Energy+Environmental Economics

Alternative Ratemaking Mechanisms for Distributed Energy Resources in California

Proposed Framework for "NEM Successor Tariff" Compliant with AB 327

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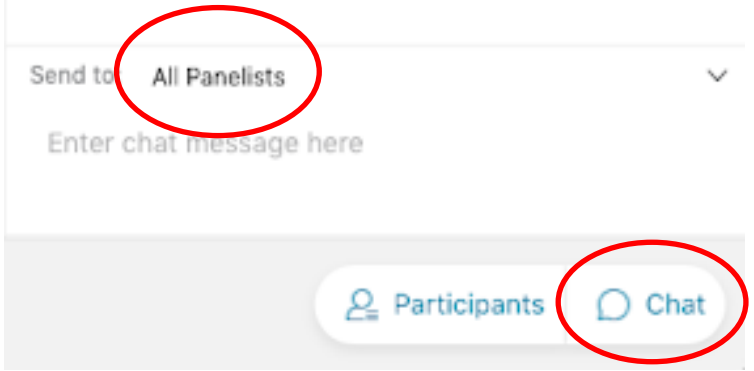
Agenda

- **Presentation** (45 min)
  - E3's Role and Intent of White Paper
  - Legislative Requirements
  - Proposed Framework Elements
  - White Paper Structure
  - Comparison of Avoided Cost and BTM Generation
  - Potential Rate Design Alternatives
  - Successor NEM Rates in Other Jurisdictions
  - Illustrative Modelled Rates and "Glide Paths"
  - Key Stakeholder Questions
- **Discussion / Q&A** (60 min+)

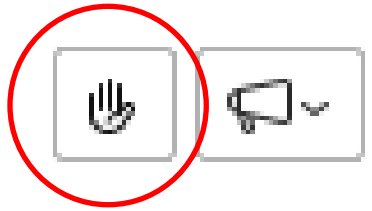
Meeting Logistics

+ **Please use the Chat feature to ask questions**
  - Select *All Panelists* option for "Send to"
  - If you are unable to use the chat feature, please call 415-306-8745 to provide your question to a moderator



+ **Questions will be answered during the allotted discussion period after the presentation**

+ **During Q&A you can request to be unmuted to verbally comment or ask a question, by clicking on the button to raise your hand**



What role is E3 playing in this process?

- **The CPUC engaged E3 to develop a white paper for a Net Energy Metering (NEM) successor tariff compliant with California legislation**
  - Informed by the findings of the *NEM 2.0 Lookback Study* conducted by Verdant Associates, with assistance from E3 and Itron
- **The white paper includes E3's views, not those of the CPUC or Energy Division**

VERDANT

Key passages from AB 327 highlight the challenge of reforming NEM in California

Public Utility Code SEC. 11. Section 2827.1

"In developing the standard contract or tariff, the commission shall do all of the following:

(1) Ensure that the standard contract or tariff made available to eligible customer-generators ensures that customer-sited renewable distributed generation continues to grow sustainably and include specific alternatives designed for growth among residential customers in disadvantaged communities.

(2) Establish terms of service and billing rules for eligible customer-generators.

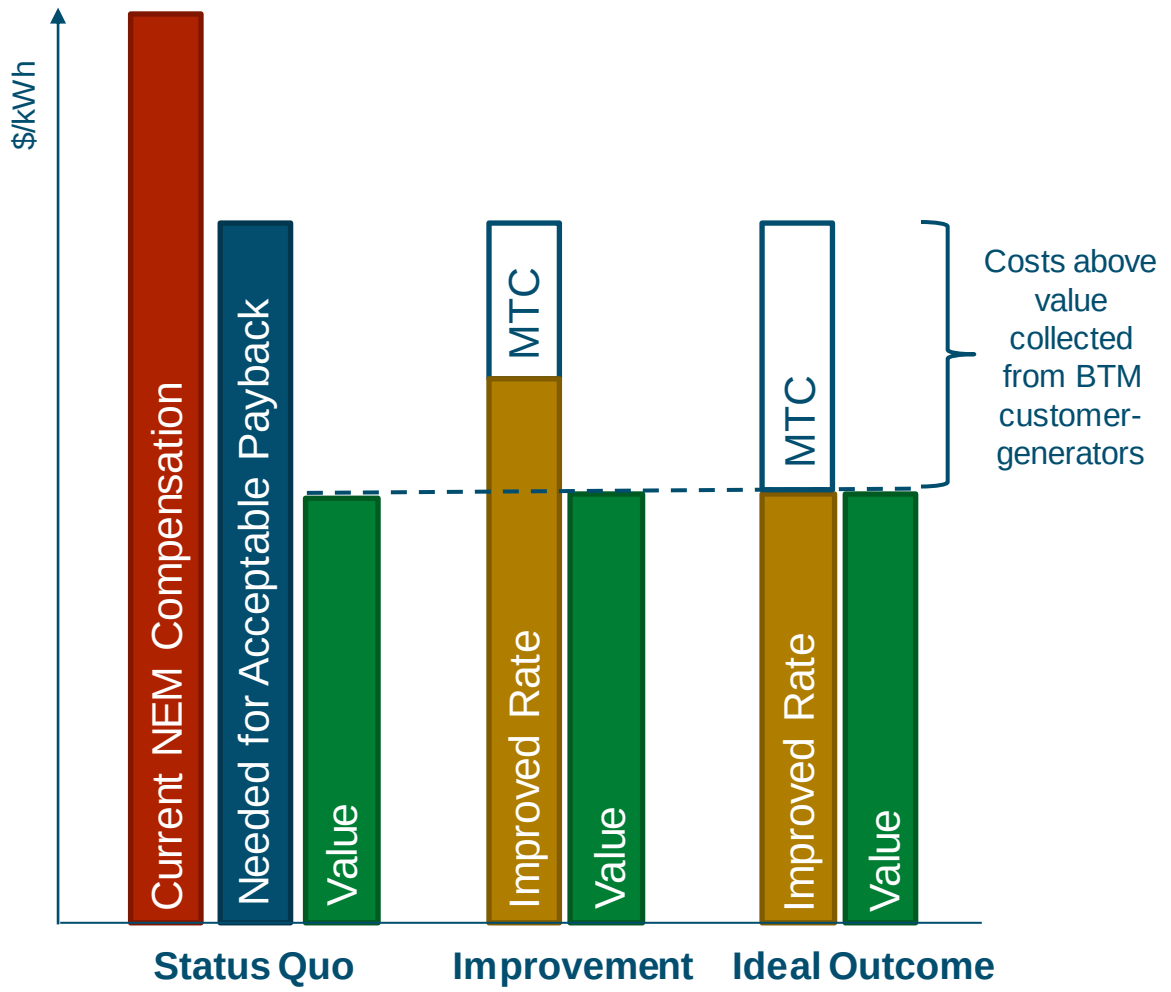
(3) Ensure that the standard contract or tariff made available to eligible customer-generators is based on the costs and benefits of the renewable electrical generation facility.

(4) Ensure that the total benefits of the standard contract or tariff to all customers and the electrical system are approximately equal to the total costs."

Source: https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201320140AB327

E3's proposed mechanisms work together to meet AB327 objectives

1. **Improved mandatory time of use (TOU) rate design for BTM renewable generation**
   - Aligns value of BTM customer renewable generation to grid with compensation
   - Design can improve over time
   - Opens door to beneficial electrification and improves storage dispatch signal
2. **Market Transition Credit (MTC)**
   - Explicit value paid to support viable growth of BTM customer-sited generation in California
   - Facilitates glide path and serves as a tool for the CPUC to define and control compensation levels
   - Mechanism to collect costs from MTC may be set to avoid moving costs to other customers

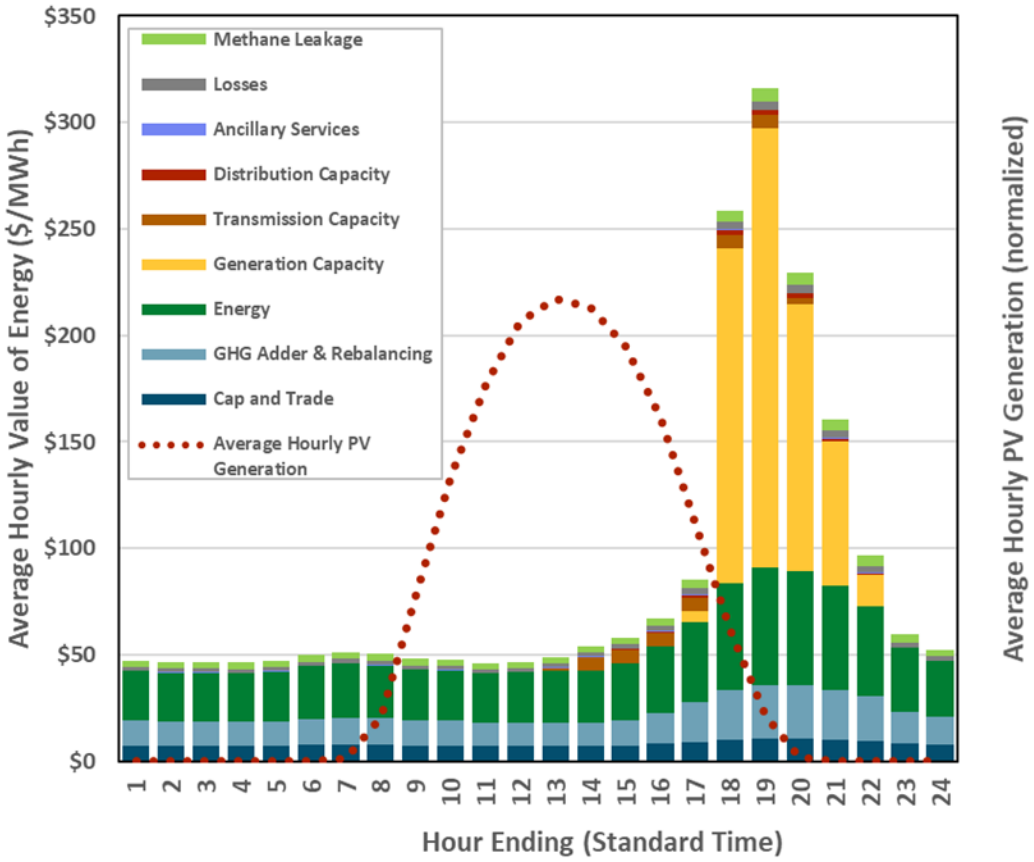


E3's white paper provides background on legislation and the tools available to ensure compliance

Overview of the Proposed Reform	• Objectives and elements of the framework
Role of the Market Transition Credit	• Defining proposed MTC and potential funding options
Alternative Rate Designs	• Elements of cost-reflective rate designs
Illustrative Cost-Based Successor Rates	• Example rates and potential impacts on bill savings and MTC
Glide Paths for Transitional Rates	• Illustrative glide paths using alternative rates and MTCs
Conclusion	• Key questions for stakeholders
Appendix: NEM Successor Rate Examples	• NY, HECO, AZ, NV

Misalignment in solar generation and marginal costs profiles

Hourly Marginal Costs and Solar Generation, Annual Averages



Source: *CPUC 2020 Avoided Cost Calculator (ACC)*, available at: https://www.cpuc.ca.gov/general.aspx?id=5267

- Solar generation largely "misses" evening system peak hours with highest marginal costs
- Misalignment between per-kWh rates and TOU marginal costs in current rates
- NEM 2.0 awards considerably more compensation to customer-sited solar than the value it provides to the system

Value	$/kWh solar
Avg. Compensation to Solar Generation	$0.312
Annual Average Solar Avoided Cost	$0.055
Delta	$0.258

Average compensation based on E3 modeling of current SDG&E TOU-DR-1 residential rate. System avoided costs based on CPUC's 2020 ACC.

Advanced TOU rate designs can alleviate misalignment in BTM solar compensation. Examples:

Rate Components	Multi-part /Dynamic Rate Designs
Grid Access Charge	TOU Energy + GAC ($/contract kW) + Fixed Charge
TOU Demand Charge	TOU Energy + TOU Demand Charges + Fixed Charge
Dynamic kWh Charge	Critical Peak Pricing (CPP), Two-part RTP
Subscription-based Rates	Subscription Fee + TOU Energy Charge

+ **Multi-part TOU rates enable more efficient per-kWh price signals**
  - Load reductions compensated closer to the average marginal costs in the TOU period
+ **Dynamic per-kWh rates particularly helpful to signal hours with highest capacity value**

Rate restructuring has been adopted elsewhere for customers with BTM renewable generation

	TOU Energy Charges	TOU Rate w/ Demand charge	GAC Based on Solar kW	GAC Based on Max Net kW	Export Rates (at AC or Value-Stack)	Export Rates (other)	Use of MTC
Hawaii - HECO	X				X		Proposed
Arizona - APS		X	X			X	
Arizona - SRP	X	X			X		
Nevada - NV Energy						X	
New York - Statewide				X	X		X

+ Most successor NEM rates introduced **Net Billing to value exports separately from load reductions**

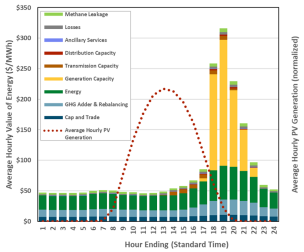
Illustrative cost-based residential rates demonstrate the need for a "glide path"

	Current Residential*	Two-Part MC	Multi-Part "Grid"	Multi-Part "Demand"
Customer Charge ($/month)	$10.28	$177.18	$40.00	$50.00
Grid Access Charge ($/contract kW/month)	N/A	N/A	$24.40/kW	N/A
On-Peak Summer Demand Charge ($/kW/month)	N/A	N/A	N/A	$40.00/kW
Mid-Peak Summer Demand Charge ($/kW/month)	N/A	N/A	N/A	$25.00/kW
Energy Charge ($/kWh)				
Summer On-Peak	$0.478	$0.288	$0.288	$0.288
Summer Mid-Peak	$0.281	$0.117	$0.117	$0.117
Summer Off-Peak	$0.235	$0.050	$0.050	$0.050
Winter On-Peak	$0.332	$0.069	$0.069	$0.069
Winter Mid-Peak	$0.324	$0.054	$0.054	$0.054
Winter Off-Peak	$0.314	$0.046	$0.046	$0.046

Multi-part rates allow more acceptable fixed charges to lessen impact on small customers

Calibrated to recover residual fixed costs (revenue-neutral design)

Total TOU MC



*SDG&E TOU-DR-1 (net of NBCs)

Transitional rates that progress kWh charges gradually towards marginal cost values are necessary

	Current Residential*	A**	B**	C**
Customer Charge ($/month)	$10.28	$50.00	$60.00	$70.00
Grid Access Charge ($/contract kW/month)	N/A	$5.00/kW	$6.00 /kW	$7.00/kW
On-Peak Summer Demand Charge ($/kW/month)	N/A	$10.00/kW	$15.00/kW	$20.00 /kW
Energy Charge ($/kWh)				
Summer On-Peak	$0.478	$0.320	$0.266	$0.212
Summer Mid-Peak	$0.281	$0.222	$0.185	$0.147
Summer Off-Peak	$0.235	$0.161	$0.134	$0.106
Winter On-Peak	$0.332	$0.231	$0.192	$0.153
Winter Mid-Peak	$0.324	$0.173	$0.143	$0.114
Winter Off-Peak	$0.314	$0.147	$0.122	$0.097

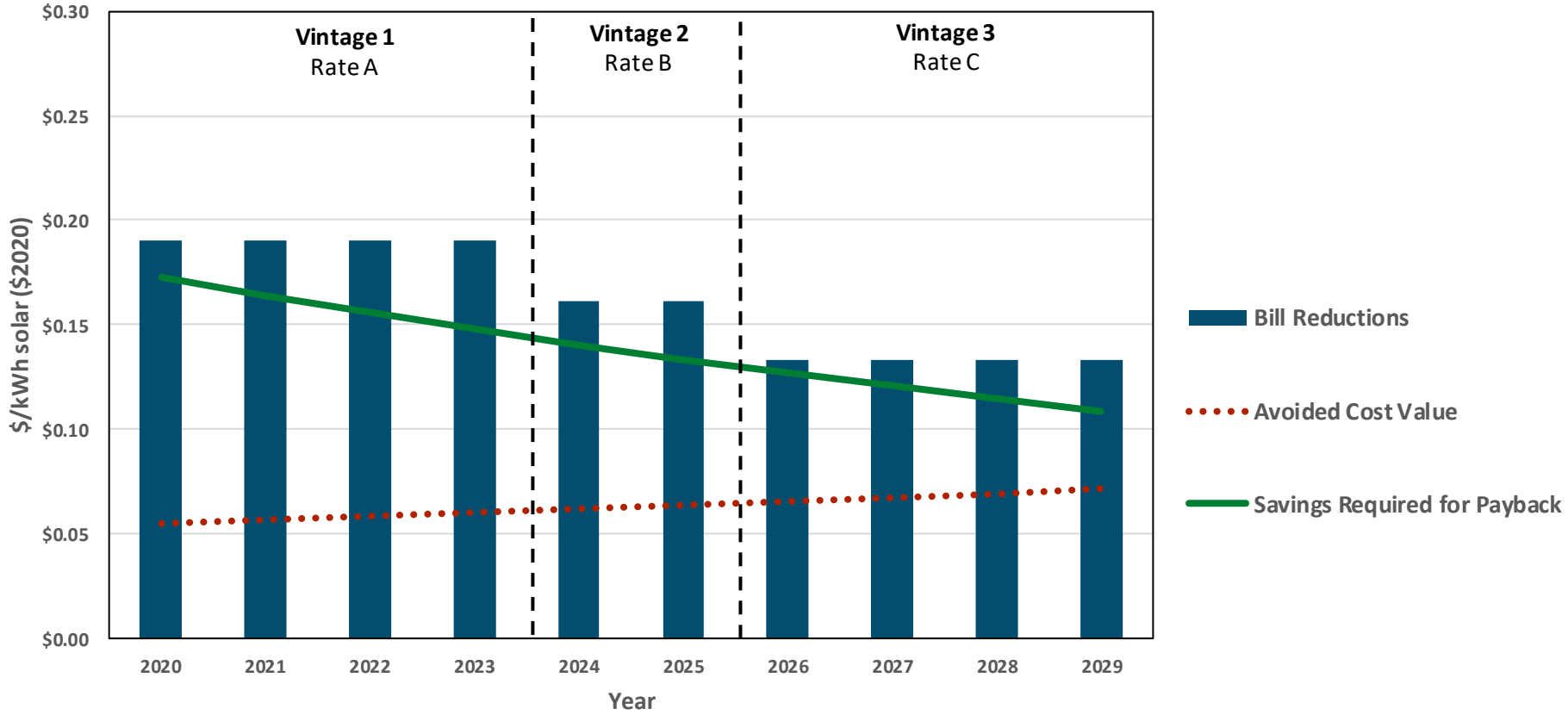
Gradual increase for higher fixed costs recovery

Gradual decrease towards marginal costs

*Current SDG&E TOU-DR-1 (net of NBCs)
** Illustrative rate levels; do not represent final rate recommendations.

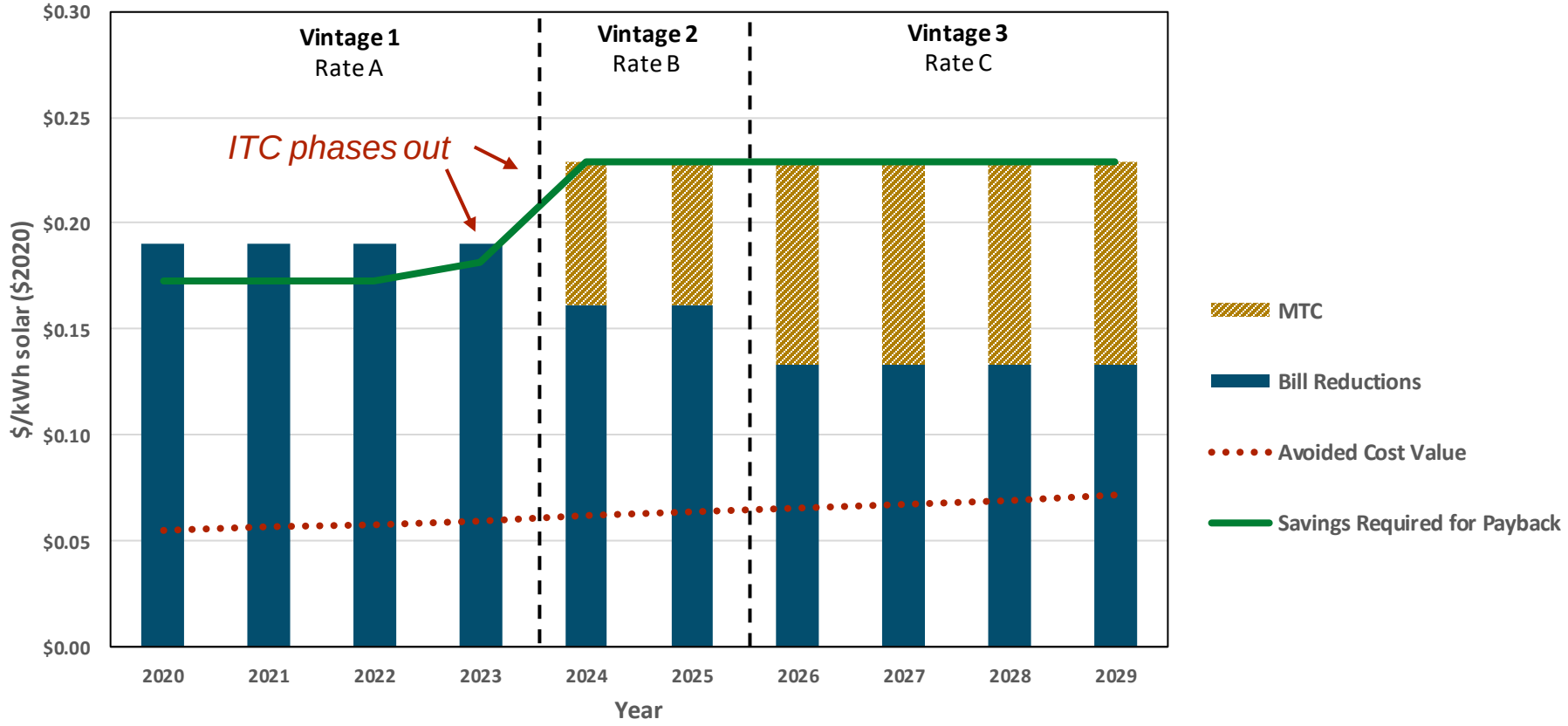
The first MTC example assumes an optimistic scenario where technology costs decline steadily

- Savings required for meeting an example 7.5-year payback period remain below the value provided through bill savings, even as rates become more cost-reflective over time
- No MTC is required throughout the period



An alternative illustrative glide path demonstrates how a MTC can provide savings needed for customer payback

- This **less optimistic** example assumes technology costs do not decline throughout the decade
- A market transition credit is applied beginning with the second vintage to provide savings needed for payback



Closing thoughts: A path forward on NEM requires stakeholders to address several key questions

1. What is a reasonable payback period for BTM generation?
2. Over what time period should more cost-based retail rates for customer-generators be implemented?
3. How can this rate transition best support other policy goals such as promoting electrification as a key decarbonization strategy?
4. How should a MTC for customer-generators be structured?
5. Should MTC vintages be based on time (e.g., annual), number of participants, or capacity (e.g., MW blocks)?
6. From which groups should the MTC recovery surcharge be collected? (future vintages of customer-generators, all customer-generators, all ratepayers, or some other group)?

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Thank You

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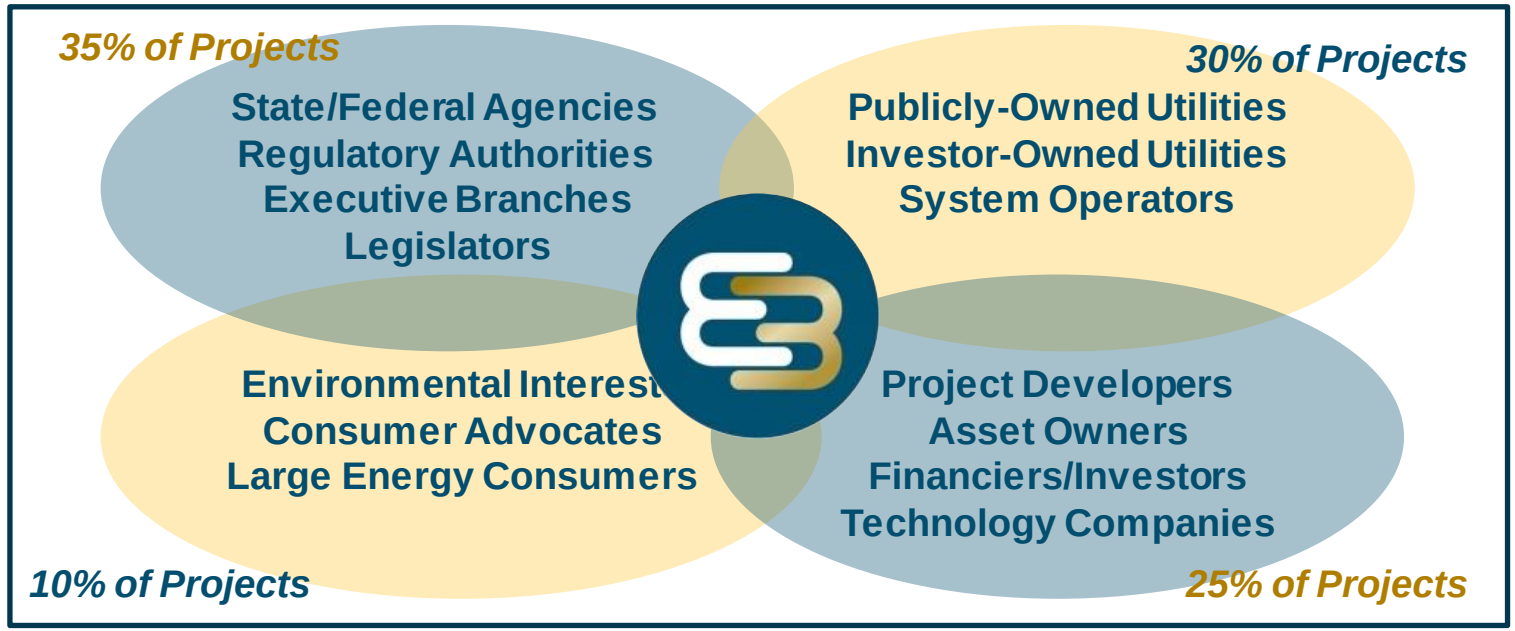

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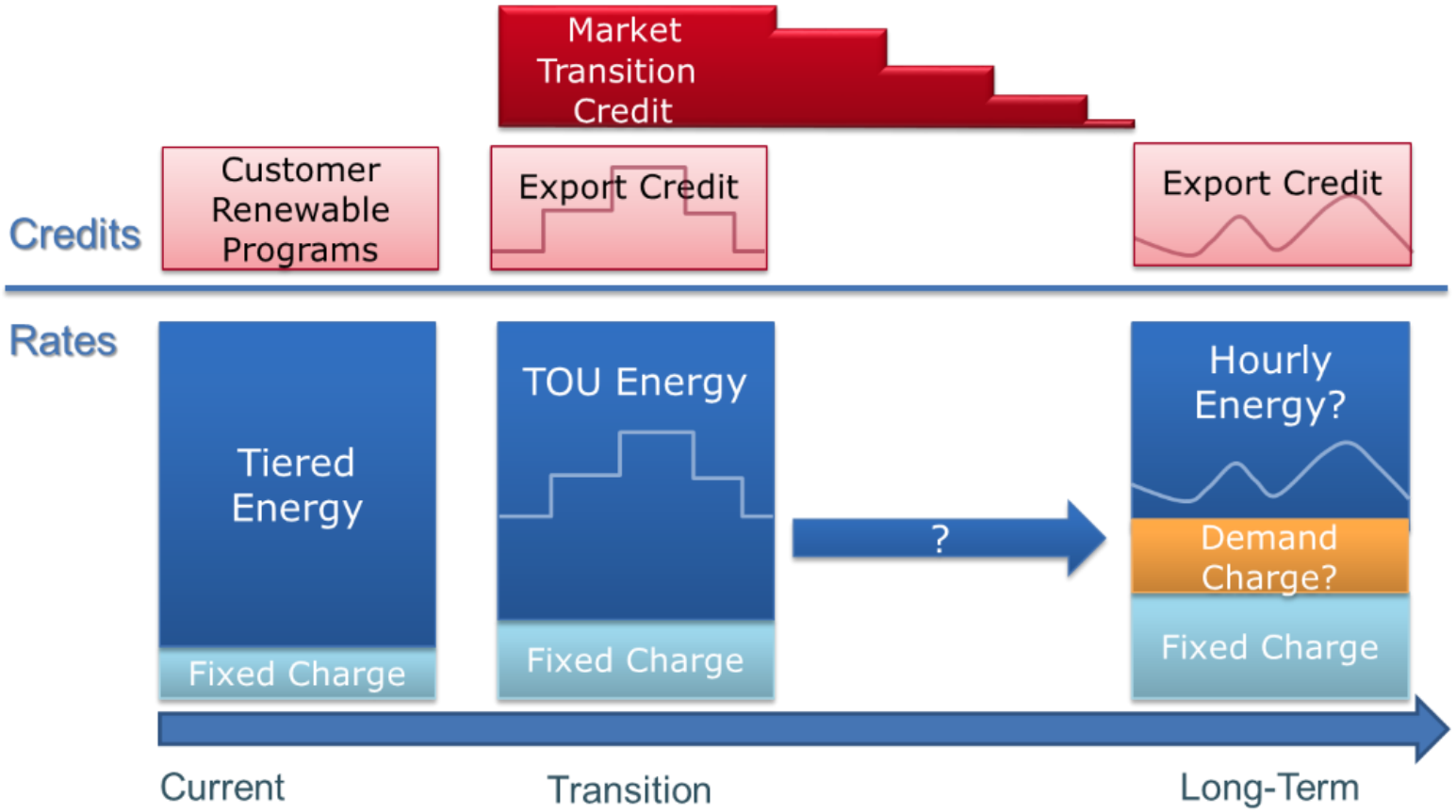
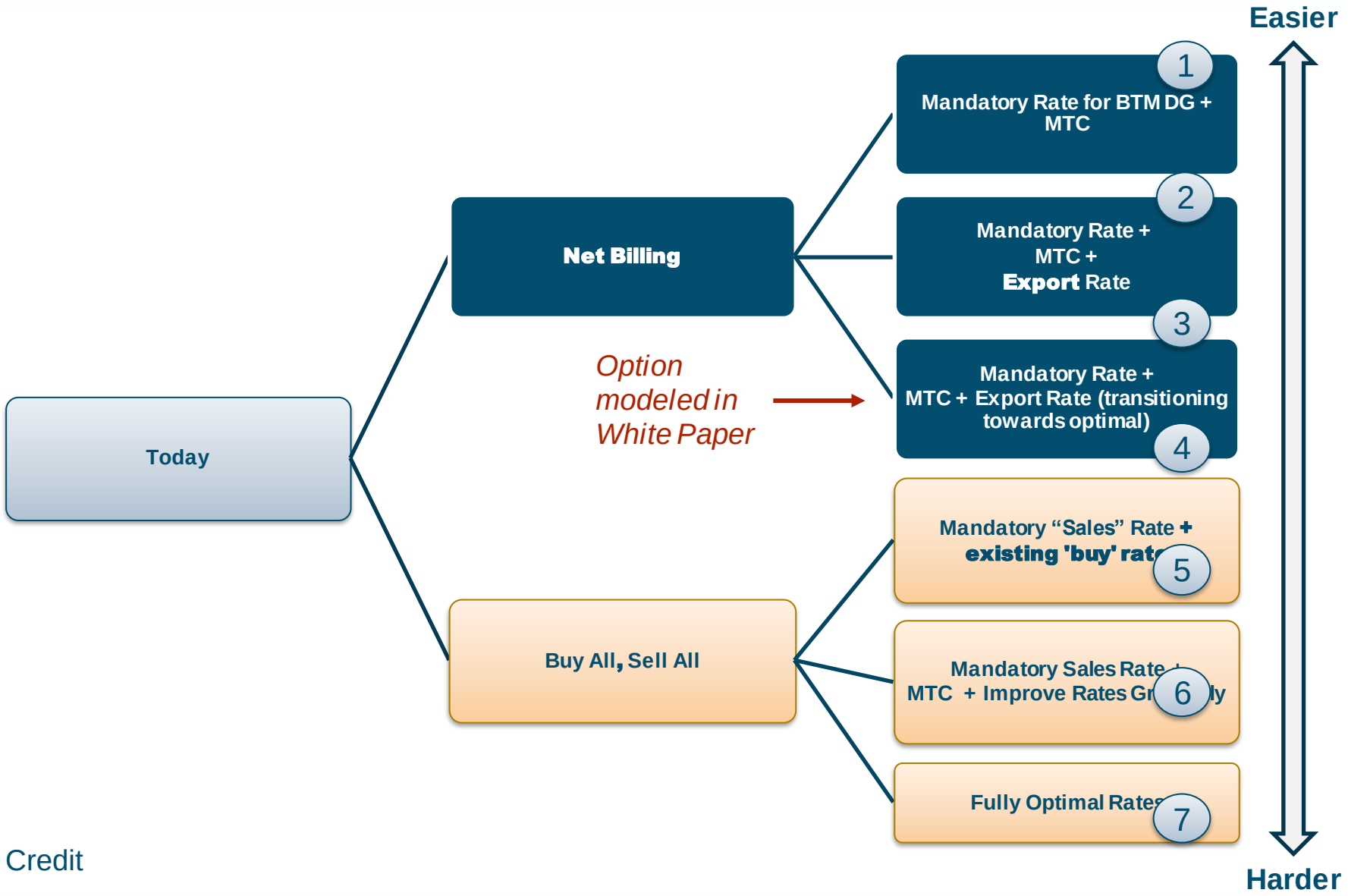
Appendix

Residential DER rates over time:



Spectrum of Alternative Successor NEM Design Choices



MTC: Market Transition Credit