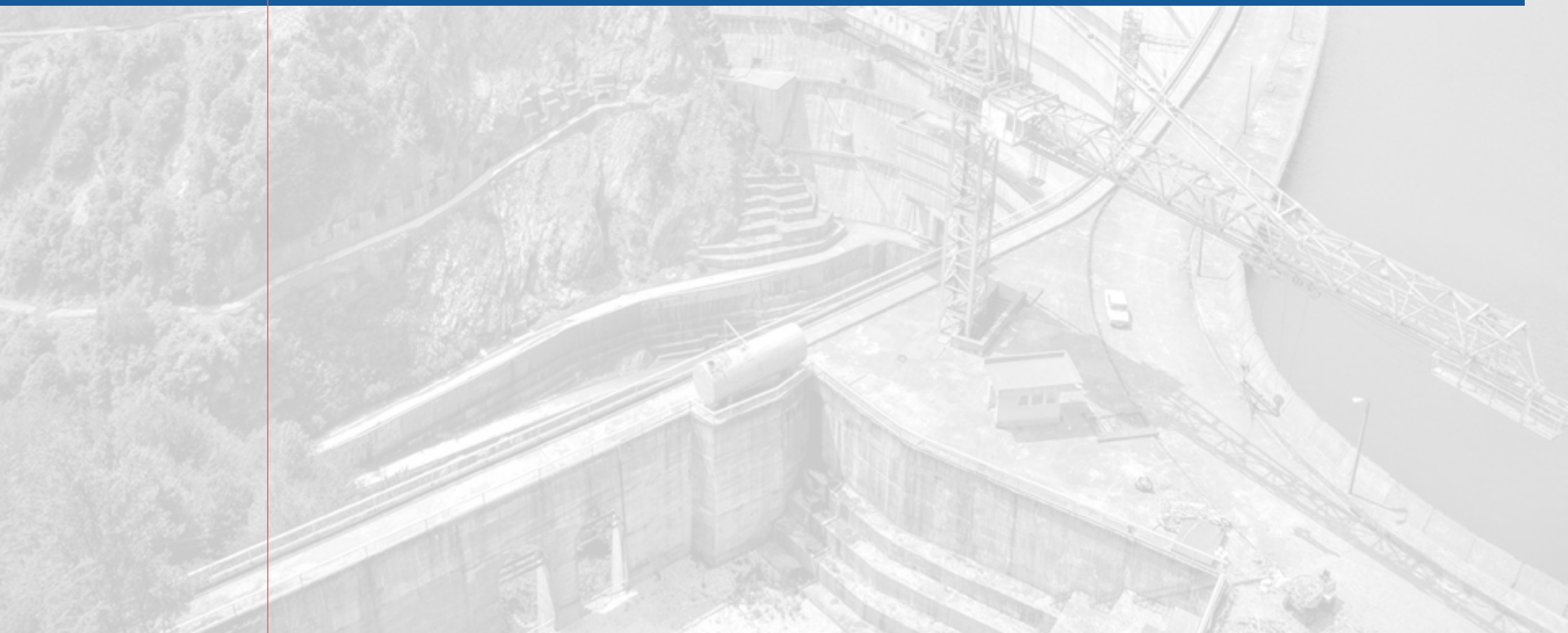
March 9, 2021

Welcome

Michigan PSC DER Rate Design Workgroup Meeting

PSC Intro



Meeting Objectives

1. Provide an opportunity to hear different stakeholder perspectives on the study purpose and approach
2. Share a broad range of perspectives on DG tariff design
3. Inform subsequent stakeholder written comments on the draft proposed outline

Meeting Agenda

9:00	Introduction to the rate design study and the Regulatory Assistance Project; Overview of the study process
9:10	Meeting objectives and agenda
9:20	Presentation of draft proposed study outline
9:40	Exploring opportunities and risks for modifications to DG Tariff design
10:10	Break
10:30	Overview presentation of changes to net metering policies and approaches in other states
10:50	Invited stakeholder presentations
11:35	Q&A for presenters and open discussion
11:55	Next steps and close

Requests for Today

- Practice “democracy of time”
- Challenge assumptions, your own and others’

Draft Study Outline

Background and Key Principles

- Background and regulatory context in Michigan
- Ratemaking principles
- Perspectives on costs and benefits

Overarching Program Parameters

- Metering and billing frameworks
- Other program/tariff design features
- Treatment of pre-existing net metering and DG program customers

Designing Rates and Credits

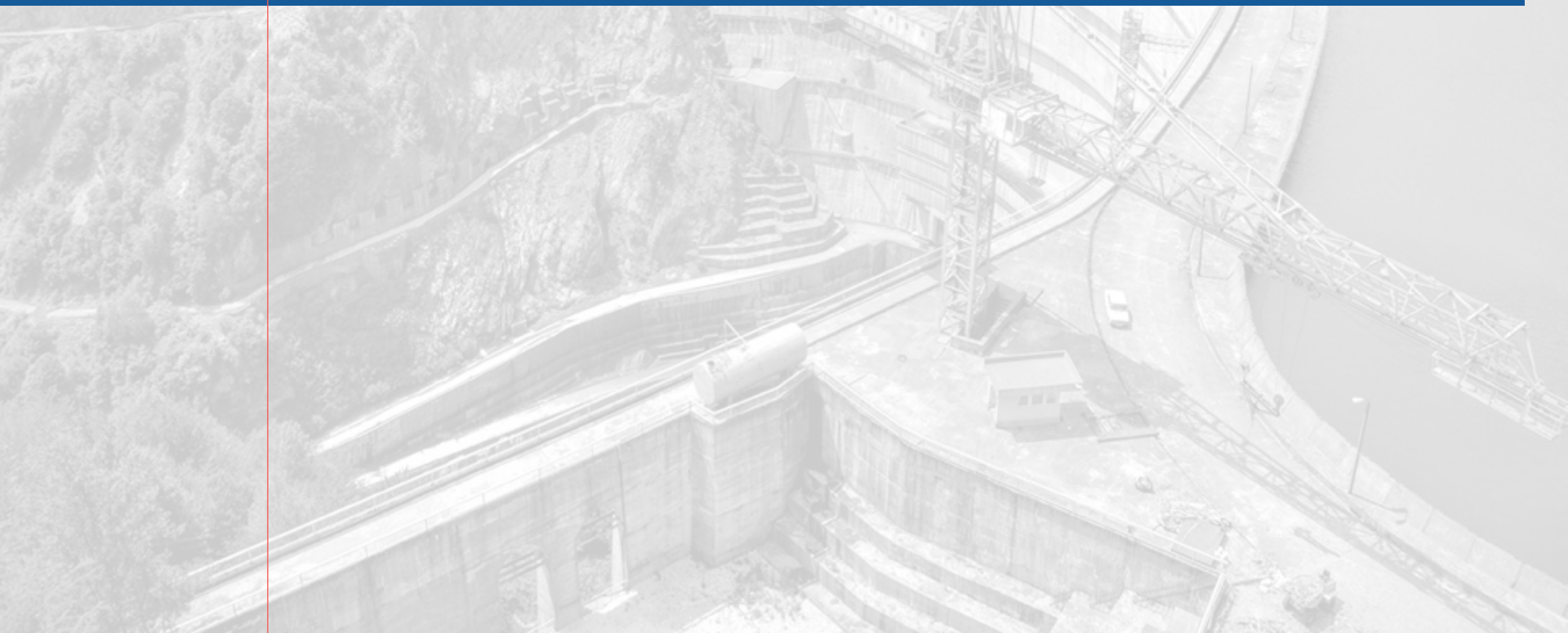
- Rate elements
  - Fixed charges
  - KW charges
  - KWh charges
- Credit design
  - Volumetric/monetary
  - Credit value
  - Rollover provisions

Evaluation Metrics and Program Options

- Key evaluation metrics
  - Fair cost allocation
  - Efficient customer pricing
  - Customer understanding and acceptance
  - Equitable distribution of program benefits
  - Levels of DER buildout
- Options for new program design
- Appendices on key state examples

Clarifying Questions?

Breakout Activity



Exploring opportunities and risks for modifications to DG tariff design

- Individual reflection/brainstorm
- Breakout groups
- Brief large-group reflection

Individual Reflection

- *From your perspective, what are the most important opportunities and risks for DG tariff design? In other words, what important outcomes could be improved or hindered by DG tariff design?*

- Please note 1-2 risks and opportunities in a text file on your computer or on a piece of paper

Breakout Groups

- Reflect on others' opportunities and risks
- Discussion:
  - *What is something you see in others' answers that is different from your perspective?*
  - *What trade-offs are presented by the opportunities and risks identified?*

Break

Please Return at 10:30

An Overview of Net Metering Reforms Across the U.S.

MI Power Grid DER Rate Design Kick-Off Meeting
March 9, 2021

Autumn Proudlove
NC Clean Energy Technology Center
Sr. Policy Program Director
afproudl@ncsu.edu

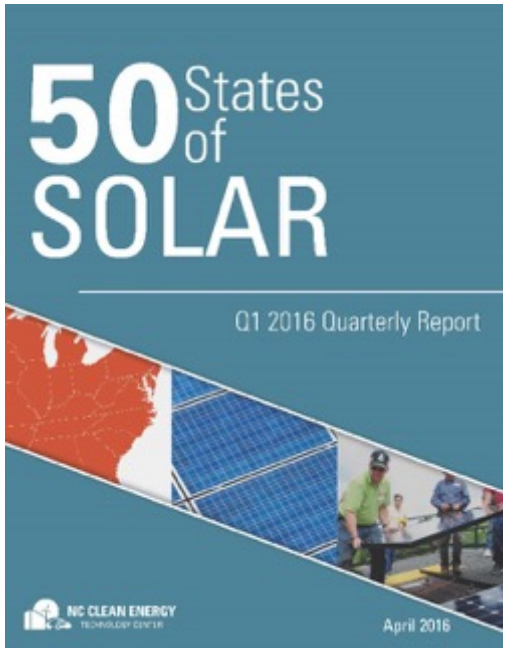
NC CLEAN ENERGY TECHNOLOGY CENTER

About the NC Clean Energy Technology Center

- UNC System-chartered Public Service Center administered by the College of Engineering at North Carolina State University
- Mission is to advance a sustainable energy economy by educating, demonstrating and providing support for clean energy technologies practices, and policies.
- Objective research, analysis, & technical assistance – no advocacy
- Manage the Database of State Incentives for Renewables and Efficiency (DSIRE – www.dsireusa.org)

About the 50 States of Solar

- Quarterly publication detailing state and utility distributed solar policy & rate design changes
  - Net Metering
  - DG Valuation/NEM Cost-Benefit Studies
  - Residential Fixed Charges & Minimum Bills
  - Residential Demand Charges & Solar Charges
  - Community Solar
  - Third-Party Ownership
  - Utility-Led Rooftop Solar
- Regulatory actions, bills passing at least one chamber
- States, IOUs, public power utilities with >100,000 customers



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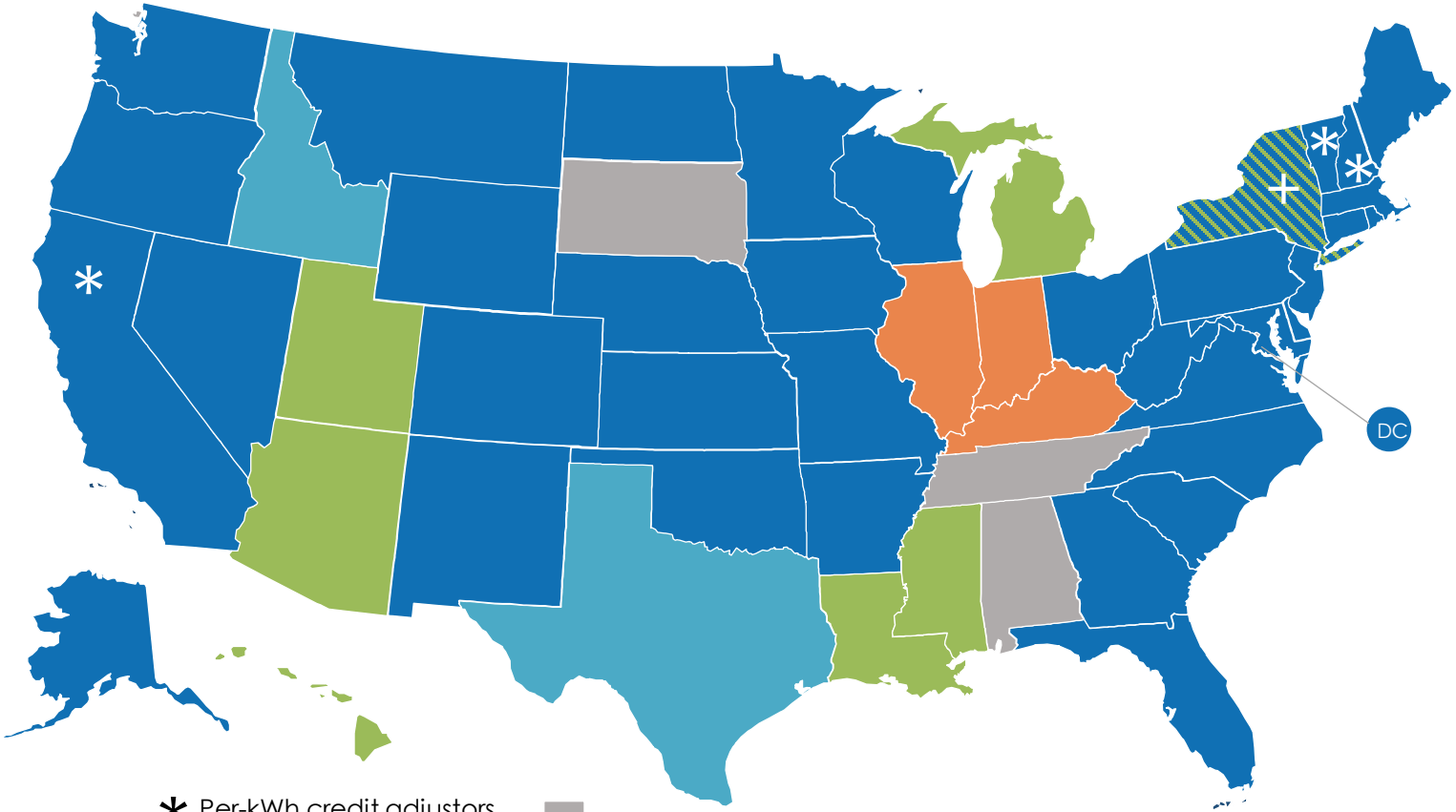
https://www.dsireinsight.com/publications

Net Metering and Distributed Generation Compensation Policies

www.dsireusa.org / March 2021



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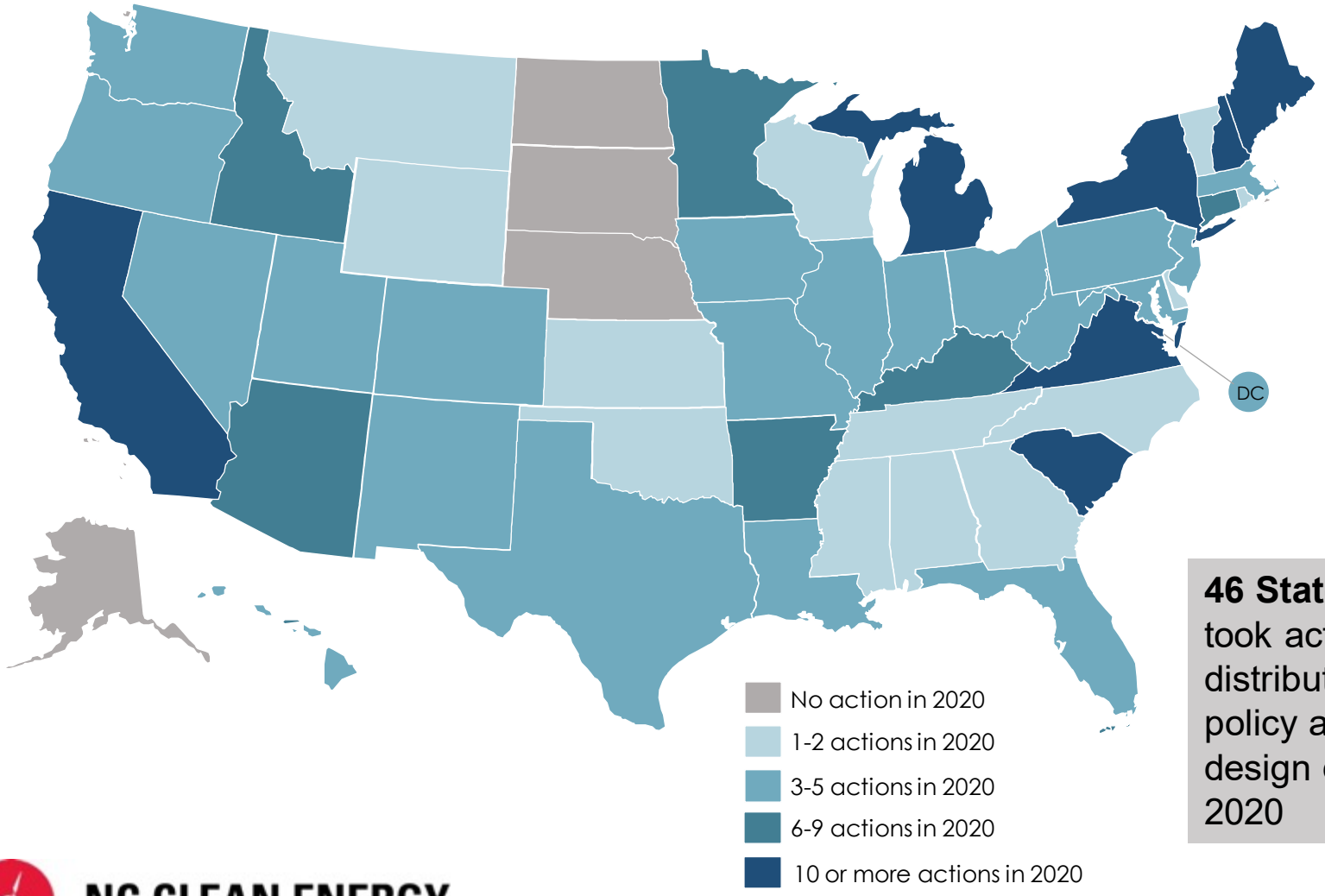
2020 Distributed Solar Policy & Rate Design Action



46 States + DC took action on distributed solar policy and rate design during 2020

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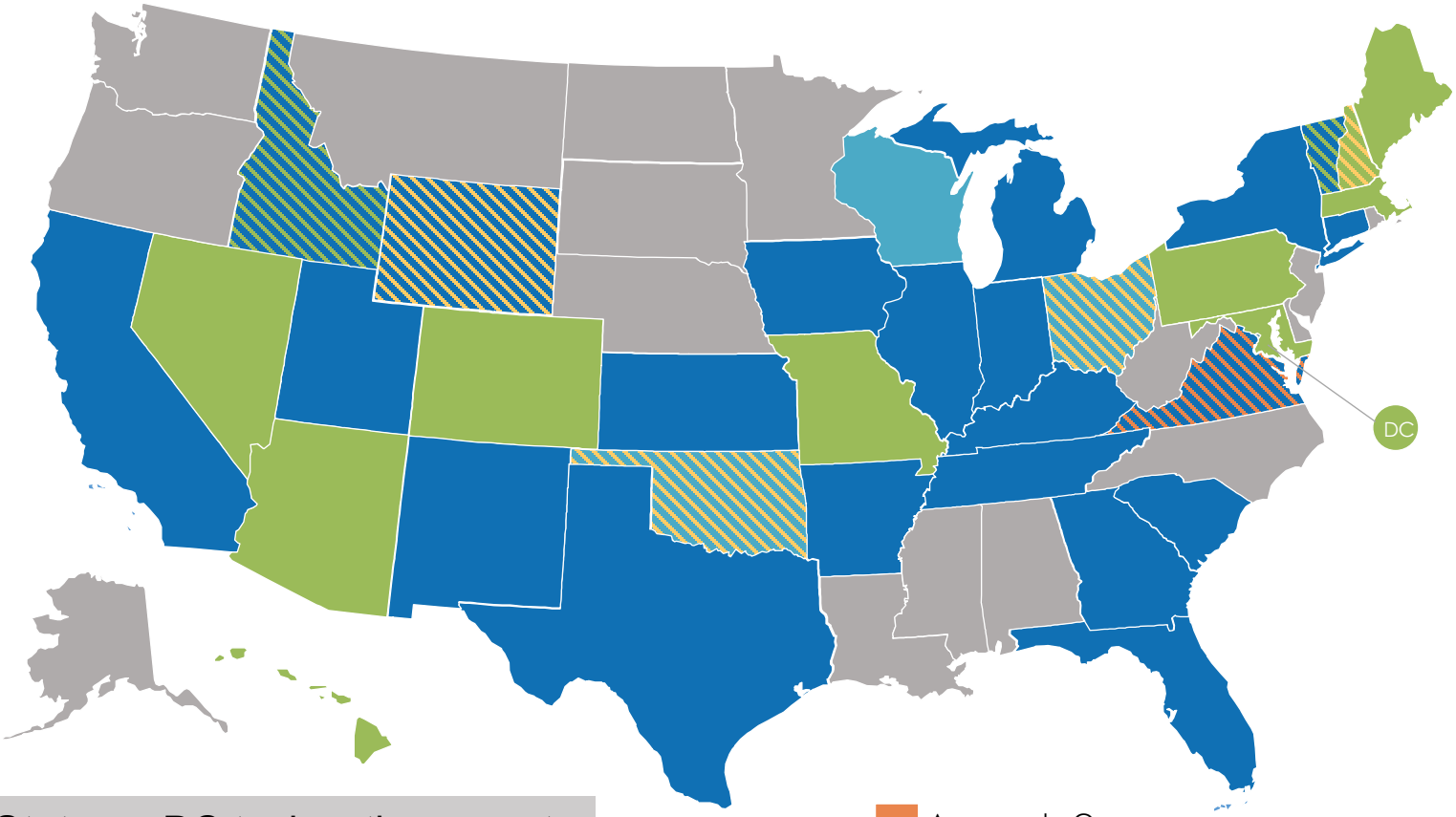
2020 Proposed or Enacted Changes to Net Metering Policies by Type



34 States + DC took action on net metering during 2020

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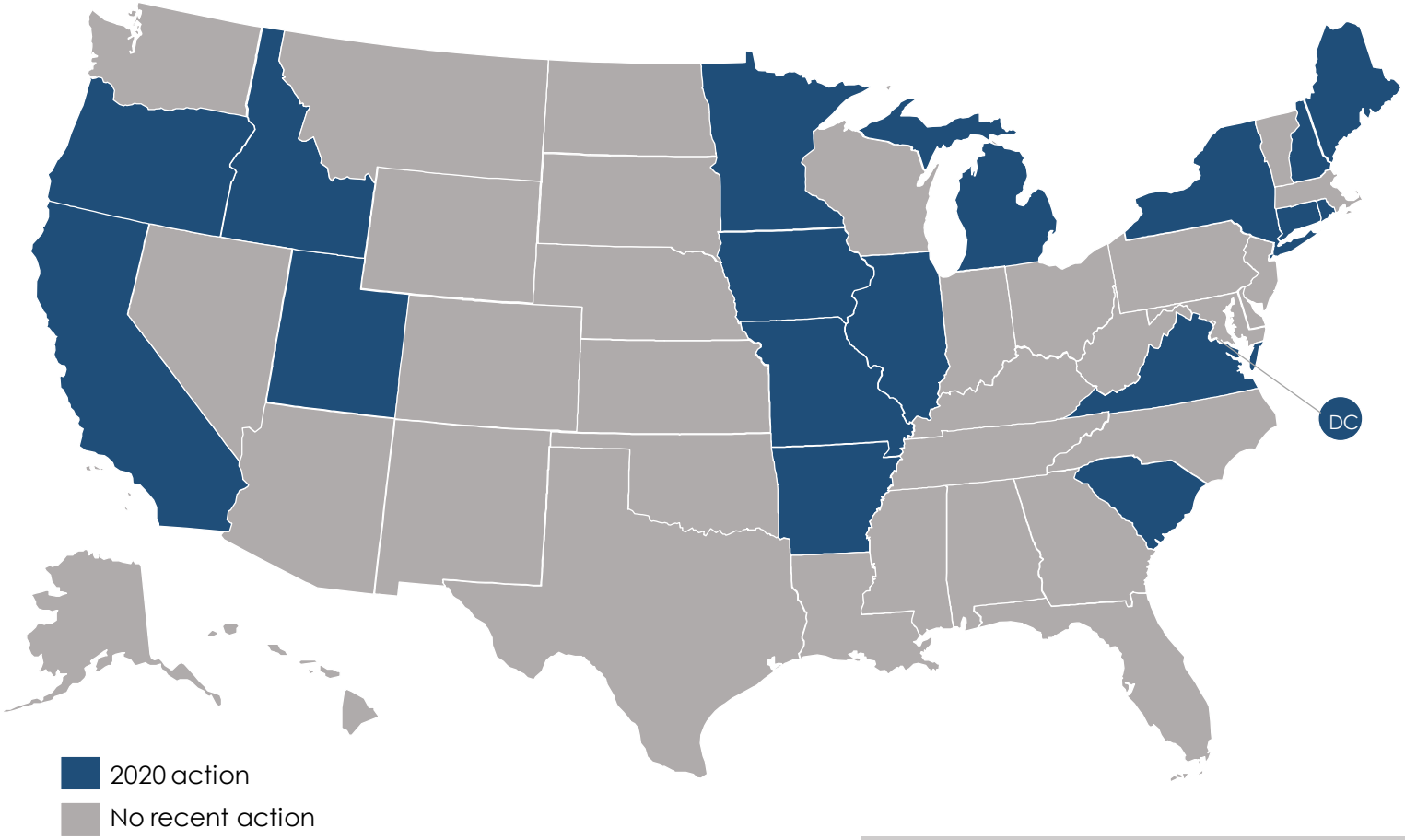
Net Metering Policy Trends

- States considering changes to **export credit rates** & **netting period**
  - Many different variations possible
  - Credit rates: retail rate, TOU rates, value of solar or DER, avoided cost, adders, locational rates, etc.
  - Netting intervals: monthly, instantaneous, 15 / 30 / 60 minute intervals, time-of-day netting, etc.
  - Almost all successor tariffs allow self-consumption

Net Metering Policy Trends

- Examples of Credit Rate/Netting Period Changes:
  - **Arizona** – Phasing down to avoided cost
  - **California** – TOU rates
  - **Indiana** – 1.25 times avoided cost rate
  - **Louisiana** – Avoided cost rate
  - **New York** – Value of DER rate (larger customers)
  - **Utah** – Rate includes value for avoided energy, generation capacity, T&D capacity, line losses, integration costs
  - **Vermont** – Credit rate adjustors
- Some states have elected to continue retail rate net metering

2020 Action on Distributed Solar Valuation and Net Metering Studies



17 States + DC took action on distributed solar valuation during 2020

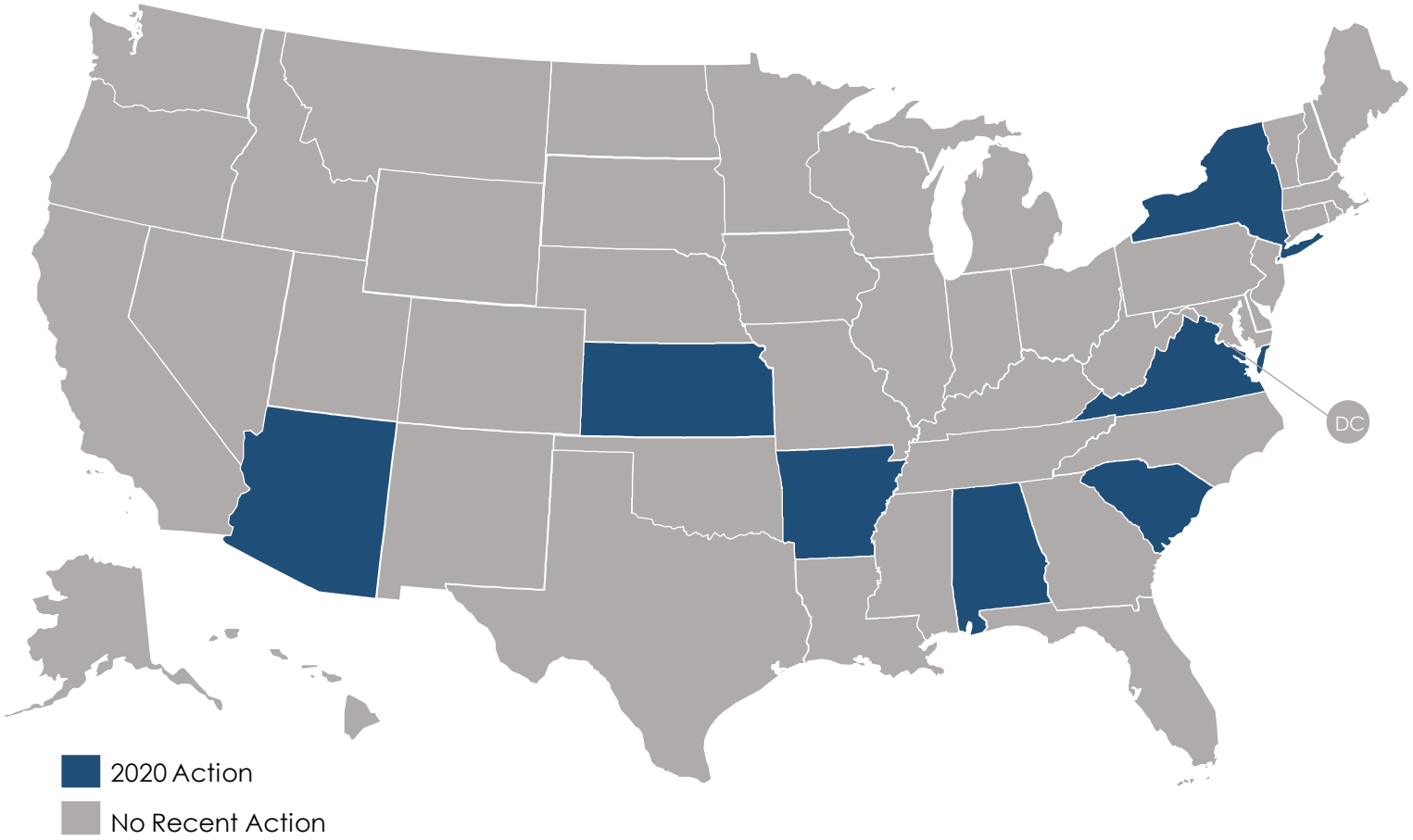
Net Metering Policy Trends

- Undertaking **studies** to inform net metering credit rate changes
- Examples:
  - **Connecticut** - PURA value of DER study conducted to inform NEM changes
  - **Idaho** – PUC requiring utilities to conduct on-site generation studies before addressing NEM reforms
  - **New Hampshire** – Value of DER study expected March 2022, locational value of DG study completed

Net Metering Policy Trends

- States establishing **timelines to transition** to net metering successor tariffs
- Examples:
  - **Arkansas** – Utilities can propose alternatives beginning in 2023
  - **Iowa** – Value of solar rate to be developed after July 2027
  - **Indiana** – Utilities moving to new tariff once aggregate cap (1.5%) is reached
  - **South Carolina** – Successor to take effect June 2021
  - **Virginia** – Proceeding to be opened when utility reaches 3% installed net-metered capacity
  - **Washington** – Utilities may establish successor tariffs once aggregate cap (4%) is reached or June 30, 2029

2020 Action on Residential Demand or Solar Customer Charges



10 Actions in 7 States related to demand or solar charges were under consideration during 2020

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Net Metering Policy Trends

- Strong movement away from mandatory **residential demand charges**
  - None proposed by IOUs in 2019 or 2020
  - Evergy demand charge overturned by KS Supreme Court
- Utilities proposing additional **fees based on DG system capacity**
  - Alabama Power (approved), New York (approved), Duke Energy (SC, pending), Dominion Energy (SC, pending), Evergy (KS, rejected)
- Interest growing in **minimum bills** as a DG rate design element
  - Duke Energy (SC), Evergy (KS), Virginia (shared solar)

Net Metering Policy Trends

- States **grandfathering** existing net metering customers under current rules
  - Time period varies, typically 15-20 years
- **Engaging stakeholders** and efforts to reach compromise, with varying degrees of success
- Considering **other DERs,** such as **storage**, as part of tariff design
  - States authorizing net metering for projects paired with storage
  - Innovative programs – Hawaii Smart Export, APS R-TECH, New York Hybrid Tariff

Net Metering Policy Trends

- **States are taking very different approaches!**
  - Credit rates
  - Netting interval
  - Grandfathering
  - Storage treatment
  - REC ownership
  - Credit rate changes or lock-in
  - Cost recovery
  - Additional fees or minimum charges
  - Carryover
  - System size
  - Aggregate cap
  - Incentives
  - Customer type
  - Metering

Thank You!

Autumn Proudlove
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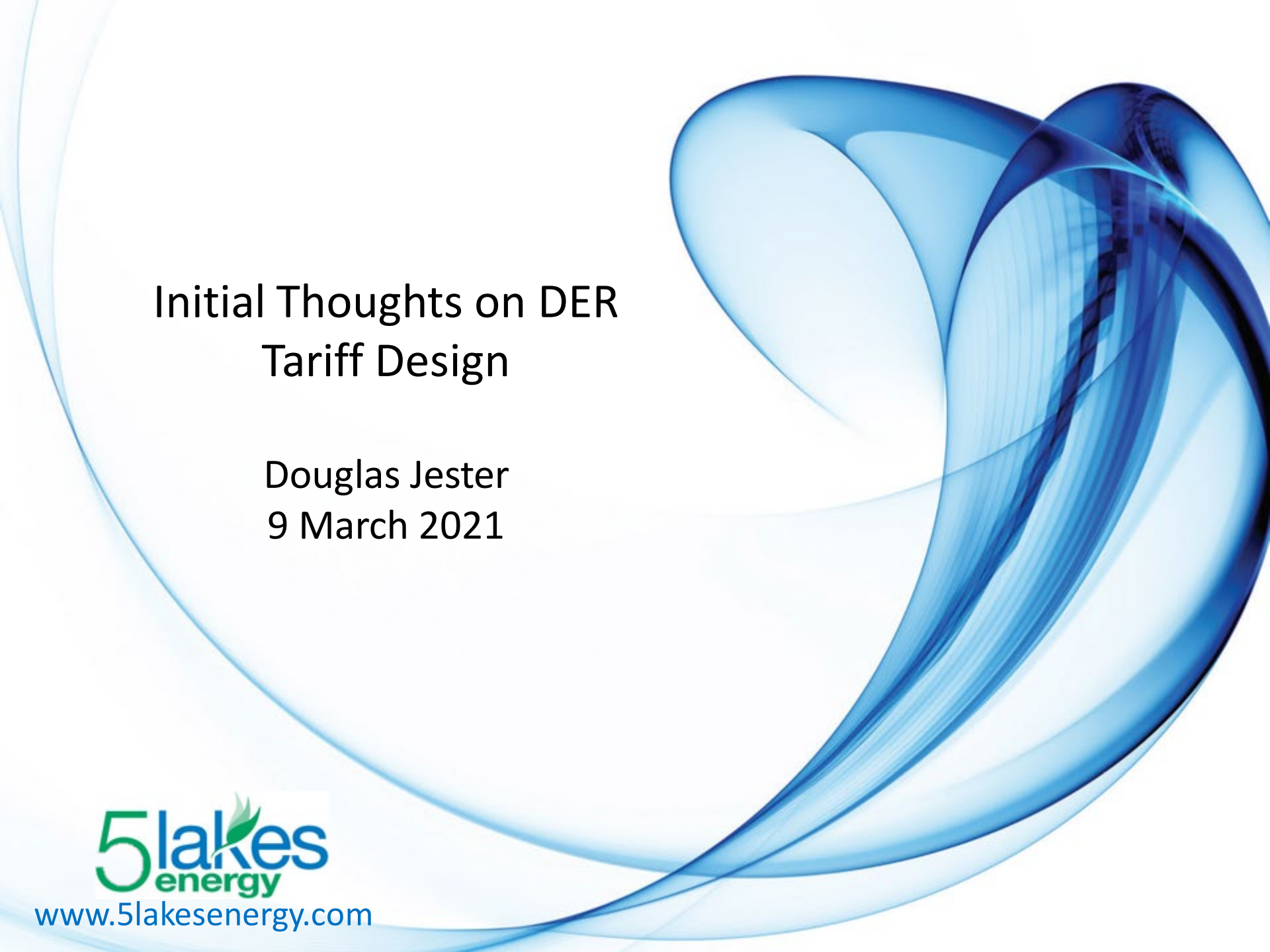
Stakeholder Presentations

Stakeholder Presentations

- Speaker order (7 minutes each):
  1. Doug Jester – 5 Lakes Energy
  2. Kirsten Millar – Rocky Mountain Institute
  3. Karl Rabago
  4. Gabe Chan
  5. Josnelly Aponte – Consumers Energy
  6. Aaron Willis – DTE
- Please hold Q&A until the end
- Questions posed to presenters:
  - *How are current or future expected changes to Michigan's electricity system and DER adoption changing how you think DG tariff design ought to be structured?*
  - *From your perspective, what is most important for DG tariff design to accomplish or avoid?*
- Other stakeholders will have an opportunity to comment and/or address these questions during the Q&A open discussion

Initial Thoughts on DER Tariff Design

Douglas Jester
9 March 2021



5lakes energy

www.5lakesenergy.com

This is Not About Subsidies

Utility claim is that DG customers do not pay their fair share of the "fixed costs" of the grid, which they should be allocated per customer.

Consumer's Customers	Annual kWh Inflow	2021 Annual Delivery Charges
Average Residential	7,681	$428.80
Residential DG Inflow - Outflow	11,396	$636.19
Residential DG Net Metering	11,261	$628.66

This effort should be focused on the future

- Economy-wide Net Zero GHG by 2050
- Declining cost of solar and storage
- Increasing importance of reliability and resilience

This effort should be focused on the future

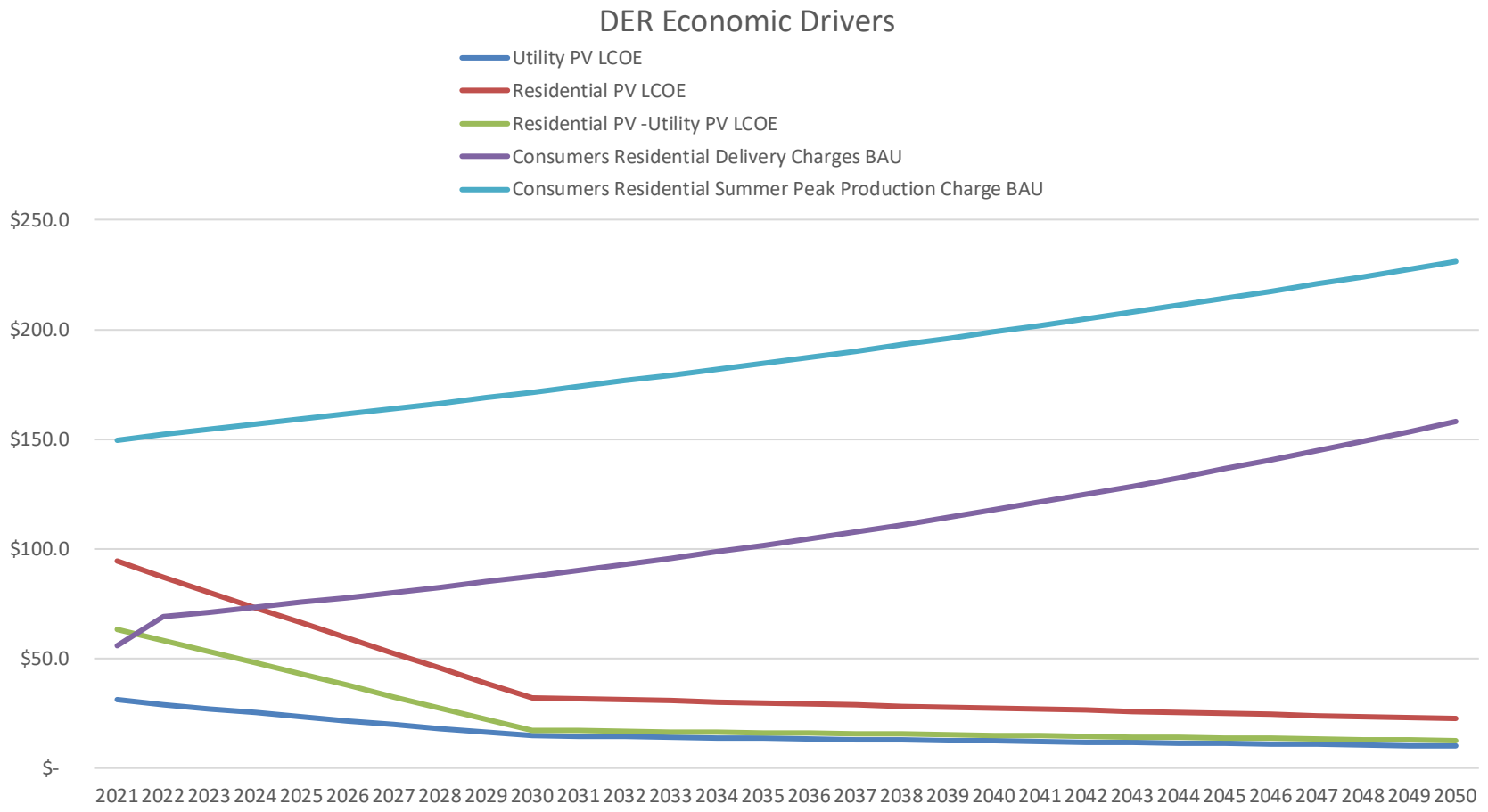
Increasing importance of reliability and resilience

- What happens to value of lost load when electricity is used for
  - Transportation?
  - Heating?
- What happens to reliability when
  - Climate changes?

This effort should be focused on the future Economy-wide Net Zero GHG by 2050

- Electricity sales increase from ~100 TWh to ~185 TWh
- Total solar capacity needed ~45 GW, ~180,000 acres
- Residential electricity sales increase from ~35 TWh to ~83 TWh
- Residential solar technical potential ~31 TWh, ~28 GW
- Net residential deliveries ~52 TWh to ~83 TWh

This effort should be focused on the future
Declining cost of solar



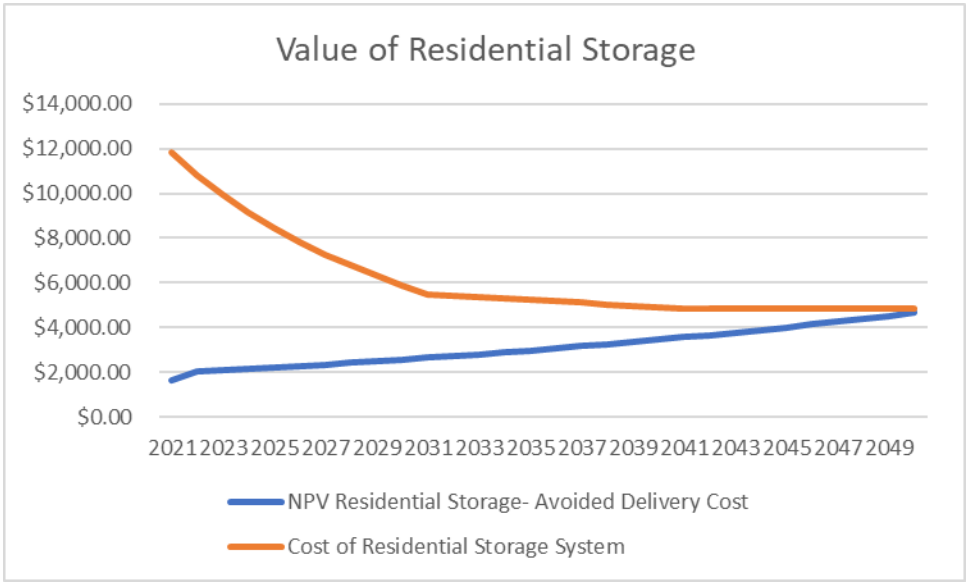
This effort should be focused on the future Declining cost of solar

- The gap between residential solar LCOE and utility solar LCOE is available to pay for
  - Utility solar land rent
  - Utility solar grid costs
  - Delivery losses
  - Delivery charges

  but is less than delivery charges by 2022.
- By 2024, Residential solar LCOE is less than delivery charges making solar cost-effective for the avoidance of delivery charges
- By 2028, Residential solar LCOE is less than Utility solar LCOE plus land rent and grid costs

This effort should be focused on the future
Declining cost of storage

- Under inflow - outflow tariff model, storage for self-consumption competes with the difference between inflow and outflow rates



Plus, there are values of resilience

www.5lakesenergy.com

MARCH 9, 2021

Distributed Generation Compensation Case Studies

Presenter:
Kirsten Millar
RMI
Manager, Carbon-Free Electricity
kmillar@rmi.org

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Agenda

1. Summary and Context
2. Case Studies

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How is DG compensation policy evolving in the United States?

How does this inform DG compensation in Michigan?

Summary of Findings From RMI Projects

1. NEM **reforms tend to be incremental** and preserve core elements. Dramatic changes have faced backlash then are often **reverted**.
   - Maine and Nevada being two states that transitioned away from NEM but then returned.
2. Program **caps can be raised** when technical problems are not encountered.
   - Net metering caps are typically between 0.5% and 5% of peak demand.
3. Generally **cost shifts are found to be small** at low penetration (and other ratemaking decisions play into cost shifting).
   - The percentage of residential customers that have solar is below 4% in all but 4 states (HI, CA, MA, AZ).
4. It's possible to **balance stakeholder interests** with the right collaborative approach.
   - Minnesota, New York, and (maybe) North Carolina/South Carolina have demonstrated this.

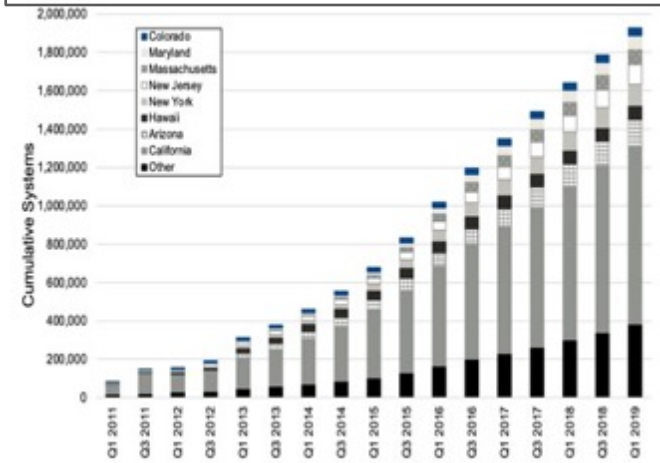
RMI

Source: NREL, BNEF

National Context

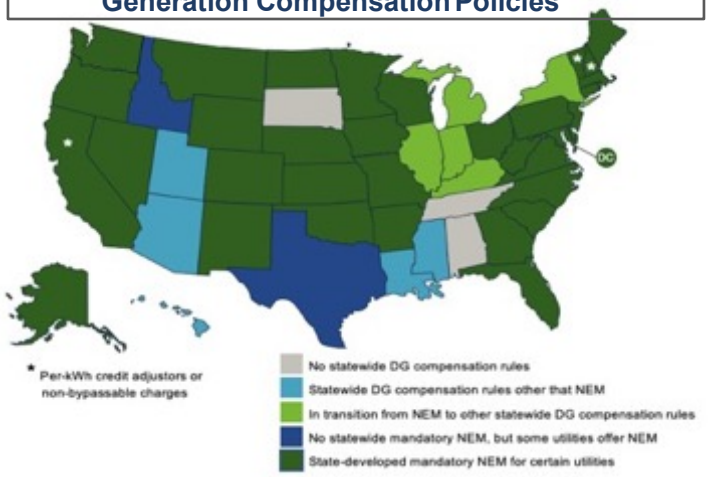
- Residential solar PV **installations are steadily growing** in the US.
- The growth of DG solar is also supporting a **growing market for behind-the-meter batteries**.
- The **residential solar market accounts for about 90,000 jobs**, or 56% of the total solar installation and project development jobs in the US.
- Most states use **traditional net metering**, though about 20% of states are exploring or using other **distributed generation compensation** rules.

Cumulative Number of US Residential PV Installations



Source: BNEF

Current Net Metering and Distributed Generation Compensation Policies



Source: 50 States of Solar

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Agenda

1. Summary and Context
2. Case Studies

Minnesota: Value of Solar

DG compensation pioneer:

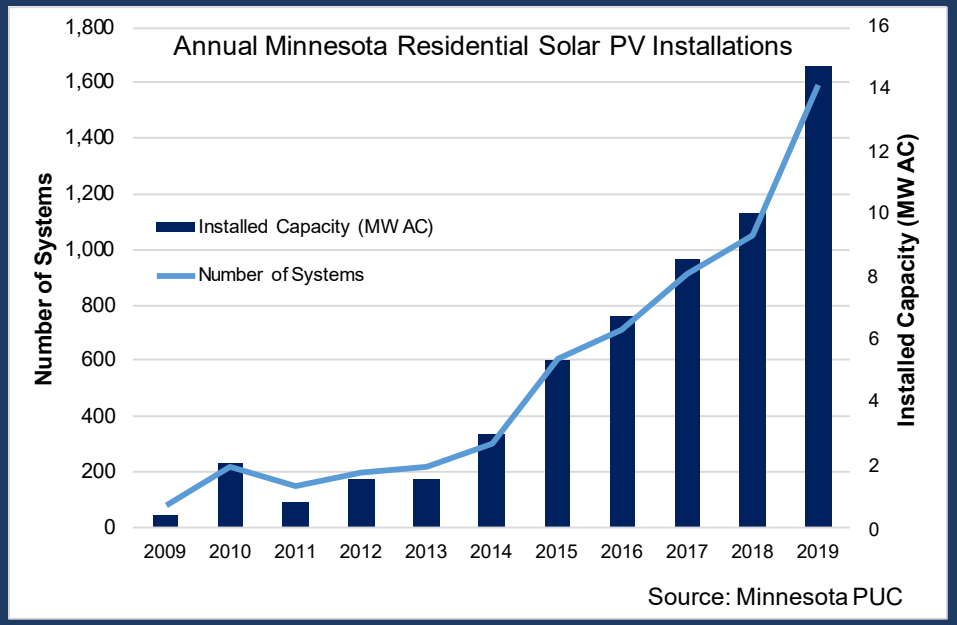
- First to adopt a net metering statute (1983), Second to approve a VOST methodology (2014), First to incorporate the 2018 national standard for interconnections, First in community solar capacity.

Transition or trigger:

- Net metering doesn't have a total cap, but a public utility may request a change to NEM once net-metered generation reaches 4% of their annual electricity sales. By statute, the request would move the utility to apply the VOST to residential customers.

Applications of VOST:

- Public utilities are required to use the VOST for community solar pricing, which trends slightly above the retail rate.



- NEM generation remains below 1% in Xcel-NSP territory (BNEF), without expectation to reach 4% trigger in foreseeable future.

New York: Value of DER

History of Traditional NEM:

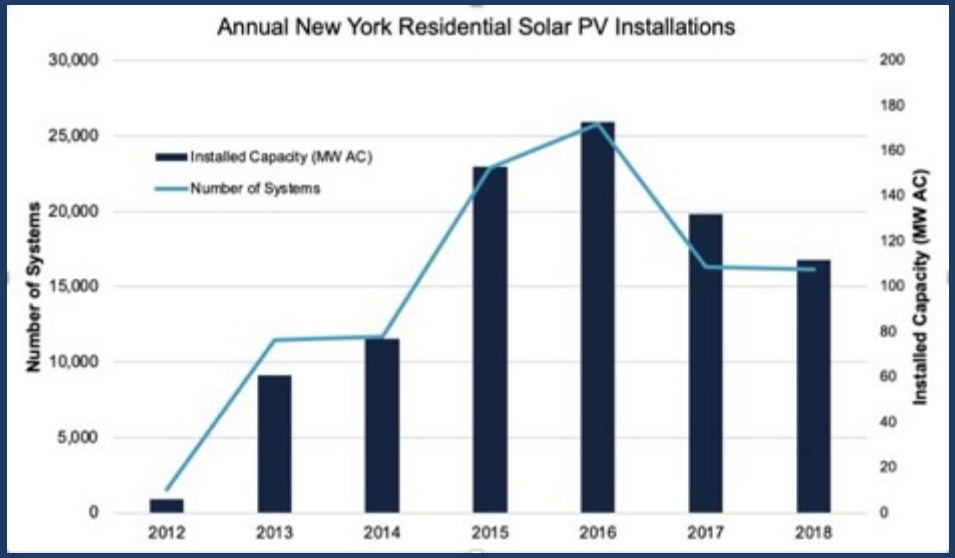
- Adopted in 1997
- Expanded to increase size caps, include new technology, and reach diverse customers

Policy-backed Transition:

- NY Reforming the Energy Vision seeks to innovate NY energy space, which included better DG compensation

Value of DER—The Value Stack:

- Enacted by PSC in 2017
- Commercial customers are compensated under the value stack, a 6-pronged compensation mechanism that includes wholesale price, capacity value, environmental value, demand reduction value, locational system relief value, and community credit



Source: BNEF

Looking Forward—Residential NEM Successor:

- Established by PSC in July 2020
- Residential customers will be charged a customer benefit contribution to offset perceived cost shifts

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California: NEM 2.0 & Beyond

Long experience with DG compensation

- NEM adopted in 1995, expanded over time

High solar penetration rate

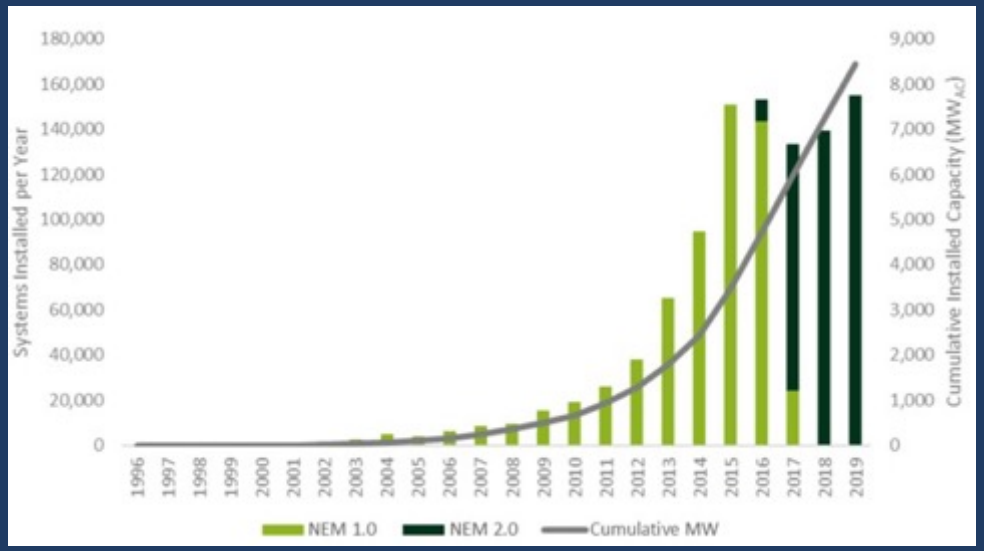
- By the mid-2000s potential grid impacts began to generate concern

NEM 2.0

- 2013 legislation required a NEM successor (adopted in 2016)
- Features netting at the retail rate, mandatory TOU rates, and non-bypassable charges (so NEM 2.0 is a net billing arrangement)
- Which rules apply depends on DG system characteristics

Storage

- Configuration restrictions, 2nd meter, or estimation of generation



Source: Verdant 2021

What's ahead

- Currently amidst a proceeding to develop a new successor tariff

Thank you!

kmillar@rmi.org

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Appendix

Structures for DG Compensation

1. Metering and billing arrangements:

- NEM
- Buy all, sell all
- Net billing

2. Sell rate designs:

- Flat vs. granular
- Examples: Wholesale rate, avoided cost rate, VOS

3. Retail rate designs:

- Volumetric rates (flat, tiered, time-varying)
- Non-bypassable charges
- Fixed, demand, and standby charges
- Minimum bills and flat bills

Design matters: The details of mechanism design can make all the difference for uptake of DG and whether regulatory goals are achieved.

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What Could DG Compensation Achieve?

Goals:

1. Reduce GHG & pollutant emissions
2. Support customer choice
3. Promote local economic development
4. Reduce utility disincentives to embrace DG
5. Be simple, predictable, and manageable
6. Promote cost-effective DG deployment
7. Be fair to DG customers
8. Be fair to non-DG customers

Principles:

1. Compatible with other policies
2. Forward-looking
3. Adaptable

Goals describe what compensation mechanisms should achieve (sometimes in tension with each other – may require balancing and tradeoffs)

Principles are design parameters to consider during mechanism development

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Carolinas: Settlement Agreement

- Settlement between Duke Energy & stakeholders
  - “Solar Choice Metering” (net billing)
- Pairs DG compensation with demand flexibility
- DG is included in Duke Energy’s energy efficiency SSM, providing an earnings opportunity
- Elements:
  - Time-varying rates (TOU, CPP)
  - Incentives for participation in demand-response
  - Minimum bill ($30)
  - Non-bypassable charges
  - Grid access charge for large systems (above 15 kW)

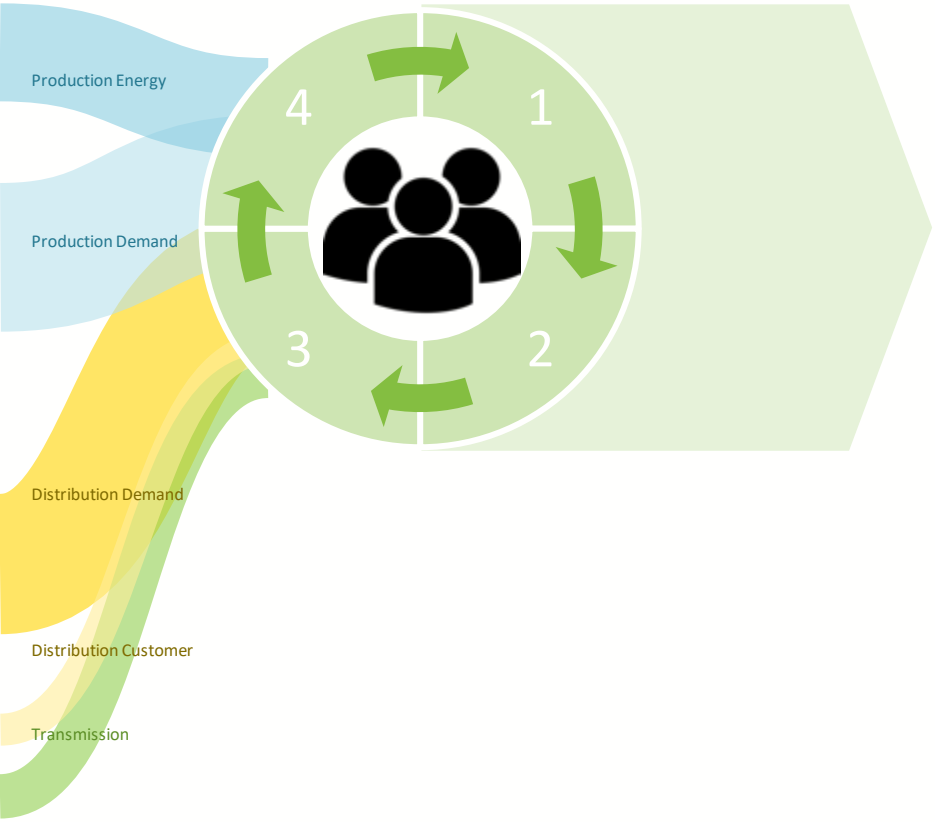
- Expected to reduce 92-96% of estimated cost shift under NEM
- DG value proposition remains strong
- Requires approval by commissions in NC and SC

RMI

Distributed Energy Resources Rate Design Workgroup

Josnelly Aponte
Principal Rate Analyst Lead
March 9, 2021

Consumers Energy
Count on Us®



Rate design options are informed by embedded cost of service studies and four guiding principles

1. REVENUE SUFFICIENCY

Rates should be designed to yield revenues sufficient to recover the total cost-to-serve.

2. ACCEPTABILITY

Rates should be feasible, stable, predictable, and easily understood by customers.

3. EFFICIENCY

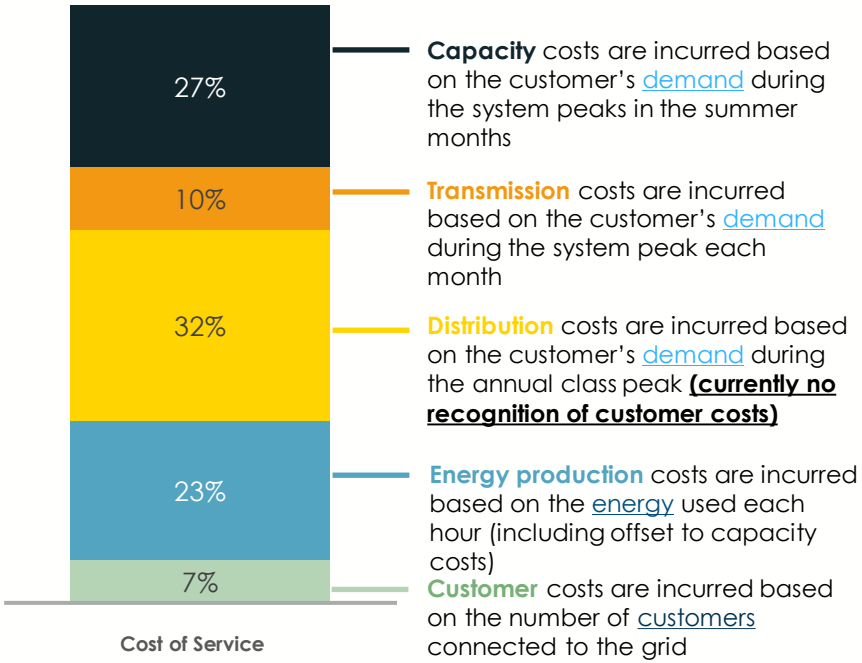
Rates should provide efficient price signals and discourage wasteful use.

4. EQUITY

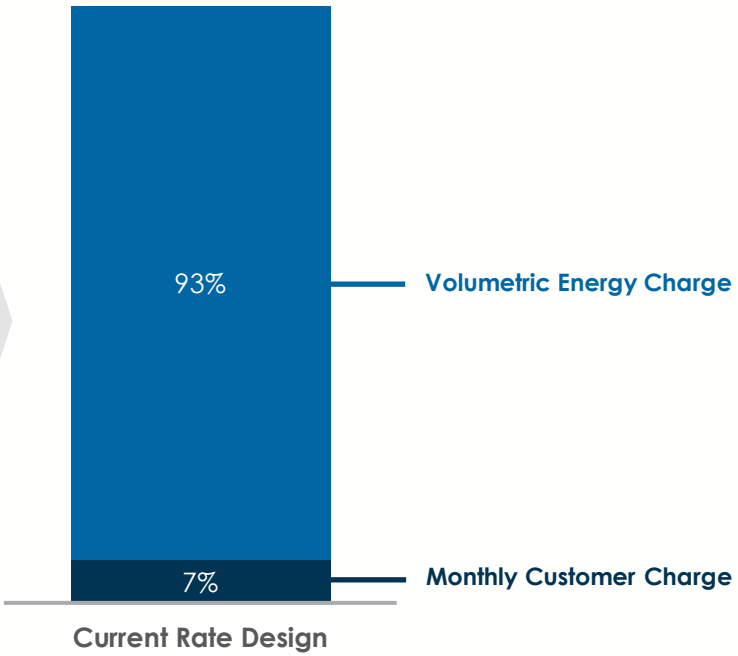
Rates should avoid unintended subsidies and be designed so that costs are equal for similarly situated customers (horizontal equity) and higher for customers who use more of the system (vertical equity).

Distributed Energy Resources highlight the importance of having updated practices in cost of service and rate design

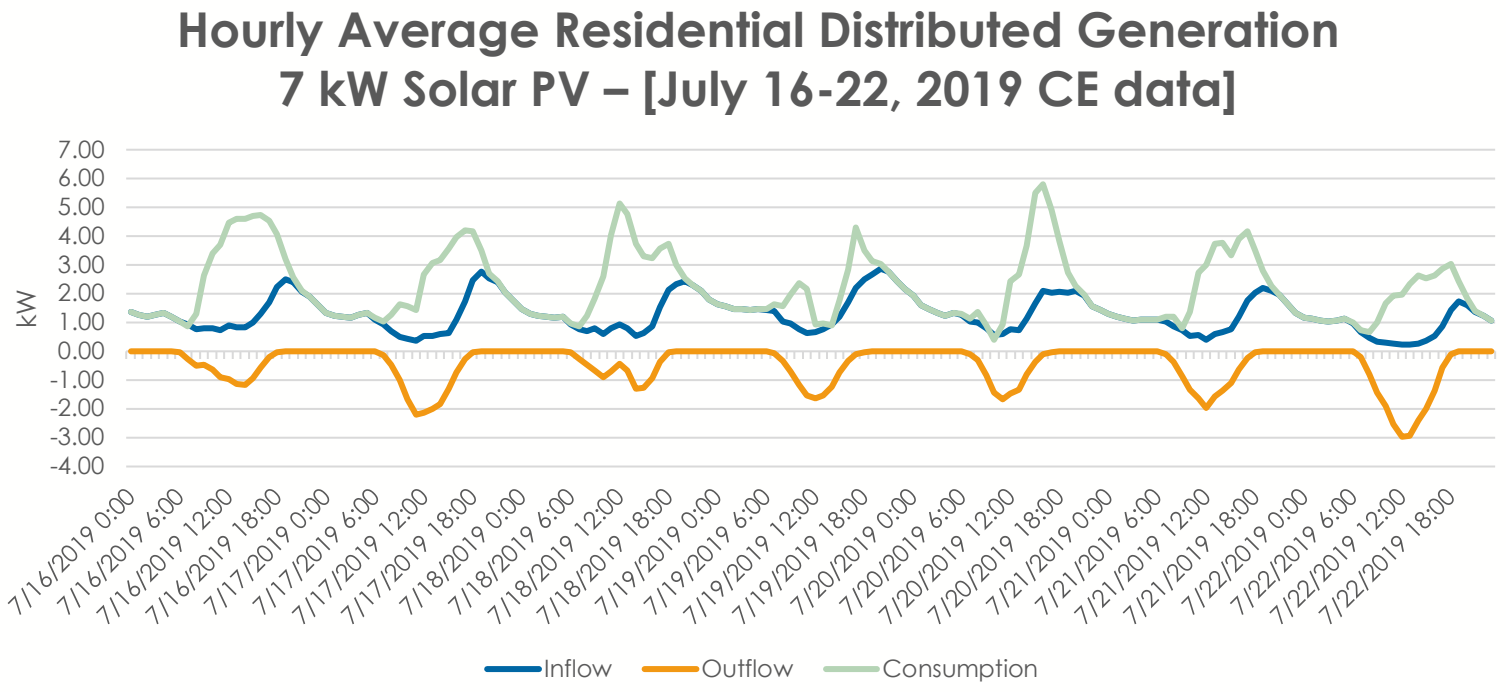
For example, residential costs are primarily fixed and incurred based on demand…



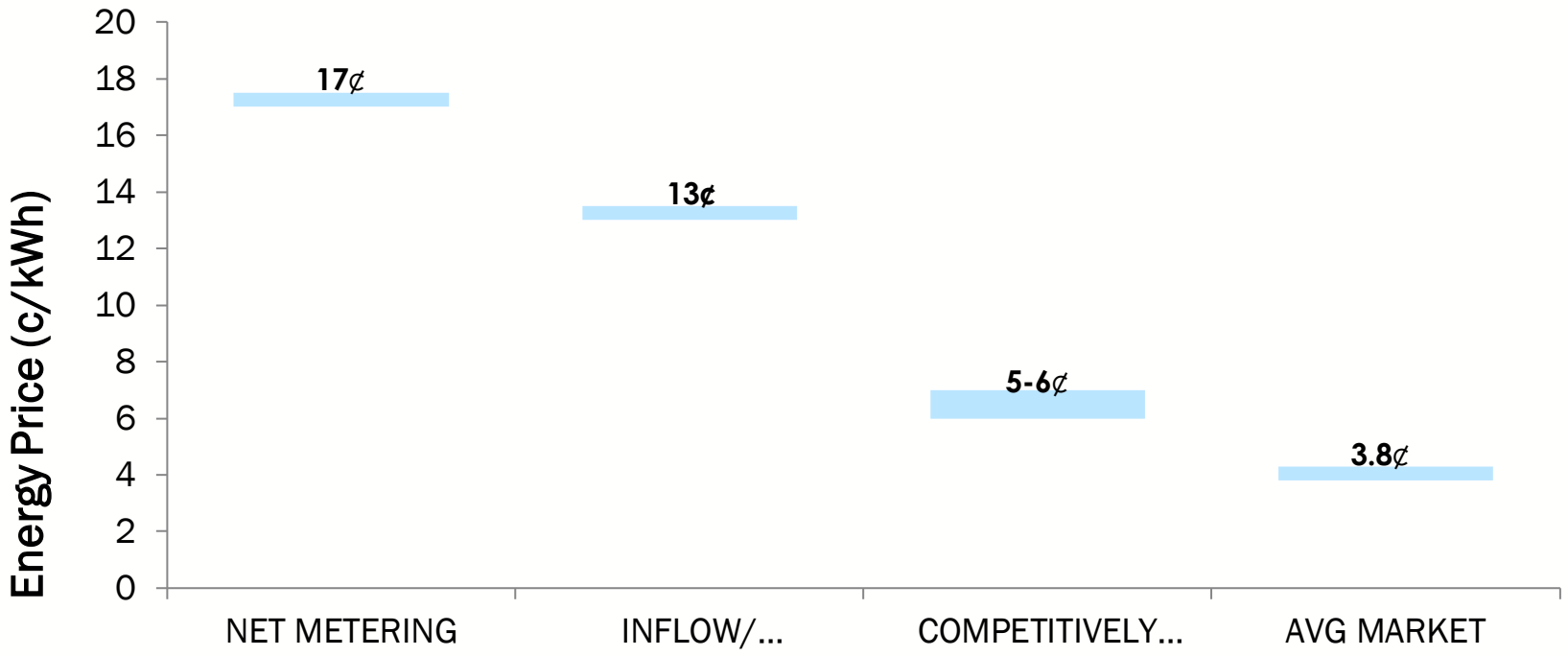
…but are recovered through volumetric energy charges.



Distributed solar systems rely on the power grid on an instantaneous basis to either inflow or outflow energy



Inflow/Outflow is a step in the right direction, but it does not reflect a fair price for clean energy



DER Rate Design Collaborative

March 9, 2021

We approach all rate design, including related to distributed generation, through a set of guiding objectives

DTE objectives of rate and pricing design

Delivering options that customers want

Responding to our customers' need for greater optionality, value, and control

Progressive design and offerings

Ensuring that our rates are progressive and provide customers maximum flexibility

Cost alignment

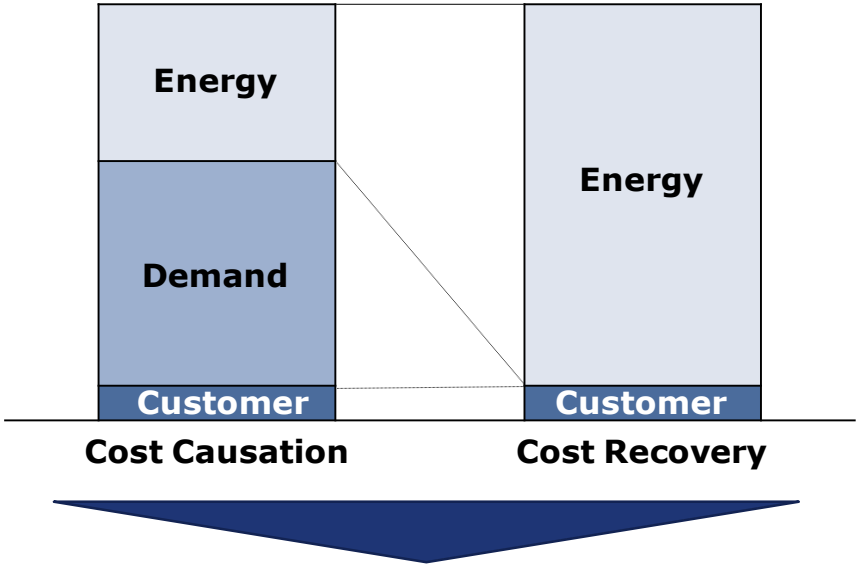
Providing our customers pricing signals that drive system efficient usage based on better alignment between costs and rates

Applied to distributed generation rate design, these principles support:

- Opportunity for DG customers to manage their usage and reduce cost
- Aligning credits for excess generation with realized system cost savings
- Ensuring grid and system costs are equitably supported by all customers

When approaching distributed generation, the greatest challenge is ensuring equitable recovery of system costs by eliminating the cost shift to non-participants

Inflow: system costs are volumetric, demand, and fixed, however cost recovery is predominately volumetric[1]



DG customers are able to reduce the amount they pay toward the grid and generation capacity without a similar savings realized by the utility. Therefore, these **costs are shifted to customers without DG**

Outflow: energy sent to the grid is compensated for full power supply capacity, but it does not provide equivalent service

Capacity is currently compensated at **the full retail rate**, which **does not reflect the characteristics of distributed solar**

- DTE's retail rate reflects dispatchable, always available generation capacity available to all customers, including those with DG
- Distributed solar production does not have these same characteristics given its intermittent nature and potential misalignment with system peaks

As such, there is currently an **overpayment on outflow and those costs being shifted to customers without DG**

1. Figures are illustrative

There is a diverse set of tools that can be leveraged to help ensure equitable recovery of system costs, and fair compensation for outflow

Tool	Considerations
TOU	• Correct for seasonal or time of day variations in power supply costs; most applicable to **power supply non-capacity costs** • Allows customers to manage their usage and equitably reduce their bill commensurate with realized system cost savings
Demand charge	• Aligns cost drivers (i.e., peak demand) with customer charges • Allows customers to manage their demand to reduce their bill – reducing peaks will drive both bill savings and system cost savings, ensuring equity in recovery • Most applicable to **demand-driven costs** incl distribution and power supply capacity
Fixed charge	• Applicable to **costs which do not vary with usage or demand**, such as customer service costs, metering, billing, IT infrastructure, and minimum system sizing that support all customers equally
Minimum bill	• Ensures each customer contributes a minimum amount toward the recovery of costs which are fixed in the near term (e.g. distribution) • Applies only when a usage-based bill falls below the minimum bill threshold • Applicable to **total bill or a subset of costs** types (e.g. distribution)
System access contribution	• Ensures recovery of distribution costs; most applicable to **distribution costs** • Progressive rate design through a $/kW, and customers with smaller installations would incur a smaller cost, driving equitable cost recovery among DG customers and across all customers • Acknowledges the role of the grid and distribution investments in supporting DERs

DTE is supportive of efforts to generate additional learnings around the implementation and impact of rate design

We have conducted several pilots and continue to explore additional opportunities to test rate designs and use cases

Time of Use

Advanced Customer Pricing Pilot

- Broad TOU pilot, soliciting >200k customers, to test alternative rate designs, messaging, and customer satisfaction

Launched Feb 2021

Dynamic Peak Pricing

- Dynamic peak TOU rate meant to manage peak usage, with an emphasis on system critical days

Launched 2010; ongoing

Experimental EV Rate

- EV-specific rates, including a unique TOU rate option and a flat fee option
- Encourage EV uptake and system-efficient charging behavior, develop learnings about EV charging patterns to inform future rate design, and understand customer response to economic signals

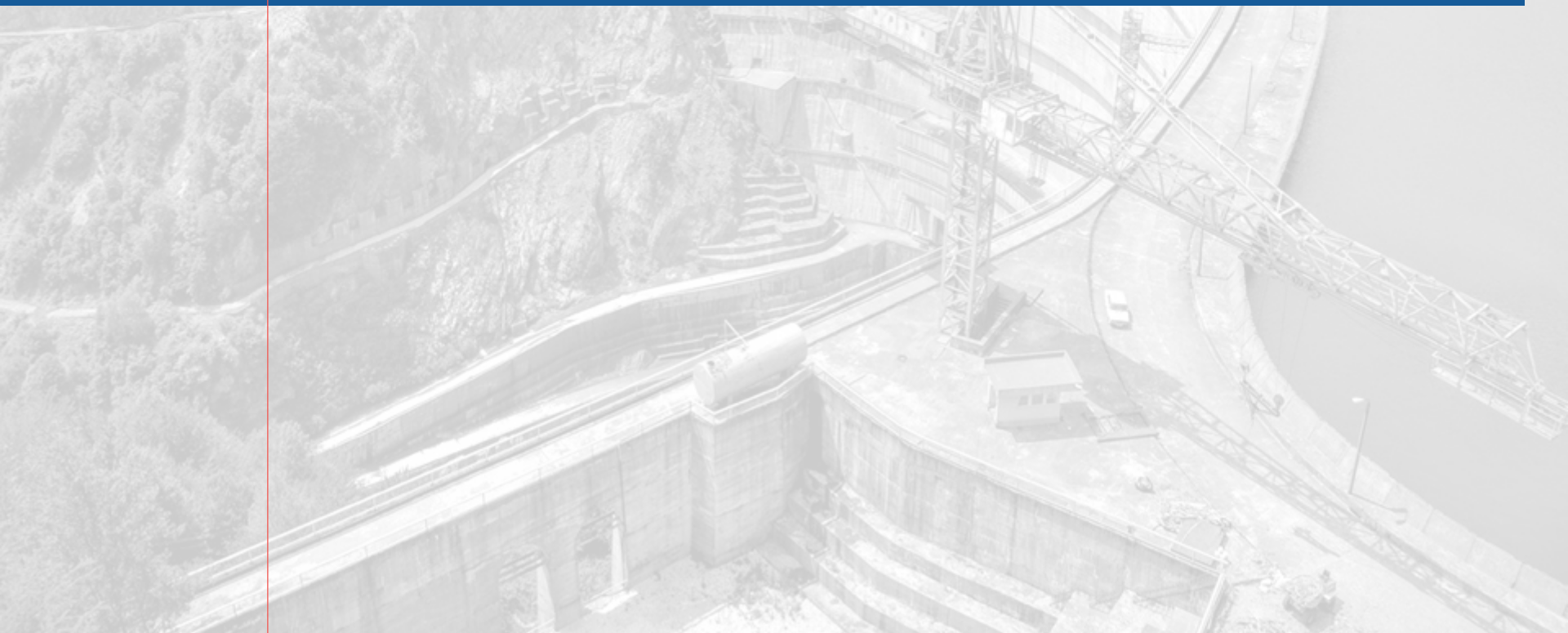
Flat fee closed Dec 2019

Solar Currents

- Engaged with ~800 early DG solar adopters to provide additional support for installations while costs were high
- Participating customers installed generation meters to help drive additional learnings around DG production behavior and grid interactions

Enrollment closed in 2014

Next Steps



Written Comments

- If submitting, please send to Kevin Krause by March 23rd
- In your comments, please try to address:
  1. *Looking at the proposed outline, please share any additions, deletions or other edits you would make.*
  2. *Please provide any relevant state examples (from Michigan or elsewhere) that you think the research team should review.*

Next Steps

- Written comments on draft outline due March 23
- Final outline will be shared in early-to-mid April
- Stay tuned for details on September stakeholder meeting

- Questions?