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The Performance Playbook: A policy strategy for scaling heat pump adoption with happy consumers and utilities

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Abstract

Across the country, states and utilities are implementing programs to accelerate the market adoption of heat pumps to meet energy and climate goals. Through case studies of leading heat pump rebate and incentive programs, including California's Technology and Equipment for Clean Heating initiative, the City of Denver's Climate Action Rebates, and New York State's Clean Heat program, Sealed explores each program's unique market animation strategies and their impact on consumer adoption of heat pumps. These programs attempt to utilize "tried and true" market animation strategies that largely rely on financial incentives for consumers, but they have all caused a market "sugar crash" when program funding is exhausted. Market strategies based solely on large consumer rebates make achieving the adoption of heat pumps difficult, if not impossible, at the speed and scale required to reduce greenhouse gas emissions from commercial and residential buildings.

But while program sugar crashes are a well known phenomenon, little work has been done to quantify the effect and compare the impact across geographies and program designs. This paper takes a first step to track the speed and scale of sugar crash program spending, and offers solutions to the problem.

Specifically, a "Performance Playbook" is proposed that seeks to address this sugar crash problem. Only market-aligned strategies that maximize scarce ratepayer funds can accelerate the consumer adoption of heat pumps and provide utilities with valuable grid services. At its core, the Performance Playbook is built upon the principles that heat pump incentive programs should be:

- Easily accessible for both consumers and market actors,
- Flexible to adapt to evolving market conditions and long-term policy goals, and
- Performance-based to ensure market actors complete high-quality installations.

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New York State's Clean Heat Program

Approved by the New York Public Service Commission (NY PSC) in its 2018 Order Adopting Accelerated Energy Efficiency Targets, the New York State Clean Heat program (Clean Heat Program) is the primary rebate program for accelerating the adoption of heat pumps in New York. The program was originally approved in 2018 with a total budget of \$250 million and a statewide energy savings goal of 5 million gross MMBtus. On April 1, 2020, the Clean Heat Program began accepting rebate applications with a revised

statewide budget of \$454 million and a heat pump energy savings goal of 3.5 million gross MMBtus.¹

The Clean Heat program is administered on a statewide basis by New York’s investor-owned utilities and in coordination with the New York State Energy Research and Development Agency (NYSERDA). Collectively this group is referred to as the “Joint Efficiency Providers” and strives to create a consistent experience and the market conditions to accelerate the adoption of heat pumps in New York.

Table 1 shows the adopted budgets and MMBtu savings goals for each of New York’s investor-owned utilities.

Table 1: Clean Heat Program Budget and Savings Goals by Utility²							
NY Utility	2020	2021	2022	2023	2024	2025	2020-2025 Total
Central Hudson Gas and Electric Corporation (“Central Hudson”)							
Base Budget	\$3,354,852	\$5,559,173	\$7,049,949	\$8,265,836	\$9,186,504	\$9,804,997	\$43,221,311
Base Energy Savings Target	17,728	30,183	38,850	48,190	56,479	63,863	255,293
Consolidated Edison, Inc. (“Con Edison”)							
Base Budget	\$18,037,338	\$29,128,534	\$35,884,450	\$42,823,631	\$48,526,394	\$52,915,488	\$227,315,835
Base Energy Savings Target	72,921	119,716	151,334	186,941	219,927	249,162	1,000,001
Niagara Mohawk Power Corporation (“Niagara Mohawk”)							
Base Budget	\$6,983,416	\$11,891,672	\$14,789,044	\$16,424,789	\$17,190,980	\$17,118,933	\$84,398,834
Base Energy Savings Target	71,239	132,010	172,203	210,694	245,889	280,647	1,112,682
New York State Electric and Gas Company (“NYSEG”)							
Base Budget	\$6,204,522	\$10,605,014	\$13,173,160	\$14,628,326	\$15,300,267	\$15,219,288	\$75,130,577
Base Energy Savings Target	63,614	117,911	153,328	187,944	219,558	250,383	992,738
Orange and Rockland Utilities, Inc. (“O&R”)							
Base Budget	\$1,236,326	\$1,973,311	\$2,397,539	\$2,828,131	\$3,164,633	\$3,403,947	\$15,003,887
Base Energy Savings Target	6,440	10,421	13,027	16,109	18,912	21,748	86,657
Rochester Gas and Electric Corporation (“RGE”)							
Base Budget	\$747,986	\$1,278,915	\$1,611,466	\$1,799,548	\$1,900,472	\$1,909,389	\$9,247,776
Base Energy Savings Target	7,541	14,206	18,304	22,468	26,422	30,282	119,223
Totals							
Base Budget	\$36,564,440	\$60,436,619	\$74,905,608	\$86,770,261	\$95,269,250	\$100,372,042	\$454,318,220
Base Energy Savings Target	239,483	424,447	547,046	672,346	787,187	896,085	3,566,594

Market Animation Strategy and Impact

The initial Order creating the Clean Heat program did not prescribe strategies or tactics the Joint Efficiency Providers should use to animate the market. The Order also did not require a percentage or fixed amount of the program budget to be set aside for certain building types (i.e., small residential, multifamily, or commercial buildings). As such, the Joint Efficiency Providers elected to animate New York’s entire building market through a program design that offered a customer-facing rebate structured as 1) a fixed dollar amount per heat pump unit, 2) per heat pump system capacity, or 3) per annual energy savings generated by a heat

¹ In response to the Heat Pump Statewide Framework submitted by the utilities, The Clean Heat program budget and goals were modified in the January 2020 Order Authorizing Utility Energy Efficiency and Building Electrification Portfolios through 2025. See: <https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={06B0FDEC-62EC-4A97-A7D7-7082F71B68B8}>

² Table 1 is a recreation of Appendix C Table C1: 2020-2025 Heat Pump Budgets and Targets (Gross MMBtu) from the January 2020 Order Authorizing Utility Energy Efficiency and Building Electrification Portfolios through 2025. See: <https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={06B0FDEC-62EC-4A97-A7D7-7082F71B68B8}>

pump project.³ At the program's launch in April 2020, the Joint Efficiency Providers offered 9 distinct rebate categories.

Over the life of the Clean Heat Program, the Joint Efficiency Providers have increased rebate values, decreased rebate values, and created entirely new rebate categories to influence heat pump installations in their respective service territories. As of November 23, 2022, the Clean Heat Program has 12 different rebate categories that provide financial rebates for air-source heat pumps, ground-source heat pumps, and heat-pump water heaters to customers, contractors, distributors, and, in some categories, all three market actors.

As of November 23, 2022, over 26,000 buildings have participated in the Clean Heat Program. On December 19, 2022, the Department of Public Service staff supporting the NY PSC filed a comprehensive Energy Efficiency and Building Electrification Report. This report summarizes the performance of all of New York's efficiency programs, including the Clean Heat Program, and asks stakeholders for comment on the future direction of these programs.

California's Technology and Equipment for Clean Heating Program

In response to the passage in 2018 of California Senate Bill 1477: Low-emissions buildings and sources of heat energy, the California Public Utilities Commission (CPUC) created the Technology and Equipment for Clean Heating (TECH) initiative to serve as the state's main incentive program for accelerating the market adoption of heat pumps.⁴ Originally approved with a total budget of \$120 million, the TECH initiative was bid out to a third party non-utility program administrator. The winning bid was led by the Energy Solutions firm and a group of 11 supporting companies that together are responsible for:

1. Offering midstream and upstream incentives to animate the market,
2. Administering regional pilots and quick-start grants designed to overcome identified market barriers to heat pump adoption,
3. Providing low-interest financing for projects in environmental justice communities,
4. Informing future clean space and water heating policies in California through meter-based data driven analysis.⁵

Of the \$120 million approved by the CPUC for the TECH initiative, approximately \$37.5 million was reserved for single-family heat pump and heat-pump water heater incentives, and approximately \$13.3 million was reserved for multi-family heat pump and heat-pump water heater incentives.⁶

Market Animation Strategy and Impact

By statute, the TECH initiative can provide incentives only through midstream or upstream techniques to encourage customer adoption.⁷ The TECH team identified contractors as key stakeholders in the heat pump supply chain and elected to issue cash incentives directly to those contractors. The TECH initiative doesn't have requirements for how much or how little of the TECH incentive contractors must pass through to the end customer.

The TECH initiative's focus on the residential building sector allowed the TECH team to design a simpler and more sector-specific set of incentives. Single-family incentives launched on December 7, 2021, utilized a

³ Specific utilities also provided "kicker" rebates for heat pump installations completed in "High Priority Electrification Zip Codes" identified having natural gas distribution system capacity constraints. See:

<https://cleanheat.ny.gov/assets/pdf/national-grid-high-priority-electrification-zip-codes.pdf>

⁴ Decision 20-03-027 approved the TECH program. See: <https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M331/K772/331772660.PDF>

⁵ The Tech California Team consists of the following firms: Energy Solutions, VEIC, Frontier Energy, Association for Energy Affordability, Building Decarbonization Coalition, Recurve, the Ortiz Group, Ardenna Energy, Electrify My Home, National Comfort Institute, Tre'Laine, and Energy Outlet. For more details on each firm and links to the company websites, see: <https://techcleanca.com/about/>

⁶ Initial funding for the TECH initiative was provided natural gas utility cap and trade proceeds. This funding source restricted the ability of TECH to offer rebates only to customers in natural gas territories.

⁷ Senate bill 1477 low-emissions buildings and source of heat energy. (2017-2018) only allows the TECH initiative to provide "upstream and midstream incentives to install low-emission space and water heating equipment in existing and new buildings, with technologies identified pursuant to subdivision." See: https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB1477

two-tier and a fixed-dollar amount, per unit, incentive for air-source heat pumps and heat-pump water heaters.⁸ Tier 1, or the baseline incentives, were available to all participants. Tier 2, or enhanced incentives, were higher incentives only available in geographies where other energy efficiency heat pump program offerings were available. The TECH initiative was able to “stack,” or “braid,” their incentives with other heat pump incentives because the program wasn’t bound by other regulatory compliance metrics, such as energy efficiency savings goals.

On May 12, 2022, the TECH initiative announced that funding for its heat pump and heat-pump water heater incentives had reached capacity and were no longer processing applications.⁹ As of November 23, 2022, the TECH program has incentivized the installation of 9,555 air-source heat pumps and 1,270 heat-pump water heaters. The average incentive provided for these installations was \$3,422 for air-source heat pumps and \$3,555 for heat-pump water heaters.¹⁰

Denver’s Climate Action Rebates

In November 2020, Denver voted in favor of Ballot Initiative 2A, approving the increase of the city’s and county’s sales tax rate by 0.25% starting in 2021. Additionally, the initiative created a new city budget fund called the Climate Protection Special Revenue Fund (Climate Action Fund).¹¹ At the time of passage, the Climate Action Fund was estimated to be valued at approximately \$40 million annually and could provide financial and technical support to a range of clean energy investments.

In November 2021, in response to the creation of the Climate Action Fund, and to provide direction on how the funds should be invested, the Office of Climate Action, Sustainability, and Resiliency filed the Climate Protection Fund Five-Year Plan. The plan identified the investments and strategies the office intends to make to achieve the city’s goal of reducing greenhouse gas emissions by 65% by 2030.¹² One of these investments and strategies included residential energy rebates designed to accelerate the adoption of clean energy technologies, including “highly efficient, all-electric energy equipment such as space/water heat pumps, electric vehicle charging, [and] solar and energy storage.”¹³

On Monday March 14, 2022, Denver’s City Council approved Resolution 22-0227, and created a new, three-year \$9 million residential energy rebate program, called the Climate Action Rebate program.¹⁴ Unlike other heat pump rebate programs, the Climate Action Rebate program sought to incentivize a range of residential electrification technologies, including electric modes of transportation, rooftop solar, battery-energy storage, and other climate-action related technologies as determined by the program administrator, Aptim Environmental and Infrastructure. The Resolution covered the period from April 1, 2022, to March 1, 2025, and had the goal of reaching between 1,500 and 2,000 households annually.

Market Animation Strategy and Impact

As described by Grace Rink, the Chief Climate Officer for the City and County of Denver, and Executive Director of its Office of Climate Action, Sustainability, and Resiliency, the Climate Action Rebates sought to animate the market for electrification technologies and drive down future installation costs.¹⁵ The program was also intentionally designed to amplify and stack with air-source heat pump and heat-pump water heater rebates available from Xcel Energy (Xcel), the City and County of Denver’s investor-owned electricity utility. This was achieved by requiring homeowners to utilize Xcel’s trade ally network to complete their installations.

⁸ See: <http://bit.ly/3hXCnty>

⁹ See: <https://tech.freshdesk.com/support/solutions/articles/69000812680>

¹⁰ For the most up to date install data, see: <https://techcleanca.com/public-data/maps-and-graphs/>

¹¹ For the full ballot text, see:

https://ballotpedia.org/Denver_Colorado_Ballot_Measure_2A_Sales_Tax_to_Fund_Environmental_and_Climate-Related_Programs_and_TABOR_Spending_Limit_Increase

¹² For the full report, see: https://denvergov.org/files/assets/public/climate-action/cpf_fiveyearplan_final.pdf

¹³ See, p.34: https://denvergov.org/files/assets/public/climate-action/cpf_fiveyearplan_final.pdf

¹⁴ Resolution 22-0227 accessed November 23, 2022. See:

<https://denver.legistar.com/LegislationDetail.aspx?ID=5456765&GUID=F009AA24-4619-4036-9BA1-91C85CCBB56E>

¹⁵ March 2, 2022, Business, Arts, Workforce, & Aviation Services Committee meeting, agenda item 22-0214. See:

https://denver.granicus.com/player/clip/14737?view_id=180&meta_id=1040268&redirect=true&h=9c5f97992620a733cc4c092ffbcc0ba3

On April 22, 2022, the Climate Action Rebates went live, making city residents eligible for the heat pump rebates summarized in Table 2.

Table 2: Summary of Denver's Climate Action Rebates Available on April 22, 2022 ¹⁶		
Eligible Equipment	Climate Action Rebate Value	Rebate Cost Cap
Ducted air source heat pumps (Cold climate certified)	\$9,000	Up to 80% of total project costs
Ducted air source heat pumps (High-Efficiency)	\$7,200	
Ground source heat pumps	\$1,800/ton up to \$9,000	
Ductless air source heat pumps (Cold climate certified)	\$5,400	
Ductless air source heat pumps (High-Efficiency)	\$4,500	
Heat Pump Water Heater ("Smart")	\$3,200	
Heat Pump Water Heater (High-Efficiency)	\$1,400	

On June 24, 2022, the city announced that funding for its heat pump and heat-pump water heater rebates had reached capacity and was no longer processing applications. During the 63 days between program launch and program pause, 350 households took advantage of the Climate Action Rebates for heat pumps.¹⁷

Market Sugar Rush and Sugar Crash

The Clean Heat Program, the TECH initiative, and the Climate Action Rebates all deployed different strategies and tactics to animate the heat pump market. In the case of the Clean Heat Program and the TECH initiative, these efforts were able to animate the market on a statewide basis and, in the process, reached thousands of homes. In the case of the Climate Action Rebates, the program was able to animate the market on a city level and, in the process, reached hundreds of homes. These efforts should be celebrated, as every heat pump installation represents progress toward a more stable climate. However, in the process of animating these markets, each program caused a market effect that Sealed refers to as a market sugar rush, followed by a sugar crash.

Also known as boom-bust cycles, sugar rushes and sugar crashes are a symptom of rebate or incentive programs that have a combination of short-term goals, short-term budgets, and financial incentives that are too generous. Together these program design elements can inject greed as well as fear, uncertainty, and doubt, commonly referred to as "FUD," into the market.

Con Edison's Clean Heat Program is the largest example of a sugar rush and crash. At the program's launch, in April 2020, the rebate offered to customers was simple and generous: Customers who installed a 3-ton heat pump, a standard size for most homes, received a \$7,200 rebate. However, due to low initial participation, Con Edison dramatically increased the program's rebate values starting August 1, 2021. For that same 3-ton heat pump, homeowners now received an \$18,000 rebate, but only if they decommissioned their existing fossil-fuel heating system.¹⁸ Installations skyrocketed — with monthly installations almost doubling — but this 150% increase in rebate value turned out to be too generous for the market.

Due to an overwhelming market response, Con Edison made a pivotal announcement at the end of 2021: Starting March 1, 2022, rebates would be reduced by approximately 50%, decreasing the value of a 3-ton heat pump to just \$9,720. This pivot by Con Edison to manage its short-term program budget infused the

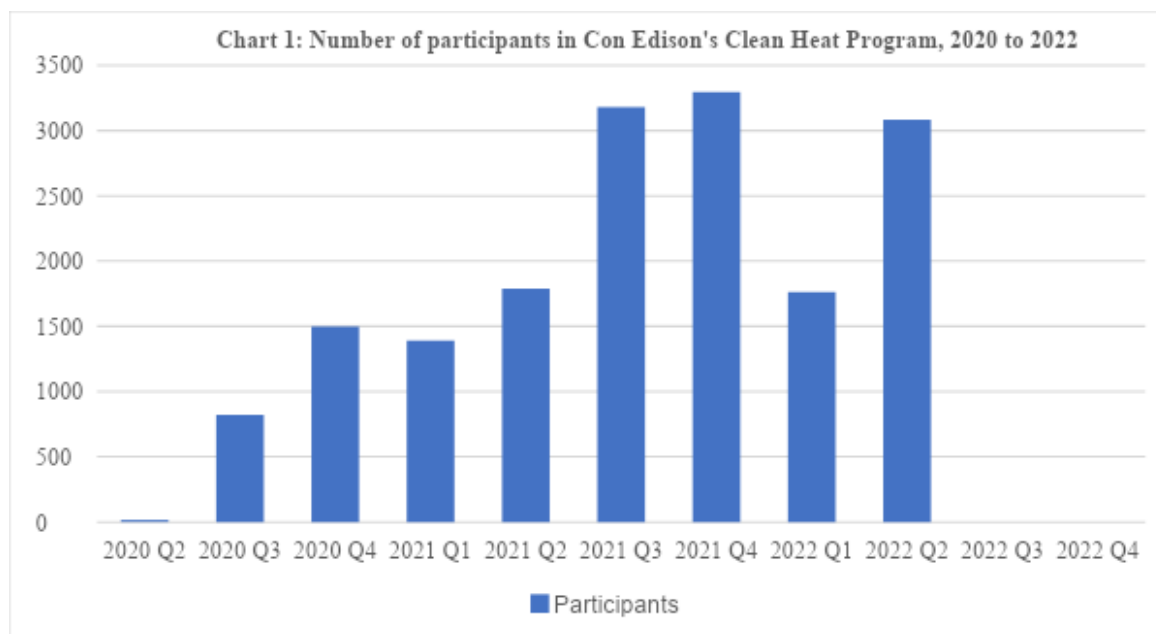
¹⁶ The program also provided rebates for e-bikes, electric vehicle (EV) charging home wiring, rooftop solar, battery energy storage, and electric service upgrades to enable another measure. See: https://www.eebco.org/resources/Documents/POLICY%20ACTION%20COMMITTEE/HVACHP%20ACTION%20GROUP/Flier%20-Denver%20Climate%20Action%20Rebates%20Summary_Overview_4.15.22.pdf

¹⁷ See: <https://www.eenews.net/articles/denver-passed-a-sales-tax-for-climate-is-it-working/>

¹⁸ Con Edison and other stakeholders initially believed the de-commissioning requirement would slow market demand for the largest tier of heat pump incentives that included decommissioning.

market with additional FUD, resulting in another rush in rebate applications from consumers trying to beat the new deadline, followed by another market crash in March and April.

Because of the huge demand caused by the pivot to lower rebates, on May 9, 2022, Con Edison announced the Clean Heat program would no longer accept rebate applications starting May 14, 2022. This announcement caused another FUD-driven sugar rush, as customers and contractors hurried to meet the May 13, 2022, deadline. Chart 1 documents the sugar rush and sugar crash by quarter.



On July 18, 2022, Con Edison announced they had received rebate applications worth \$642 million in 2022, bringing total applications to the program since its launch to \$755 million — \$528 million more than originally planned. On August 11, 2022, the NY PSC approved Con Edison's petition to transfer unspent energy efficiency funding to cover the cost overrun. The NY PSC also approved Con Edison's request for a new \$10 million monthly Continuity Funding Mechanism to restart the Clean Heat Program in their service territory, with the program re-starting on January 17, 2023.

The Performance Playbook

To address these market dynamics and accelerate consumer adoption of heat pumps in alignment with utility price signals, Sealed has developed a three-part market transformation strategy called the Performance Playbook. The Performance Playbook pairs proven market-animation strategies, such as consumer-facing rebates, with flexible market incentives for market actors, along with performance-based incentives to sustainably accelerate market growth while avoiding sugar highs and sugar crashes. Each component is explored below.

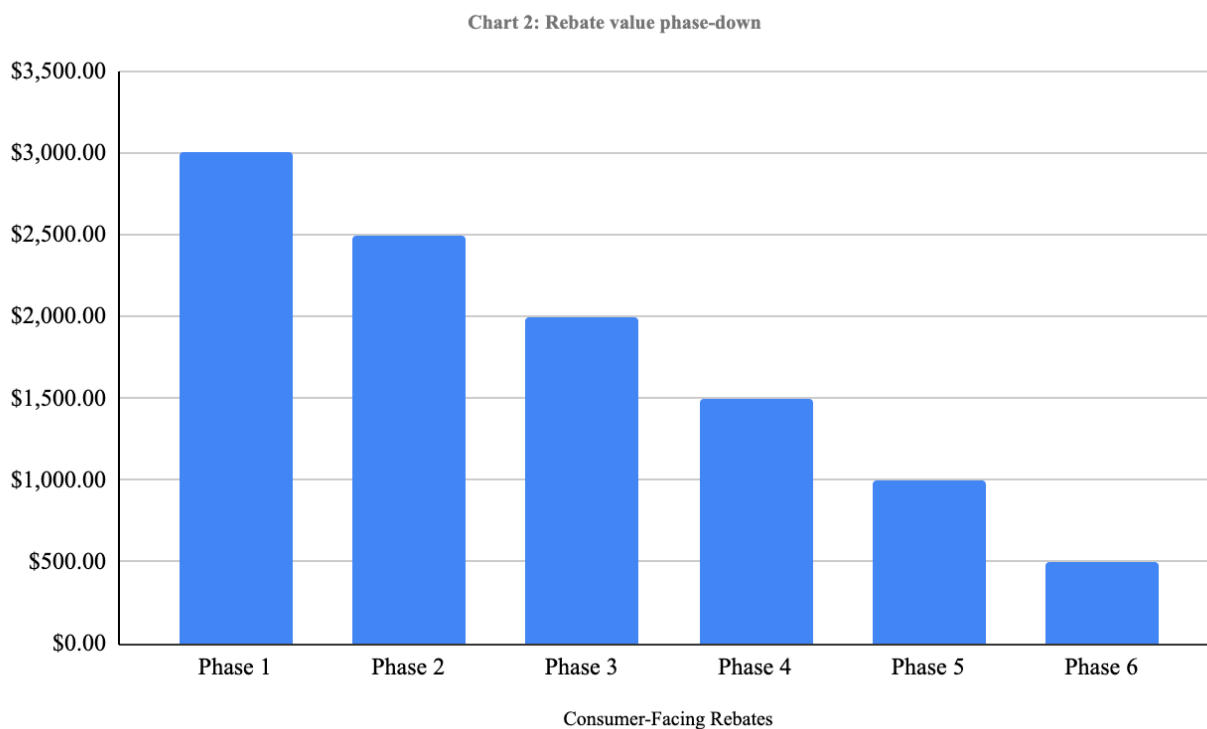
Consumer-Facing Rebates and Rebate Blocks

First, heat pump programs that provide consumer-facing rebates, like New York's Clean Heat Program and Denver's Climate Action Rebate program, should be restructured to predictably decrease in value as market adoption increases. In many leading heat pump markets, consumers have become accustomed to the rush of receiving a rebate for installing a heat pump, but what causes a subsequent crash is the fear of missing the opportunity to receive the rebate. Program designs that set clearer and more sustainable expectations of how much money customers will receive negate this fear.

Incentive blocks, or phase-downs, have been utilized by multiple rooftop-solar programs, including New York's NY-Sun program and the California Solar Initiative, to reduce incentive amounts over time in a transparent way. These programs were by no means perfect, but they helped grow their states' solar markets in a predictable fashion by providing long-term incentive certainty. Ideally, these declining incentive blocks

should be executed over multi-year program budgets to minimize year to year fluctuations in program budgets.

Chart 2 provides an illustrative example of decreasing rebate blocks, starting with a \$3,000 heat pump incentive and decreasing the incentive value by \$500 over time. Each incentive block should represent a market milestone, such as 10,000 units installed.



Market-Based Incentives

Second, smaller and more stable consumer-facing rebates should be paired with market-based incentives that numerous market actors, or aggregators, can receive. [Studies](#) have found that such market-based midstream and upstream incentive programs drive heat pump adoption better than stand-alone consumer-facing rebates.

In addition, the traditional rebate-heavy approach often suffers from being complicated and expensive. [One study of more than 600 utilities](#) found that just 60% of the money underpinning such energy efficiency programs was allocated to incentives. The rest? Spent on administrative and marketing costs. While we do not know the administrative allocation of the programs cited in this paper, it is clear that administrative costs are often higher than necessary or sustainable.

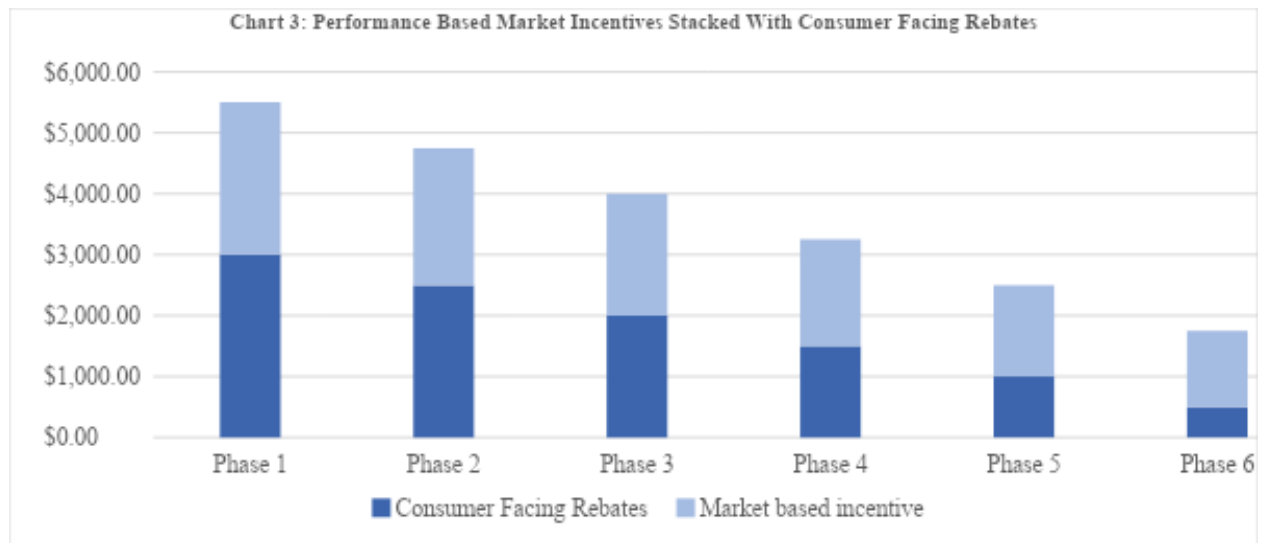
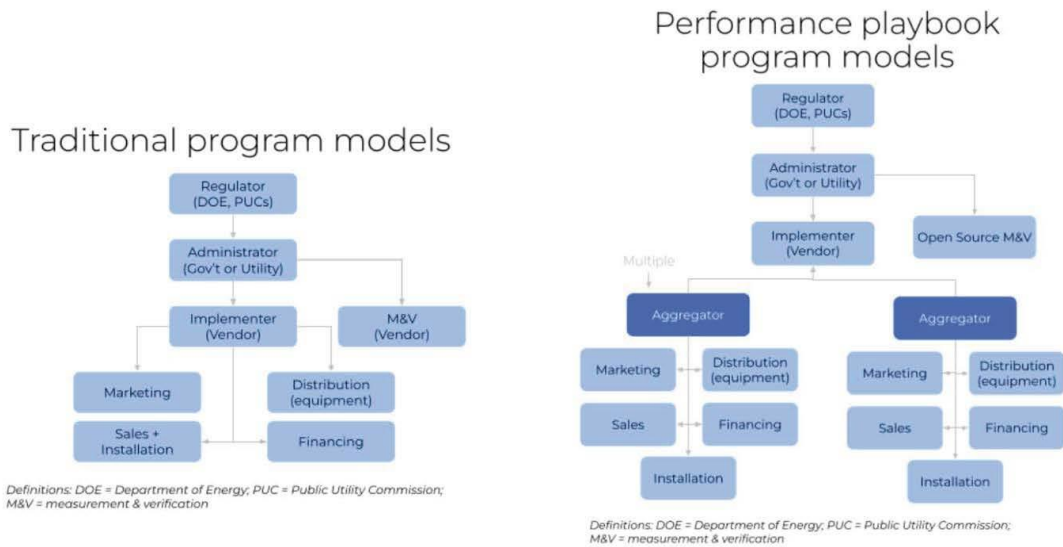
Under the Performance Playbook, aggregators receive incentives that can be used in a variety of ways. Upfront rebates can be used to offset the cost of energy efficiency projects. Incentives can also be used to lower financing costs, minimize sticker price or fund project “extras,” like smart thermostats. In other words, market-based incentives provide flexibility, as aggregators compete to discover innovative ways to drive heat pump adoption and performance at the lowest possible cost.

These market-based incentives, like the ones available through California’s Market Access Program or the Inflation Reduction Act’s HOMES program, motivate market actors to invest in market transformation activities, such as customer marketing, software, and infrastructure, necessary to have a sustainable market. And since these incentives are delivered midstream, they can be lowered if market demand is higher than initially expected.

Graph 1 summarizes the key differences between a traditional approach and one based on the Performance

Playbook. And Chart 3, beneath that, provides an illustrative example of how market incentives could “stack” with consumer-facing rebates and decrease over time.

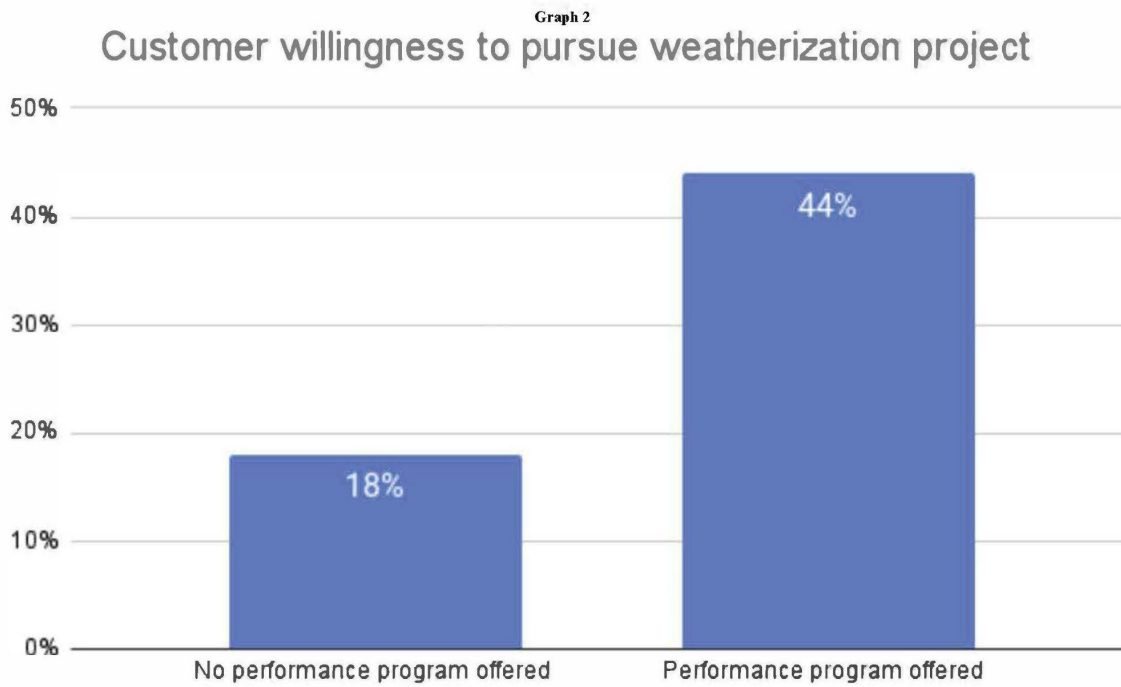
Graph 1



Performance-Based Incentives Ensure Consumer, Ratepayer, and Taxpayer Protection

Third, any incentives paid out to drive the installation of heat pumps should be based on how those energy efficiency projects ultimately perform. This is the [measured savings approach](#) that is one pathway defined in the Inflation Reduction Act’s HOMES program. The risks of energy efficiency projects are currently shared by consumers, ratepayers, and taxpayers alike, whereas under the Performance Playbook these risks lie with aggregators.

With the Performance Playbook, therefore, incentives are valued based on measured energy savings in order to drive consumer adoption. One survey of New York homeowners discovered that while incentives of 50% of project costs drove significant uptake in heat pump installations, the bigger impact came from [performance-based financing](#). In other words, consumers were more willing to pursue energy efficiency projects if market actors, like aggregators, could take on the project performance risk, as Graph 2 shows.



Conclusion

The rebate and incentives provided for heat pump technologies is exploding, with the August 2022 passage of the Inflation Reduction Act injecting billions of additional dollars into the market. Policymakers across the country will have to grapple with how best to design programs to accelerate heat pump adoption without crashing the market.

Now is the time to learn from previous programs, set realistic incentive amounts and, most importantly, design programs that can last and achieve true market transformation. The Performance Playbook can do this by leveraging taxpayer and ratepayer investments to accelerate the market rather than crash it. By focusing on flexible, performance-based incentives that have long-term budget certainty, precious public resources can be used to unlock multiples of private capital.

But this will only happen if policymakers, utilities, and other stakeholders take a hard look at past program experience, and better understand the relationship between incentive levels, program design, and market demand.