Climate-Forward Efficiency Performance Incentives: Rewarding What Matters

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ABSTRACT

In the last three years, states across the U.S have stepped up to set greenhouse gas reduction commitments and policies, with some also pledging to center social equity and racial justice in greenhouse gas (GHG) reduction strategies. As a result, leading states and utilities are recognizing the need for more rapid utility innovation and realignment of investments, operational choices, and customer offerings to deliver on a safe, reliable, and affordable electricity system that also meets equity and decarbonization pledges.

Performance incentive mechanisms (PIMs) are one regulatory tool that aims to align utility investments and actions with desired policy outcomes. To date, energy efficiency performance incentives have relied on four different structures: net benefits incentives; energy savings incentives, measured in kWh or therms; spending through a rate-of-return incentive; and multifactor incentives (e.g., demand or sector savings). While these can be proxies for GHG reductions, leading policymakers are shifting PIMs to more directly align with decarbonization goals.

In this paper, based on primary research, we characterize the national landscape of existing utility PIMs that explicitly or implicitly reward GHG reductions from energy efficiency, demand flexibility, and building and vehicle electrification – "climate-forward efficiency PIMs." For each state included in this report, we include information on PIM design, and where available, the level of incentive available to be earned and the extent to which utilities delivered GHG reductions. We discuss early lessons learned and potential application to other states considering GHG-aligned PIMs.

Introduction

In many states, the energy efficiency (EE) programs offered by electric and natural gas utilities, energy efficiency utilities, and third-party administrators have long been implicitly motivated by policies to reduce greenhouse gas emissions. These programs have made important contributions to decarbonization – carbon dioxide (CO_2) emissions from the power sector declined 28% from 2005 to 2018, with 50% of this decrease coming from demand reduction and the remainder from fuel switching to natural gas and new zero-carbon generating capacity additions (EIA 2018). However, these efforts are insufficient. The International Energy Agency (IEA) projects that to meet "net zero by 2050" targets, we need to increase global energy saving efforts three-fold, to a rate of 4% per year energy savings through 2030 (IEA 2021). In response to this need and the increasing climate ambitions of states, cities, investors, and companies, many EE program administrators are now facing pressure to deliver on the potential of customer efficiency to reduce emissions.

Policymakers are recognizing the need for more rapid utility innovation to deliver on a safe, reliable, and affordable system that also meets equity and decarbonization commitments. The result has been a recent wave of state legislation and regulatory agency action to better align utility investment and activities with desired policy outcomes, including policies to institute performance-based regulation (PBR) and to revisit the metrics for energy efficiency programs to ensure they are promoting the lowest carbon options for customers. At least seven states have eliminated or changed fuel switching restrictions or otherwise redefined energy efficiency to include a broader range of "climate-forward efficiency" options, including efficient fuel switching, passive and active demand response, and non-energy GHG reduction resources, such as refrigerant savings and tree planting (Specian and Gold 2021).[1]

One barrier to utilities scaling the uptake of climate-forward efficiency is the traditional utility business model. Utilities generally depend on increasing capital investment and growth in sales of electricity or natural gas to drive shareholder returns (Kihm et al. 2015). This structure creates bias toward capital expenditures and increased sales and is a powerful disincentive to investment in climate-forward efficiency. This model undermines utility earnings opportunities and punishes them for managing demand to reduce overall greenhouse gas emissions and costs. Even for energy efficiency utilities which do not have the same business model, there can be value in aligning performance with desired outcomes such as greenhouse gas reductions, as maximizing energy savings alone may result in unintended consequences, such as investment in more efficient natural gas equipment that "locks in" fossil fuel consumption for the life of that equipment.

There are a range of solutions to encourage desired utility behavior, including energy savings mandates, cap and trade programs that fund utility energy efficiency or electrification programs, and changes to ratemaking such as revenue decoupling. This paper is focused on performance incentive mechanisms (PIMs), which tie a portion of utility earnings to the achievement of performance targets. PIMs have long been used in combination with revenue decoupling to encourage energy efficiency and were present in 32 states as of 2020 (Berg et al 2020). With the evolution towards a broader definition of climate-forward efficiency, PIMs are beginning to shift towards rewarding greenhouse gas reductions.

This report focuses on PIMs motivated by state GHG goals or utility climate commitments, including those that directly measure GHG reductions as well as those that use proxy metrics such as fuel-neutral energy savings or metrics for specific technologies or programs, such as adoption of electric vehicles. Given that this is a new area of policy for many states, we also highlight where GHG emissions are tracked but where there is no associated earnings opportunity for utilities. Tracking metrics or scorecards (when a metric has an associated target for performance) are indicators measured and reported by a utility or program administrator, but where no reward or penalty for performance is levied.

[1] Climate-forward efficiency efforts are those that i) treat EE as an intentional driver of GHG reduction; ii) scale to meet the magnitude of the decarbonization goals in policy and utility corporate commitments; iii) leverage EE as a tool to mitigate and adapt to the impacts of climate change on customers by advancing equity, enhancing resilience, and improving health outcomes; iv) prioritize EE investments based on their time, seasonal, and geographic impacts, and v) enable prioritization of investments across fuels, systems, and sectors, particularly from electrification

Methodology

We started with an internal RMI resource which listed and described a variety of performance mechanisms (PIMs, scorecards, and metrics) in emergent policy areas, as well as relevant ACEEE research reports (Berg et al 2020; Specian and Gold 2021). These resources served as a starting point to identify known gaps in our current knowledge of PIMs and informed prioritization of states to research. Next, we pulled publicly-available documents such as utility commission orders and utility filings to collect data and information on relevant PIMs and mechanisms. Finally, we verified our findings with RMI and ACEEE colleagues, and individuals in specific states with expertise on relevant PIMs and proceedings. Finally, the April 2022 survey for the ACEEE State Energy Efficiency Scorecard included a question about GHG PIMs that was sent to all state public utilities commissions, which we used to validate our findings.[2]

Landscape of Climate-Forward Efficiency Mechanisms

We found varying degrees of climate-forward efficiency in the identified PIMs and tracking metrics. While a few PIMs were explicitly GHG focused – meaning the corresponding metrics measure avoided and/or reduced GHGs, in CO_2 and CO_2e – others were clearly linked to state emission reduction policies but did not explicitly measure avoided GHG emissions. This latter category of mechanisms, which we term Policy Intent PIMs, used metrics such as fuel-neutral energy savings, demand or capacity savings, or metrics associated with transportation electrification. Below, we describe existing climate-forward efficiency PIMs in the U.S., beginning with explicit GHG incentives, and moving to those that display policy intent for decarbonization but are measured in another way.

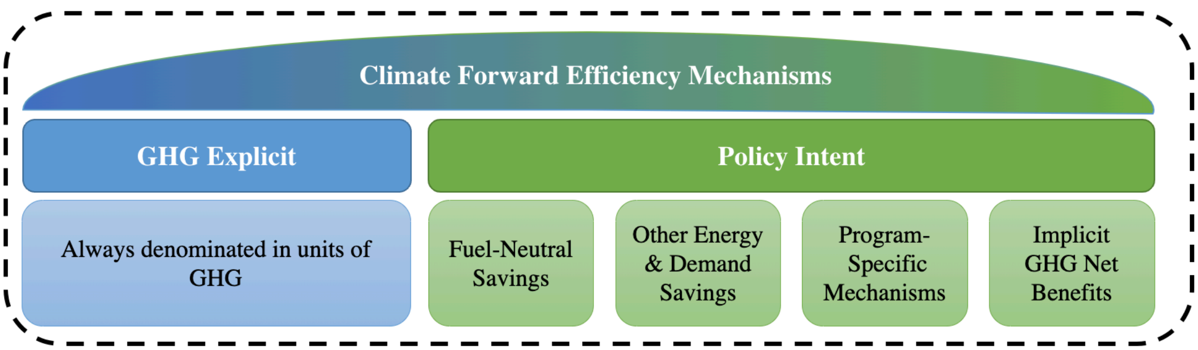

Figure 1. Typology of climate-forward efficiency mechanisms

Explicit GHG PIMs for Climate-Forward Efficiency

Examples of PIMs that explicitly measure GHG reductions associated with climate-forward efficiency are limited. We found three examples, from New York, Vermont, and Washington D.C.

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[2] The ACEEE State Scorecard survey and data collection effort was underway at the time of publication. Twenty-six states had responded to the survey, of which 8 had answered this question.

In its 2018-2020 rate case, Consolidated Edison (ConEd) in New York included an earnings adjustment mechanism (EAM)[3] measuring annualized avoided metric tons of carbon dioxide equivalent (MTCO2e). Eligible GHG reductions include activities selected for their emissions reduction potential, including, for example, rooftop and community solar PV, light-duty EVs, electric buses, air- and ground-source heat pumps, and battery and ice energy storage. The group of intervening parties that signed onto the proposal noted that while "energy efficiency has significant beneficial emissions impacts," it was not selected as one of the activities because it is already supported through other EAMs (EAM Collaborative 2018).[4] This metric was established as a scorecard for the 2018 year, and then an EAM in 2019. For 2019, ConEd reported GHG reductions larger than the maximum target, resulting in the maximum available reward (ConEdison 2020; see Table 1 below for details).

Beginning in March 2018 for Niagara Mohawk (National Grid), orders in rate cases for all six large load-serving entities (LSEs) in New York shifted to a slightly different GHG PIM, focused on reductions from beneficial electrification technologies. This beneficial electrification EAM is defined as total lifetime CO_2 or CO_2e emissions reductions, measured on a marginal emissions basis, provided by annual incremental beneficial electrification technologies (both vehicles and buildings) in a given year.

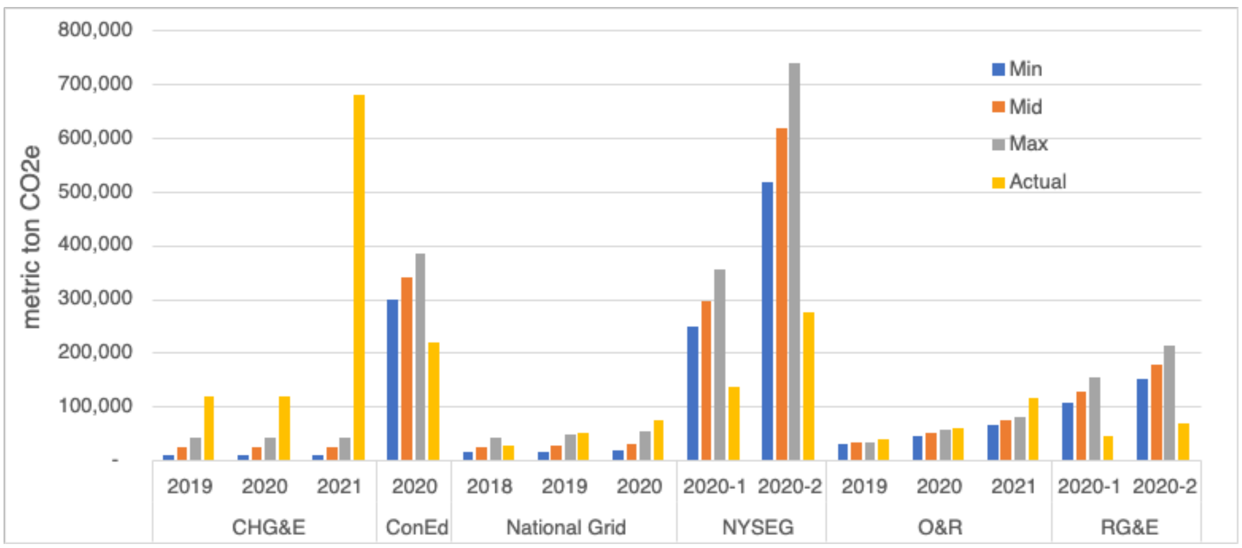

Figure 2. Beneficial electrification PIM performance for New York LSEs, 2019-2021. *S*ources: (National Grid 2019, 2020, 2021; O&R 2020, 2021; CHG&E 2020, 2021, 2022; NYSEG and RG&E 2021, 2022; ConEdison 2022. ** NYSEG and RG&E values represent progress through the third quarter of the 2021-2022 rate year.

Figure 2 shows the utilities' performance against this EAM. O&R and CHG&E earned the maximum available incentives in each year a beneficial electrification EAM was available, as did National Grid in 2019 and 2020; in its first year with the incentive, 2018, it received the midpoint incentive level. NYSEG and RG&E did not meet their minimum targets in their first

[3] EAM is the term for PIMs in New York State.

[4] An earnings adjustment mechanism, or "EAM", is a synonymous term for PIMs and is used primarily in New York.

rate year (2020-2021), and quarterly reports for the second rate year indicated that they will not meet minimum targets. ConEd also did not meet its minimum 2020 target; results are not yet available for this EAM in 2021 (ConEd 2022a,b).

Vermont's energy efficiency utility, Efficiency Vermont (administered by VEIC), earns performance incentives on a series of seventeen quantitative performance indicators (QPIs) for their electric portfolio and seven for their thermal-energy-and-process-fuels (or TEPF, largely oil and propane) portfolio. Beginning in 2021-2023, QPIs include two GHG reduction metrics; one is based on electric energy and non-energy savings, and the other is based on TEPF energy and non-energy savings, both measured in metric tons of CO2e. Notably, non-energy savings includes reduced hydrofluorcarbon emissions due to refrigerant management programs. The performance award is calculated as a percentage of the approved budget (3.6% for electric and 3.8% for thermal energy and process fuels), with the opportunity for Efficiency Vermont to earn a portion of that award following Commission verification of annual and three-year performance on the QPIs (Efficiency Vermont 2021a). Those results are not yet available for 2021 program year performance.

The most recently adopted example of an explicit GHG climate forward efficiency PIM comes from another energy efficiency utility, the District of Columbia Sustainable Energy Utility (DCSEU), which is also administered by VEIC. The five-year SEU contract, adopted in October 2021, includes a total performance incentive pool of $5 million based on achievement of six metrics (SEU 2021). GHG is one of these metrics, accounting for 20%, or up to $1 million, of the incentive. GHG is calculated by converting the annual modified gross source energy savings achieved for electricity (MWh), natural gas (therms), and other non-energy GHG savings, into $MTCO_2e$.[5] Targets and incentives are cumulative, so that any incentives not earned in a given year may still be earned in subsequent years if minimum benchmark performance targets for a given fiscal year are achieved. The contract includes a penalty for failure to achieve the minimum performance target, pro-rated based on achievement, and is capped at $1,000,000. Final results from this PIM will be available following an independent evaluation report after the end of the performance period in 2026, with interim results available after evaluation of the first contract year.

GHG Policy Intent PIMs

Fuel-Neutral Savings PIMs

Washington, DC and Vermont, both noted above for their explicit GHG PIMs, have also, maintained complementary PIMs based on fuel-neutral energy savings for several years. In contrast to fuel-specific electric and gas savings measurements–either kWh or therms–that that have historically characterized utility efficiency PIMs, a fuel-neutral approach creates an overarching portfolio goal that may not specify the resources from which utilities must derive energy savings. These PIMs are expressed as energy goals, typically measured in Btus, and can

[5] The DCSEU will calculate the avoided annual and cumulative GHG reductions based on marginal emission rates, and will estimate an annual weighted average marginal emissions rate based on savings from each of four seasonal costing periods (SEU 2021).

be a step towards aligning efficiency programs with state climate goals.[6] By measuring savings on a fuel-neutral basis, programs can prioritize investments in measures that save the most energy and emissions, including switching customers from fossil fuels to more efficient electrified end uses.

In addition to the DCSEU's explicit GHG PIM described above, its FY2022-26 contract for sustainable energy programs also includes cumulative annual fuel-neutral benchmarks to reduce the use of multiple fuels, including fuel oil, in Btu (SEU 2021).[7] This PIM, awarded for reducing energy consumption across all fuels, accounts for a larger portion of the five-year incentive (40%, capped at $2 million) than the GHG PIM described earlier. The PIM also includes a potential penalty for failure to achieve the 5-year minimum performance target, assessed for each million Btus (MMBtu) that SEU falls short of the target.

In addition to Efficiency Vermont's explicit GHG goals, it has thermal-energy-and-process-fuels (TEPF) performance targets, which encompass both natural gas and unregulated fuels like propane, fuel oil, and woody biomass. TEPF budgets and targets are determined by the PUC's Demand Resource Plan Proceeding, conducted every three years; however, TEPF funds are dependent on fluctuating proceeds from the Regional Greenhouse Gas Initiative (RGGI) quarterly auctions and the ISO-New England (NE) Forward Capacity Market (VT PUC 2020). In a 2020 report to the state legislature, the PUC found that current funding levels for unregulated-fuel efficiency needs are inadequate and recommended that lawmakers authorize new funding for the program (VT PUC 2020). The fuel-neutral TEPF savings target was set at 340,600 annual incremental net MMBtus for the 2021-2023 program cycle. Efficiency Vermont is eligible to receive a minimum award for achieving 75% of the target and a maximum award at 100% of the target (see Table 2). In the previous 2018-2020 program cycle, Efficiency Vermont achieved 102% of its TEPF target, and prior to that achieved 149% of its 2015-2017 target (Efficiency Vermont 2018, 2021b). This PIM is 60% of the total reward offered for Thermal & Mechanical Efficiency Savings QPIs.

Other Energy and Demand Savings PIMs

Beyond fuel-neutral savings, we found one other PIM motivated by state climate policy, measured in peak demand savings. Efficiency Vermont's 2021-2023 portfolio electric quantitative performance indicators include both a summer and a winter peak demand savings metric. Both are measured in kW reductions, with corresponding maximum and minimum rewards based on the level of achievement (see Table 2). The policy intent for the PIMs connects to the state authorizing statute for utility delivery of energy efficiency programs, which requires that the Vermont PUC places "particular emphasis" on four objectives when establishing the energy efficiency charge and its allocation on customer energy bills, one of which is "reducing the generation of greenhouse gases"(30 V.S.A. §209(d)(3)(B)). As described in a 2014 order, the Department of Public Service noted: "to the extent that Vermont's efficiency programs can impact peak loads more than average loads, this will result in additional emission reductions due

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[6] For more information regarding calculating MMBtu calculations of site and source savings see Molina et al (2020).
[7] DCSEU tracks natural gas savings in two ways: gross savings and modified gross savings. Gross savings include both cross-fuel and like-fuel interactive effects but exclude free-ridership and spillover. Modified gross savings exclude cross-fuel interactive effects and are used to assess progress towards performance benchmarks per DCSEU's contract.

to a decrease in the use of oil and other "peaking" units (which have relatively greater GHG emissions) that tend to run during peak load conditions" (VT PSB 2014). In this way, PIMs based on seasonal peak demand savings also offer an indirect incentive to target measures reducing energy consumption when it is most carbon intensive. However, not all peak demand reductions necessarily result in measurable carbon benefits, so such PIMs may be simpler to measure but less tied to GHG reduction outcomes.

Program-Specific PIMs

Another category of climate-forward PIMs includes those based on proxies for greenhouse gas reduction, energy savings, or demand reduction, typically in units associated with program delivery or market transformation. In these cases, the PIM is clearly linked to emissions reduction policies, but measures the performance of specific activities of energy efficiency program administrators and market actors rather than the associated outcomes.

In an example of a PIM indirectly advancing climate-forward goals, Con Edison has a PIM to reward reducing its energy efficiency unit cost in the form of a cross-commodity fuel-neutral EAM known as 'Share the Savings' (NYPSC 2020). The Share the Savings EAM incentivizes reductions in energy efficiency lifetime unit cost ($/lifetime MMBtu saved) to drive cost efficiency in support of the state's Climate Leadership and Community Protection Act (CLCPA) goal to reduce GHG emissions 85% by 2050; the EAM has also informed utility efforts to improve market forecasting and strengthen the savings pipeline (Con Edison 2021).[8] The Share the Savings EAM fulfilled Con Edison's conditional requirement to meet annual energy efficiency targets set in the January 2020 Order that implemented building decarbonization goals outlined in the state's "New Efficiency: New York" plan and codified in the CLCPA (NYS Assembly 2019). In 2020, Con Edison reduced its costs for lifetime savings by 35%, while at the same time achieving 120% of the savings target for the PIM. As a result, Con Edison earned $20 million reward under the Share the Savings EAM (NYPSC 2020a). In addition, a Deeper Energy Efficiency Lifetime Savings EAM encourages more complex, comprehensive, and deeper efficiency, like building envelope and heating system upgrades. The utility also exceeded the lifetime savings target by 1%, resulting in $4.2 million in earnings (Con Edison 2021).

Implicit GHG in Net Benefits PIMs

Another type of climate forward PIM is one that implicitly rewards utilities for achievement of efficiency-related climate benefits by incorporating the avoided cost of carbon within net benefits incentive calculations.

Recently-approved PIMs based on benefits achieved by Massachusetts utilities in the Mass Save 2022-2024 Triennial Plan offer one example. The incentive pool for this 3-year performance period has a four-component structure, including two components specifically focused on electrification and equity. The state's recent 2021 Climate Act reorients Mass Save

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[8] The Expected Average Useful Life (EUL) for the Share the Savings EAM is calculated as a weighted average by savings on a program basis as determined by the applicable Technical Resource Manual for the projected non-LMI energy efficiency portfolio.

efficiency programs around GHG reduction goals, requiring prioritization of longer measure lives and persistent carbon savings (for example, measures like envelope improvements and efficient electrification). This reframing helped spur the state's development of an electrification-specific PIM to motivate utilities to fully achieve planned electrification benefits. In calculating net benefits for cost-effectiveness and PIMs, utilities incorporate a social value of GHG reductions across each PIM component set at $128 per short ton of CO_2e for the upcoming program cycle per the 2021 avoided cost study (Synapse 2021).[9] PIM awards are based on achieving a desired minimum percent of overall benefits in each PIMs category. While a higher $393 value had initially been proposed in light of the 2021 Climate Act, the DPU opted in a January 2022 order to stay with the $128 value. The DPU's decision highlights considerations other regulators will need to address in determining an appropriate value of avoided carbon, including selection of an appropriate discount rate and what level of analytical rigor and process is sufficient to determine a credible value.

Scorecards and Tracking Metrics for Climate-Forward Efficiency

Compared to PIMs for climate-forward efficiency, there are many more tracking metrics and scorecards in use across states and utilities. As such, it is difficult to comprehensively identify all the tracking metrics and scorecards that may qualify as climate-forward efficiency. Rather than attempt an exhaustive review, this section highlights several standout metrics and scorecards that have potential to evolve into PIMs. Our research found that climate-forward efficiency metrics and scorecards that explicitly track GHG are weighted toward those that measure achievements associated with particular programs, specifically electrified transportation, but a few other tracking metrics and scorecards are highlighted below. We did not find scorecards or metrics that measure implicit GHG through net benefits calculations, or that track progress toward the other energy and demand savings categories described above.

Fuel-Neutral Savings Tracking Metrics

Like the fuel-neutral incentives described above in DC and Vermont, the Massachusetts 2022-2024 statewide energy efficiency plan established a scorecard to encourage and track annual MTCO2e avoided by all efforts undertaken during the plan period. This scorecard is intended to further the state's achievement of the Climate Act's 2030 economy-wide emissions reduction target (Mass Save 2021). Electric and natural gas utilities are targeting a cumulative of 845,916 $MTCO_2e$ reductions to occur by 2030 due to investments made during 2022-2024 (Mass Save 2021; Massachusetts EOEEA n.d.). Annual plan-year reporting will likely provide an indication of the utilities' progress toward the three-year target. The plan also contains climate-forward efficiency policy intent scorecards for net annual and lifetime fuel-neutral savings (MMBtu) and metrics for demand savings and lifetime electricity and gas savings. Combined, these scorecards and metrics will provide useful information to regulators to assess which programming is delivering most effectively on decarbonization (Mass Save 2021).

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[9] The Avoided Energy Supply Component Study calculates the avoided cost of compliance with Massachusetts' Global Warming Solutions Act by comparing the cost of meeting state targets with and without new incremental energy efficiency.

Program-Specific Tracking Metrics & Scorecards

Two states have implemented explicit GHG tracking metrics associated with transportation electrification. In Rhode Island, National Grid uses a pre-determined per-vehicle annual CO2 emissions reduction value for battery electric vehicles (BEV) and plug-in hybrid vehicles (PHEV) to estimate the emissions avoided by registered vehicles that exceed the utility's forecast for annual EV and PHEV registrations (National Grid 2018). This metric design has several shortcomings. First, while it measures National Grid's performance on encouraging increased EV adoption via customer outreach efforts and attractive EV program offerings, the utility's performance against the metric is highly dependent upon a variety of economic factors beyond the utility's control, such as fuel costs, federal and state policies (e.g., tax credits), and EV supply chains. Second, the accuracy of forecasted registration levels will likewise have great influence on National Grid's performance against this metric; should the forecasts turn out to be underestimates, National Grid's performance may appear artificially superior.[10] Finally, the pre-determined emission reduction for BEV and PHEV assumes a specific usage pattern which may again, over- or under-estimate the utility's performance against the metric. While there is no perfect measurement solution for emission reductions from EVs and PHEVs, this metric's calculation method leaves room for false attribution.

In contrast, Xcel Minnesota uses a more rigorous approach to calculating a similar metric - avoided emissions from electric vehicles - by multiplying the kWh of metered charging by the annual system average carbon intensity. The kWh of charging is converted into an estimate of miles driven, which is used to estimate the CO2 that would have been emitted by a gasoline vehicle to drive the same distance. The cumulative difference between the emissions associated with charging and the emissions of driving a gasoline vehicle represents the avoided emissions Xcel is tracking (Xcel 2021). In addition, Xcel Minnesota also tracks two other policy-intent EV metrics focused on encouraging charging behavior that results in lower-carbon electricity charging: the percent of managed charging load occurring during off-peak hours, and percent of EVs in Xcel's service territory participating in managed charging or whole house rates (Xcel 2021).

The Hawaii Public Utilities Commission recently approved electrification of transportation ("EoT") scorecards associated with metrics that correlate to outcomes within Hawaiian Electric's (the state's investor-owned utility) purview but are not measured in GHG reductions. The PUC prioritized EoT "in recognition of the importance of EoT to meeting GHG reduction goals," and as such, established a variety of EoT related scorecards for Hawaiian Electric, including: electrification of Hawaiian Electric's fleet, measured EV load delivered to EV charging stations (kWh) occurring in peak and off-peak hours, average EV charging demand (kW) by hour, estimated total EV load (kWh) at charging stations and other locations, and EV registrations by island (Hawaii PUC 2021; Hawaii PUC 2020).[11] While the PUC did not approve a proposed metric to explicitly track the GHG emissions avoided by electrified transport, the order approving the scorecards expressed interest in exploring the methodology to do so in the

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[10] While National Grid continues to track progress towards these metrics on an annual basis in its PIM Annual Report, their connection to future planning efforts is currently uncertain given plans to sell Narragansett Electric Company to Pennsylvania-based PPL, which is currently under appeal.

[11] Hawaii portfolio of EoT scorecards can be accessed on the Hawaiian Electric Performance Scorecards and Metrics webpage. https://www.hawaiianelectric.com/about-us/performance-scorecards-and-metrics

future (Hawaii 2021). Hawaii's suite of EoT metrics illustrates how adopting several scorecards and metrics can set the stage for later development of a PIM.

In contrast to EoT, few states have yet to create mechanisms to track the electrification of buildings. Xcel Energy in Minnesota is the only utility identified in this research that is tracking the CO2 emissions avoided by "buildings, agriculture, & other sectors," with a metric that is intended to evolve over time (Xcel 2021). In 2020 and 2021, the first two years of tracking this metric, Xcel reported negligible building electrification, but the utility noted that 2021 legislative changes will enable greater electrification going forward (Xcel 2021, Xcel 2022). As states increasingly prioritize building electrification efforts to reach their decarbonization goals, quantifying and reporting avoided emissions from such efforts will be critical to justifying their impact and tracking utility progress in delivering these programs.

Summary Tables

The tables below summarize the Explicit GHG (Table 1) and Policy Intent (Table 2) climate-forward efficiency PIMs at the time of writing. Few such PIMs have been in place long enough to report performance, other than New York LSEs, whose results are are detailed in Figure 2 above.

Table 1. PIM Design – Explicit GHG PIMs

State / Utility	PIM Name	Threshold Values	Period of Performance	Maximum Reward/Penalty
New York (ConEd)	GHG Reduction EAM	20,700-25,700 $MTCO_2e$	2019	$7.65 million in 2019 (fixed reward)
All New York LSEs	Beneficial Electrification EAM	see Figure 2 above for details	2019-ongoing, depending on rate case timing	Differs by utility
Vermont	Greenhouse Gas Reduction	120,500-160,600 $MTCO_2e$	2021-2023	$292,600 (fixed reward, 2021-2023)
District of Columbia	Reduce GHG Emissions Benchmark	471,900-524,300 $MtCO_2e$	2022-2026	$1 million (fixed reward/*penalty,* 2022-2026)

Threshold, reward, and penalty values provided in table are rounded up to the nearest hundred. Threshold values represent the minimum targets for the first year of the incentive and the maximum target for the final year. Annual threshold targets can be found within referenced sources. *Source*: ConEd 2020, VEIC 2021, SEU 2021

Table 2. PIM Design – Policy Intent PIMs

State	PIM Name	Threshold Values	Period	Maximum Reward/Penalty (incentive type)
Fuel Neutral Savings Incentives				

State	PIM Name	Threshold Values	Period	Maximum Reward/Penalty (incentive type)
District of Columbia	Reduce Energy Consumption Performance Benchmark	1,136,800-7,578,600 Btu	2022-2026	$2 million (Fixed reward/*penalty)*
Vermont	Thermal & Mechanical Energy Efficiency Savings QPI	255,500–340,600 MMBtu	2021-2023	$539,700 (Fixed reward)
Other Energy and Demand Savings Incentives				
Vermont	Summer and Winter Peak Demand Savings QPI	21,300-28,400 kW Summer; 26,600-35,500 kW Winter	2021-2023	$1,535,200 (Fixed reward)
Program-Specific Incentives				
New York (ConEd)	Share the Savings EAM	Conditional on meeting annual efficiency goals in NENY Order	2020-2022	30% of unit cost savings realized (Savings based)
New York (ConEd)	Deeper Energy Efficiency Lifetime ("DEEL") Savings EAM	9-16 million lifetime MMBtu	2020-2022	13 basis points (ROR based)
Implicit GHG in Net Benefits Incentives				
Massachusetts	Separate electric and natural gas PIMs include multiple PIM components (e.g, equity, standard), each incorporating social value of GHG reductions	Equity: 85% of equity benefits Electrification: 60% of electrification benefits Standard: 75% of benefit OR weighted avg portfolio threshold (excl. value component) Value: 75% of portfolio benefits	2022-2024	All pools subject to a cap of 100% of portfolio design level for that pool until all thresholds have been reached, then no cap. Payout rates vary by utility.

Threshold, reward, and penalty values provided in table are rounded up to the nearest hundred. Where threshold values constitute a range, the range represents minimum targets for the first year of the incentive and the maximum target for the final year. Annual threshold targets can be found within referenced sources. MA targets are portfolio-wide and based on planned benefits. *Sources*: ConEd 2021, Mass Save 2021, 2022, VEIC 2021, SEU 2021, Xcel 2021

Discussion

While energy efficiency PIMs have existed for some time, PIMs that incentivize GHG reductions through climate-forward efficiency – including demand response and flexibility and electrification - are in their infancy, even in states that are on the vanguard of PBR implementation. It is notable that GHG PIMs for climate-forward efficiency are largely emerging first in third-party programs (Vermont, DC), suggesting that these entities may have more incentive or flexibility to evolve PIMs as policies shift.

In the few states that currently implement an explicit GHG reduction climate-forward efficiency PIM, most were adopted in the last few years, which limits examination of results to the New York utilities, each of whom has a beneficial electrification PIM in place, measured in CO_2e. The New York utilities exhibit a range of performance, from CHG&E, which exceeded maximum targets by more than 290% each year, to RG&E and NYSEG, which have not yet met their minimum targets. This suggests different approaches to setting targets amongst the utilities, or vastly different performance amongst the utilities in the state. PIMs of all stripes, and particularly ones as important as climate-forward efficiency, require an iterative approach to strike the right balance of setting targets that reflect truly superior performance as well as incentives that are proportionally scaled to the societal value of reductions.

Bias toward upside-only incentive structures and proxy metrics may be related to regulatory concerns about tying penalties to outcomes based on evaluation, measurement, and verification (EM&V) of counterfactuals; such concerns have typically led commissions to eliminate energy efficiency penalties (Gold 2014). Alternatively, it may be indicative of regulatory hesitancy to tie penalties to decarbonization performance due to lack of experience with the metric and a desire to better understand program strategies and measurement first. Moreover, reluctance to adopt climate-forward efficiency PIMs with explicit GHG metrics may also stem from the evolving variety of approaches to calculating avoided emissions, some of which are more precise than others, and concern about a lack of data on time-varying impacts of measures (Specian and Gold 2021).[12] Continued technology improvements and increased data granularity are likely to enable the evolution and standardization of increasingly accurate avoided or reduced emissions calculation methods.

Alternatives to Explicit GHG Metrics

The bulk of climate-forward efficiency PIMs active today are much more likely to use an energy savings or programmatic proxy metric for GHG reductions. Most commonly, states have made changes to the metrics associated with energy savings to incorporate a broader definition of energy efficiency, either by valuing savings in Btus to enable fuel switching, or in peak demand savings to encourage demand response. In some cases, these PIMs are targeted at specific programs, technologies, or emergent areas of utility performance (e.g., electrified transportation). Additionally, where climate-forward efficiency PIMs do exist, incentives are predominantly asymmetrical – providing an opportunity for reward without an accompanying risk of incurring a penalty – with the exception of the benchmarks established for the DCSEU.

Some states are implicitly integrating climate goals within a state's current PIMs framework by valuing carbon as a net benefit, such as within a net benefits PIM, the most prevalent PIMs mechanism employed by states (ACEEE 2018). For example, the 2021 Massachusetts Climate Act specified that the social value of GHG emissions reductions must now be included in determining cost effectiveness and in the calculation of program benefits.[13]

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[12] These approaches include marginal or average emissions, as well as short-run or long-run marginal emissions, still a source of much debate in conversations about GHG metric design.
[13] Except in the case of conversion from one fossil fuel to another for heating and cooling

This value is used both in benefit-cost screening and for purposes of PIM calculations. The recent January 2022 DPU Order approving the next program cycle highlights some of the questions policymakers must address when settling upon an appropriate value for avoided GHG emissions. These included selection of underlying assumptions, such as an appropriate discount rate, future prices, load projections (including electrification growth), and applications of the social value of carbon to different measures. For example, draft filings initially proposed removing the marginal abatement cost in PIMs calculations for fossil fuel heating and hot water measures to prioritize electrification measures, but the DPU rejected this exclusion in its final order (MA DPU 2022).

Looking Forward

In researching the topic of climate-forward efficiency PIMs, we sought examples of PIMs that focus on both greenhouse gas reductions and equity.[14] However, we did not find examples of equity-focused PIMs where the ordering language or motivating legislation explicitly revealed a policy intent tied to GHG reduction. Given the recent adoption of legislation to embed equity and climate as a part of PUC mandates in multiple states such as Massachusetts and Washington, emergence of PIMs that address both equity and GHG is likely in coming years.

If tracking metrics are indicative of the next wave of climate-forward efficiency PIMs, it is likely that many will focus on electrified transportation. The range of metrics and methods of calculation for tracking metrics related to EVs in Hawaii, Rhode Island, and Minnesota suggest that utilities and regulators are still grappling with how best to track progress in this area. In contrast, few states have yet to create tracking metrics for electrified end uses in buildings or other sectors, likely due to the continued prevalence of fuel switching restrictions in many states which prevent utility programs from encouraging customers to switch out their gas appliances for electric ones (Berg 2022).

Several states appear poised to implement climate-forward efficiency mechanisms in the near future. Maryland's and D.C.'s Public Service Commissions are both in the midst of proceedings at the time of writing which may yield climate-forward efficiency PIMs. In D.C., the Public Service Commission conditioned approval of Potomac Electric Power Company's (PEPCO) multi-year rate plan upon several outcomes, including development of five metrics pertaining to GHG emissions, energy efficiency, and peak demand reduction achieved for specific DERs (PSCDC 2021). In Maryland, the Commission's rejection of PEPCO's multi-year rate plan application cited important design criteria for PIMs, emphasizing that PIMs must be tethered to a recognized state policy, accelerate the policy goal beyond current capabilities, and demonstrate measurable benefits to ratepayers (MDPSC 2021). The orders in Maryland and D.C. represent examples of PUCs providing guidance for climate-forward efficiency PIM development that others states can look to.

Beyond Maryland and D.C., several states are currently engaged in PBR proceedings. Some, like Connecticut, Illinois, North Carolina, and Washington - passed laws in 2020 and

[14] There are examples of PIMs targeted at low-income communities – such as Hawaii's LMI Energy Efficiency PIM, which measures program participation, energy savings (kWh), and peak demand reduction (kW), Michigan's low-income savings PIM, which measures lifetime energy savings, and DC's Energy Efficiency and Renewable Energy Capacity benchmark for buildings serving low-income residents, measured based on minimum spend.

2021 authorizing PBR. In each of those recent legislative efforts, reducing greenhouse gases was a primary motivation of the legislation, suggesting that climate-forward efficiency PIMs may be developed as a part of those processes (Wilson et al 2022). Those states can look to the early examples cited in this paper, as well as to the broader literature and experience on energy efficiency PIMs, as inspiration for their efforts to set utilities on a climate-aligned path.

References

American Council for an Energy-Efficient Economy (ACEEE). 2018. *Snapshot of Energy Efficiency Performance Incentives for Electric Utilities*. Washington, DC: ACEEE.

Berg, W., and S. Vaidyanathan, B. Jennings, E. Cooper, C. Perry, M. DiMascio, and J. Singletary. The 2020 State Energy Efficiency Scorecard. Washington, DC: ACEEE.

Berg, W. 2022. State Policies and Rules to Enable Beneficial Electrification in Buildings through Fuel Switching. Washington, DC: ACEEE.

CHG&E (Central Hudson Gas & Electric). 2022. Cases 17-E-0459 and 17-G-0460. Earnings Adjustment Mechanisms: 2021 Annual Report.

. 2021. Cases 17-E-0459 and 17-G-0460. EAMs: 2020 Annual Report.

. 2020. Cases 17-E-0459 and 17-G-0460. EAMs: 2019 Annual Report.

Con Edison. 2022a. Case-19-E0065 Final 2020 Con Edison EAM Achievement Report

. 2022b. Case-19-E0065: 2021 Con Edison EAM Achievement Report.

. 2021. Case-19-E0065: 2020 Con Edison EAM Achievement Report.

. 2020. Updated. CASE 16-E-0060. Con Edison 2019 Energy Efficiency EAM Achievement Report.

ComEd. 2021. Smart Grid Advanced Metering Annual Implementation Progress Report.

EIA (Energy Information Administration). 2018. “Carbon dioxide emissions from the U.S. power sector have declined 28% since 2005.”

EAM (Earnings Adjustment Mechanism) Collaborative. 2018. Case 16-E-0060. 2018 Outcome-Based EAM Collaborative Report.

Efficiency Vermont. 2021a. 2022 Update to the 2021-2023 Triennial Plan.

. 2021b. 2020 Annual Report.

.2018. 2017 Annual Report. efficiencyvermont.com/Media/Default/docs/plans-reports-highlights/2017/efficiency-vermont-annual-report-2017.pdf

Gold, R. 2014. Penalties in Utility Incentive Mechanisms: A Necessary 'Stick' to Encourage Utility Energy Efficiency?. The Electricity Journal, Vol 27, Issue 9.

Hawaii Public Utilities Commission. 2020. Docket 2018-0088. Decision and Order No. 37507

. 2021. Docket 2019-0088. Decision and Order No. 37787

Kihm, S., R. Lehr, S. Aggarwal, and E. Burgess. 2015. You Get What You Pay For: Moving toward Value in Utility Compensation. San Francisco: Energy Innovation.

IEA (International Energy Agency). 2021. Net Zero by 2050: A Roadmap for the Global Energy Sector. IEA, Paris.

Massachusetts Executive Office of Energy and Environmental Affairs. "Re: Greenhouse Gas Emissions Reduction Goal for Mass Save," 15 July, 2021. mass.gov/doc/greenhouse-gas-emissions-reduction-goal-for-mass-save/download

MDPSC (Maryland Public Service Commission). 2021. Order on Application For Multi-year Rate Plan. Order No. 89868/ Case No. 9655 - Potomac Electric Power Company's Application for an Electric Multi-Year Rate Plan

Mass Save. 2021. D.P.U. 21-120 – D.P.U. 21-129: Massachusetts Joint Statewide Electric and Gas Three-Year Energy Efficiency Plan 2022-2024.

. 2022. Addendum to the Massachusetts Joint Statewide Electric and Gas Three-Year Energy Efficiency Plan 2022-2024. 1 April 2022.

Molina, M., R. Gold, G. Calcagni, E. Belliveau, and S. Cowell. 2020. "Implementing Fuel-Neutral Goals: A Progress Report from Massachusetts and New York." Proceedings of the 2020 ACEEE Summer Study on Energy Efficiency in Buildings 9:320-34. Washington, DC: ACEEE.

National Grid. 2021. Earnings Adjustment Mechanisms (EAM) 2020 Annual Report. Cases 17-E-0238 and 17-G-0239.

. 2020. EAM 2019 Annual Report. Cases 17-E-0238, 17-G-0239.

. 2019. EAM 2018 Annual Report. Cases 17-E-0238, 17-G-0239.

National Grid. 2018. Amended Settlement Agreement, Docket 4770. 4780.

NYS (New York State) Assembly. 2019. *A.8429/S.6599: Climate Leadership and Community Protection Act (CLCPA)*. Albany: New York State Assembly.

NYSEG and RG&E (New York State Electric and Gas and Rochester Gas and Electric). 2022. Case 19-E-0378. NYSEG-RGE Quarterly EAM Progress Filing.

. 2021. Case 19-E-0378. EAM Rate Year 1 Annual Compliance Filing.

NYPSC (State of New York Public Service Commission). 2020. Order Adopting Terms of Joint Proposal and Establishing Electric and Gas Rate Plan. CASE 19-E- and CASE 19-G-0066.

. 2020a. Order Authorizing Utility Energy Efficiency and Building Electrification Portfolios through 2025.

O&R (Orange & Rockland Utilities). 2021. Earnings Adjustment Mechanisms 2020 Annual Report. Cases 18-E-0067 and 18-G-0068

. 2020. Earnings Adjustment Mechanisms 2019 Annual Report. Cases 18-E-0067 and 18-G-0068

PSCDC (Public Service Commission of the District of Columbia). 2021. Formal Case No. 1156, Order No. 20755.

SEU (DC Sustainable Energy Utility). 2021. DOEE-2016-C-0002 Modification of Contract.

Synapse Energy Economics. 2021. Avoided Energy Supply Components in New England: 2021 Report.

Specian, M., and R. Gold. 2021. The Need for Climate-Forward Efficiency: Early Experience and Principles for Evolution. Washington, DC: ACEEE.

VEIC (Efficiency Vermont). 2021. 2022 Update to the 2021-2023 Triennial Plan.

VT PSB (Vermont Public Service Board). 2014. EEU-2013-01. Order re: Energy Efficiency Utility Budgets for Demand Resources Plan.

VT PUC (Public Utility Commission). 2020. Order Approving Efficiency Vermont’s 2021-2023 Demand Resource Plan. Case 19-3272-PET.

Wilson, G., C. Felder, R. Gold. 2022. “States Move Swiftly on Performance-Based Regulation to Achieve Policy Priorities” RMI.

Xcel Energy. 2021. Docket No. E002/CI-17-40: Performance Metrics and Incentives 2020 Annual Report.

Xcel Energy. 2022. Docket No. E002/CI-17-401: Performance Metrics and Incentives 2021 Annual Report.