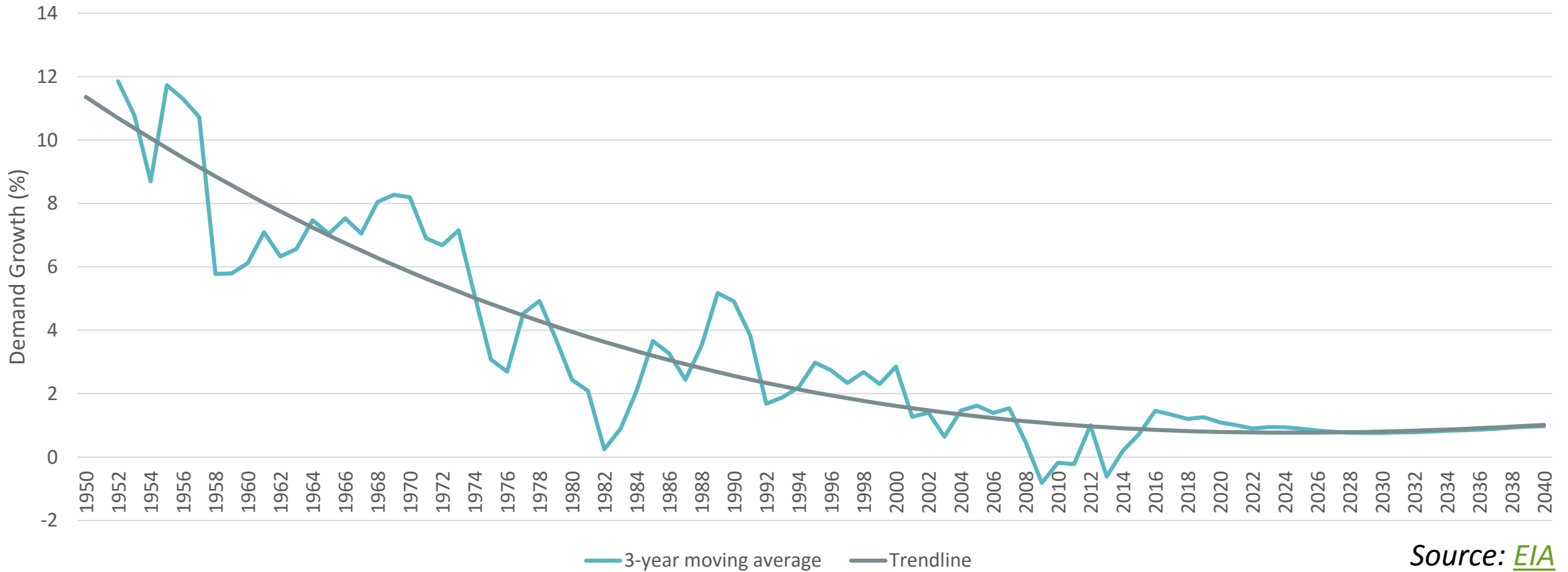
- Building Codes
- Appliance Efficiency Standards
- Electric Company Decoupling



Source: ACEEE 2015 Report

Leading to Declining System Utilization Nationwide

U.S. electricity demand growth, 1950-2040 (percent, 3-year moving average)

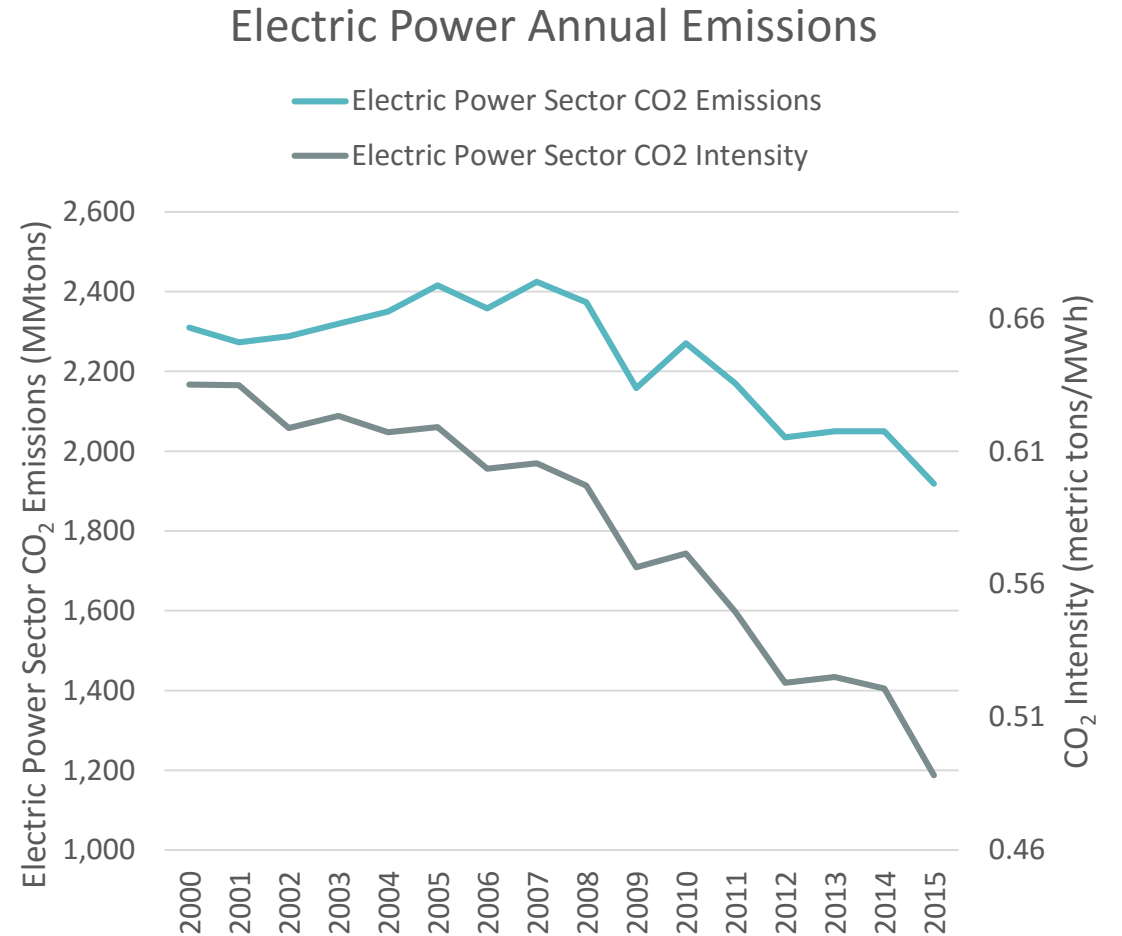


Source: [EIA](#)

U.S. Power Sector CO₂ Emissions Declining

- As of 2015, industry carbon dioxide emissions were nearly 21 percent below 2005 levels
- Nearly 1/3 of U.S. power generation comes from zero-emissions sources
- Trajectory will continue

Source: EEI



Source: [EIA](#)

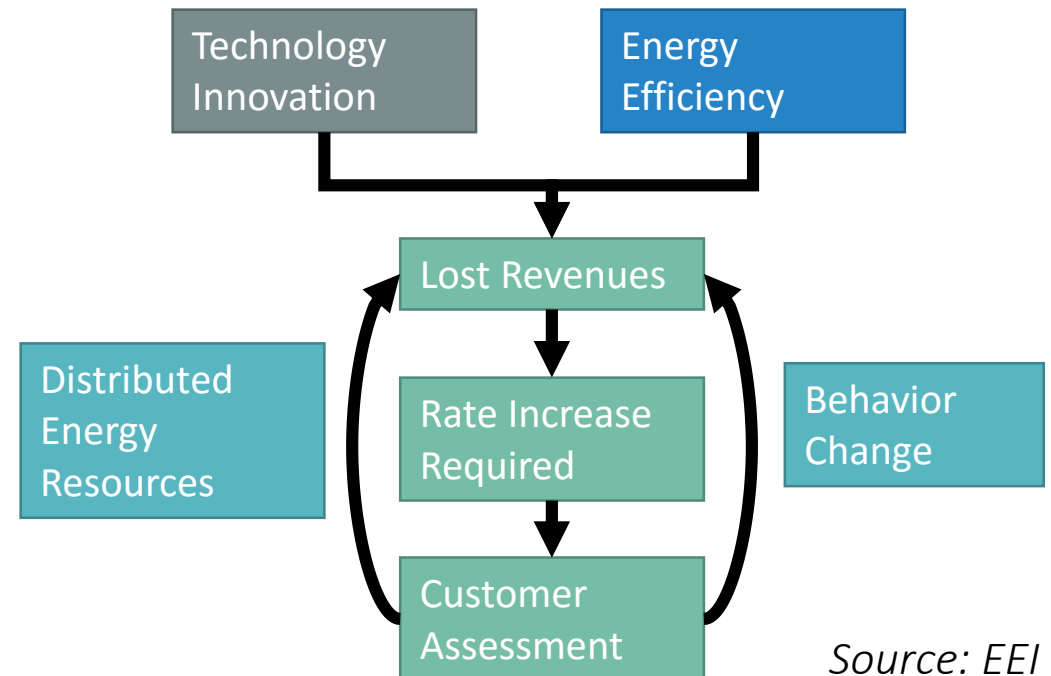
Mixed Results From an Electric Company Perspective

Opportunities

- Significant electric company investments in grid modernization, reliability and resiliency
- Extensive pilots and demos
 - Smart grid, smart energy use, TE, renewables and storage integration-
 - Lead to new business models and an informed regulatory process

Challenges

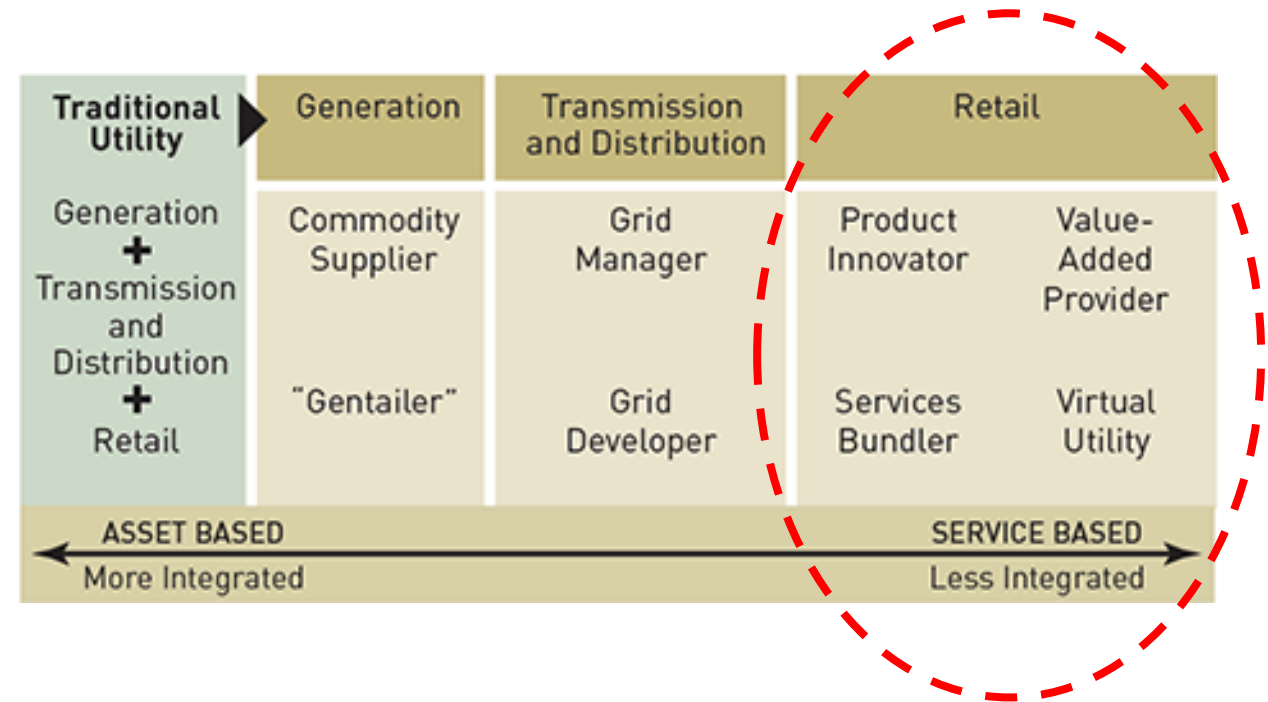
- Less grid use leads to higher rates and further system avoidance



Source: EEI

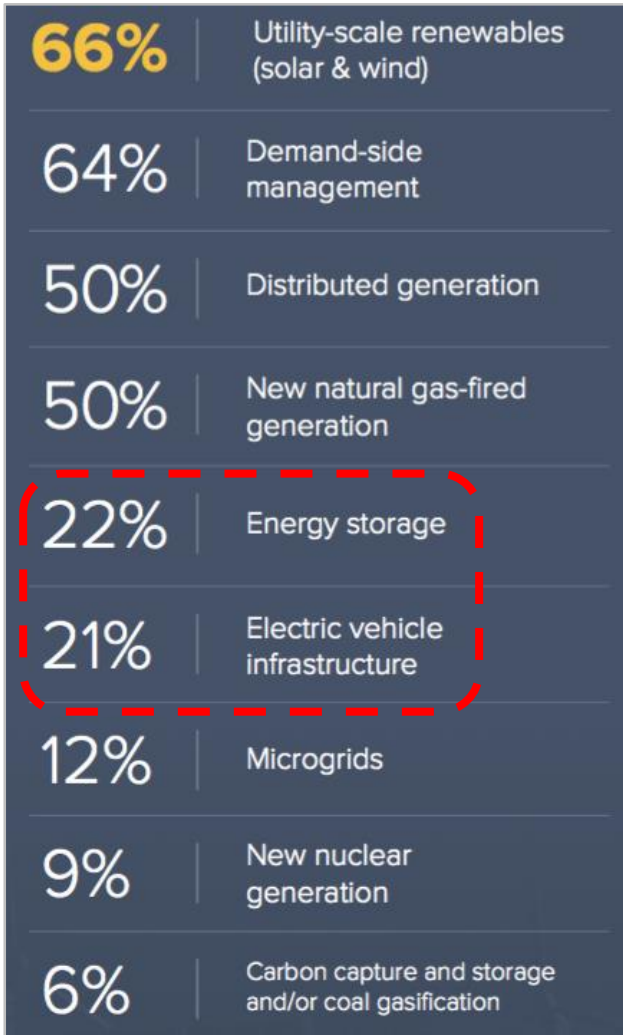
Electric Companies Focusing on New Revenue Streams

- Technology changing status quo
 - Competition to own “connected home” is heating up
- Traditional electric company model is not gone but being complemented by:
 - New retail models partnerships
 - Service-based competition
 - Changing customer preferences



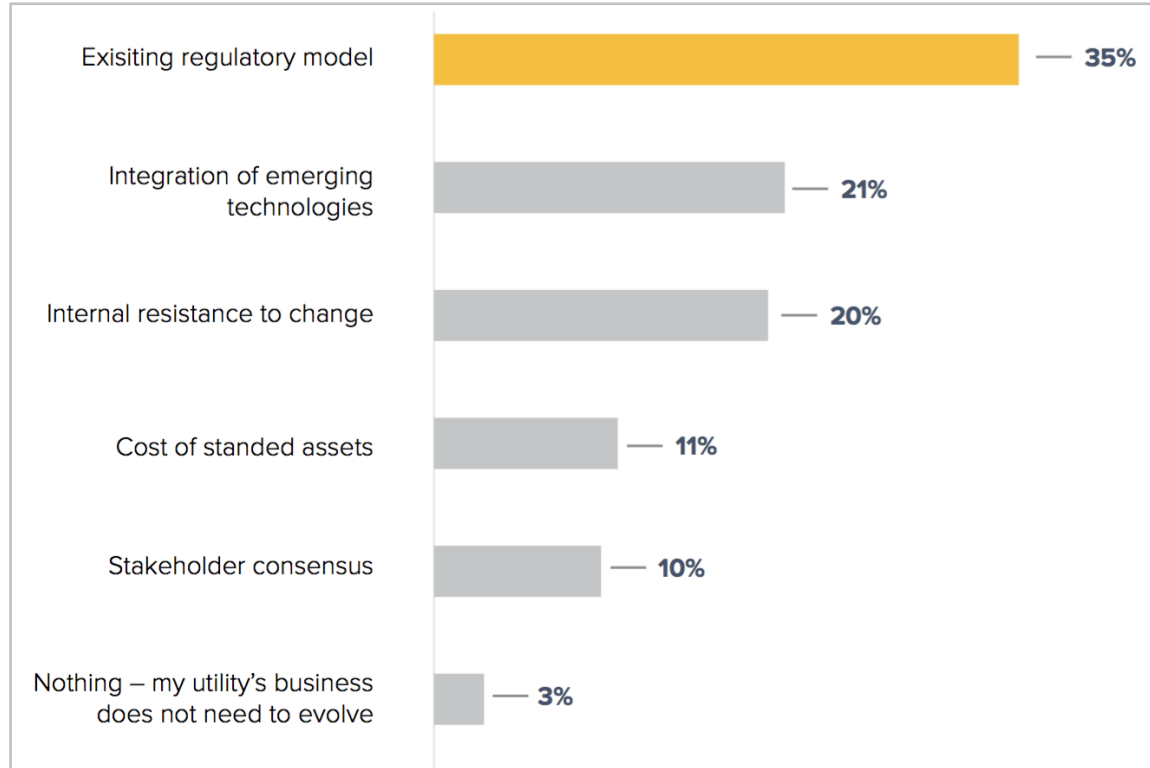
...And Changing Attitudes

Technologies Most Invested In



515 Electric Company Executives Surveyed

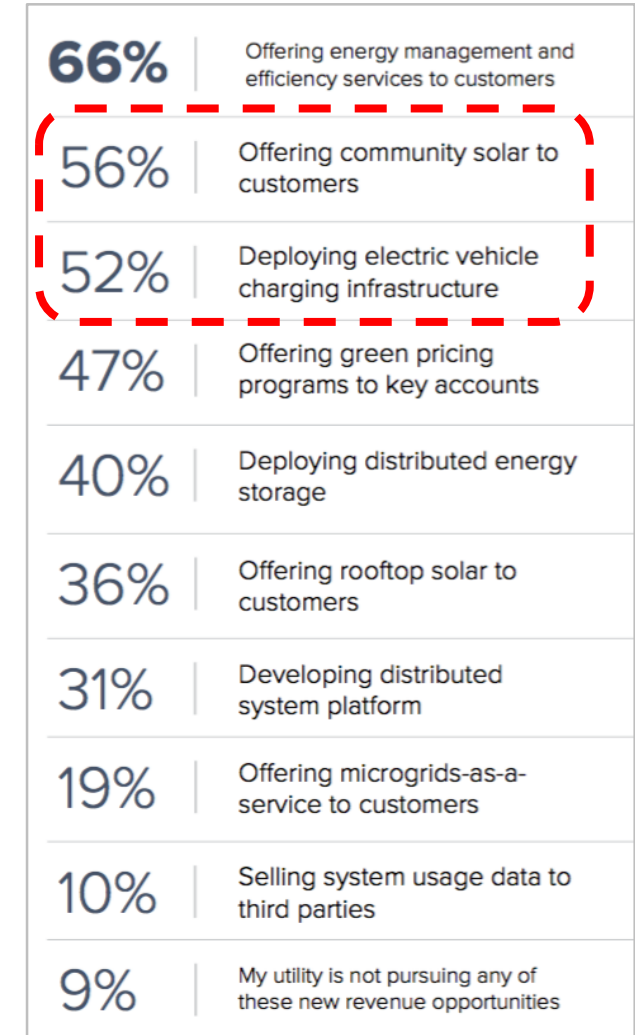
Greatest Obstacle to Business Model



Source: Utility Dive 2016 Survey

Why Should Electric Companies Engage in Transportation Electrification Activities?

Pursuing Future Regulated Business



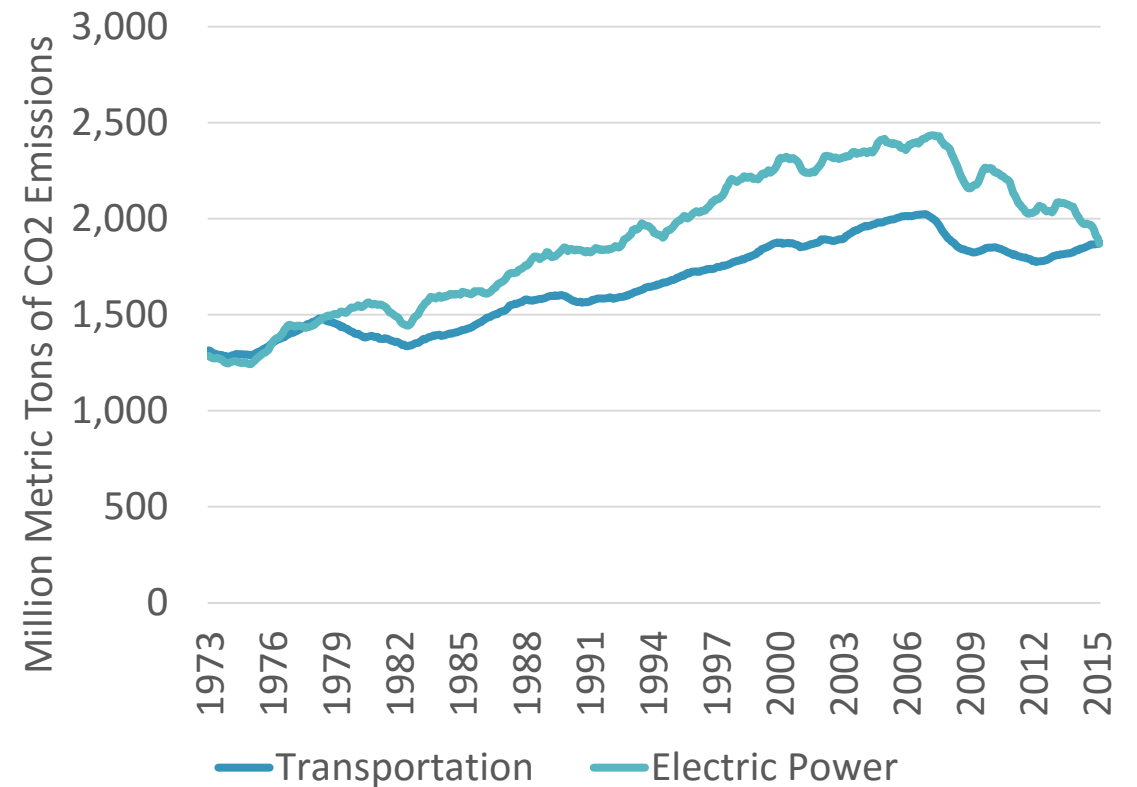
Section 1 Q&A

Section 2: What's Driving The PEV Market?

Key Policy Drivers

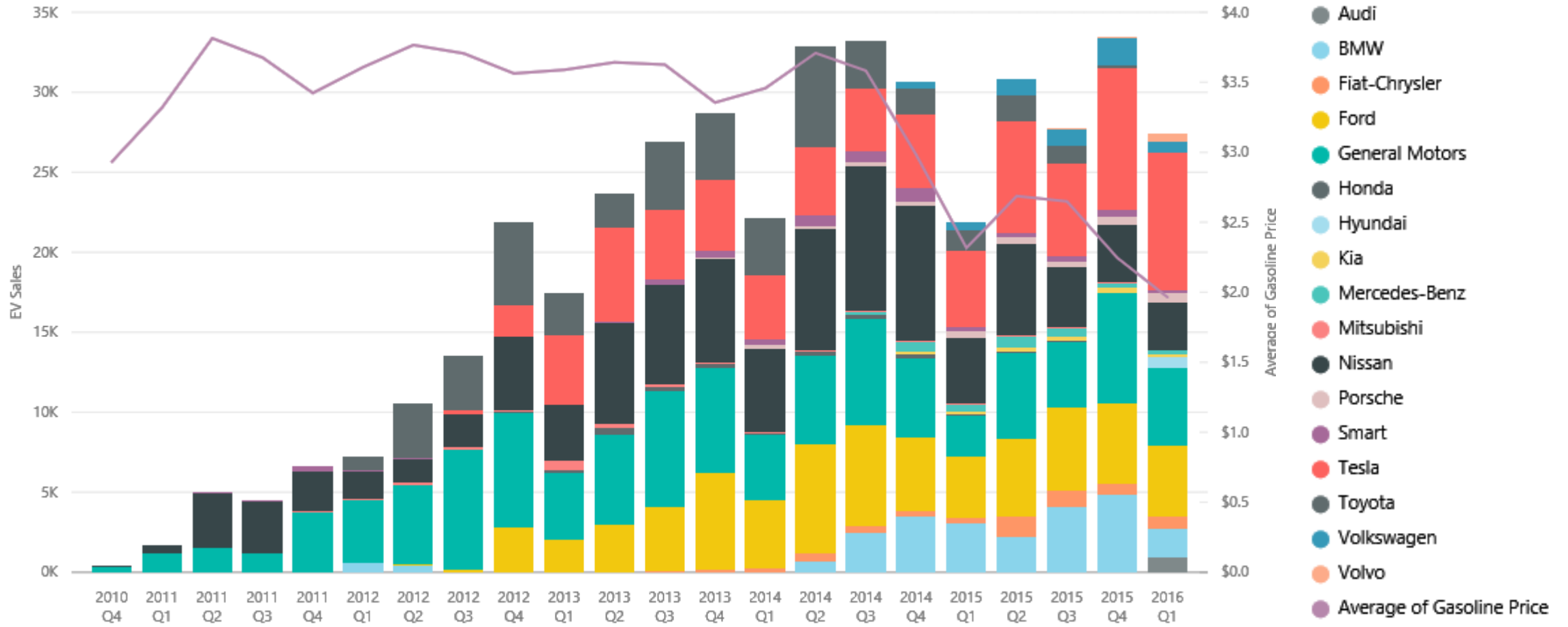
- Nationwide transportation CO₂ emissions just surpassed electric power emissions
- Alternative fuel vehicles (e.g., EVs) allow automakers to earn CAFE “credits”
- By 2025, California’s ZEV Program (plus 9 other states) require 15.4% of vehicles be Battery EV and Fuel Cell EV

Transportation CO₂ Emissions Surpassed Electric Power in Feb 2016



Source: [EIA](#)

Quarterly EV Sales and Gasoline Price



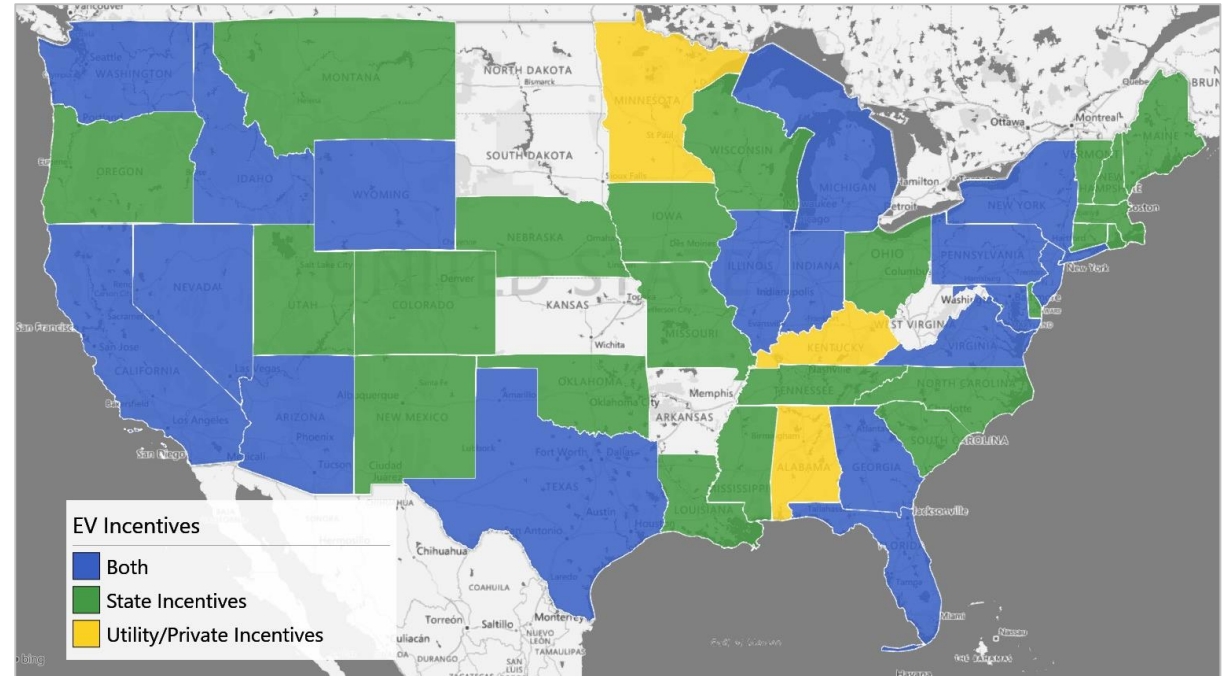
Incentives That Help Close The “Deal”

Financial

- Customer Incentives

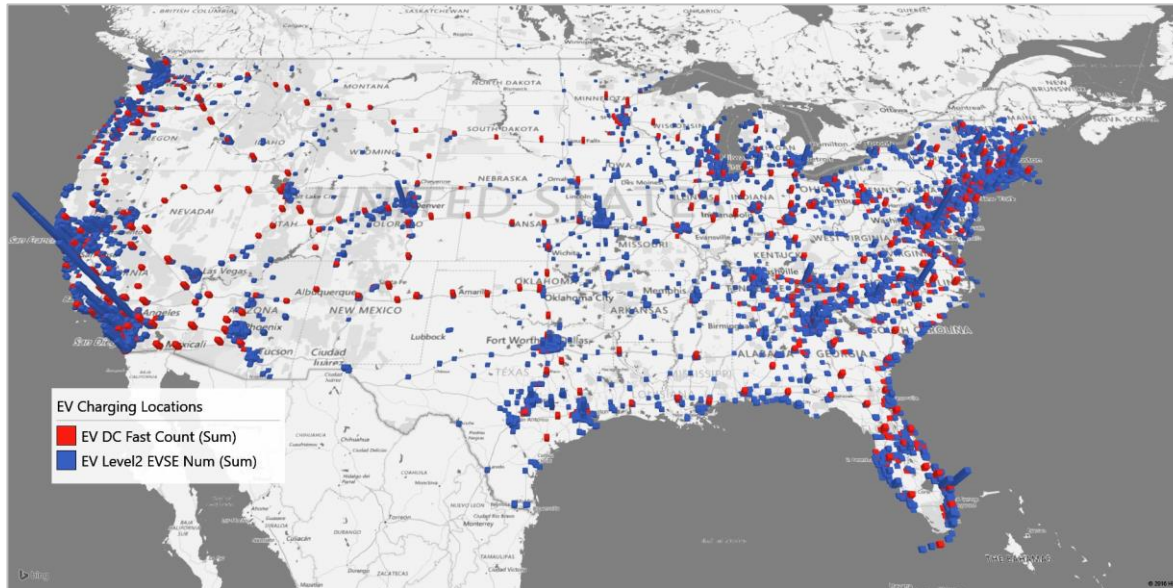
Non-Financial

- HOV lane access, free public charging



Source: Atlas Public Policy Analysis of data from U.S. DOE

Public and “Visible” Charging Reassures Drivers



Source: Atlas Public Policy Analysis of data from U.S. DOE

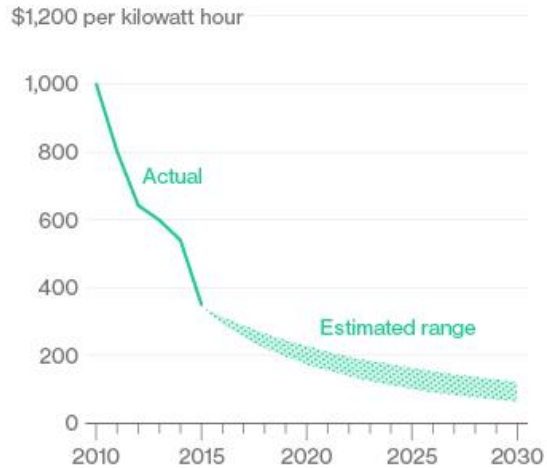
- Majority of charging done at home
- Visible public charging and broad networks address range anxiety and provide convenient “top off”
- DC fast charging growing in popularity, helping increase the long range capability of BEVs
- Critical for electric company to be involved in process of deploying infrastructure

Battery Advances Will Make EVs More Affordable

It's All About the Batteries

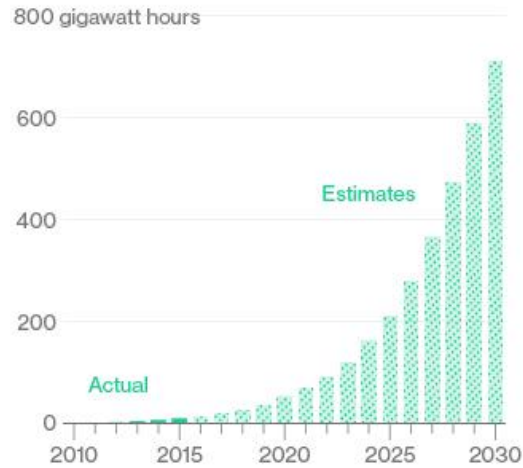
Batteries make up a third of the cost of an electric vehicle. As battery costs continue to fall, demand for EVs will rise.

Cost for lithium-ion battery packs



Source: Data compiled by Bloomberg New Energy Finance

Yearly demand for EV battery power



Bloomberg 

Cheapest Battery Range Available

	Vehicle cost per mile of battery range	Range in miles	MSRP
Tesla Model 3	\$163 per mile of range	215	\$35,000
Chevy Bolt	\$188	200	\$37,500
Nissan Leaf	\$271	107	\$29,010
Tesla Model S	\$311	230	\$71,500
Chevy Spark	\$317	82	\$25,995
VW e-Golf	\$349	83	\$28,995
Tesla Model X	\$350	237	\$83,000
Ford Focus Electric	\$384	76	\$29,170
Mercedes B-Class	\$476	87	\$41,450
BMW i3	\$523	81	\$42,400

Source: Company information

Battery costs are 30-50% of cost of an EV today and fell more than 70% since 2008. Last year, costs fell 35% (\$264/kwh).

Automakers Doubling Down on EVs

- Affordable long-range EVs arriving much faster than expected
 - 200-mile Chevy Bolt on sale this year at \$37,500
 - 200-mile Tesla Model 3 on sale late 2017
- Major EV investments by automakers
 - Ford committed **\$4.5b** with goal of 40% of its models having electric option by 2022
 - GM invested **\$500m** in Lyft, helping bring autonomous EVs to shared mobility
 - Volkswagen plans to have **30** new all-electric models by 2025
 - Mercedes will have **10** plug-in hybrids available by next year
 - Tesla's grand opening of its **\$5b** Gigafactory next month

Tesla May Have Had Its “iPhone Moment”

There’s only been one other car with numbers like these: the 1955 Citroen DS



Sources: Company information, press reports

- Unique event in 100-year history of mass-market automobiles
- More than 325k deposits in first week after press event- streamed live on social media

There Is Growing Electrification Momentum



Transit

**EV Buses Are in Service
in 15+ Cities**



Airports

**Seattle Sea-Tac Saves
\$2.8 Million in Fuel
per Year**



Seaports

**Long Beach Terminal Electrification Is
Equal to 5,000 Homes**



Fleet

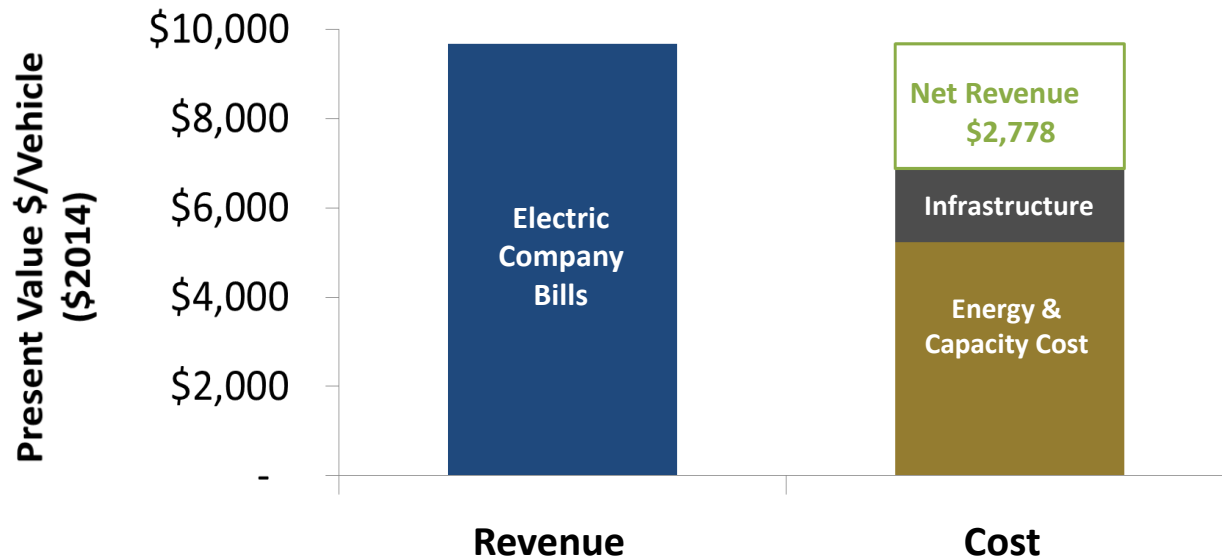
**\$90 Million Was
Spent by 77 Electric
Companies in 2015**

Section 2 Q&A

Section 3: Potential Grid Benefits and Engaging With Key Stakeholders

PEVs Can Benefit All Ratepayers, Not Just Owners

Net Revenues from PEV Charging Load
 Illustrative results for California Electric Companies



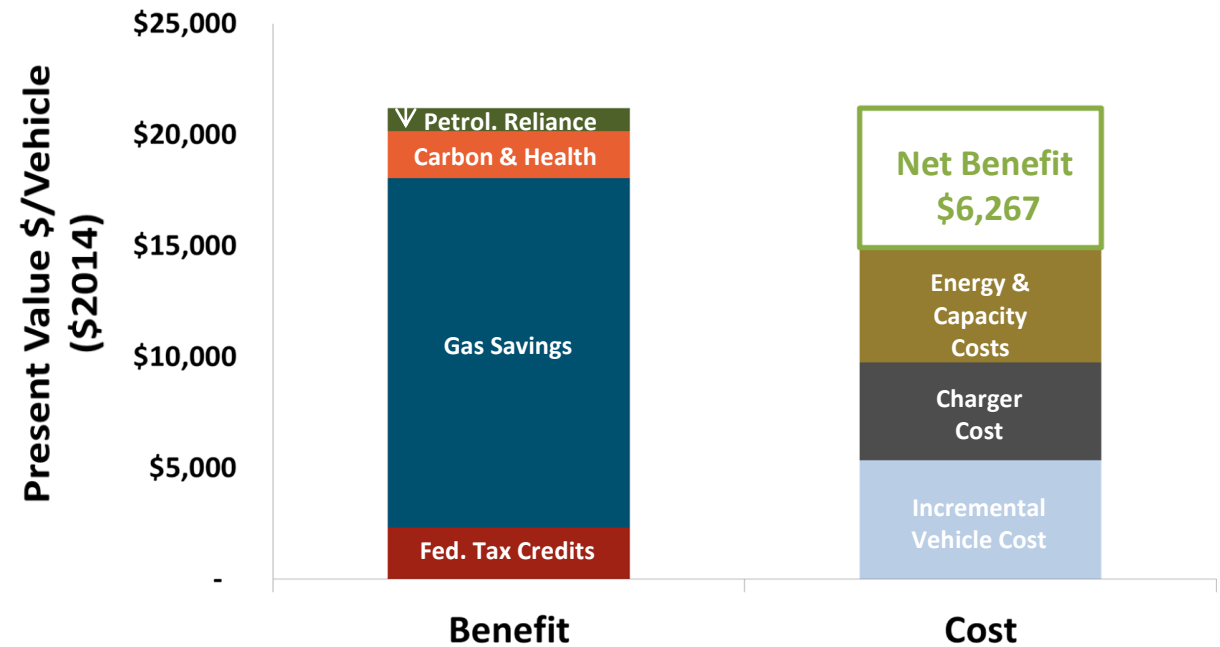
Source: Nancy Ryan E3

- Research for California grid found net revenue from PEVs
 - PEV owners monthly bills more than offset costs to serve incremental load and put downward pressure on rates
- Grid-specific research like this needed for other regions

PEVs Can Bring Economic Benefit To Your Region

- California PUC cost tests compared costs and benefits that represent actual cash transfers into and out of state
 - Determined state achieves net economic benefits with PEV adoption
- Grid-specific research needed to evaluate societal benefits for other regions

Net Societal Benefits from PEV Charging Load
 Illustrative results for California Electric Companies



Source: Nancy Ryan E3

Some Key Organizations for Electric Companies to Engage With on PEV Efforts



Represents all U.S. investor-owned electric companies, advocating public policy, expanding market opportunities, and providing strategic business information. EEI's CEO Transportation Taskforce helps electric companies implement PEV programs across the country



Federal agency whose mission is to advance energy technology and promote related innovation in the United States. Engaging with Clean Cities Program is a great way to partner with key local stakeholders.



DC based- preeminent Industry voice supporting electric vehicle policy, advocacy, market education, and industry collaboration



Bringing together scientists, engineers, academia and electric companies, to conduct research (including PEVs) helping mitigate risks and contributing to safe, reliable, and environmentally responsible electric service



Raising consumer awareness of PEVs under tagline
“Best.Drive.EVer.—Go Electric!”

Message Board * Print Ads * Social Media * Outdoor Ads * Web Banner Ads

Ways to Get Involved With DOE



Join the Workplace Charging Challenge

- Visit: <http://energy.gov/eere/vehicles/ev-everywhere-workplace-charging-challenge>
- Contact Acting Coordinator, Nick Bleich at Nicholas.Bleich@ee.doe.gov



Request an EV Everywhere decal for your vehicle and EVSE

- <http://www.afdc.energy.gov/decals>



Raise awareness about PEVs with Best.Drive.EVer. Campaign

- Request materials from Robert.Graham@ee.doe.gov



Connect with your local Clean Cities Coordinator

- Contact Linda.Bluestein@ee.doe.gov for more information

Ways to Get Involved With EEI



- Join EEI's ***CEO Transportation Taskforce*** and benefit from other electric company experiences
- Join EEI's ***Fleet Electrification Initiative*** and the new ***Employee PEV Engagement initiative***
- Connect to EEI's TheElectricGeneration.org website

Section 3 Q&A

Section 4: Webinar Summary and Next Steps

Summary

- **EEI and DOE partnership** leverages electric company PEV programs nationwide
- For **electric companies there's an ever-changing landscape**
 - Dealing with innovation and technological change
 - Driven by environmental policies
 - Grid investments and an evolving generation mix
 - Declining use of the system, accelerating search for new revenue and business opportunities and new approaches to conducting business

Summary (Continued)

- PEV markets are driven by
 - Increasing **policies, incentives, and charging infrastructure**
 - **Technology innovation**—particularly with battery cost and performance
- **Understanding the grid benefits and impacts** of PEVs helps to shape electric company programs and regulatory constructs
- Finally, **engaging with key stakeholders** is a valuable way to share risk and leverage previous experiences across the country

How to Get Involved



Have any specific questions or challenges you're trying to address? Contact Becky Knox at bknox@eei.org

Audience Question Prompt

What to Expect in the Next Webinar

- The webinar series will continue with the second webinar at the end of July
 - 2) What are the transportation electrification markets (people movement, good movement, transit) and where are they going?
 - 3) What helps make a transportation electrification market succeed?
 - 4) What are the different roles an electric company could play and why?
 - 5) What could a utility transportation electrification filing look like?

We encourage you to share your feedback on these webinars

- Webinar registrants will receive a follow-up email from us within a few days
- Your input will make future webinars more valuable for everyone!



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