



Electric Vehicles: Key Trends, Issues, and Considerations for State Regulators

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FEBRUARY 16, 2021

NARUC Report

- Published by NARUC's Center for Partnerships & Innovation (CPI) in December 2019
- Highlights key EV trends
- Scopes the EV issues likely to come before Commissions
- Summarizes likely stakeholder perspectives
- <http://bit.ly/EVkeytrends>



NARUC
National Association of Regulatory Utility Commissioners

Electric Vehicles: Key Trends, Issues, and Considerations for State Regulators



Charles Harper, Gregory McAndrews, & Danielle Sass Byrnett
October 2019

The Role of Commissions

Two central questions:

- ▶ Charging station buildout and the role of the utility
- ▶ Managing grid impacts (through rate design, demand response, load shifting, etc.)

First Steps: Approach to Initial Proceedings

Non-Contested Options:

- ▶ Maryland
- ▶ Minnesota
- ▶ Michigan

Utility Proposals Considered:

- ▶ Washington, D.C.
- ▶ Oregon



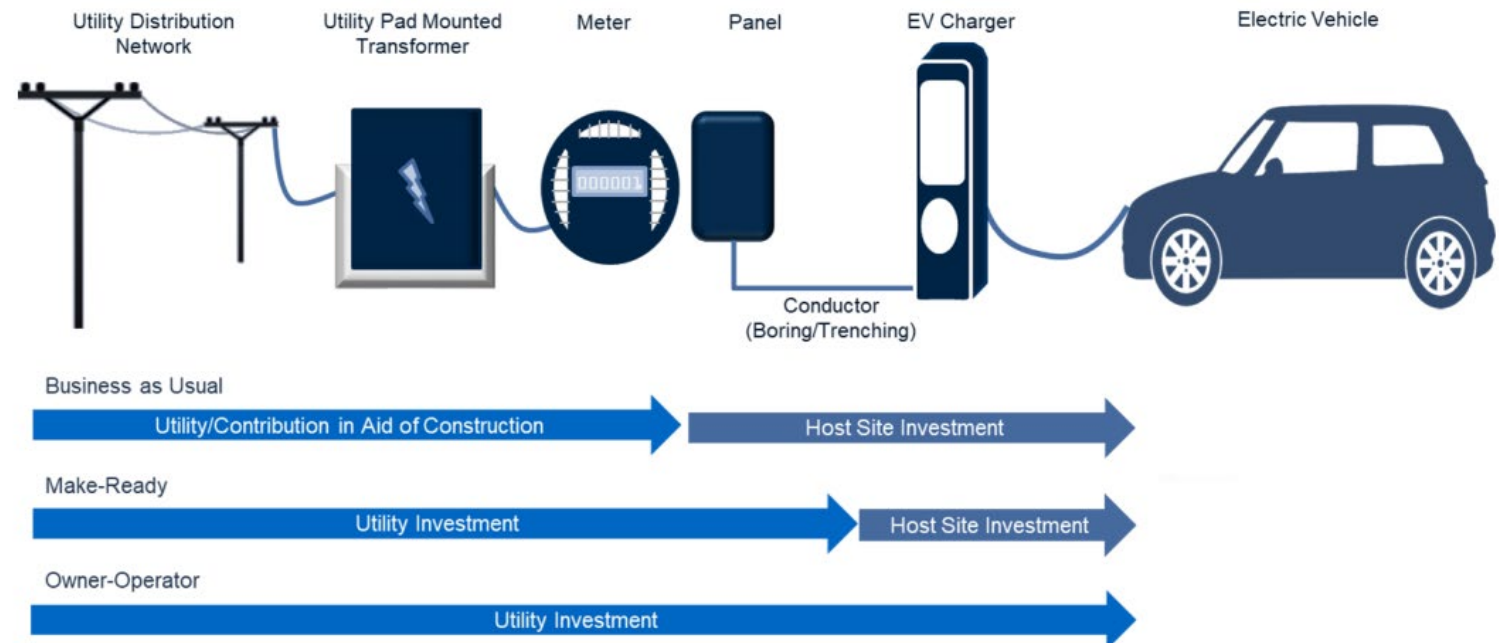
Panel at 2020 NARUC Winter Policy Summit featuring commission staff from Maryland, Michigan, and Minnesota

Charging Infrastructure Ownership

Four major considerations:

- ▶ Pace of market transformation and competitive market questions
- ▶ Cost of installation
- ▶ Equity of siting and charging rates
- ▶ Integration of EVs' electricity load into the grid

Three models for utility role in EVSE (MJ Bradley)



Charging Infrastructure Ownership

Commission Decision	Perspective		
	Consideration	Proponents' Rationale	Opponents' Rationale
A. Allow Utility Ownership of Charging Stations	Mkt Transformation	• Solves "chicken or egg" dilemma	• Anti-competitive
	Cost	• Economy of scale	• Overbuilding
	Equity	• Subject to equity oversight	• Regressive cost-allocation
	Integration	• Better siting for grid	• Utilities less cutting edge
B. Disallow Utility Ownership of Charging Stations	Mkt Transformation	• Crowd out private sector	• Charging has poor business case
	Cost	• Overbuilding drives up cost	• Utilities have low-cost capital
	Equity	• Low-income ratepayers subsidizing EV drivers	• Private sector could neglect LMI areas
	Integration	• EVSE companies site based on demand	• Utilities could integrate with distribution system planning
C. "Make-Ready" Approach	Mkt Transformation	• Speeds rollout w/o limiting private sector	• Doesn't take full advantage of utility capital
	Cost	• Would decrease costs for third parties	• Doesn't reduce costs enough for drivers or site owners
	Equity	• Improve biz case for EVSE in neglected areas	• Wouldn't guarantee equitable charging distribution
	Integration	• Utility involvement ensures grid planning	• Less utility insight than ownership

First Steps: Jurisdictional Questions

Should EV charging companies be regulated as a public utility or exempt from “sale for resale” regulations?

- ▶ At least 29 states and DC have decided that charging should not be regulated in the same manner as public utilities
- ▶ Dependent on state statute
- ▶ Even if charging rates aren't regulated, Commissions still oversee infrastructure investments, incentives, rate design, managed charging, and distribution system planning

Grid Impacts – Shifting Load Curve

Impacts of Expanded Transportation Electrification

An increase in peak demand due to charging could strain local distribution networks



Increased Costs

EVs represent an opportunity for grid management

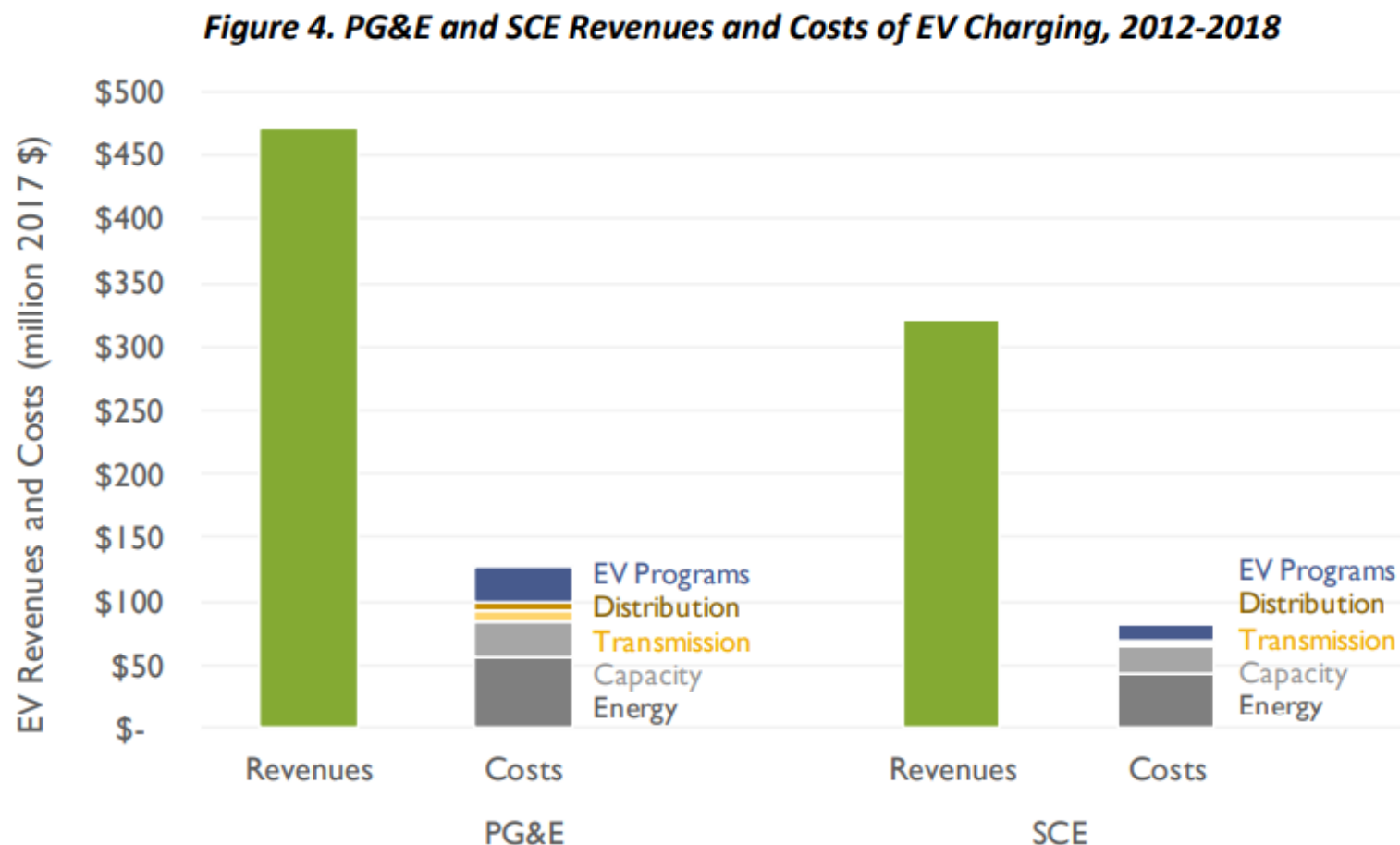


Decreased Costs

EV Charging and Impact on Costs

Off-peak charging can put downward pressure on rates

- ▶ Revenue from EV charging surpassed costs by more than 3:1 (Synapse Energy Economics)
- ▶ General agreement by stakeholders (LBNL Perspectives Report, August 2018)



Grid Impacts and Rate Design

Two main principles of EV-specific rate design:

- ▶ Rate design should be utilized to increase efficient usage of existing assets rather than undergoing expensive distribution system upgrades to serve EVs
- ▶ Bill increases due to EV infrastructure upgrades should be kept to a minimum for customers who do not own EVs

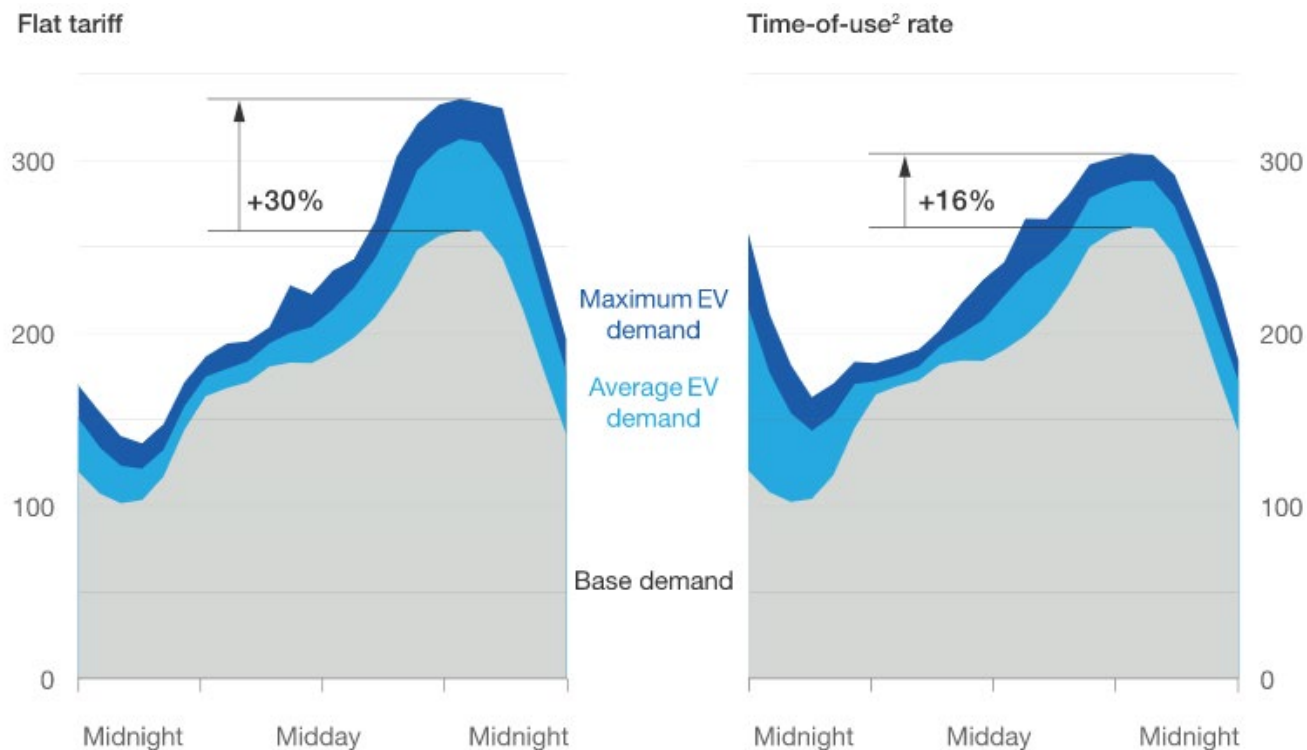
Should rates be available to all customers, only optional, or mandatory for EV loads?

Grid Impacts and Rate Design

Examined three methods of load shifting:

- ▶ Time of use rates
- ▶ Real-time (hourly) pricing
- ▶ Managed charging

Time-varying rates could halve the increase to peak load (McKinsey)



Grid Impacts and Rate Design

Commission Approach	Perspectives		
	Consideration	Proponents' Rationale	Opponents' Rationale
Time of Use (TOU) Rates	Grid Impact	Pilots show effectiveness	Can create secondary peaks, rely on customer participation
	Uptake	Simpler than hourly rates	Customers can be disinterested, low participation
	Cost	Cost savings for most customers	Requires secondary meter or submeter if not whole-home
Real-Time Pricing (RTP)	Grid Impact	More accurate costs lead to efficiency	Low customer adoption can lead to minimal benefits
	Uptake	Low or negative prices very tempting	Lack of price certainty, requires effort to follow prices
	Cost	Potential for large customer savings	Requires secondary meter or submeter if not whole-home
Managed Charging	Grid Impact	With more utility control over charging	Connectivity issues may reduce benefit
	Uptake	Easy on consumer, no need for customer to monitor rates	Concerns around privacy and lack of flexibility to charge might cause customers to opt out
	Cost	Customers can receive bill credits, utilities pay only for performance	More expensive infrastructure required for two-way communication

Demand Charges

Issues and Approaches

- ▶ Demand charges pose challenge to charging station economics, especially with low utilization rates
- ▶ Demand charges can represent up to 93% of monthly electricity bills for DC Fast Chargers (depends on location and size of commercial load)
- ▶ Demand charge holidays, credits, subscriptions and DCFC-specific rates: CA, NV, PA

Future Gaps and Research Questions

Six areas for more research:

- ▶ Interoperability and open standards* – Aug. 25, 2020
- ▶ Obsolescence
- ▶ Vehicle-to-Grid (V2G)* – Apr. 28, 2020
- ▶ Cybersecurity
- ▶ Critical Infrastructure
- ▶ Mitigation of Lost Gas Tax Revenue
- ▶ Performance-Based Regulation* – Dec. 15, 2020

*Resources available from NARUC's EV State Working Group

<https://www.naruc.org/cpi-1/energy-infrastructure-modernization/electric-vehicles/>

Questions?

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