



NARUC Electric Vehicles State Working Group

APRIL MEETING – **EV DEMAND CHARGES AND RATE DESIGNS**

APRIL 25, 2023, 3:00- 4:30PM



Welcome

EV SWG Chair

Commissioner Katherine Peretick, Michigan Public Service Commission

EV SWG Vice-Chair

Chair Jason Stanek, Maryland Public Service Commission

NARUC Staff

- Danielle Sass Byrnett, Robert Bennett

*Feel free to enter
questions into chat at
any time*

3:00 PM	Welcome and Announcements – Commissioner Katherine Peretick (5 minutes) <ul style="list-style-type: none">• Agenda review• Announcements
3:05 PM	Presentation: Peter Cappers, Lawrence Berkeley National Lab (15 minutes) <ul style="list-style-type: none">• Overview of the national landscape for EV rates
3:15 PM	Working Group Peer Sharing and Discussion (1 hour and 10 minutes) <ul style="list-style-type: none">• Jennifer Robertson/Rob Cully, New York• Krystina Schaefer, Ohio• Kevin Krause, Michigan• Joey Chen, Maryland• Other working group members• Q&A of colleagues and discussion
4:30 PM	Adjourn

Agenda

Event Announcements (May)

- **NARUC Grid Data Sharing workshop on May 25, 2023**, in person in Alexandria, Virginia with a focus on DER interconnection and EV fleet charger siting. *Travel stipends are available for commissioners / commission staff; indicate your request during registration.* Please contact Danielle for more information (dbyrnett@naruc.org).
- **NASEO, NARUC, AASHTO will host a webinar on State-Level Roles and Collaboration among Public Utility Commissions, State Energy Offices, and Departments of Transportation for Transportation Electrification**
 - May or June – Date / time TBD

Event Announcements (Summer)

- NASEO and AASHTO will host an **Electric Vehicle Charging Infrastructure (NEVI) National Conference on July 13-14, 2023, in Arlington, VA.**
 - Registration and more information at:
<https://www.naseo.org/event?EventID=8413>. *NARUC can provide limited travel support and stipends for Commissioners and their staff.* Please contact me for more information (rbennett@naruc.org).
- **NARUC Summer Policy Summit: July 16–19, 2023 in Austin, Texas**
 - Multiple EV sessions are likely. Virtual power plant workshop on Weds afternoon.
 - **Registration and agenda information coming May 1.**

Welcome

Moderator: **Sarah Mullkoff for Commissioner Katherine Peretick, Michigan
Public Service Commission**

Guest Speaker

- Peter Cappers, Lawrence Berkeley National Laboratory (LBNL)



A Snapshot of EV-Specific Rate Designs Among U.S. Investor-Owned Electric Utilities

NARUC EV State Working Group

Peter Cappers, Andrew Satchwell, Cameron Brooks, and Sam Kozel

April 25, 2023

This work was funded by the U.S. Department of Energy's Office of Electricity under Contract No. DE-AC02-05CH11231.



How are EV-Specific Electric Utility Rates Designed Presently?

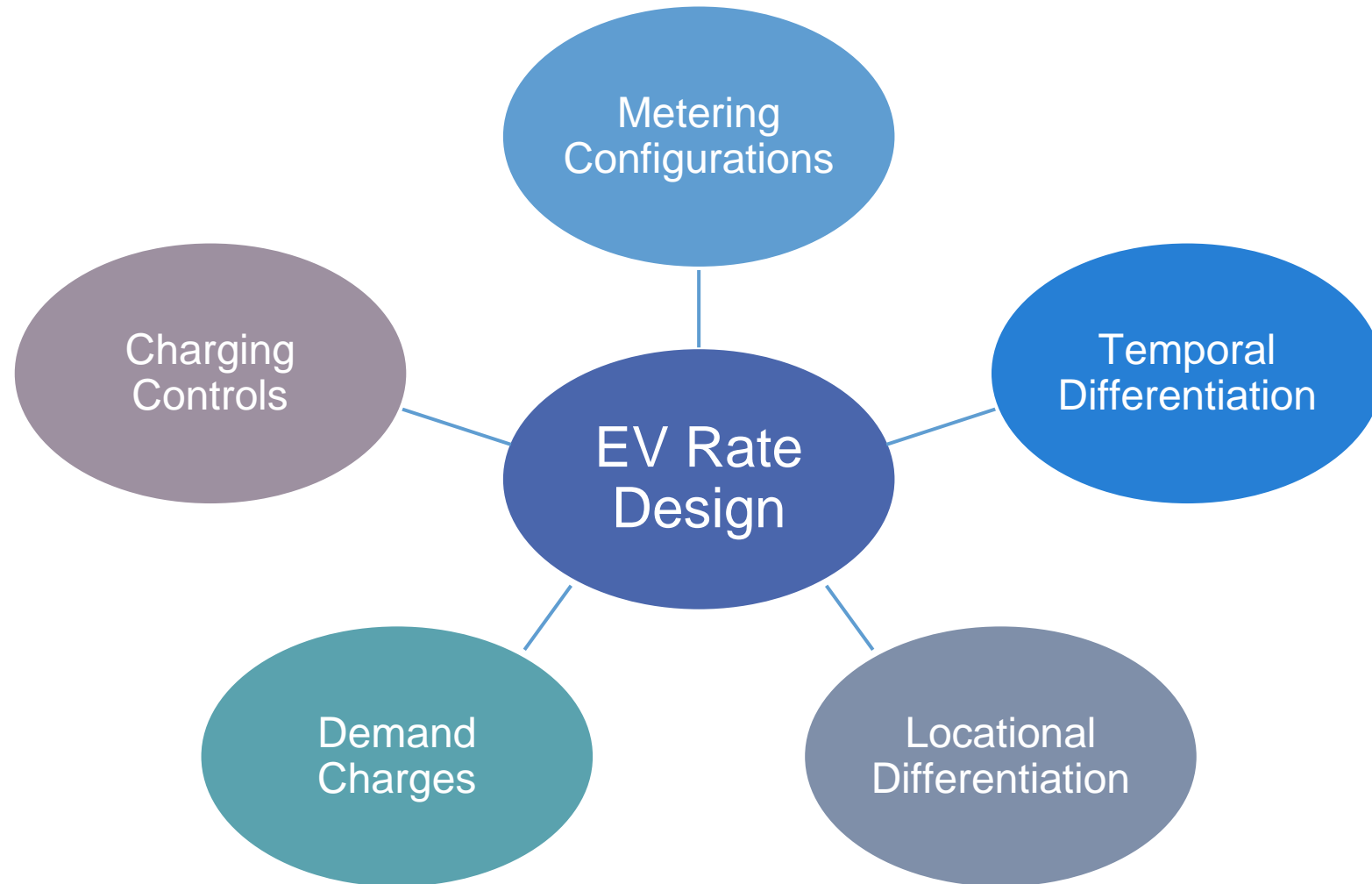
Objective

- Provide regulators, utilities, and the EV industry with a more robust understanding of **how EV-specific electric utility rates could be designed** and **how they are actually being designed presently in the United States**

Methods

- Develop a **framework** for identifying the **design elements** of EV-specific rates
- Collect **electric utility tariff filings** with state utility regulators of EV-specific rates
- Apply the framework to the tariff filings to develop a **database** that categorizes EV-specific rates
- Evaluate the database to characterize the **landscape** of EV-specific rate designs

EV-Specific Rate Design Components



Source: <https://emp.lbl.gov/publications/ev-retail-rate-design-101>

Database of U.S. Electric Investor-Owned Utility EV-Specific Rates

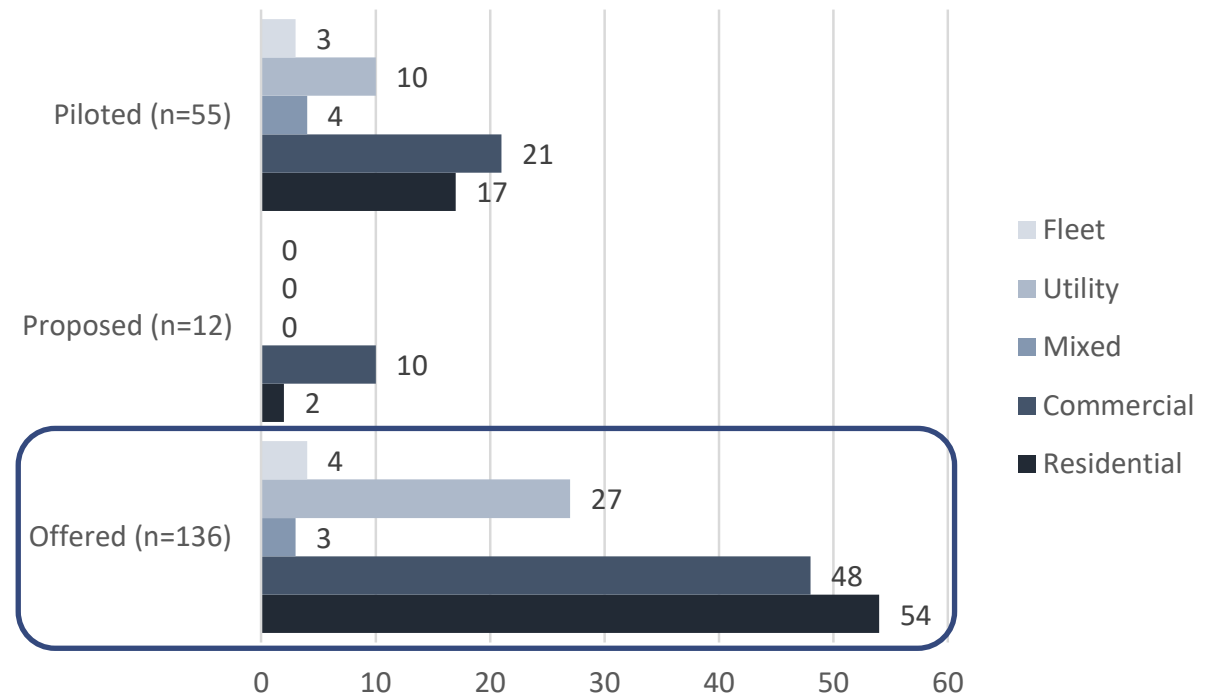
- Reviewed IOU tariff filings between 2012 and 2022
 - ▢ Majority dated from 2018-2022
- Eligible EV-specific rates:
 - ▢ Required proof of EV ownership
 - ▢ Designed for the purposes of reselling energy for use in EV charging
- Identified 217 EV-specific rates from IOUs in 37 states and District of Columbia
 - ▢ **Offered** (n=136): Rates that were either active or had been approved
 - ▢ **Proposed** (n=12): Rates that had been filed but awaited a decision by the PUC
 - ▢ **Piloted** (n=54): Rates that were temporary or where service was offered provisionally

EV-Specific Rate Snapshot

By Customer Class

Categorized Definitions

- **Residential:** Intended for use by typical residential class customers, including multi-family
- **Commercial:** Intended for use by commercial, industrial, or general service classes of customers, as well as those who were not included in any other category
- **Mixed:** Included a combination of residential and commercial customers
- **Utility-owned:** Intended for use at utility-owned charging equipment that is primarily deployed for public use, although examples at private multi-unit dwellings do exist
- **Fleet:** Intended for specific use by public or private fleets (e.g., commercial fleets, school bus fleets)



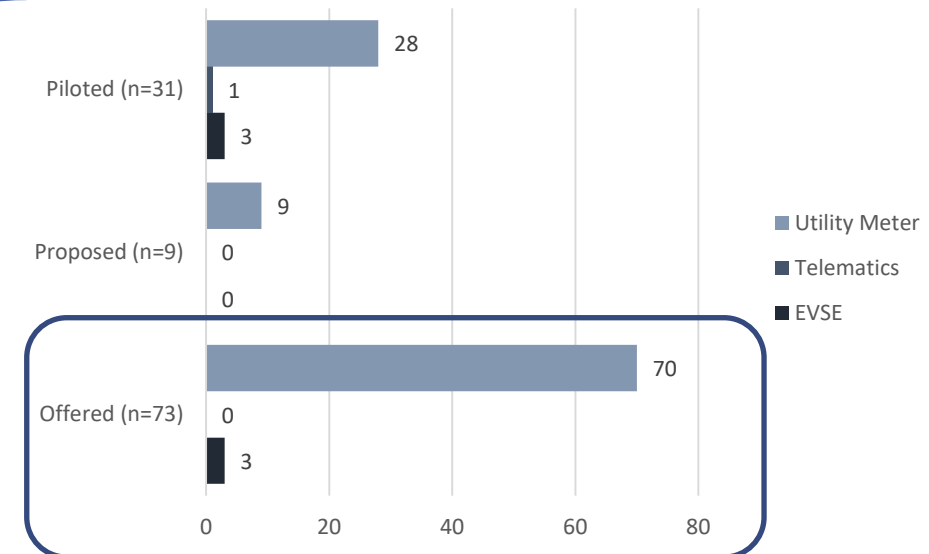
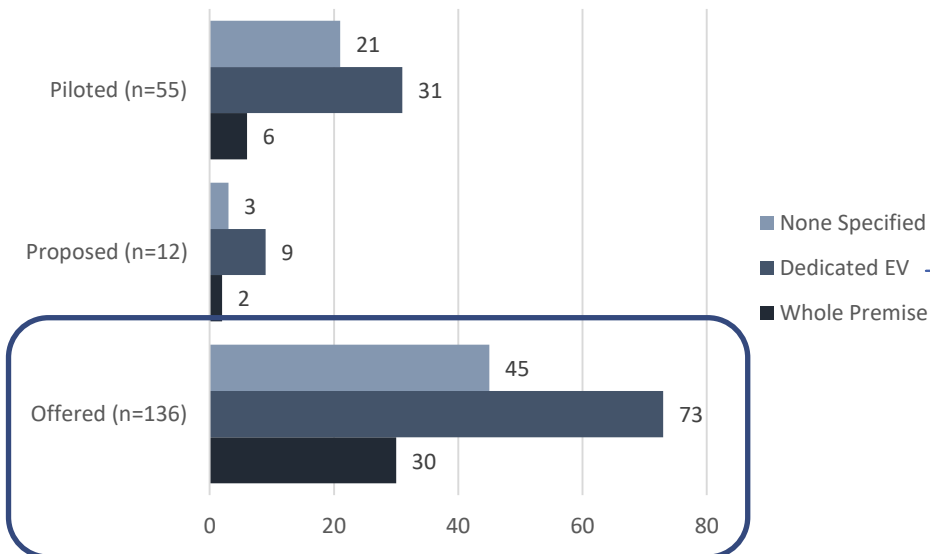
EV-Specific Rate Snapshot

By Meter Configuration

Categorized Definitions

- **Whole Premise:** The meter measured electricity consumption for the entire premise
- **Dedicated EV:** The meter measured electricity consumption strictly for the EV

- **Utility Meter:** An additional utility-grade meter was used to measure EV charging load
- **Telematics:** The EV's own internal telematics were used to measure EV charging load
- **EVSE:** The EV supply equipment's internal measurement capabilities were used to measure charging load

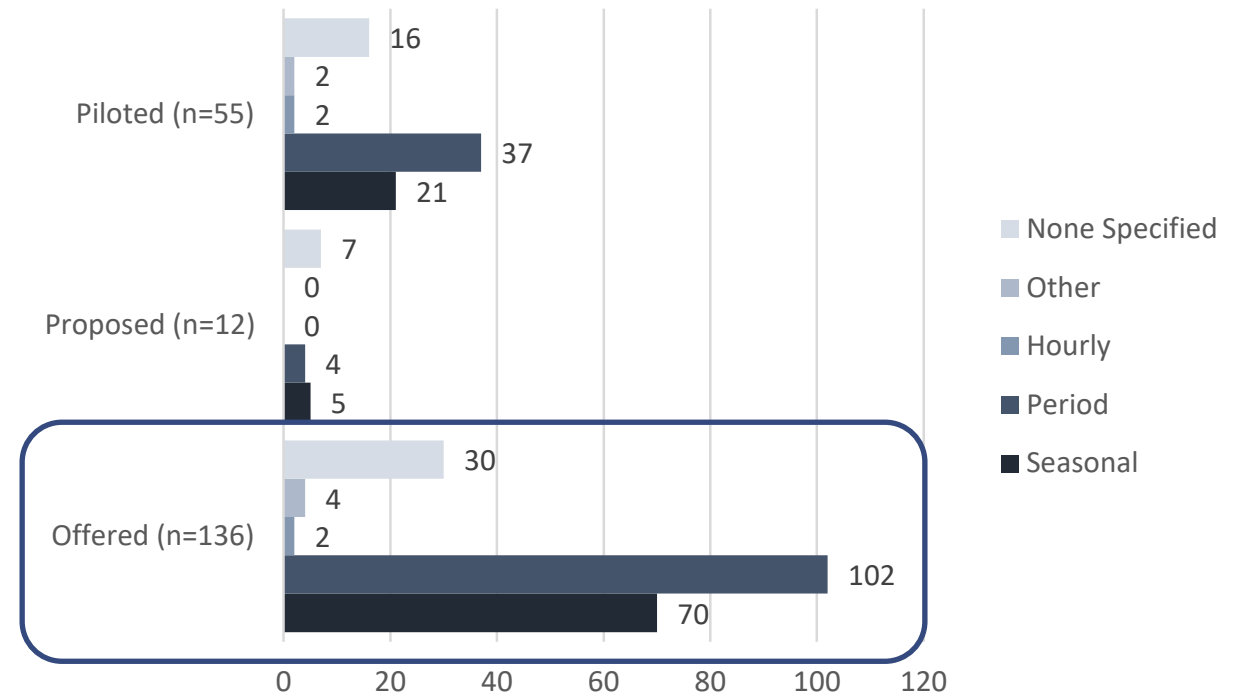


EV-Specific Rate Snapshot

By Temporal Differentiation

Categorized Definitions

- **Seasonal:** Rate schedules that differed by season (e.g., summer and non-summer)
- **Period:** Rate schedules that varied according to two or more multi-hour periods of the day (e.g., TOU rates)
- **Hourly:** Rate schedules that varied according to the hour of the day (e.g., RTP)
- **Other:** Rate schedules that varied temporally in any other way (e.g., as monthly load factors increase the cost per kWh charge decreases, critical peak energy charge overlay)

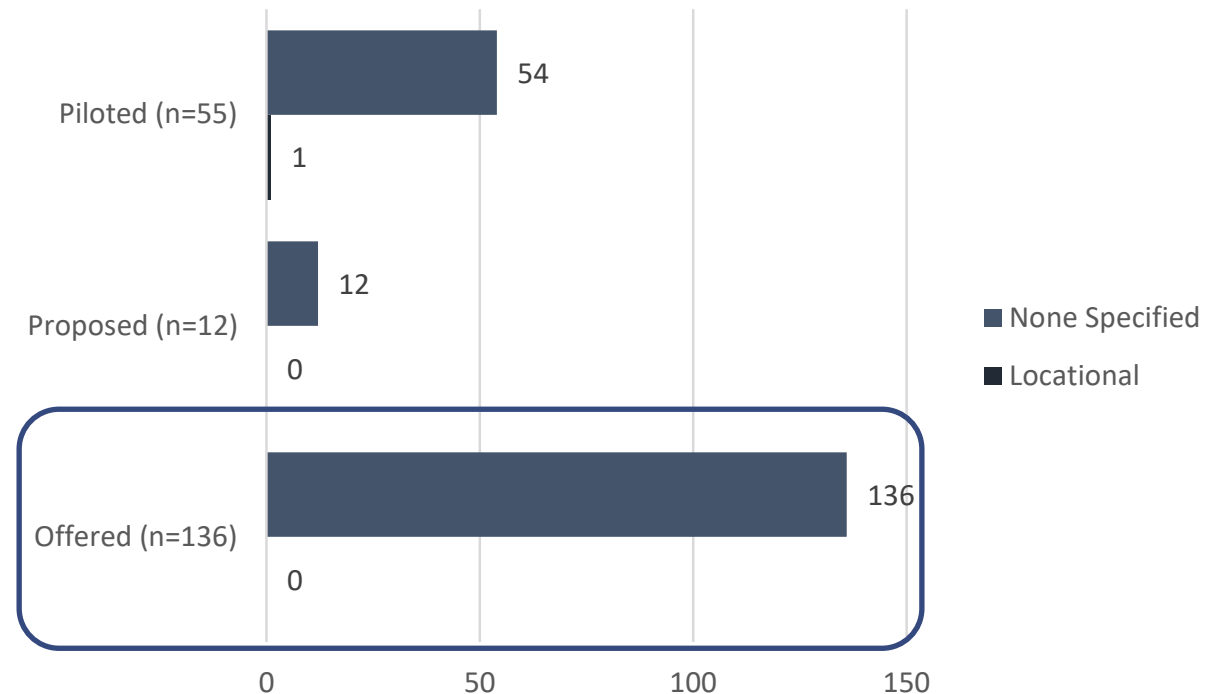


EV-Specific Rate Snapshot

By Locational Differentiation

Categorized Definitions

- Rate designs with locational differentiation can be as simple as volumetric energy charges that vary by location on the subtransmission (e.g., 34.5-69.0 kV) grid, or more complex differential coincident peak demand charges that are based on congestion of local distribution lines (e.g., below 34.5 kV).
- For this analysis, rate levels reflective of cost differences at the bulk power system (e.g., above 69 kV) were not considered to have any locational differentiation.

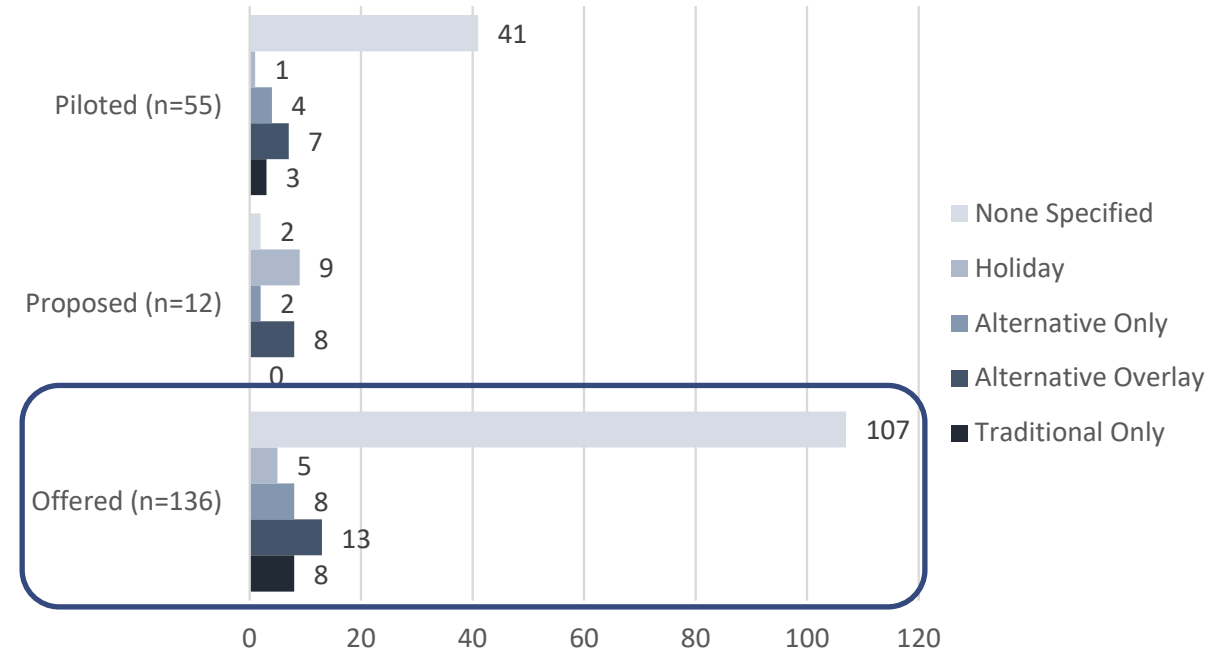


EV-Specific Rate Snapshot

By Demand Charges

Categorized Definitions

- **Traditional Only:** Rates that included a typical, traditional design for a demand charge
- **Alternative Only:** Rates that only included an alternative to a traditionally designed demand charge (e.g., demand subscription model, monthly upper limits on billed demand, level of demand charge tied to monthly load factor/station utilization)
- **Alternative Overlay:** Rates that under particular conditions specified in the tariff overlaid an alternative to a traditional demand charge on top of a traditionally designed demand charge, both which were included in the tariff filing (e.g., discounted demand charge applied as a credit, reduced demand charge for off-peak usage, phasing out the \$/kW demand charge in favor of a \$/kWh volumetric energy charge based on station utilization)



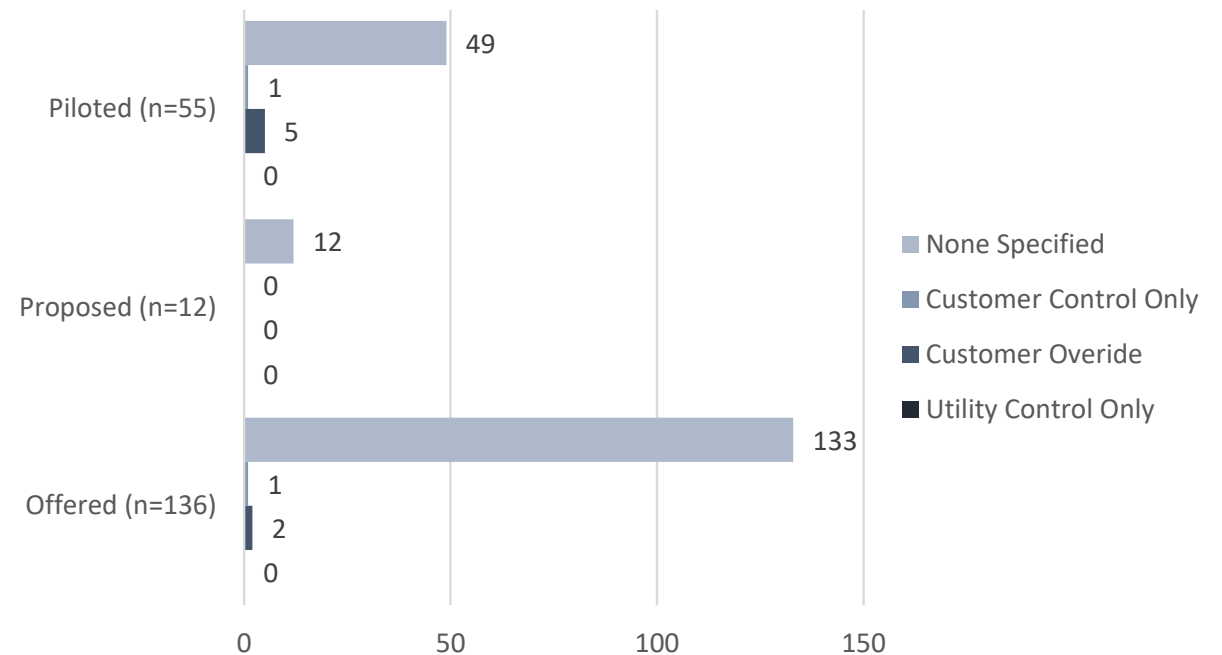
- **Holiday:** Rates that included some version of a demand charge holiday, where the demand charge would be suspended for a period of time or where the holiday would otherwise be scheduled to sunset.

EV-Specific Rate Snapshot

By Charging Controls

Categorized Definitions

- **Utility Control Only:** Rates that exclusively allow the utility to directly control the charging equipment, under specified circumstances, without the ability for a customer to override the utility control signals
- **Customer Override:** Rates that give the customer the ability to override utility control signals, under specified circumstances
- **Customer Control Only:** Rates that exclusively give the customer the ability to directly control charging equipment



Dominant EV-Specific Rate Designs Among U.S. IOUS

Offered Rates		
Customer Class	Primary	Secondary
Residential (n=54)	Dedicated EV metered w/ TOU & w/o Demand Charge (n=26)	Whole-premise metered w/ TOU & w/o Demand Charge (n=16)
Commercial (n=48)	Dedicated EV metered w/ TOU & w/ Demand Charge Alternative (n=13)	Dedicated EV metered w/ TOU & w/o Demand Charge (n=13)
Utility-Owned (n=27)	DCFC or L2 w/o TOU & w/o Demand Charge (n=12)	DCFC or L2 w/ TOU & w/o Demand Charge (n=8)

Key Conclusions

- Utilities and regulators may be highly motivated to currently promote EV adoption through simple rate designs while seeking broad management of grid impacts from the additional electric demand associated with charging loads (e.g., by encouraging off-peak charging).
- The absence of highly dynamic temporal or locational rate designs suggests that, as in other utility applications, achieving the greatest level of economic efficiency is likely not as high a priority at the present time as other issues or may not be feasible or cost-effective due a variety of reasons (e.g., the existing metering infrastructure is too limited or nonexistent).
- The additional complexity introduced by alternatives to traditionally designed demand charges or outright holidays from them were deemed acceptable, by some, in order to support an industry at the beginning stages of a transition
- Regulators and utilities should consider the frequency with which EV-specific rate designs are updated or altered to reflect changing grid, economic and/or environmental conditions as well as their effectiveness in achieving the stated (or, more likely, implicit) objective

Contact

Peter Cappers | PACappers@lbl.gov

For more information

Download publications from the Electricity Markets & Policy: <https://emp.lbl.gov/publications>

Sign up for our email list: <https://emp.lbl.gov/mailling-list>

Follow the Electricity Markets & Policy on Twitter: @BerkeleyLabEMP

Access the report at <https://emp.lbl.gov/publications/snapshot-ev-specific-rate-designs>

Acknowledgements

The work described in this study was conducted at Lawrence Berkeley National Laboratory and supported by the U.S. Department of Energy's Office of Electricity under Contract No. DE-AC02-05CH11231. We would like to especially thank Chris Irwin (DOE) for his support of this work. For reviewing the study and providing valuable feedback, we thank Tanya Burns (Arara Blue Energy Group), Galen Barbose (Berkeley Lab), Garrett Fitzgerald (SEPA), Michelle Levinson (World Resources Institute), Jeff Loiter (NARUC), Kara Podkaminer (DOE), and Melissa Whited (Synapse Energy)

The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof, or The Regents of the University of California.



Questions?

Raise your hand to ask a question or type a question
into the question box

Working Group Peer Sharing

- Jennifer Robertson/Rob Cully, New York
- Krystina Schaefer, Ohio
- Kevin Krause, Michigan
- Joey Chen, Maryland
- Other working group members who would like to share

EV Rate Design/Demand Charges in Ohio, as of 4/25/23

Krystina Schaefer, PUCO

Division Chief, Grid Mod & Retail Markets

Krystina.Schaefer@PUCO.Ohio.gov

Overview

- Ohio has a restructured electricity market and four investor-owned utilities (IOUs), which include:
 - AEP Ohio,
 - AES Ohio (formerly Dayton Power & Light),
 - Duke Energy, and
 - FirstEnergy Ohio, which has three operating companies:
 - Cleveland Electric Illuminating Company
 - Ohio Edison Company
 - The Toledo Edison Company

Ratemaking Authority

Distribution Service

- The traditional rate case process for distribution service is defined through [Chapter 4909](#) (Public Utilities Commission of Ohio – Fixation of Rates) of the Ohio Revised Code
 - Section 4909.15 (Fixation of reasonable rate)
 - Section 4909.18 (Application to establish or change rate)
 - Section 4909.19 (Publication of notice – investigation)

Generation Service & Riders

- The procurement of generation for non-shopping, or standard service offer (SSO), retail electric customers is defined through [Chapter 4928](#) (Competitive Retail Electric Service) of the R.C.
 - Through Section 4928.143 (Application for approval of electric security plan (ESP) – testing), the IOUs in Ohio have developed a framework to procure energy and capacity requirements for SSO customers through competitive wholesale auctions.
 - The statute also allows for single-issue ratemaking outside of the traditional rate case process.

AEP Ohio's Pilot Plug-In Electric Vehicle (PEV) Schedule

- [Pilot Plug-In Electric Vehicle \(PEV\) Schedule](#)
 - Placeholder tariff established in Case No. [16-1852-EL-SSO](#)
 - Populated as part of a Stipulation & Recommendation approved in Case No. [20-585-EL-AIR](#)
 - Pilot distribution rate for separately metered EV charging (500 customer limit)
- For residential customers:
 - Additional customer charge - \$10
 - On-peak only demand charge - \$2.14/kW
 - On-peak period: Monday through Friday (6AM – 8PM)
 - Single highest 30-minute integrated peak during on-peak period each month
 - Distribution energy charge - \$0.0131563/kWh (half the typical rate)
- For secondary customers w/ public chargers (Level 2 or DCFC):
 - Allows new EVSE (installed after June 1, 2020) to be billed on non-demand metered rates

AES Ohio's Residential Off-Peak Incentive Program

- Residential Off-Peak Incentive Program
 - Participating residential customers will receive an incentive (\$0.05/kWh credit) to charge during off-peak hours (available to shopping or SSO customers)
 - Off Peak Hours:
 - Summer: 10PM—10AM
 - Winter: 10PM—6AM
 - Uses metering telemetry within qualified EVSE
 - Program costs are paid for by ratepayers and collected through a rider recovery mechanism
 - Costs are capped at \$260K annually for the three-year ESP term
 - Using the lessons learned, the Company is required to propose a cost-based distribution rate for EV charging
- The Company will propose modifications to reduce the line extension costs for customers installing publicly available EVSE as part of the next rule review in Ohio Adm. Code Chapter [4901:1-9](#)
 - Current 60% utility and 40% customer
 - Proposed 80% utility and 20% eligible customer

Note: Both provisions above are pending as part of a Stipulation & Recommendation before the Commission in Case No. [22-0900-EL-SSO](#).

Working Group Peer Sharing

- Jennifer Robertson/Rob Cully, New York
- Krystina Schaefer, Ohio
- Kevin Krause, Michigan
- Joey Chen, Maryland
- Other working group members who would like to share

Rates, Cost of Service, and EV Charging

NARUC EVSWG

Kevin Krause

Michigan Public Service
Commission Staff

4/25/23

Rates, Cost of Service, and EV Charging

- Is Michigan Innovative?
- Are demand charges for Fast Charging actually a good thing?
- Another option?



Is Michigan Innovative?

The major utilities in Michigan have implemented mandatory Time-Of-Use rates for ALL residential customers. They are all three part rates.

Strong evidence that EV owners that are charging at home are taking advantage of the lowest price period for charging their EVs.



Are demand charges for Fast Charging actually a good thing?

- Demand charges send a price signal for on-site storage (1)
- Demand charges send a stronger price signal for availability



(1) [LBL storage and rate design study](#)



Another option?

Fast Charging stations claim that their loads are significantly different from all other customers.

If this is accepted as being true, then one possible answer is:



Separate Cost-of-Service class



Questions/Comments

Kevin Krause

krausek@michigan.gov



Working Group Peer Sharing

- Jennifer Robertson/Rob Cully, New York
- Krystina Schaefer, Ohio
- Kevin Krause, Michigan
- Joey Chen, Maryland
- Other working group members who would like to share

Discussion / Peer Sharing Questions

- What EV rate(s) has the commission approved? What was the intended objective?
- How long has the rate or charge been active/in place?
- Who does the rate or charge apply to?
- Have you obtained any results or when are those expected?
- If there are results, how successful has the rate been?
- If a demand charge holiday or alternative has been approved or is being piloted or considered, what were the considerations?
- What decisions has your commission made around sub-metering for EV rate eligibility?

All working group members are invited to share about their state

Next EV SWG
meeting:
Tues, May 30,
3:00 – 4:30pm

[WWW.NARUC.ORG/CPI-1/ENERGY-
INFRASTRUCTURE-
MODERNIZATION/ELECTRIC-
VEHICLES/](http://WWW.NARUC.ORG/CPI-1/ENERGY-INFRASTRUCTURE-MODERNIZATION/ELECTRIC-VEHICLES/)

Appendix: Resources for Reference

- ▶ **DOE's EV Grid Assist webinar series** (June – November) recordings are posted at: www.energy.gov/eere/evgrid-assist-accelerating-transition
- ▶ **Presentations and recordings of past EVSWG events** are available on the NARUC website: www.naruc.org/cpi-1/energy-infrastructure-modernization/electric-vehicles/
- ▶ EVSWG Listserv: NARUC-EVSWG@lists.naruc.org
- ▶ ICYMI – **4 NARUC EV publications** released late 2022:
 - [Models for Incorporating Equity in Transportation Electrification](#)
 - [Electric Vehicle Interoperability: Considerations for Public Utility Regulators](#)
 - [Considering Interoperability for Electric Vehicle Charging: A Commission Case Study](#)
 - [Transportation Electrification: State Level Roles and Collaboration among Public Utility Commissions, State Energy Offices, and Departments of Transportation](#)