Massachusetts Grid Services & DER Compensation Study

Workshop 3

April 25, 2025

MASSACHUSETTS CLEAN ENERGY CENTER®

In Partnership With

EVERSOURCE

Unitil

nationalgrid

RMI

Energy+Environmental Economics

Welcome and Check -In

- Please use the rename function to add your affiliation after your name – eg. "Brett Webster, RMI"

- Check-in question (please put your response in the chat):
  - What is your favorite distributed energy resource (DER)?

Disclaimer Prior to Recording

- This workshop will be recorded to ensure transparency in this process and provide participants or those unable to attend the opportunity to refer back to the workshop at a later date.
- This recording and the slides presented will be posted publicly on the MassCEC website at the link below.
  - https://www.masscec.com/grid-modernization-and-infrastructure-planning/grid-services-study
- If you are not comfortable being recorded, you may mute your video and microphones now.
  - Once the time dedicated to the primary content of this meeting has concluded, the recording will be ended.
- In order to facilitate free and open discussion during the workshop, it should be understood that statements made, positions taken, and information provided by the participants are part of an evolving and collaborative effort to encourage discussion and develop effective solutions to the challenges presented. As such, except as set forth below, these perspectives and materials should not be used by or against participants or presenters in any litigation, including administrative proceedings before federal, state, or local governmental authorities.
- This prohibition does not prevent any participant from using its own statements, positions, or information provided in any subsequent litigation, provided that such use contains no reference or indication that these materials were made and presented in the workshops.

Objectives for the Massachusetts Grid Services Study

1. Develop an initial methodology for calculating location-specific distribution grid services value that may be provided by flexible Distributed Energy Resources (DERs) in Massachusetts
2. Explore potential compensation frameworks specific to this grid services value – balancing policy objectives and avoiding overlap or double-counting with other available benefits/incentives
3. Integrate equity and environmental justice impacts in both valuation and compensation for grid services
4. Create a roadmap to guide both near and long-term development of grid services programs for DERs
5. *Provide ongoing opportunities to incorporate stakeholder input!*

Recap – Topics from Workshop 1 & 2

Workshop 1

Build foundational understanding and vision for the role of DERs and grid services in MA

- Motivations, goals, and intended approach for establishing a compensation mechanism
- Role of stakeholder engagement throughout this study
- Gathered initial feedback

Workshop 2

- Approaches to valuing distribution grid services – *Distinct from other benefits addressed via existing frameworks in Massachusetts*
- Introduction to compensation structures for grid services value
- Gathered feedback on: valuation methods, compensation structures, and considerations for implementation and reducing barriers to access from an equity standpoint

Recordings and materials from both workshops can be found on the MassCEC Grid Services webpage

Workshop 3 Objectives

1. Share input received from Environmental Justice stakeholder focus groups and re-center key equity considerations
2. Provide a deeper understanding of potential mechanisms and constraints for compensating grid services value
3. Share and receive feedback on *criteria* against which compensation mechanisms should be evaluated
4. Allow participants to reflect on and share their priorities related to developing specific compensation mechanisms

Agenda

12:00 - 12:10 **1. Welcome and Check-in**

12:10 – 12:30 **2. Introduction to Grid Services - The Study so Far**

- Prior workshop recap
- Incorporating equity and environmental justice stakeholder input

12:30 – 1:15 **3. Compensation Design**

- Structuring program offerings
- Break-out 1 Focus: Residential offerings
- Break-out 2 Focus: Commercial and front of the meter offerings

Clarifying questions?

1:15 – 2:30 **4. Break-out Rooms** ***(including a short break)***

2:30 – 2:45 **5. Reflections and Closing**

Workshop Participation Guidelines

- Please mute yourself when not speaking
- We suggest minimizing distractions by silencing or turning off cell phones during the workshop
- Please post questions in chat as we go along, or use the raise hand function for any questions during the Q&A breaks
- Please identify yourself when speaking or commenting in the chat, including the organization or community you represent if applicable

Workshop Resources and Communication

- **Future meeting announcements will be sent by email to the workshop mailing list**
  - If you are not on the list and would like to be added, please sign up here
- **Workshop session slides and recordings will be made available on the MassCEC website:**
  - https://www.masscec.com/grid-modernization-and-infrastructure-planning/grid-services-study
  - This site also contains general information about the study and a primer for this workshop series
- **Please share any questions or feedback after the meeting with:**
  - Grid@masscec.com
  - Andrew.Solfest@ethree.com
  - Bwebster@rmi.org

The Grid Services Study so far

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Collaborative Study Partners:

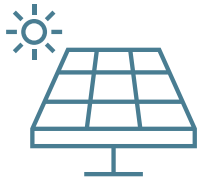
+ **Study is led & funded by MassCEC's Net Zero Grid team**

+ **MA state agencies:**
  - Department of Energy Resources (DOER)
  - Attorney General's Office (AGO), Office of the Ratepayer Advocate

+ **Investor-owned MA electric distribution companies (EDCs):**
  - Eversource
  - Unitil
  - National Grid

+ **Consultants:**
  - Rocky Mountain Institute (RMI)
  - Energy and Environmental Economics (E3)

Workshop Context – What are DERs?



Distributed energy resources (DERs) are technologies connected to the distribution grid which can generate electricity or reduce or shift grid loads.

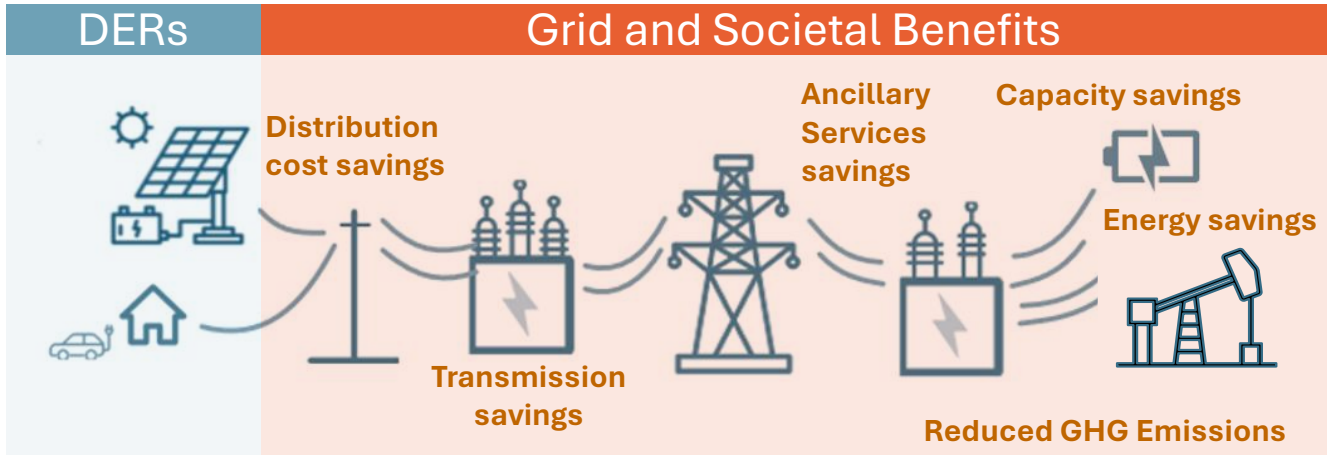
DERs include energy efficiency, demand response, distributed solar PV, distributed energy storage, and electrification loads such as from EV and heat pumps.

DERs can provide a range of services to the electric grid, including generating, storing, and modulating the use of electricity, among others. DER grid services can play a critical role in meeting local demand, easing localized constraints, and improving reliability.

DERs can perform a variety of valuable functions for the electric grid, referred to as grid services

+ **DERs frequently benefit the grid by:**
  - Generating carbon-free electricity
  - Reducing customer electricity loads
  - Shifting customer loads to times when the grid is less constrained

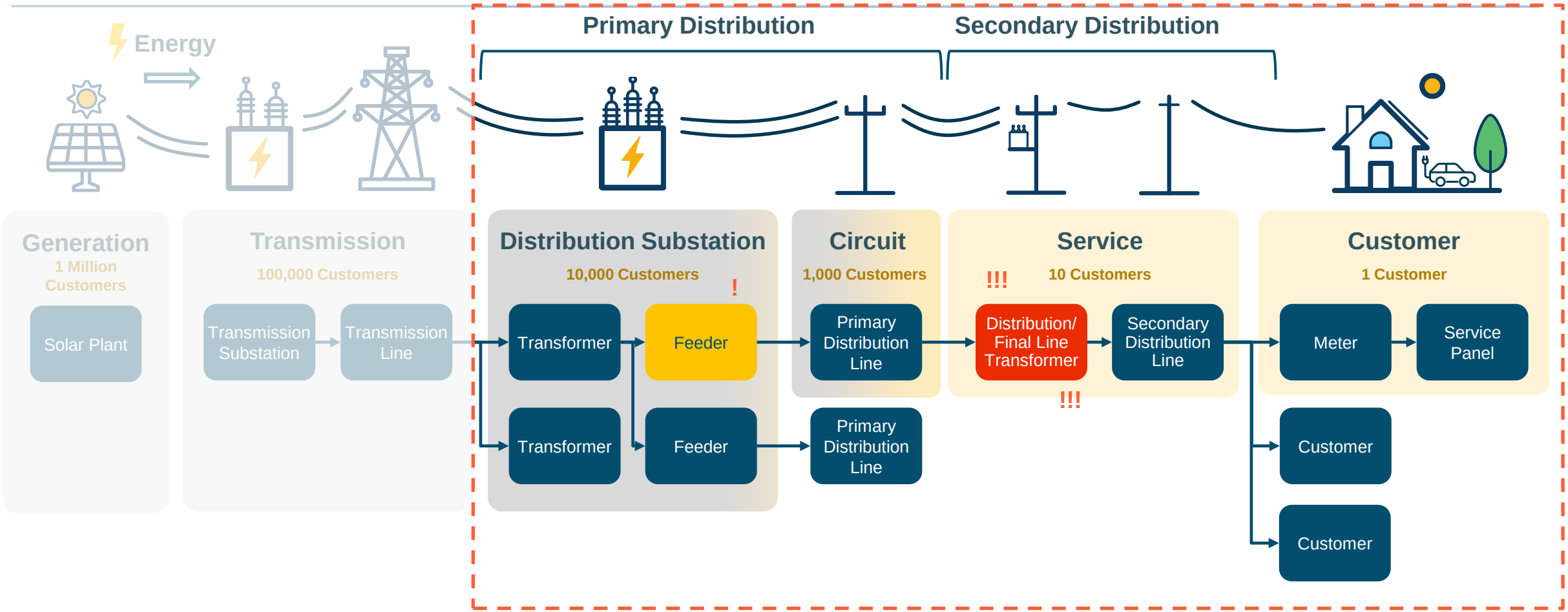
These benefits reduce costs for electric grid operators; resulting savings can be passed on to ratepayers



+ **DERs can also provide societal benefits in the form of 'Non-Rate Impacts', such as reduced emissions of greenhouse gases or other pollutants harmful to human health**

This study focuses specifically on *distribution* grid services, with the goal of establishing a framework for valuing these services and laying out a roadmap for how we can capture and compensate those benefits

Distribution grid services address highly location-specific needs



Driving questions for this study

- **What are the benefits that DERs can provide to the distribution grid?**
- **How can DERs providing grid services contribute to a more equitable energy system?**
- **How do we quantify the different types of benefits?**
  - How can we incorporate non-monetizable benefits?
- **What determines where on the grid these benefits appear and what value they provide?**
  - How may these benefits impact Environmental Justice populations differently and specifically?
- **What is required for utilities to be able to realize these benefits?**
- **How should we go about compensating these benefits?**
  - What does a feasible near-term implementation plan look like to begin exploring this value?
  - How should the approach to valuation and compensation evolve over time?

Study work products

Valuation Framework

- Incorporate distribution grid services and non-rate impacts
- Must be applicable statewide and include consideration for EJ communities

Today's focus →

Compensation Mechanism

- Compare candidate mechanisms
- Determine qualitative considerations of each mechanism

With an eye to what comes next...

Near Term Implementation Plan

- Provide steps for engaging stakeholders and supporting EJ communities in implementation
- Identify potential barriers to implementation and recommend improvements

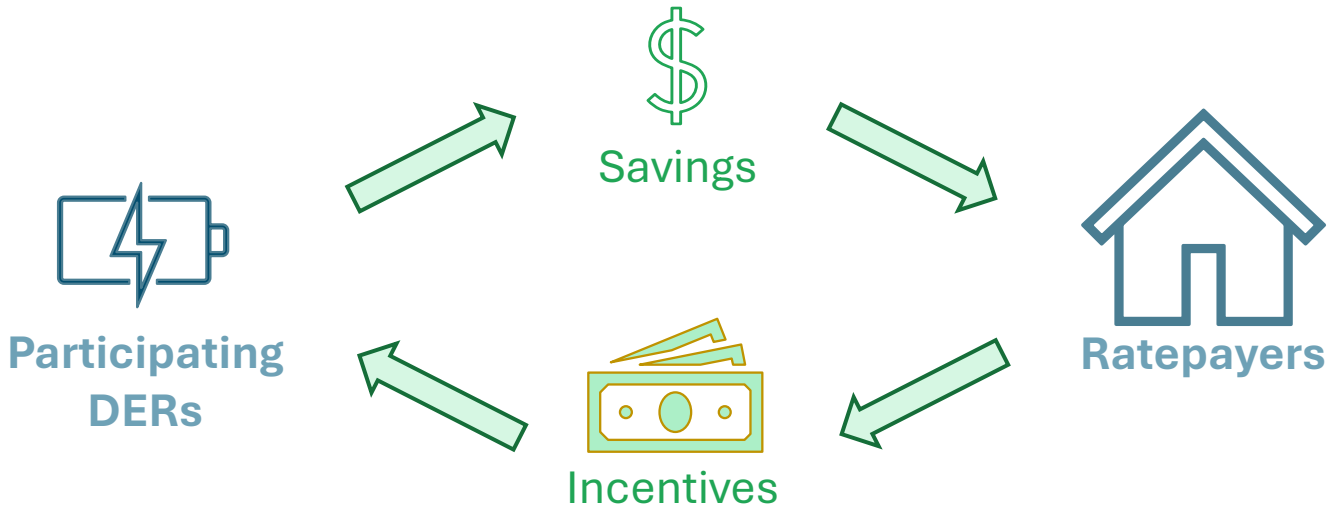
Long Term Implementation Plan

- Consider the future of the electric sector and impacts on compensation design
- Discuss milestones that can be used to determine when to re-evaluate the mechanism

Recap: This study values three types of Grid Services

1. **Deferral Value.**
   - Additional capacity can allow utilities to delay investments in traditional solutions, reducing costs for customers
   - Deferral also offers additional **Optionality** value, allowing planners to wait and see how system needs develop before committing to long-term investments – making them more efficient
2. **Bridge-to-Wires Value.**
   - DERs can help meet near-term capacity needs while longer-term infrastructure solutions are under construction
   - This can avoid costs for alternate interim solutions or reduce operational risks to the electric system (e.g. over-straining equipment or preventing outages in the most extreme scenarios)
3. **Additional Value for Environmental Justice Communities, including Non-Rate Impacts**
   - DERs may reduce costs or harms borne by Environmental Justice populations which do not show up in utility rates
   - Recognizing non-rate impacts specific to EJ populations also provides an avenue to improve equity in compensation
   - Impacts, such as reliability and or air quality concerns, can be directly quantified for bridge-to-wires scenarios or reflected by a % compensation adder for deferral

Valuation provides a North Star for compensation design

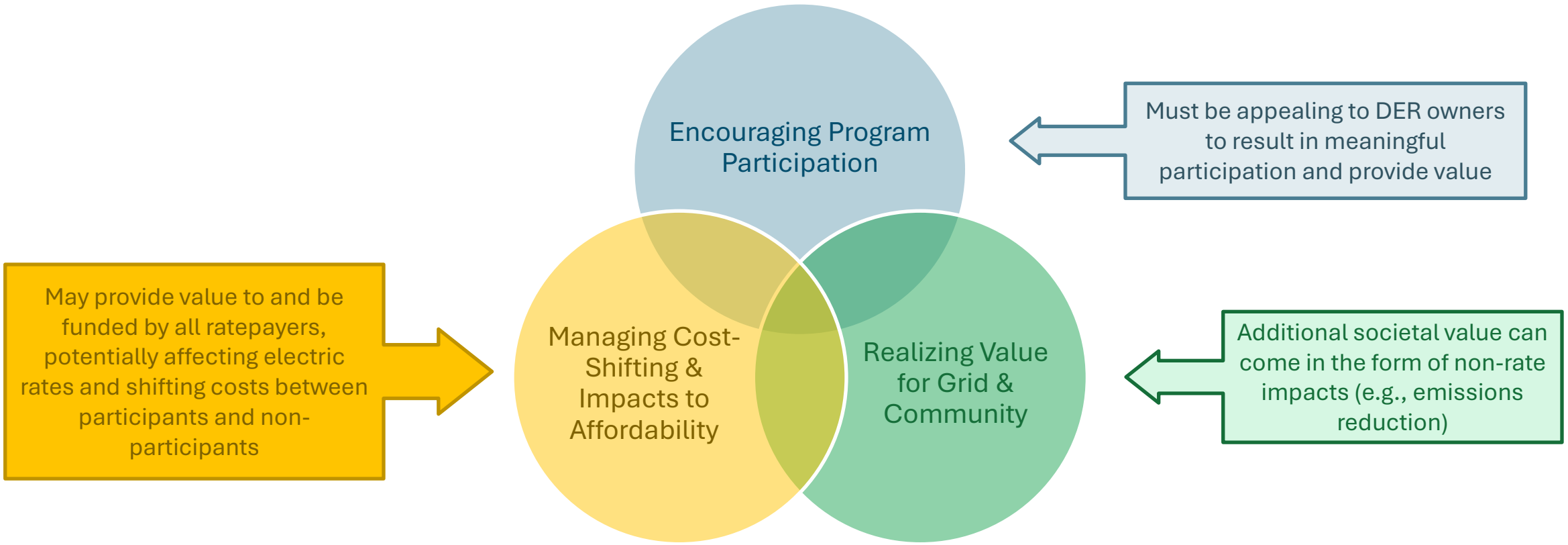


- **Ratepayers will benefit from grid services through reduced electric infrastructure costs and rates over time, and pay for these benefits through incentive payments**
- **Quantifying value provided by a resource can provide a guidepost for setting maximum incentive payment levels. This can ensure impacts on ratepayers is positive or net neutral**
- **While compensation does not need to equal the value provided, this should be a conscious decision**

Equity should always be considered here, as excess costs for program incentives can increase energy burdens for all ratepayers, with greater burden for low-income ratepayers. Even programs targeting participation by low-income customers typically have some share of individuals unable to participate.

Compensation design must balance competing policy goals and ultimately be actionable

Competing policy goals



Ideal compensation structures address all three key goals

All while remaining simple and transparent enough for participants to understand and for administrators to implement

Timeline of Grid Services Study

Study Timeline

Fall 2024
Study begins

Ongoing engagement

Today
Workshop 3

Ongoing engagement

Summer 2025
Study published

And Beyond
Grid services work continues outside of this specific coalition of partners

Engagement Channels

2 Public Workshops
December 2024 & March 2025

EJ Focus Groups
April 2025

Written Feedback
Ongoing

4th Public Workshop
May/June 2025

Possible additional EJ Focus Groups
Not yet confirmed

Written Feedback
Ongoing, including surveys

Feedback spotlight on equity and EJ

Themes of Feedback Received	Action to Take
Importance of Historical Context	
+ Experience of high and increasing electric rates + Impact on ratepayers (esp. low-income) from historical inequities created by both the energy system at large and from past/existing programs	→ Work with EJ stakeholders to ensure adequate recognition and framing of this context Include definition of equity
Access to Participation and Benefits	
+ Ensure direct access to benefits: • protect from continuing to shoulder disproportionate costs for energy programs • ensure ability to adopt and own eligible DERs • transparency on where opportunities for deferral and avoidance are determined	→ Recognize the structural barriers to access and ownership of DERs for EJ and LI communities and recommend steps to support structural changes Tools to increase transparency and engagement (e.g., maps)
Feedback and Engagement	
+ Want to understand what happens with feedback + Stretched thin by multiple related initiatives	→ Log feedback and identify how it is addressed Provide surveys for additional avenue of feedback Pursue coordination among State efforts

How equity and justice integrate into this study

	Stakeholder perspectives: expertise, concerns, goals	Barriers for historically disadvantaged communities	Impacts on historically disadvantaged communities
Comp. & Valuation Modeling:	*Workshops, EJ focus groups, and individual organization outreach*	*Including a participation adder to encourage EJ customer enrollment*	*Quantifying air quality impacts to EJ communities*
Long-Term Roadmap Report:	• *Responses and recs that address stakeholder feedback* • *Record of feedback received*	• *Recommendations to increase access to DER adoption and ownership, incl. recognizing the current structural barriers* • *Recommend maps & tools for transparency*	• *Recognizing additional non-quantified impacts of the offering*

Compensation Mechanism Design

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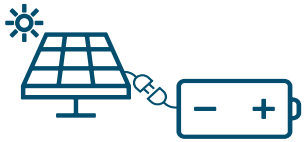
Structuring this compensation discussion

1. **Big picture considerations for compensation design**
   - How incentive offerings meet grid needs
   - Criteria for evaluating compensation mechanisms
2. **Components of compensation (levers to pull)**
3. **Break-out rooms:**
   - Input on components and developing a menu of compensation mechanisms that make sense to you
   - Revisiting evaluation criteria – Input and prioritizing considerations
4. **Reflections**

Break-out Room 1: Household or Individual Participant Perspectives	**Break-out Room 2**: DER Aggregator or Front-of-the-Meter Participant Perspectives
	

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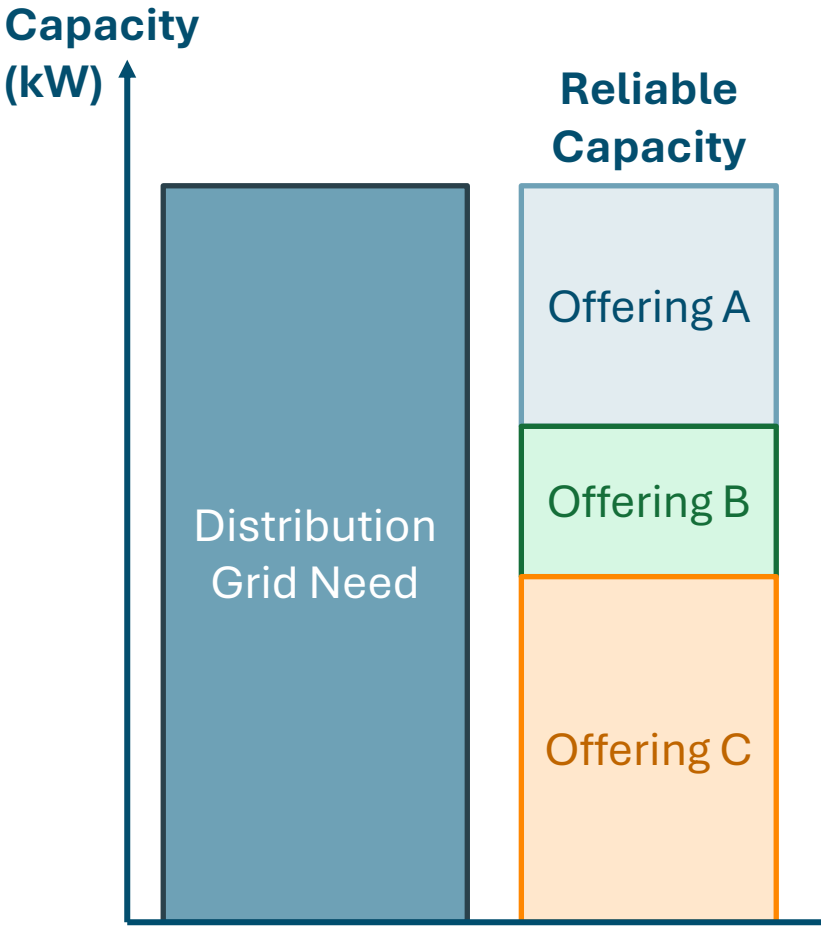
The Big Picture

Programs to provide grid services may include a range of customer offerings

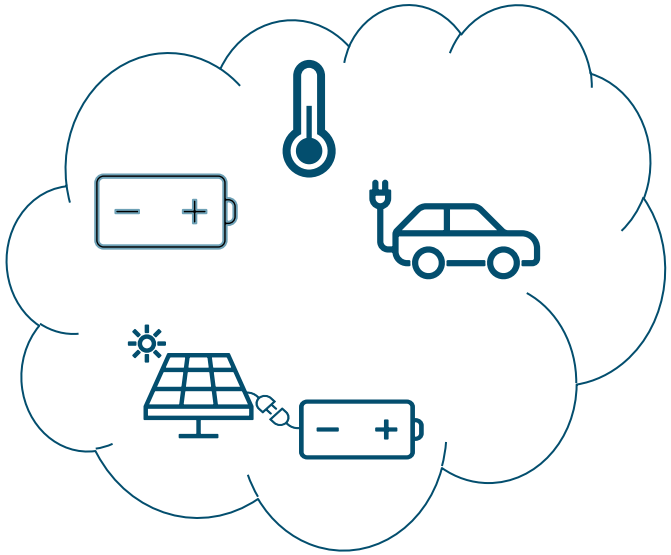
Utility Planner's Perspective



Customer's Perspective

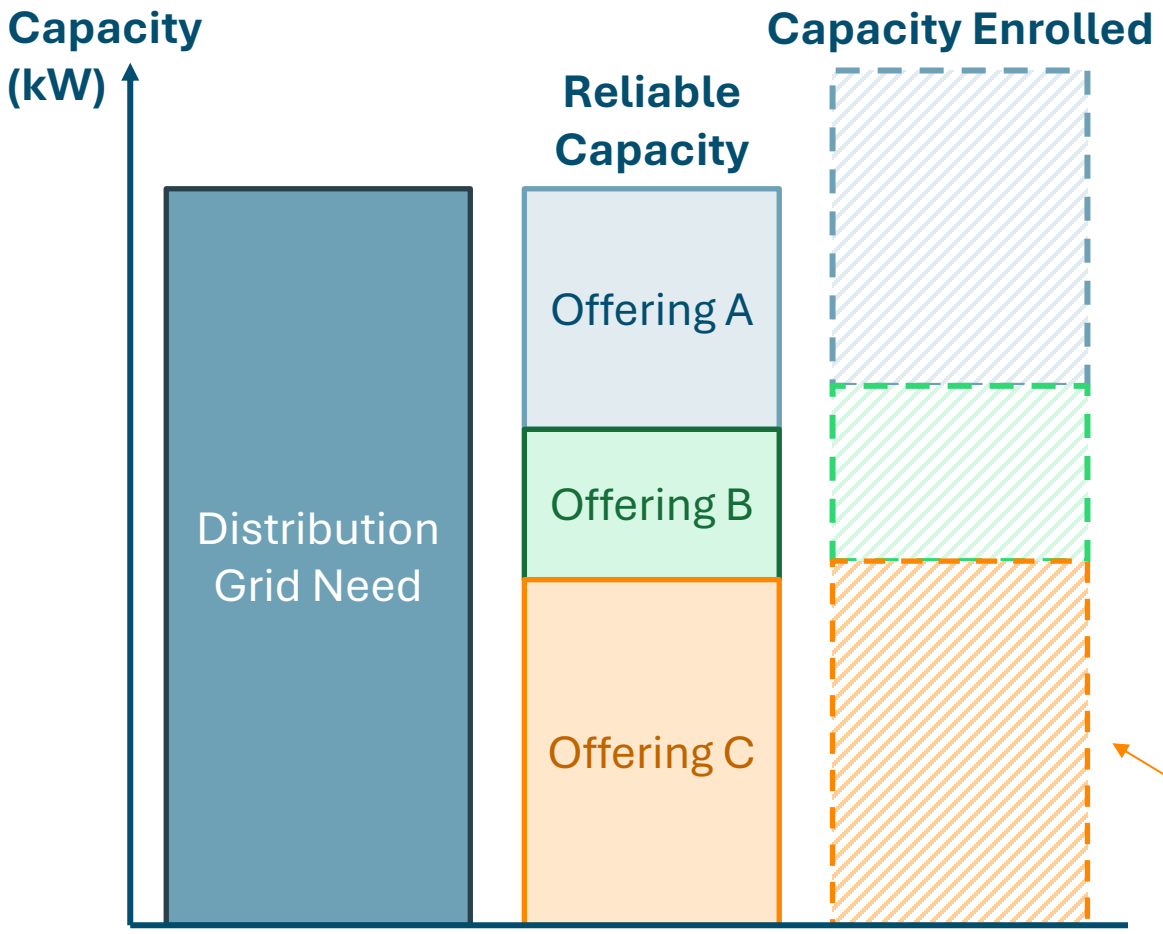
Customer/ DER Type	Grid Services Offerings
Residential	Offering A
Residential	Offering B
Commercial & Industrial	Offering B
Front of the Meter	Offering C

Potentially Participating DERs



**Selection of eligible DERs is a sample for illustration only, non-exhaustive*

Most offerings will include some range of reliability in response, requiring a safety margin of over-enrollment



Customer/ DER Type	Grid Services Offerings
Residential	Offering A
Residential	Offering B
Commercial & Industrial	Offering B
Front of the Meter	Offering C

Offerings with high degrees of utility control (direct or financial) or other benefits like real-time response may provide more guaranteed value

From a policy perspective, compensation mechanisms are shaped and evaluated based on objective-focused criteria

Criteria	Key Considerations
Drives Participation	• Simplicity • Predictability and size of payment • Accessibility across ownership types
Centers the EJ Experience	• Minimizes barriers to entry on an equity basis • Minimizes negative impacts to non-participants • Ensures value flows to EJ communities
Creates Ratepayer Savings	• Cost-effectiveness for value provided
Provides Dependable Impacts	• Reliability in response • Certainty in level of participation & commitment
Ease of Implementation	• Need for additional onsite equipment • Ability to execute using existing back-office tools

What other priorities should be considered?

Criteria	Key Considerations
Drives Participation	• Simplicity • Predictability and size of payment • Accessibility across ownership types
Centers the EJ Experience	• Minimizes barriers to entry on an equity basis • Minimizes negative impacts to non-participants • Ensures value flows to EJ communities
Creates Ratepayer Savings	• Cost-effectiveness for value provided
Provides Dependable Impacts	• Reliability in response • Certainty in level of participation & commitment
Ease of Implementation	• Need for additional onsite equipment • Ability to execute using existing back-office tools
? ? ?	• What of the above is higher/lower priority? Is there anything that should be added to the criteria?

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Components of Compensation

Individual offerings can be developed by pulling a series of levers

	Compensation Component	Scale	
1	Tenor – length of any applicable contract terms	Multi-year	1-hour
2	Control – What level of control / influence would the utility have on participant behavior?	Natural behavior	Direct utility control
3	Activation – When is specific participant behavior scheduled?	At time of initial agreement	Real-time load-following
4	Availability – When is availability agreed upon relative to the grid need?	Multiple years ahead of need	Day-ahead / rolling enrollment
5	Allocation – how participating DERs may be selected	Self-enrollment – First come, first serve	Utility selects bids based on need
6	Payment structure – relative balance between reservation/availability and activation/performance payments (payment basis + performance)	Reservation - Set payments to all participants ($)	Performance - Issued for successful response ($/kW)

Each compensation lever presents trade-offs, and choices may have implications for other levers

Example scenario

	Compensation Component		Scale	
1	Tenor – length of any applicable contract terms	Multi-year		1-hour

- *Participant locks in price for multiple years*
- *Utility receives guaranteed capacity for the same period*

- *Participant responds to a single specific call as desired, with no lasting commitment by either side*

Each compensation lever presents trade-offs, and choices may have implications for other levers

Example scenario

	Compensation Component	Scale		
2	Control – What level of control / influence would the utility have on participant behavior?	Natural behavior		Direct utility control

- *Participants make little to no changes in their normal behavior. They may be compensated if they happen to provide capacity during a time of need*
- *Utility directly operates customer batteries or provides critical price signals for specific behaviors*

Each compensation lever presents trade-offs, and choices may have implications for other levers

Example scenario

	Compensation Component	Scale		
3	Activation – When is specific participant behavior scheduled?	At time of initial agreement		Real-time load-following

- *Participant signs up at the beginning the year to provide capacity during summer evenings*
- *Participant responds to capacity calls as they happen or with minimal notice*

Each compensation lever presents trade-offs, and choices may have implications for other levers

Example scenario

	Compensation Component	Scale		
4	Availability – When is availability agreed upon relative to the grid need?	Multiple years ahead of need		Day-ahead / rolling enrollment

- *Customer signs up to participate 3 years before need is anticipated*
- *Participants bid and commit on a daily basis to meet projected needs*

Each compensation lever presents trade-offs, and choices may have implications for other levers

Example scenario

	Compensation Component	Scale	
5	Allocation – how participating DERs may be selected	Self-enrollment – First come, first serve	Utility selects bids based on need

- *Any customer can sign up until a program is full, with no specific prioritization*
- *Participants bid in at varying prices and the utility enrolls a limited selection based on price and other criteria*

Each compensation lever presents trade-offs, and choices may have implications for other levers

Example scenario

	Compensation Component	Scale	
6	Payment structure – relative balance between reservation/availability and activation/performance payments (payment basis + performance)	• *Participants commit to provide a set amount of capacity any time a call occurs* • *Payments are issued based on the kW capacity committed at the beginning/end of each year*	• *Participants are paid out for the kWh provided at the end of each month/year*
		Reservation* - Set payments to all participants ($)	Performance - Issued for successful response ($/kW)

**To ensure that value materializes, a penalty for non-response may be necessary to pair with a reservation payment structure*

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Example Compensation Mechanisms

Example – Connected Solutions-Daily Dispatch

Example Selection

	Compensation Component	Scale		
1	Tenor – length of any applicable contract terms*	Multi-year		1-hour
2	Control – What level of control / influence would the utility have on participant behavior?	Natural behavior		Direct utility control
3	Activation – When is specific participant behavior scheduled?	At time of initial agreement		Real-time load-following
4	Availability – When is availability agreed upon relative to the grid need?	Multiple years ahead of need		Day-ahead / rolling enrollment
5	Allocation – how participating DERs may be selected	Self-enrollment – First come, first serve		Utility selects bids based on need
6	Payment structure – relative balance between reservation/availability and activation/performance payments (payment basis + performance)	Reservation - Set payments to all participants ($)		Performance - Issued for successful response ($/kW)

**While Connected Solutions includes a 5-year incentive lock for batteries, Daily Dispatch only requires enrollment for a full season to receive incentive payments*

Example – Market-bid Capacity contracts

Example Selection

	Compensation Component	Scale	
1	Tenor – length of any applicable contract terms	Multi-year	1-hour
2	Control – What level of control / influence would the utility have on participant behavior?	Natural behavior	Direct utility control
3	Activation – When is specific participant behavior scheduled?	At time of initial agreement	Real-time load-following
4	Availability – When is availability agreed upon relative to the grid need?	Multiple years ahead of need	Day-ahead / rolling enrollment
5	Allocation – how participating DERs may be selected	Self-enrollment – First come, first serve	Utility selects bids based on need
6	Payment structure – relative balance between reservation/availability and activation/performance payments (payment basis + performance)	Reservation - Set payments to all participants ($)	Performance - Issued for successful response ($/kW)

Example – Day Ahead Market Auction

Example Selection

	Compensation Component		Scale	
1	Tenor – length of any applicable contract terms	Multi-year		1-hour
2	Control – What level of control / influence would the utility have on participant behavior?	Natural behavior		Direct utility control
3	Activation – When is specific participant behavior scheduled?	At time of initial agreement		Real-time load-following
4	Availability – When is availability agreed upon relative to the grid need?	Multiple years ahead of need		Day-ahead / rolling enrollment
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6	Payment structure – relative balance between reservation/availability and activation/performance payments (payment basis + performance)	Reservation - Set payments to all participants ($)		Performance - Issued for successful response ($/kW)

Example – *Utility Operated, customer sited batteries*

Example Selection

	Compensation Component		Scale	
1	Tenor – length of any applicable contract terms	Multi-year		1-hour
2	Control – What level of control / influence would the utility have on participant behavior?	Natural behavior		Direct utility control
3	Activation – When is specific participant behavior scheduled?	At time of initial agreement		Real-time load-following
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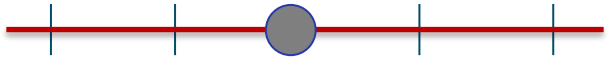
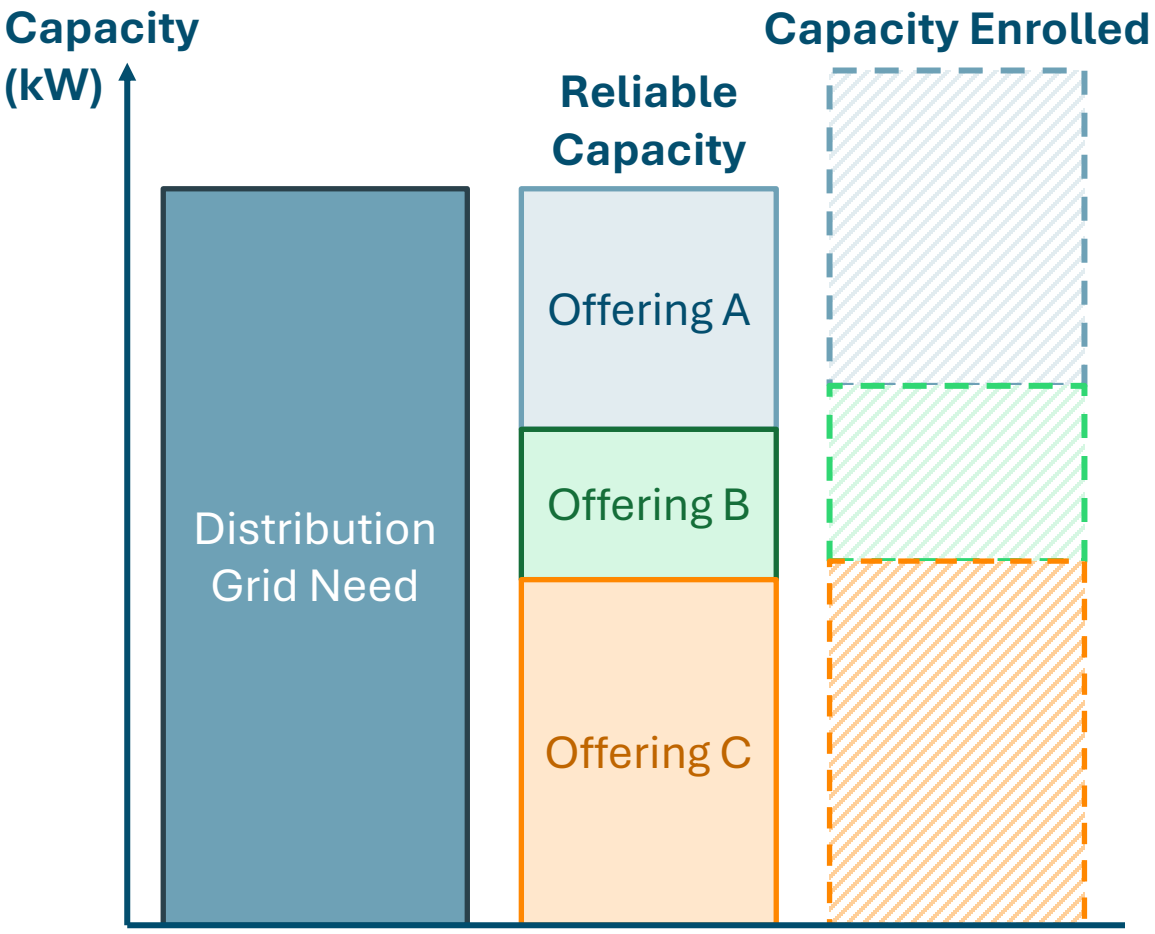
6	Payment structure – relative balance between reservation/availability and activation/performance payments (payment basis + performance)	Reservation - Set payments to all participants ($)		Performance - Issued for successful response ($/kW)

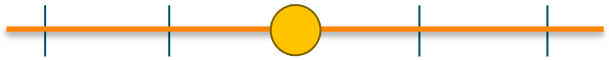
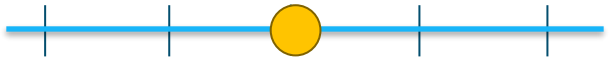
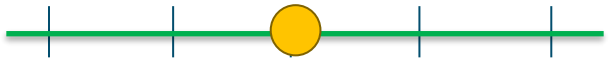
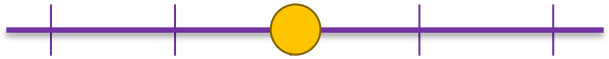
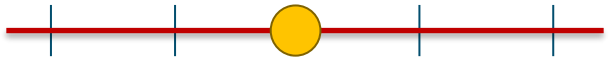
Compensation components influence the reliability of response and what customer or DER types may be drawn to each offering



Customer/ DER Type	Grid Services Offerings	Primary Enrolled Technologies
Residential	Offering A	
Residential	Offering B	
Commercial & Industrial	Offering B	
Front of the Meter	Offering C	

How would you choose to build an offering?

Example Selection

	Compensation Component	Scale		
1	Tenor – length of any applicable contract terms	Multi-year		1-hour
2	Control – What level of control / influence would the utility have on participant behavior?	Natural behavior		Direct utility control
3	Activation – When is specific participant behavior scheduled?	At time of initial agreement		Real-time load-following
4	Availability – When is availability agreed upon relative to the grid need?	Multiple years ahead of need		Day-ahead / rolling enrollment
5	Allocation – how participating DERs may be selected	Self-enrollment – First come, first serve		Utility selects bids based on need
6	Payment structure – relative balance between reservation/availability and activation/performance payments (payment basis + performance)	Reservation - Set payments to all participants ($)		Performance - Issued for successful response ($/kW)

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Clarifying Questions?

Break-out Rooms

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Break-out Room Poll

- **We will reserve 60 minutes for break-out rooms, to be followed by a share-out with the large group**
- **Each room will have a distinct emphasis on the types of offerings being considered**
  - Break-out room 1: Residential offerings
  - Break-out room 2: Commercial and front-of-the-meter offerings
  - (Optional) Break-out room 3 and/or 4: Same topic as either room 1 or 2 depending on poll response
- **We will open a poll with two choices**
- **Please do not fill out the poll if you are a teaming partner on the Study, or if you do not plan to stay for the breakouts**

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Breakout Room Poll

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Scheduled Break: 10 minutes

Break-out Rooms Guidelines

- We will reserve 60 minutes for break-out rooms, to be followed by a share-out with the large group
- Breakouts are designed to gather your feedback and input on the compensation components and evaluation criteria
- Facilitators and notetakers from MassCEC, E3, and RMI will be present in each room to guide the activities and discussion
- Breakout rooms will include a shared workspace that facilitators will share a link to
- Once the breakout rooms open, you'll need to self select into the room for the topic you expressed interest in, we may move folks around to help balance the numbers

Breakout Room Share-Outs

- Notetakers in each room will share 2-3 key themes discussed in their breakout room
  - If you have any additional comments to share with the whole group, please add them to the chat

Closing and Next Steps

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Final Workshop

+ **Workshop 1: December 2024**
  - Introduction to Study
+ **Workshop 2: March 3, 2025**
  - Detailed analytical approach to Grid Services valuation
  - Introduction of compensation mechanisms and implementation considerations
+ **Workshop 3: April 25, 2025**
  - Discussion and Feedback on potential Grid Services compensation mechanisms
+ **Workshop 4: Early June 2025 (*Date TBA*)**
  - Presentation of findings and discussion of Implementation Roadmap
+ **Final Roadmap Report: Summer 2025**

Workshop Resources and Communication

+ **Workshop session slides and recordings will be made available on the MassCEC website:**
  - https://www.masscec.com/grid-modernization-and-infrastructure-planning/grid-services-study
  - This site is the home for general information about the study, including stakeholder presentations and a primer for this workshop series

+ **Future meeting announcements and invitations to Workshop 4 will be sent by email to the workshop mailing list**
  - If you are not on the list and would like to be added, please sign up here

Please stay in touch!

- **Please share any questions or feedback after the meeting with:**
  - Grid@masscec.com
  - Andrew.Solfest@ethree.com
  - Bwebster@rmi.org
- **Let us know if you would prefer to share feedback in a 1-on-1 call or virtual meeting**
- **Stay tuned (and join the email list) for the public release of the Grid Services valuation model, coming early May!**
  - This will illustrate the methods by which the EDCs intend to value grid services at various locations and include approaches for deferral, bridge-to-wires, and environmental justice adders, as discussed in Workshop 2
  - The model will be accompanied by both a training video and a feedback form for you to share your thoughts

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Thank You

Video recording
will be ended now