Final Report of the Distributed Generation Stakeholder Group

Presentation to the Joint Standing Committee on Energy, Utilities and Technology

February 14, 2023

GOVERNOR'S
Energy Office

Overview

- Background
  - Net energy billing (NEB)
  - Distributed Generation Stakeholder Group (DGSG)
- Final Report overview
- Proposed successor program
  - Benefit-cost analysis
  - Rate impact analysis
- Questions

GOVERNOR'S
Energy Office

Maine's Climate and Clean Energy Targets

REDUCE MAINE'S GREENHOUSE GAS EMISSIONS

45%
BELOW 1990 LEVELS BY 2030

80%
BELOW 1990 LEVELS BY 2050

RENEWABLE PORTFOLIO STANDARD REQUIREMENTS

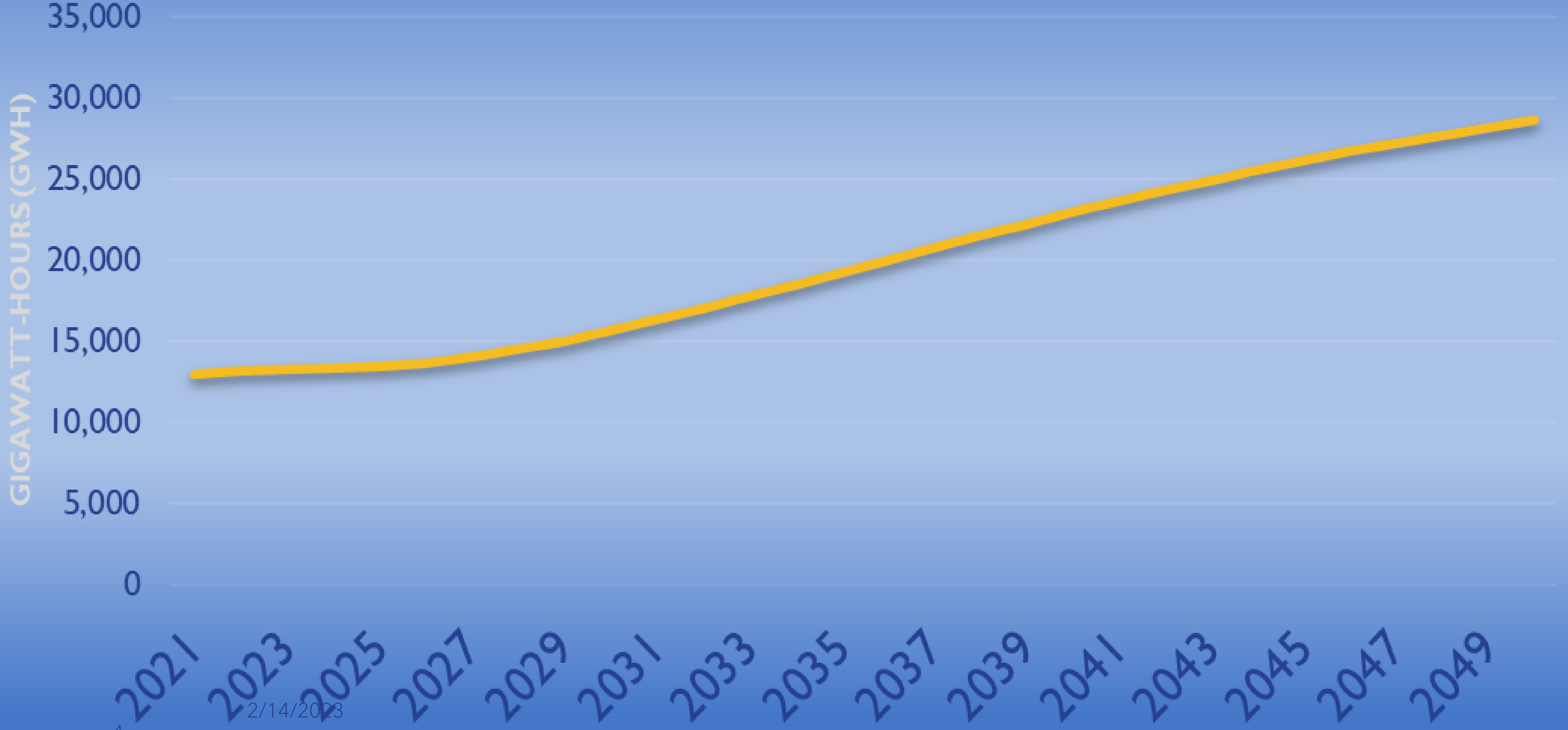
80%
BY 2030

100%
BY 2050

ACHIEVE CARBON NEUTRALITY BY

2045

Electrification of heating and transportation will double Maine's annual electricity use by 2050



Net energy billing

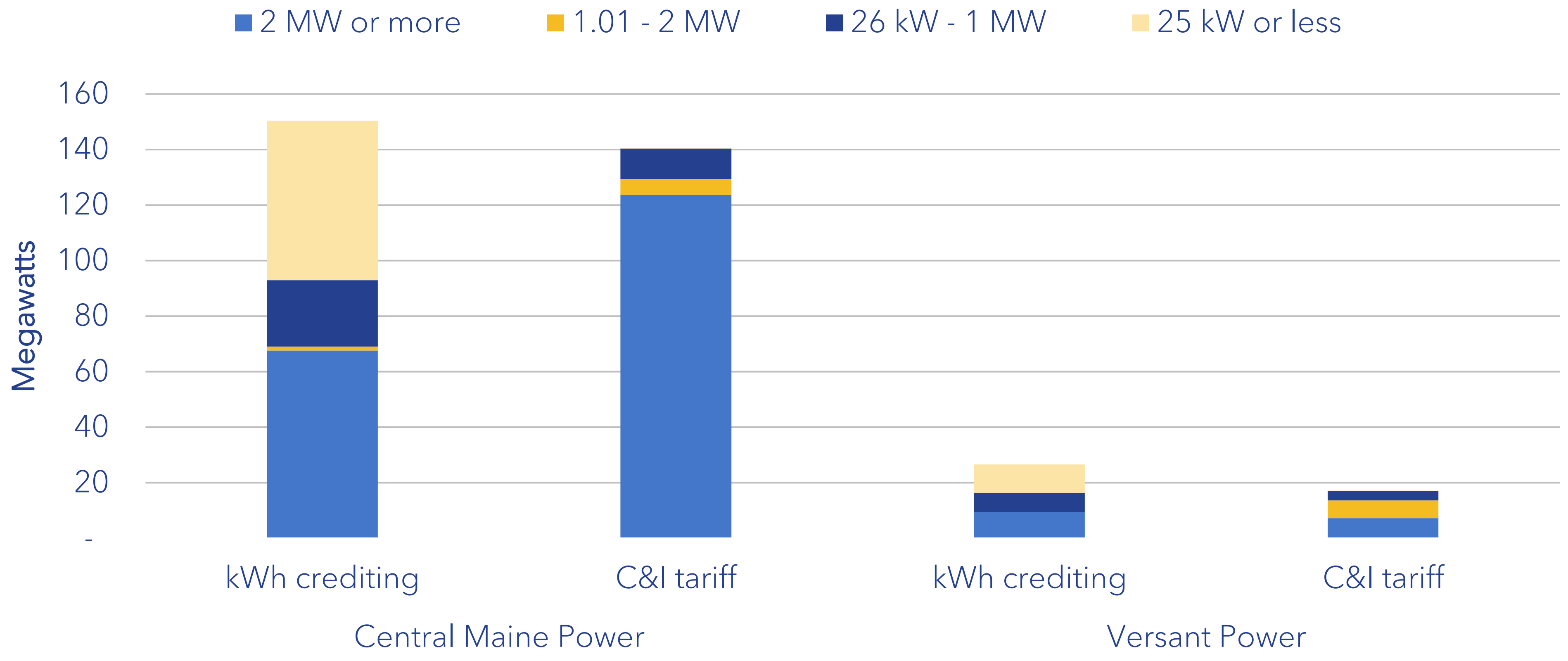
Net energy billing

- In 2019 Maine law changed to encourage the development of distributed generation (DG) resources
  - DG: an electric generating facility with a nameplate capacity of less than 5 megawatts (MW) that uses a renewable fuel or technology and is located in the service territory of a transmission and distribution utility in the State. *(35-A M.R.S. §3481(5)).*
- The primary mechanisms driving current distributed generation development are the two net energy billing programs: kilowatt-hour credit *(35-A M.R.S. §3209-A)* and C&I tariff rate *(35-A M.R.S. §3209-B).*
- In 2021, through passage of P.L. 2021 ch. 390 (LD 936) the Legislature placed a limit on projects eligible to participate (must be operational by 2024) and established a goal of 750 MW of distributed generation developed under the net energy billing programs.
- In 2022, recognizing significant volatility in the C&I tariff program as a result of volatility in natural gas prices – which largely set retail electricity rates – the Legislature passed P.L. 2021 ch. 659 (LD 634), which reformed compensation for all C&I tariff projects that did not commence continuous construction efforts by September 1, 2022.

GOVERNOR'S
Energy Office

Operational net energy billing capacity by utility and program

November 2022

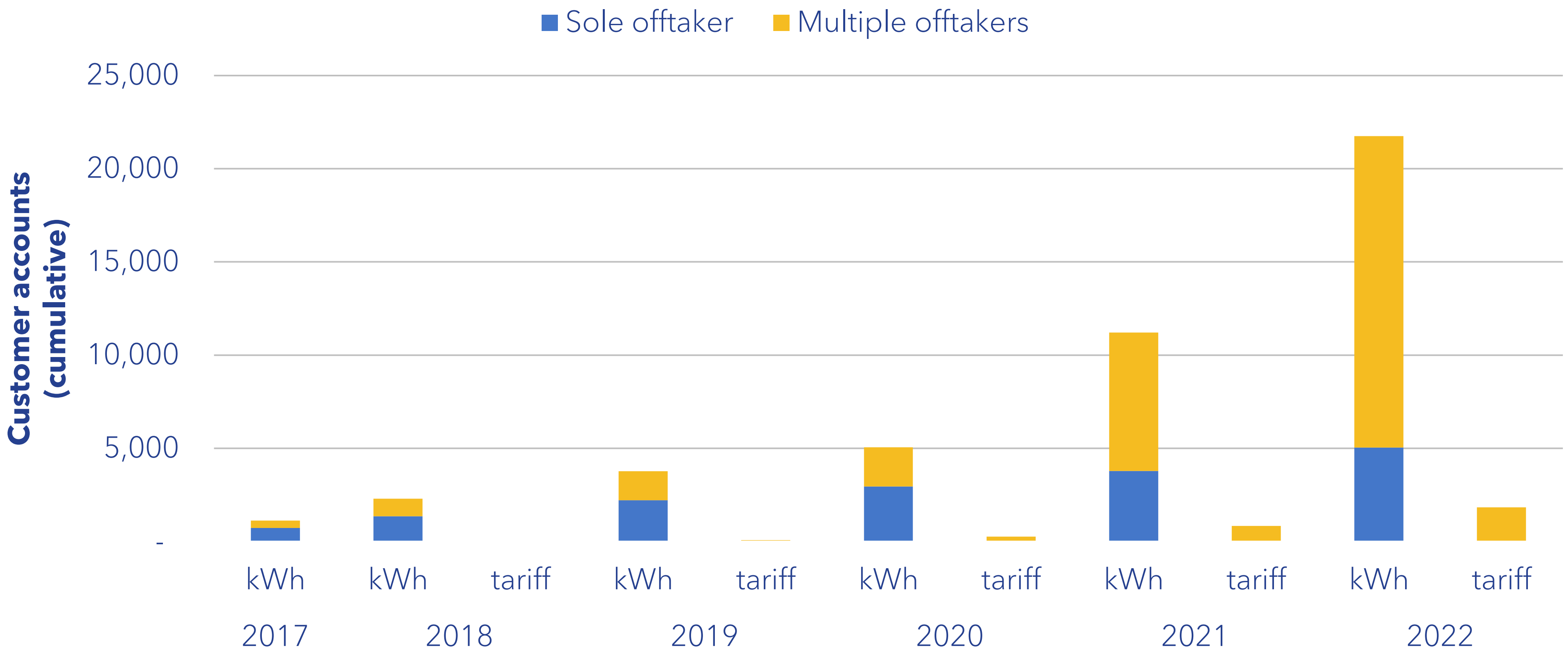


There are a total of 335 megawatts of capacity currently operational in the net energy billing programs: 295 MW of solar, 30 MW of hydro, 5 MW of wind, and 5 MW of other projects.

GOVERNOR'S Energy Office

Net energy billing customer enrollment for operational projects

cumulative customers receiving credits as of November 2022

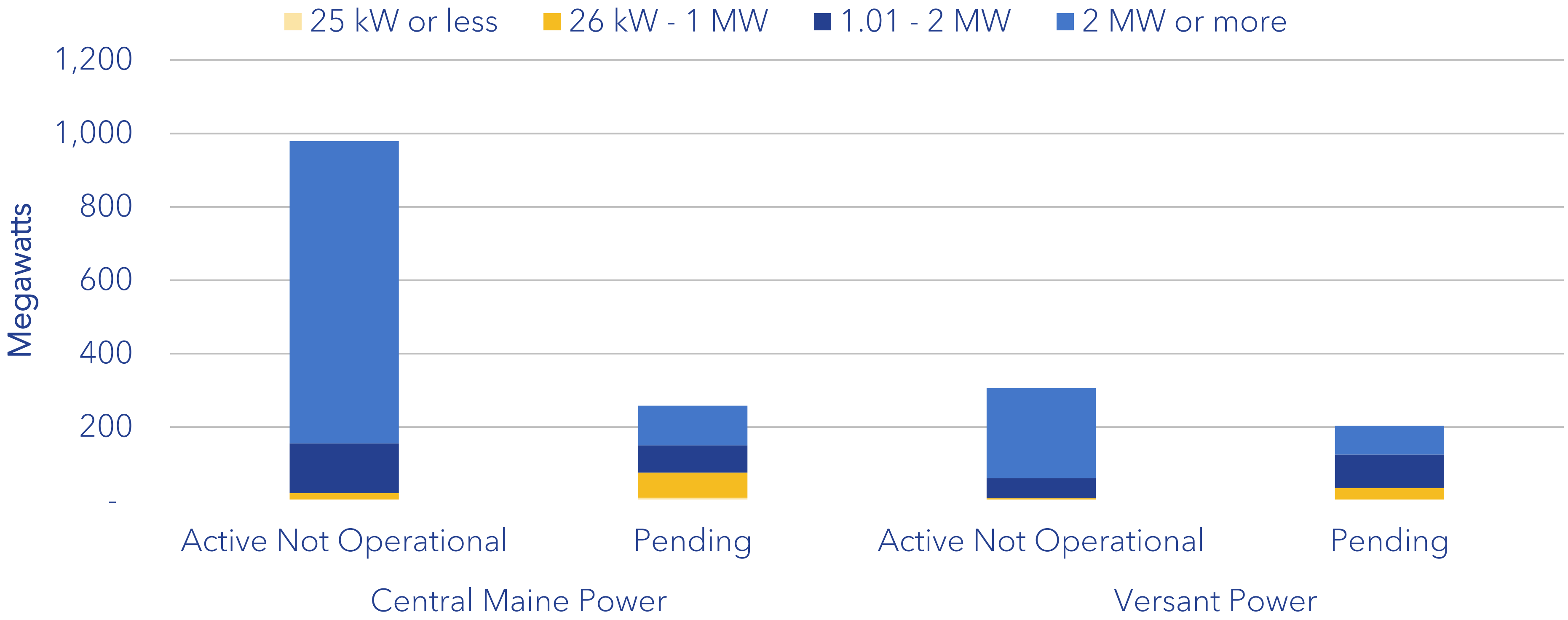


GOVERNOR'S Energy Office

2/14/2023

Net energy billing capacity in the pipeline, by project size

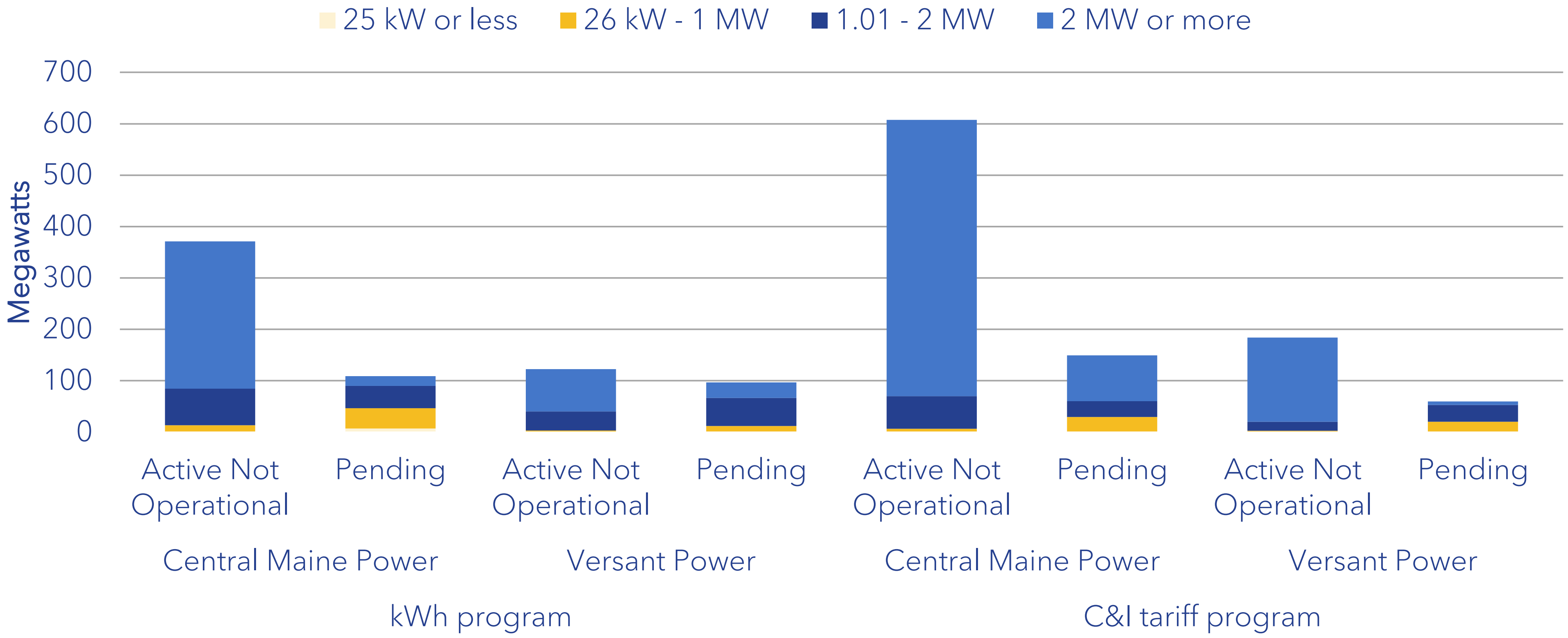
November 2022



GOVERNOR'S
Energy Office

Net energy billing capacity in the pipeline, by project size, status, and program

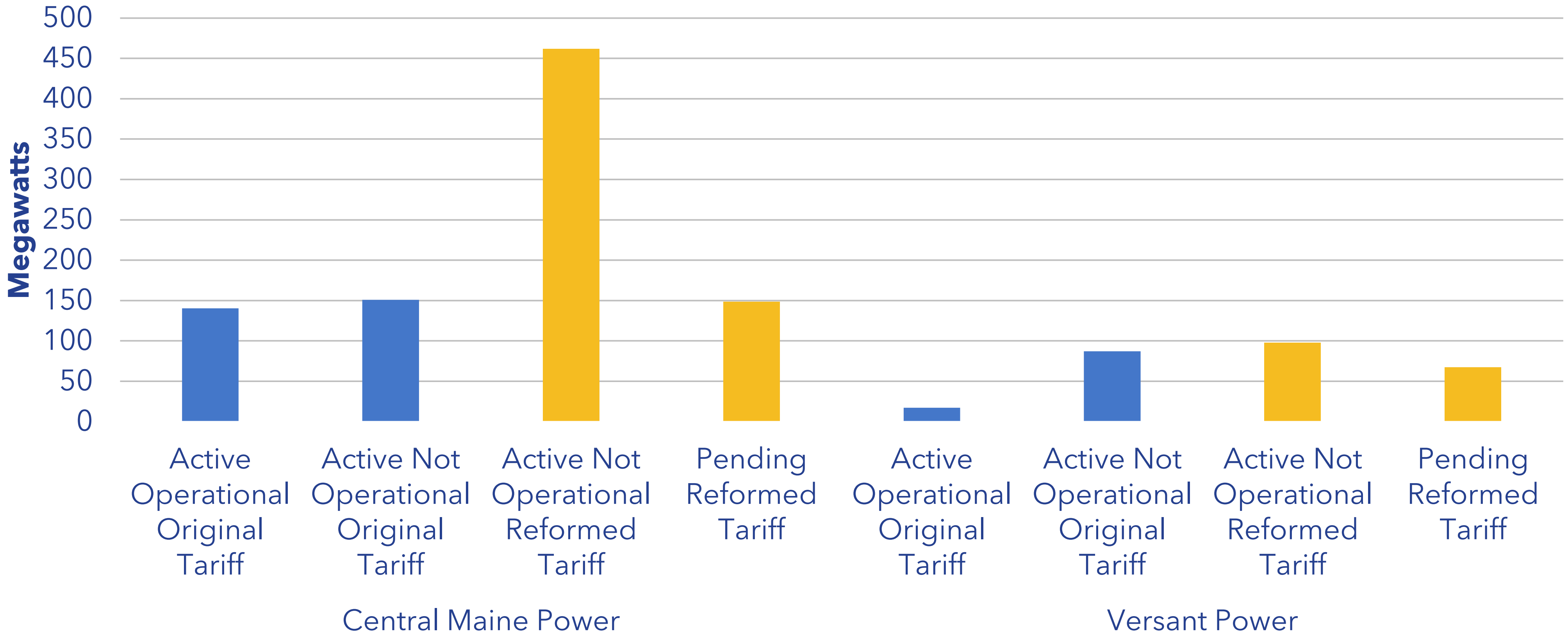
November 2022



GOVERNOR'S
Energy Office

LD 634 reformed compensation for 77% of the C&I tariff net energy billing projects in the pipeline

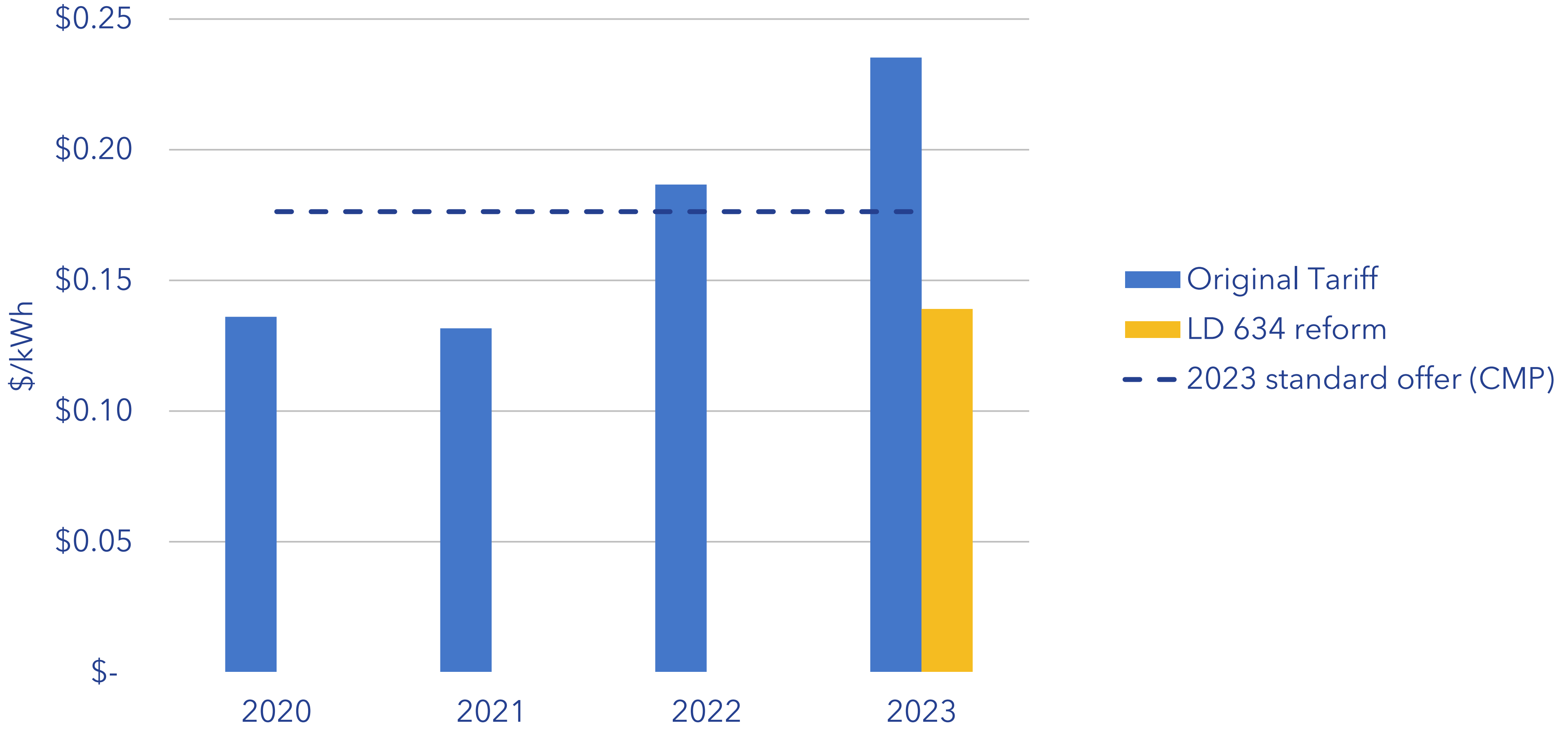
Estimated based on publicly-available data, December 2022



GOVERNOR'S Energy Office

LD 634 reduces the C&I tariff by 41% in 2023

Average C&I tariff by year as established by the Maine PUC



GOVERNOR'S
Energy Office

2/14/2023

Interconnection status

- Interconnection for distributed generation resources is governed by Chapter 324 of the Maine Public Utilities Commission rules. Level 4 projects – typically those between 2 and 5 megawatts, or smaller projects in areas with substantial pre-existing DG – are placed in publicly-accessible interconnection queues maintained by the utility.
- A distributed generator does not need to be enrolled in net energy billing to obtain a position in an interconnection queue.
- Not all projects enrolled in net energy billing are listed in Level 4 interconnection queues.
- Chapter 324 establishes timelines and requirements for various studies to be completed by the T&D utility, at the interconnecting facility's expense, that assess the potential impact of the generator on the existing distribution system and determine any necessary upgrades to accommodate the interconnection.
- Under the rule, any necessary upgrades are funded by the interconnecting customer.

GOVERNOR'S
Energy Office

Interconnection status

- In addition to Chapter 324, ISO-New England requires T&D utilities to conduct additional studies of distributed generators that may, either individually or when aggregated as "clusters," produce a significant adverse impact on the transmission system.
- 308 projects totaling 1,176 megawatts have had "cluster studies" completed or were not subject to the cluster study requirement.
- An additional 172 projects totaling 516 megawatts are involved in cluster studies either underway or slated to commence.
- A more detailed list by utility and status is available in the appendix.

GOVERNOR'S
Energy Office

Lessons learned

The Stakeholder Group periodically discussed various implications of the existing distributed generation programs, particularly net energy billing.

This discussion was largely focused on the Stakeholder Group's directive under LD 936 to inform the design and implementation of the successor program proposed in this report.

There are a wide variety of viewpoints among the Stakeholder Group on Maine's existing solar programs and the full impacts of modifications made to them. The following points are consolidated from the extensive discussions of the Stakeholder Group and are not intended to represent the consensus of the group, nor the entirety of the perspective of any member.

- Net energy billing has stimulated substantial solar development, increasing the volume of new renewable energy in Maine.
- Deploying distributed generation can deliver significant benefits, which may accrue to ratepayers, program participants, or others depending on program design. Some benefits may be achievable through other avenues, and some are unique to distributed generation.
- Shared net energy billing has enabled the participation of a broad range of residential, municipal, commercial, and industrial customers in solar development.
- Linking C&I tariff net energy billing project compensation to retail rates initially drove volatility and higher costs, although the previously discussed reform is likely to have addressed a significant portion of this issue.
- The absence of clear objectives and opportunities for flexibility, through mechanisms such as program caps, and responsibility for program outcomes have contributed to a lack of clarity about the initial programs among some stakeholders and limits the opportunity for potential program modifications or improvements.
- Experience with the existing net energy billing programs has stimulated a range of feedback from many stakeholders, which should be considered in the development and implementation of any successor program.

Distributed Generation Stakeholder Group

GOVERNOR'S
Energy Office

Distributed Generation Stakeholder Group membership

Members of the DGSG were appointed as specified in LD 936.

- Dan Burgess, Governor's Energy Office
- Philip Bartlett, Public Utilities Commission
- William Harwood, Office of the Public Advocate
- Anthony Buxton, Preti Flaherty Beliveau & Pachios on behalf of Industrial Energy Consumers Group
- Bob Cleaves, Dirigo Solar
- Peter Cohen/Sue Clary, Central Maine Power
- Neal Goldberg, Maine Municipal Association
- Mike Judge, Coalition for Community Solar Access
- Arielle Silver Karsh/David Norman, Versant Power
- Sharon Klein, University of Maine School of Economics
- Fortunat Mueller, ReVision Energy
- Jeremy Payne, Maine Renewable Energy Association
- Jessica Robertson, New Leaf Energy
- Phelps Turner, Conservation Law Foundation
- Amy Winston/Jesse McKinnell, Coastal Enterprises, Inc.

GOVERNOR'S
Energy Office

Stakeholder Group process

P.L. 2021 ch. 390 (LD 936)

- Convene stakeholder group
- Design DG successor program accounting for policy objectives

Interim report

- DG has a role in state policy goals
- Successor program will optimize net benefits and ratepayer costs
  - Benefits include avoided costs
- Work in 2022 to develop successor program that achieves these objectives

Technical analysis

- For multiple possible DG program designs:
  - Quantify benefits of DG - including exclusive to DG
  - Quantify costs of DG
  - Quantify rate impacts (positive and negative) of DG

Issue-focused work sessions

- Obtain broader input on specific policy aspects including land use and equity and access
- Incorporate input into successor program design

Final report

- Propose successor program design that meets agreed-upon criteria
- Incorporate public feedback received through straw proposal comments

Technical analysis

- GEO retained expert contractors Synapse Energy Economics, Inc. (Synapse) and Sustainable Energy Advantage, LLC (SEA) to provide technical expertise in support of the Stakeholder Group's work. Synapse and SEA were contracted to:
  - support the Stakeholder Group in formulating a benefit-cost analysis (BCA) to be used in determining the net benefits of distributed generation programs;
  - quantify and compare various distributed generation program options in terms of net benefits (using the BCA) and rate, bill, and participant impacts.
- The Synapse team participated in seven meetings of the Stakeholder Group between August and December 2022, during which they presented proposed methods, data sources, and draft results, obtaining and incorporating input from the Stakeholder Group at multiple stages.
- A complete summary of this technical work is included with the Final Report as Appendix A.

GOVERNOR'S
Energy Office

Public input

All meetings of the Distributed Generation Stakeholder Group were noticed publicly and open to attendance by the public. All meetings in 2022 were hybrid, with attendance options both in person and by Zoom. All meetings included a public comment period.

In addition, the Distributed Generation Stakeholder Group hosted two issue-focused work sessions to obtain additional input on specific areas.

The Distributed Generation Stakeholder Group published a draft of the successor program proposed in this report for public comment.

A total of 27 commenters submitted written feedback, including nine members of the Distributed Generation Stakeholder Group. The Stakeholder Group reviewed these comments and subsequently incorporated multiple modifications to the successor program proposed in this report suggested by commenters.

GOVERNOR'S
Energy Office

Issue-focused work sessions

In addition to the nine Stakeholder Group meetings, two issue-focused work sessions were hosted by the GEO to obtain broader input from interested parties and subject matter experts. Public input obtained at both sessions is summarized below.

Equity and access

- Broad support for a streamlined and accessible program with clear and tangible benefits
- Emphasis on consumer protection
- Program implementation should align with other state climate and efficiency programs
- Broad support for a program that allows DG to be utilized to reduce energy burdens for LMI customers
- Maximize the benefits of the IRA
- Expand the definition of benefits
- Ensure program benefits accrue to all, whether or not they participate

Land use

- Support for encouraging development in priority areas such as brownfields, while recognizing successful climate mitigation hinges on cost effective renewable deployment
- Improved access to data
- Program design should align with existing state programs and resources
- Maximize the benefits of the IRA
- Need for additional planning capacity at the municipal and regional level
- Desire for standardized regulatory and financial guidance
- Ensure program delivers benefits to ratepayers and communities
- Program design should encourage the pairing of battery storage with DG

The Inflation Reduction Act of 2022

- In August 2022, Congress passed the Inflation Reduction Act (IRA), legislation that directs billions of dollars in spending to climate change related programs aimed at accelerating the deployment of clean energy technologies, reducing emissions, lowering energy prices, and building the resiliency of our energy system.
- This legislation created substantial new opportunities to support and lower the cost of renewable energy projects that often result in incremental costs, such as projects on brownfield sites or projects serving LMI communities.
- Pending final guidance from the U.S. Department of the Treasury, bonus federal Investment Tax Credits (ITC) and a future Clean Energy Incentive Credit (CEIC) will be available to qualifying clean energy projects sited in "energy communities" or serving low income or disadvantaged communities as defined by the law.
- Additionally, the IRA allows all qualified projects 5 MW or less to include certain interconnection costs in their total costs eligible for the ITC or CEIC.
- The Stakeholder Group agreed that where possible, the successor program should align program design with IRA criteria to maximize cost recovery and minimize program costs while also encouraging resource diversity.
- At the time of this report, components of the IRA implementation including guidance pertaining to new ITC, PTC and CEIC eligibility are still in process by a variety of federal government agencies.

Distributed Generation Stakeholder Group Final Report

GOVERNOR'S
Energy Office

Successor program analysis

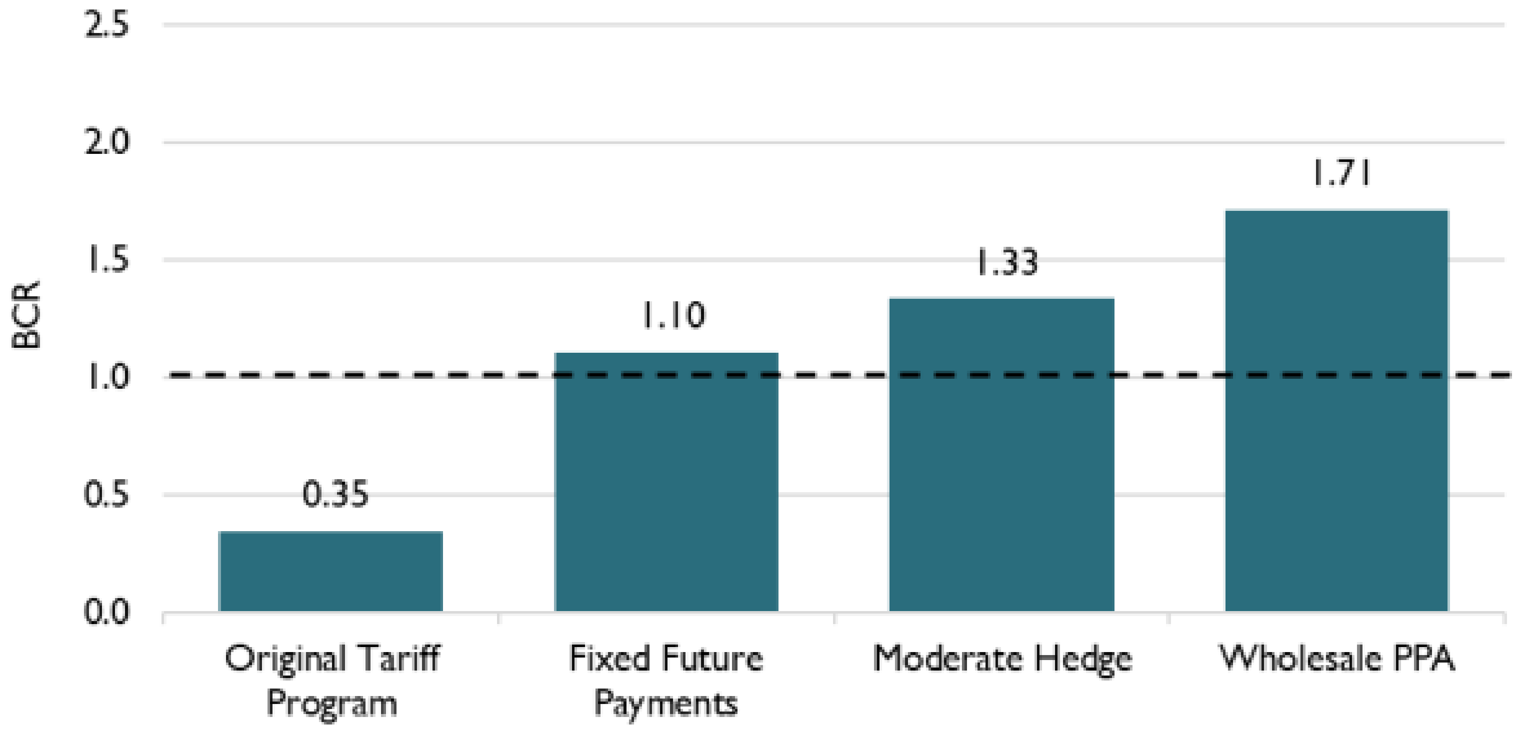
The Stakeholder Group considered three different successor program options. Each option was evaluated using benefit-cost analysis and rate impact analysis. The purposes of these two analyses are summarized below.

Key Considerations	Cost-Effectiveness Analysis (Benefit-Cost Analysis)	Rate Impact Analysis
Answers the question:	*Which utility DER investments are expected to have benefits that exceed costs?* Cost-effectiveness indicates the extent to which different utility investments will reduce utility costs and achieve other policy goals, regardless of how the benefits and costs are distributed across different customers.	*How much will utility DER investments impact rates for one group of customers compared to another?*
Results of the analysis are expressed as:	Present value of revenue requirements, benefit-cost ratios, and net benefits. These metrics are important for regulators and other stakeholders to understand cost-effectiveness, but do not provide any information relevant to rate impacts.	Long-term impacts on rates (in ¢/kWh or percent changes to rates) or in terms of long-term bill impacts (in $ per month or percent changes to bills). These metrics are important for regulators and other stakeholders to understand rate impacts but do little to inform benefit-cost analyses.

GOVERNOR'S
Energy Office

Successor program analysis: preliminary program options

Using a benefit-cost testing approach developed with input from the Stakeholder Group, Synapse evaluated the overall cost-effectiveness of each potential successor program option. A benefit-cost ratio (BCR) greater than 1 indicates benefits outweigh costs, while a BCR less than 1 indicates costs exceed benefits. The Original Tariff Program (the C&I tariff program prior to the modification adopted in LD 634) was also modeled as a comparison.



GOVERNOR'S
Energy Office

Stakeholder Group
Proposed Successor Program

GOVERNOR'S
Energy Office

Successor program priorities

As directed by LD 936, the final report calculates a successor program target based on 7% of total electric load, net of any NEB capacity above 750 megawatts.

- The projected successor program target would be approximately 560 megawatts over the period 2024-2028, or approximately 112 megawatts per year.

Consistent with the directives of LD 936, the successor program is designed to:

- Build low-cost renewable energy to save Maine people money and continue growing Maine's clean energy economy;
- Ensure opportunities for competitive cost-effective distributed renewable energy and storage are captured to benefit Maine ratepayers;
- Maximize the opportunity to direct federal financial incentives to continue deploying cost-effective community-scale renewable energy that delivers tangible benefits to Maine communities;
- Deploy the incremental benefits to Maine community-scale renewable energy to reduce energy burdens faced by low- and moderate-income households; and
- Align community-scale renewable energy deployment with siting incentives funded by the federal government, directing future development to previously disturbed sites including brownfields to minimize impacts.

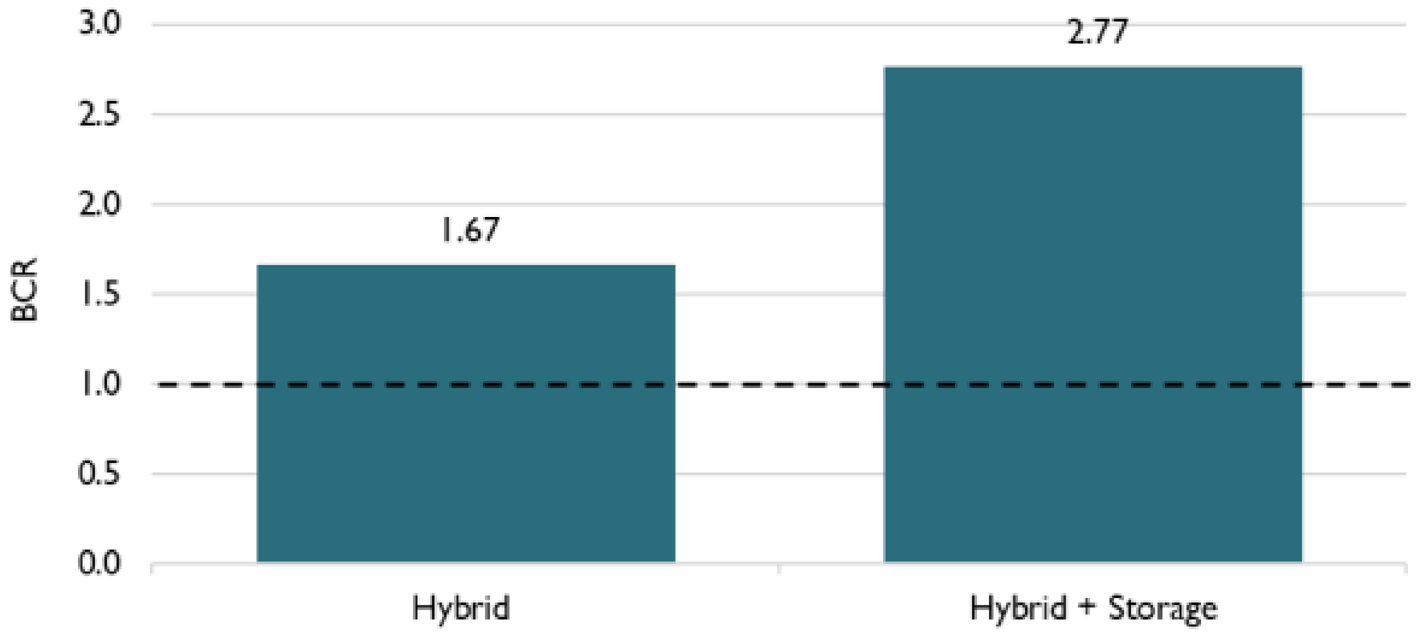
GOVERNOR'S
Energy Office

Successor program overview

Program Component	Capacity Allocation	Eligible Projects	Project Selection	Siting	Offtake
Competitive Procurement	Not less than 70% of annual program target.	Distributed generation paired with storage.	Projects submit sealed bids to sell energy and RECs at a fixed price, or fixed price with an annual escalator. Projects are selected beginning with the lowest qualified bids until the total capacity of all selected projects equals at least 70% of the annual program target. Projects are awarded a power purchase agreement no greater than 20 years with the applicable T&D utility at their bid price.	Projects sited on previously disturbed or degraded lands, including brownfields, capped landfills, and gravel pits will be evaluated at 85% of their bid price.	Attributes purchased from all projects would be monetized by the PPA counterparty to maximize value to ratepayers. A portion of the resulting revenue would be allocated to provide a financial benefit to low- and moderate-income ratepayers that complies with forthcoming guidance to obtain an incremental 20% ITC.
Community Access	Up to 30% of annual program target.	Distributed generation paired with storage owned by a municipality, tribe, school or state entity.	Eligible projects may enroll on a first-come, first-served basis with compensation set at the capacity-weighted 50th percentile of selected bids in the competitive procurement.PPA terms are otherwise equivalent to those in the competitive procurement.	Projects sited on previously disturbed or degraded lands, including brownfields, capped landfills, and gravel pits will receive an equivalent price adjustment.	Attributes purchased from all projects would be monetized by the PPA counterparty to maximize value to ratepayers. Revenue realized by the project owner would be available to offset energy bills or provide other public benefit as determined by the project owner.

Successor program analysis: final program options

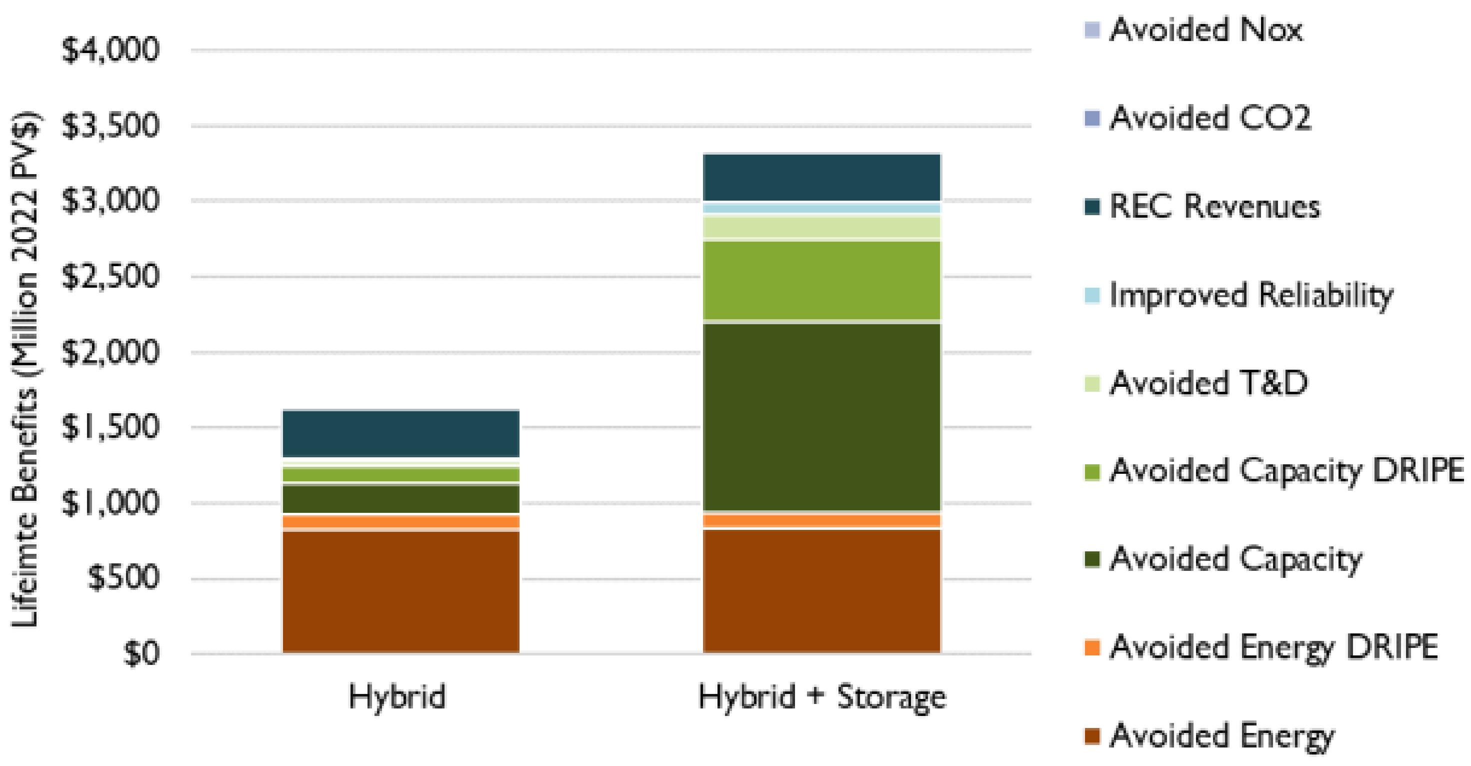
Using the same benefit-cost testing approach, Synapse evaluated the overall cost-effectiveness of two final successor program options. **The "Hybrid + Storage" option illustrated below is the proposed successor program.** The benefit-cost ratio of 2.77 indicates each $1 of cost will yield an estimated $2.77 of benefits.



GOVERNOR'S
Energy Office

Estimated total lifetime benefits for the successor program

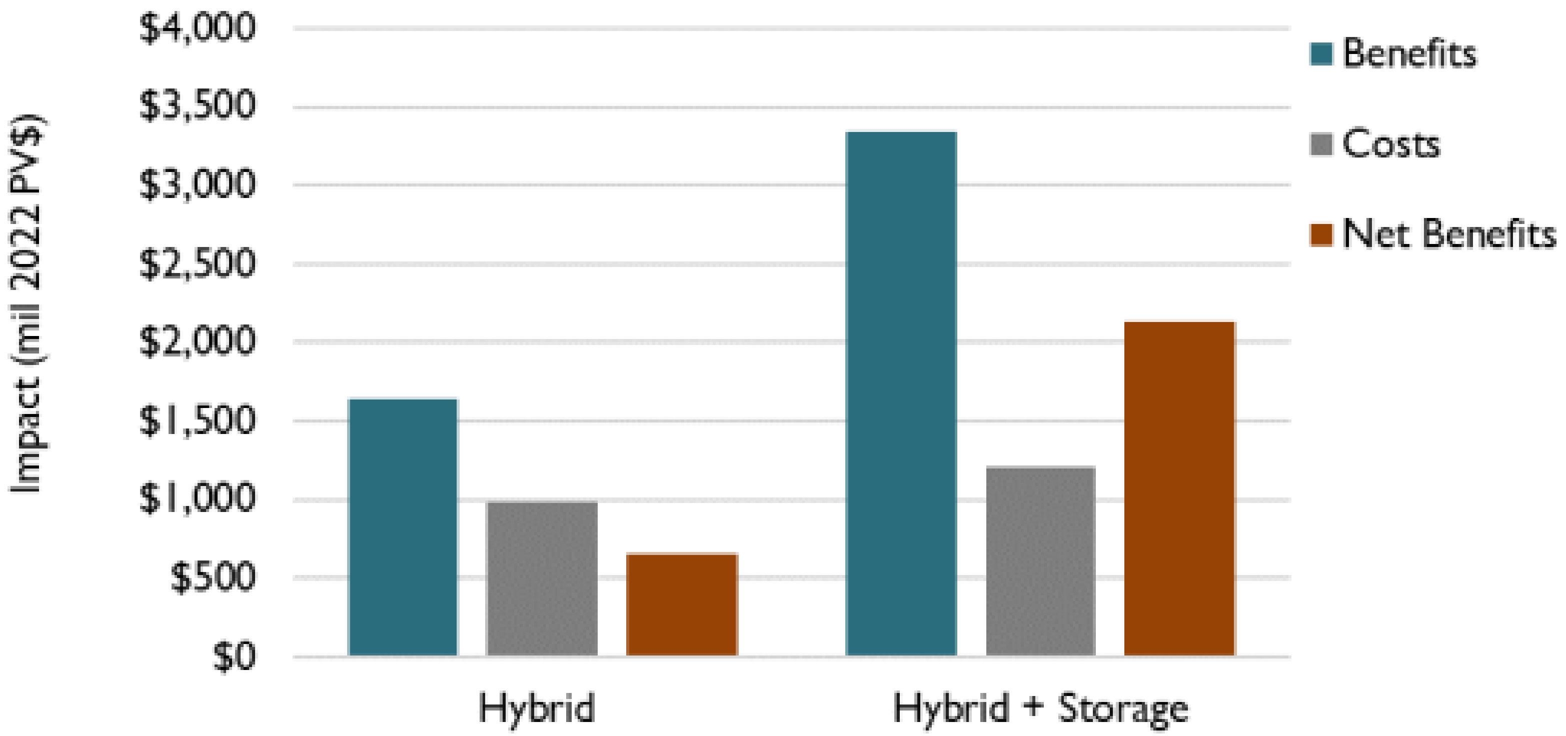
The Synapse analysis found the successor program ("Hybrid + Storage" below) would result in a range of benefits, with substantial additional avoided capacity and avoided T&D benefits associated with the inclusion of energy storage.



GOVERNOR'S
Energy Office

Successor program benefit-cost results

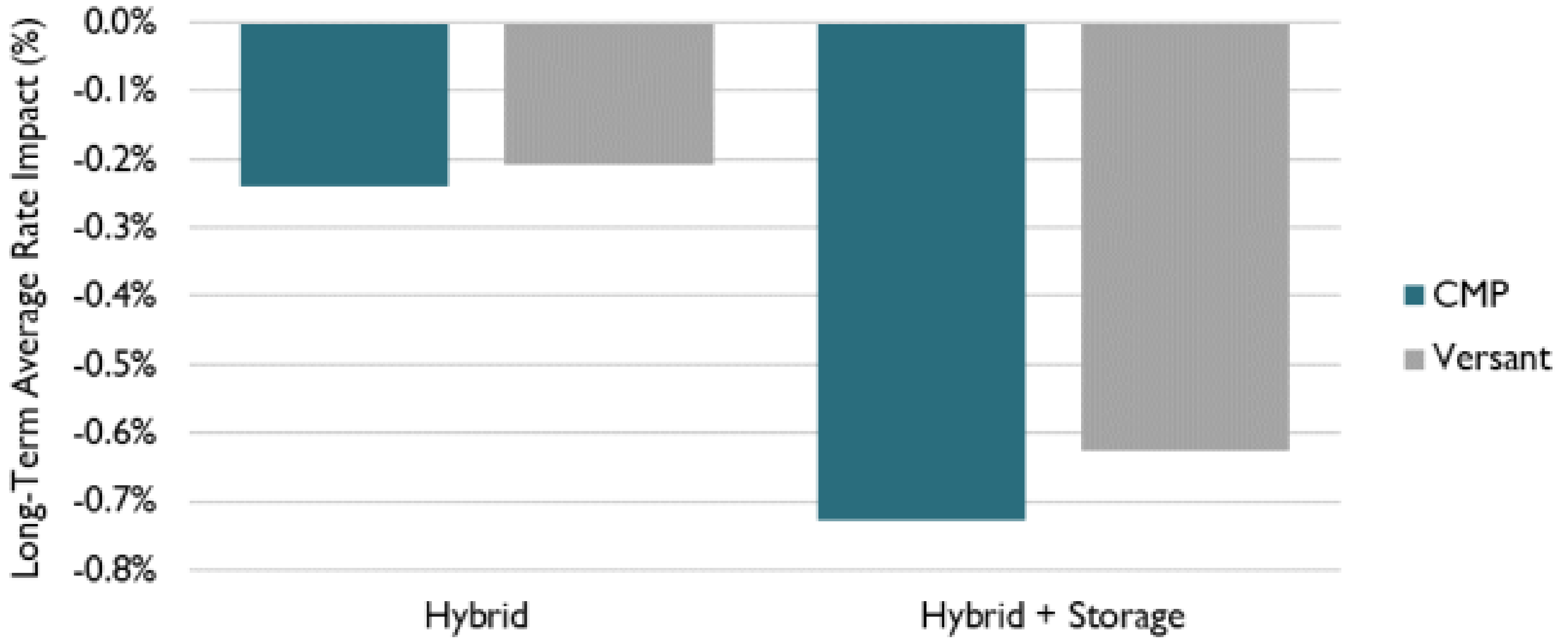
The Synapse analysis found the successor program ("Hybrid + Storage" below) would result in approximately $2.1 billion in net benefits over the life of the program.



GOVERNOR'S
Energy Office

Successor program rate impact analysis results

The Synapse analysis found the successor program ("Hybrid + Storage" below) would result in a long-term average rate decrease of approximately 0.65%.



GOVERNOR'S Energy Office

Thank you

The Final Report of the Distributed Generation Stakeholder Group is available here: https://www.maine.gov/energy/sites/maine.gov.energy/files/inline-files/Final%20Report%20of%20the%20DG%20Stakeholder%20Group_with%20appendix.pdf

All meeting materials are available here: https://www.maine.gov/energy/studies-reports-working-groups/current-studies-working-groups/dg-stakeholder-group

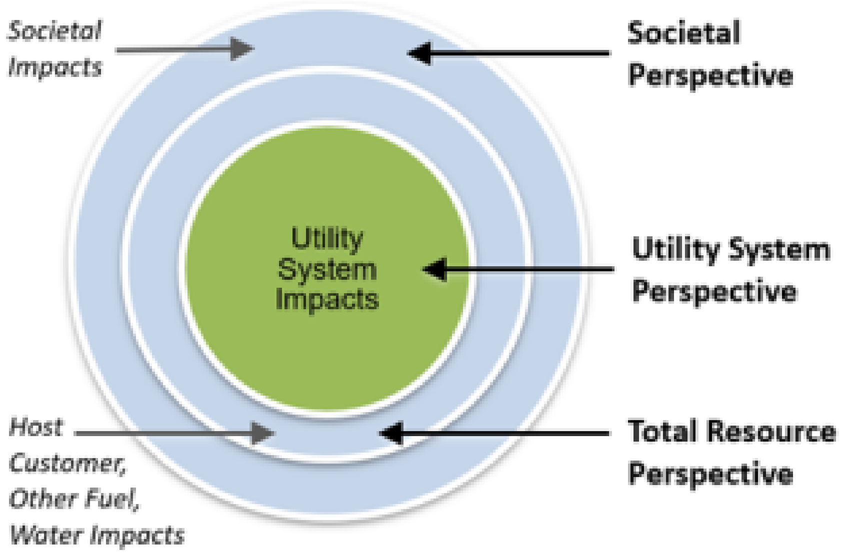
GOVERNOR'S
Energy Office

Appendix

GOVERNOR'S
Energy Office

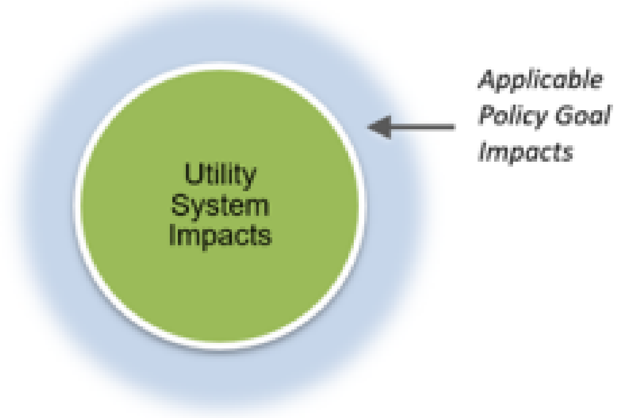
Benefit-cost analysis perspectives

Traditional Perspectives



- Three perspectives define the scope of impacts to include in the most common traditional cost-effectiveness tests.

Regulatory Perspective



- Perspective of public utility commissions, legislators, muni/coop boards, public power authorities, and other relevant decision-makers.
- Accounts for utility system plus impacts relevant to a jurisdiction's applicable policy goals (which may or may not include host customer impacts).
- Can align with one of the traditional test perspectives, but not necessarily.

GOVERNOR'S
Energy Office

Benefits and costs quantified in the benefit-cost analysis

Type of Impact	Impact	Benefit or Cost?	Method
Generation	Avoided Energy Cost	Benefit	AESC 2021
	Avoided Capacity Cost	Benefit	AESC 2021
	Avoided Environmental Compliance	Benefit	AESC 2021
	Avoided RPS Compliance Costs	Benefit	AESC 2021
	Market Price Effects ("DRIPE")	Benefit	AESC 2021
Transmission	Avoided PTF Costs	Benefit	Efficiency Maine assumptions
	Avoided Non-PTF Costs	Benefit	Efficiency Maine assumptions – only applied to BTM
Distribution	Avoided Distribution Costs	Benefit	Efficiency Maine assumptions – only applied to BTM
General	Renewable Energy Credit Prices	Benefit	Sustainable Energy Advantage (SEA) "CREST" Model
	DG Costs	Cost	Based on program design and total cost from SEA "CREST" Model
	Program Administration Costs	Cost	Input from utilities ($600,000 for first 5 years, $300,000 for remaining generation period)
Societal	Avoided CO_2	Benefit	AESC 2021
	Avoided NOx	Benefit	AESC 2021

GOVERNOR'S Energy Office

Comparison of preliminary successor program options

Program Type	Original NEB Tariff Program[14] (P.L. 2019, Ch. 478)	Successor Option #1: Fixed Future Payments	Successor Option #2: Moderate Hedge	Successor Option #3: Wholesale PPA
Eligible Project Size Range	Less than 5 MW_{AC}	1-5 MW_{AC}		
Eligible Offtakers/Participants	Commercial and institutional customers	"Identified residential, commercial and institutional customers" (per P.L. 2021 Ch. 390)		N/A (No specific offtakers)
Prioritization of Resources Meeting Policy Objectives	None (Eligible projects are not differentiated)	Successor options modeled utilizing a specific set of eligible project resource blocks (described in Section 2)		
Attributes Titled to Electric Distribution Company (EDC)	Energy*	Energy*	Energy and RECs*	
Price-Setting Mechanism	EDC Billing Determinants (SOS + 75% of T&D rate)	Competitive procurement (can be either (a) a one-time procurement ahead of a standard offer program or (b) annual procurements)		
Compensation Term (Years)	20 years			
Compensation Approach	Variable	Fixed (can be flat rate in nominal terms, or escalating at known rate)		
Benefits Provided to Offtakers	Bill credits			None (No specific offtakers)
Cost Shifting Potential	Yes (Bill credits result in lost EDC revenue)			No (Program costs recovered from all customers)
Bill Credit Creation Interval	Monthly			N/A (No specific offtakers)
Type of Bill Credit Utilized	Monetary (at NEB/other contract rate)	Monetary (at unspecified other rate)		N/A (No specific offtakers)
Bill Credit "Cash Out" Term	12 months			N/A (No specific offtakers)

**The gains from the resale of these attributes are assumed to accrue to the ratepayers of the EDCs purchasing the attributes produced by eligible projects*

GOVERNOR'S
Energy Office

Definitions of benefits included in cost-benefit analysis

Impact	Definition
Utility system benefits	
Avoided energy costs	Avoided fuel and operating costs associated with producing or procuring energy.
Avoided capacity costs	Avoided cost of building or procuring capacity to meet the peak demand of the generation system.
Avoided environmental compliance costs	The avoided cost of complying with environmental requirements for air emissions or other environmental factors.
Avoided RPS compliance costs	The avoided cost of complying with a renewable portfolio standard (RPS) or similar policy such as clean energy standards (CES) or clean peak standards (CPS).
Market price effects/demand reduction induced price effects (DRIPE)	The price reduction effect in competitive wholesale electricity markets price impacts from reducing system demand or increasing low-cost supply.
Avoided transmission costs	The avoided (or increased) cost of upgrading the transmission system to safely and reliably transfer electricity between regions. This avoided cost applies if the DERs passively defers investments by reducing load during transmission peak periods or if the DER is strategically placed to avoid transmission investments and is operated for that purpose. Alternatively, DERs can increase costs on the transmission system by adding new load.
Avoided distribution costs	The avoided (or increased) cost of upgrading the distribution system (including substations) to transfer electricity in local electric grids. If peak demand exceeds capacity of a circuit, it will require investments to increase distribution capacity to a level that preserves safety and reliability. Similar to transmission avoided costs, DERs can passively or actively reduce strain on the distribution system. Alternatively, DERs can increase costs by adding new load.
REC revenue	Revenue from selling renewable energy certificates (RECs). RECs are credits designed to represent the clean energy attributes of renewable energy generation.
Societal benefits	
Greenhouse gas (GHG) emissions impacts	The benefit associated with reducing GHG emissions because of DERs. GHGs are created during fossil fuel-based energy production, transmission, and distribution. DERs that produce clean energy can avoid GHG emissions from other sources. In the BCA, this impact represents the avoided societal cost of GHG emissions.

GOVERNOR'S Energy Office

Technical analysis

The Synapse team provided multiple takeaways based on their analysis:

1. Successor DG programs can be designed to provide significant net benefits to all utility customers on average.
2. Successor DG programs can be designed to provide long-term average reductions in rates – thereby eliminating any cost-shifting among customers.
3. Successor DG Programs can pay developers significantly less than retail rates and still encourage deployment of DG resources.
4. Successor DG programs can use competitive bidding processes and/or administratively set prices based on contemporaneous price information that incorporate future learning curves to drive down costs of renewable energy procurement.
5. Successor DG programs that provide developers with fixed prices over time will significantly reduce the cost of these program relative to those that provide increasing prices over time.
6. Larger capacity solar projects are less expensive per unit than smaller capacity projects.
7. There are tradeoffs between policy goals and costs of successor program implementation, but provisions of the Inflation Reduction Act help to balance the scales in some instances by encouraging LMI participation and siting of clean energy on brownfield sites and certain other federally incentivized locations.
8. There are tradeoffs between the number of direct beneficiaries (offtakers) in a program and the financial impacts faced by non-participants. The more program participants, the higher the rate and bill impacts for non-participants, and vice-versa.
9. If given proper dispatch incentives, battery storage can be deployed in conjunction with solar PV at incremental costs that are significantly less than incremental benefits.

Current interconnection queue status

- In addition to Chapter 324, the ISO-New England Tariff establishes obligations of market participants and other customers, which include requirements related to ensuring the reliability of the transmission system. Under these requirements, T&D utilities conduct additional studies of distributed generators that may, either individually or when aggregated as "clusters," produce a significant adverse impact on the transmission system.
- So-called "cluster studies" involve additional review, funded by the interconnecting customers, and are subject to review and approval by the ISO-New England Reliability Committee.
- As of this report, Central Maine Power reported that four cluster studies totaling 72 active projects and 256 megawatts had been completed, and fifteen cluster studies totaling 118 active projects 418 megawatts were underway or slated to commence, with most currently scheduled to be completed in spring or summer 2023. Central Maine Power further reported that 123 active projects totaling 539 MW received the requisite approval from ISO-New England prior to the triggering of the cluster study process.
- Also as of this report, Versant Power reported that, for the Bangor Hydro District, three cluster studies totaling 76 active projects and approximately 268 MW had been completed, and one cluster study containing 22 projects totaling approximately 44 MW was expected to be completed in summer 2023. For the Maine Public District, Versant Power reported one cluster study with 37 projects totaling 113 MW had been completed, and one cluster study with 32 projects totaling approximately 54 MW was expected to be completed in summer 2023.