Balancing Equity and Energy Objectives: Dealing with the Trade-Offs

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ABSTRACT

This paper explores the implications on energy-related programs' outcomes when the programs seek to achieve traditional energy-related goals and broader societal equity goals. The paper demonstrates a substantial likelihood that these objectives compete with each other and recommends more recognition of the trade-offs between these objectives during policymaking, program funding, program design, and program assessment.

Modeling suggests that energy programs that target only populations of concern to advance broader societal equity considerations may be substantially less effective at reducing total energy use, increasing societal energy sustainability, and reducing the impacts of climate change than those that seek to maximize energy outcomes. The paper suggests the development and refinement of tools that support consideration of the trade-offs with intentionality during policymaking and program design as a step toward aligning program outcomes with decision-makers' intent.

Introduction

A societal shift in the United States in recent years has resulted in the introduction or elevation of societal equity considerations to energy- and associated climate-related policies, initiatives, and programs. As a result, it is now common for programs that have previously focused primarily on energy-related goals to be authorized, funded, and designed to accomplish combinations of objectives like the following:

- Meet energy savings goals cost-effectively *and* expect increasing shares of program participants from households and business ownership structures that have been previously underserved;[1]
- Reduce greenhouse gas emissions and ensure that a given share of program funding is spent on interventions in homes of households from marginalized communities;
- Electrify homes and businesses to reduce future greenhouse gas emissions specifically in geographic areas that have been classified formally as disadvantaged communities; and
- Place electric vehicle charging infrastructure based on modeling that accounts for likely ownership and charging practices while also prioritizing placement of charging in neighborhoods because their residents are primarily low-income or inhabited mostly by people identified as belonging to marginalized communities.

These are just a few illustrative examples of how objectives for energy and climate programs have broadened in recent years. The energy or climate components of program goals

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[1] Underserved is a common term used by policymakers and programs, but it is often not defined well. Some of these efforts seek to focus on population groups that are less likely to have participated in energy programs, while other efforts focus on populations that have either not benefited from or been held back by broader public policy, society, or the economy.

have evolved into their current form for many years alongside a separate set of programs targeting low-income households that seek to ensure energy-related basic human needs are met. Equity considerations in their current form—and direct considerations of diversity, equity, and inclusion (DEI)—are newer and have generated much attention among policymakers, program administrators, program implementers, and stakeholders in the energy efficiency industry.

The equity components of program efforts are evolving. There are continuing changes in the way policy objectives are formulated, the ways these objectives are translated into program approaches, and the ways that the programs' successes, failures, and potential improvements are assessed internally or by third-party evaluators. This paper seeks to contribute to that evolution from an empirical and evaluation research perspective.

Multiple Objectives Lead to Trade-Offs

In a world of constrained resources, programs with multiple objectives generally involve trade-offs and require some sort of effort to optimize results. Optimization involves making decisions about the degree of effort or resources allocated to the activities that support each objective.

History of Trade-Offs in Energy Efficiency

Trade-offs and competing objectives are nothing new to the energy industry. Energy efficiency programs originated under the name *demand-side management* in the 1970s as efforts to ensure lowest-cost supply capacity (Eto 1996). Energy efficiency became the supply solution of first resort, but how far should they go? What is the appropriate investment in energy efficiency?

Additional questions emerged: How do we ensure fairness across different classes of ratepayers, so that there is a relationship between those who pay for programs and those who benefit from them? How do programs ensure incremental effectiveness so that their investments are causing efficiency improvements that would not have occurred anyway? How do programs address social concerns, including the ability of those least able to pay for the energy they need to live safely and comfortably?

In response to several of these issues and questions, regulators compared the cost of running energy efficiency programs to the cost of building new generation, and the energy industry developed a series of cost-effectiveness tests for energy efficiency programs (CPUC 2001). These tests compare the costs and benefits from multiple points-of-view so that societal, ratepayer, utility, and program participant perspectives can be considered. Generally, energy efficiency programs were expected to be cost-effective based on one or more of these perspectives. In addition, the energy industry developed approaches to measuring attribution that account for free-ridership and spillover.

Collectively, these tools allow policymakers, regulators, program implementers, and evaluators to:

- Assess the cost-effectiveness of program spending;
- Estimate the net marginal energy savings from programs through an attribution adjustment; and

- Make budgetary and program design decisions based on objective, albeit imperfect, empirical data.[2]

The transition of energy efficiency from an energy generation cost concern to a solution to climate concerns led to the introduction of new objectives. Increasingly, energy efficiency programs are being justified, at least in part, by the climate benefits they bring through reduced carbon emissions. These relatively new objectives for energy efficiency programs lead to the need to consider not just total energy saved, but also the degree to which the energy savings result in carbon emissions now and in the future. Often, climate benefits are addressed as a quantified benefit of energy efficiency in cost-effectiveness calculations, but with a broad-brush valuation of benefits rather than a more specific accounting concerning their value or precision in the carbon saved based on the time of the savings and the emissions from the generation mix in use at the time. These approaches add carbon benefits into the existing energy efficiency decision-making tools, although there is clear room for improvement and for further evolution in the tools to ensure climate is addressed appropriately and that climate benefits can be maximized, costs minimized, or an optimal balance can be identified.

Common Trade-Offs in Mixing Energy and Equity Objectives

The trade-offs involved when programs strive to achieve both energy efficiency or climate goals and address societal equity concerns do not appear to receive much discussion or consideration yet, at least not explicitly. They really should. The following modeling exercise seeks to illustrate the fact that there are trade-offs that warrant direct conversation during policy-setting, budgeting, and program design, and it seeks to show the potential degree of those trade-offs as a way of emphasizing the need for tools to quantify the likely impacts of policy directives and objectives on the likely effectiveness of the resulting programs.

Context

The author of this paper created a program model and situational scenario for a fictious city of New Energy, which is intended to serve as a representation of the United States. Population and energy characteristics are based on those of the United States, as reported in the Energy Information Administration's Residential Energy Consumption Survey (RECS) (EIA 2020).

New Energy consists of 10,000 households in a mix of neighborhoods ranging from low income to high income. Energy use per household is greater by those in wealthier neighborhoods, but energy efficiency opportunities exist across all types of neighborhoods, homes, and households. For simplicity, New Energy households use electricity as their only household fuel.[3]

New Energy's statistical office classifies residents along many demographic dimensions, including majority race and minority race. Policymakers have been concerned about statistical differences across many societal metrics between majority and minority race residents. Table 1

[2] It is worth noting that low-income programs are often exempt from cost-benefit requirements or free-ridership adjustments (because the purpose of providing energy efficiency services to low-income customers is seen as related to livability, while services for those who can more easily afford energy efficiency improvements are generally intended to address market failures that lead to economically and societally inefficient results).

[3] Natural gas usage from EIA RECS data has been converted from therms to equivalent kilowatt-hours and added in with applicable electrical usage.

describes New Energy’s populations quantitatively. The table also lists annual electricity usage per household, which correlates with income and ultimately with potential energy savings.

Table 1. New Energy’s Neighborhoods[4]

Neighborhood	Median Income[5]	Number of Households	Racial Distribution	Average Annual kWh Consumption per Household
A	Low	3,600	Minority: 40% Majority: 60%	Min: 16,598 Maj: 18,218
B	Low to moderate	1,900	Minority: 28% Majority: 72%	Min: 18,631 Maj: 20,140
C	Moderate to high	2,300	Minority: 21% Majority: 79%	Min: 20,027 Maj: 22,682
D	High	1,200	Minority: 19% Majority: 81%	Min: 21,544 Maj: 25,619

Homes in New Energy have unrealized energy-saving opportunities that the policy-makers of New Energy believe should be addressed by energy efficiency programs, both for the societal benefit of a reduced need for energy generation and transmission and for the climate benefits. The local policymaking body directs the municipal electric utility, New Energy Power & Light, to offer an appropriately designed energy efficiency program to harvest available energy efficiency among its customers. The policymaking body also wishes to address societal issues related to racial equity and plans to add a directive for New Energy Power & Light related to equity considerations.

For its part, the utility has determined that energy-saving opportunities fall into three categories:

- Easily addressed energy waste that equals about two percent of each home’s electric consumption could be eliminated at a program cost of two cents per annual kilowatt-hour saved.
- A moderate package of piecemeal energy-saving improvements that would reduce each home’s current electricity consumption by an additional four percent could be achieved at a program cost of four cents per annual kilowatt-hour saved.
- Complex upgrades to each home could reduce each home’s energy usage by an additional eight percent (of current consumption) at a cost of 18 cents per annual kilowatt-hour saved.[6]

[4] All proportions shown here are based on actual U.S. values with electric consumption representing the combination of actual electric and natural gas consumption.
[5] Income categories correspond roughly to real-world quartile values.
[6] These energy saving opportunities and costs are stylized examples, but within a realistic ballpark for actual energy efficiency programs.

Given New Energy Power & Light's rates and generation mix, each kilowatt-hour saved will reduce the energy bills of customers by 10 cents and reduce CO_2 emissions by 0.75 pounds.[7]

Baselining the Standard Energy Efficiency Program

If the policymaking body directed New Energy Power and Light to focus just on the energy efficiency opportunities in the most cost-effective way feasible, the utility would seek to address the lowest hanging fruit first and work its way progressively to the more difficult and costly energy savings until its available budget or cost-effectiveness threshold has been met. It would be fair to assume that a potential study would have pointed to a portfolio budget of $577,528, which is consistent with addressing all the savings opportunities available at or below 6 cents per kilowatt-hour.

Given the simplified energy-saving opportunities described above, that would mean New Energy Power & Light would:

- First, provide the easy energy savings to all interested households[8] in all neighborhoods. Reminder: This intervention costs 2 cents per kilowatt-hour saved and is the least cost option all-around. Given the characteristics of New Energy and the energy-related assumptions described above, this part of the program would save 4,125,198 kWh and cost $82,504 in program costs.[9]
- Second, provide the moderate energy savings options to all interested households in all neighborhoods. Reminder: This intervention costs 6 cents per kilowatt-hour saved and is the next least cost option all-around. This part of the program would save 8,250,396 kWh and cost $495,024, bringing the total program cost to the budget of $577,528 allocated by the policymaking body.
- Because the program budget had been reached with lower-cost alternatives, New Energy Power & Light would not offer the complex home upgrades, which would have cost 18 cents per kilowatt-hour saved.

Figure 1 summarizes overall results for this program and presents a visual representation of where the energy savings, bill savings, and benefit of reduced carbon emissions fall.

The total benefits of the program are $1,237,559 in annual bill savings (for as long as the energy-saving interventions last), of which $314,947 accrues to minority households (regardless of income) and $379,512 accrues to households in low-income neighborhoods (regardless of race). In addition, carbon emissions are reduced by 9,281,695 pounds annually (subject to the life of the energy savings and future mixes of generating fuels). Rather than being allocated to individuals, the benefit of the carbon savings accrues to everyone (and their future descendants)

[7] Cost of electricity is based on average marginal rates implied across the United States, as shown in RECS 2020 data. Carbon savings are based on US data from the Energy Information Administration using 0.855 pounds of CO_2 per kilowatt-hour for large scale utility generation in 2021 and reduced (by this paper's author) to 0.75 to account for a continuous shift over time toward renewable generation. (Retrieved from https://www.eia.gov/tools/faqs/faq.php?id=74&t=11 on October 21, 2023.)
[8] The model assumes that all eligible households participate in all modeled scenarios.
[9] The modeling described here is ambivalent about how total costs of the energy efficiency improvements are distributed between the program and households. The model simply assumes a program cost of 2 cents per kilowatt-hour for this class of savings (and a similar logic for the other classes of savings).

because the climate is a shared resource and it is irrelevant whose actions reduced greenhouse gas emissions for the benefits to occur for all.[10]

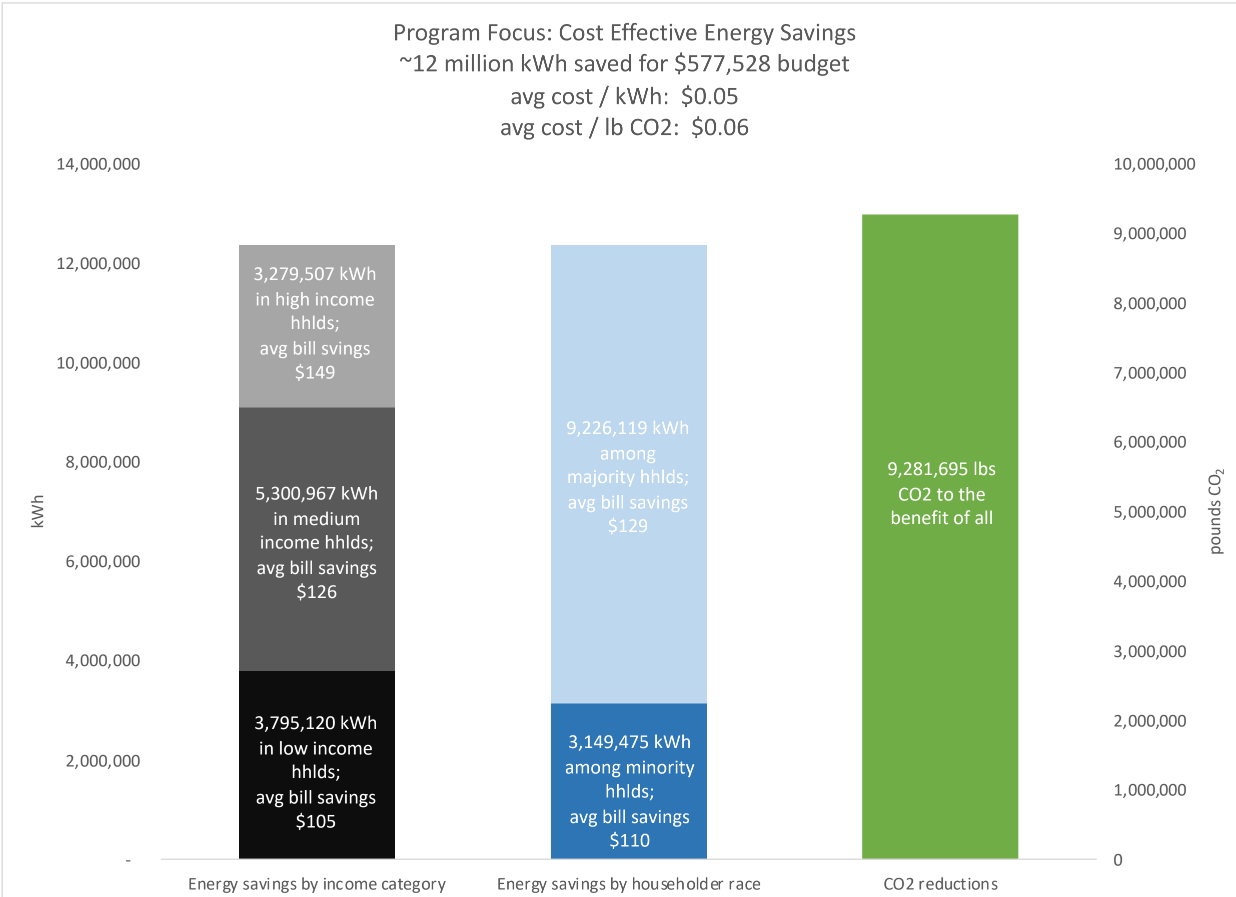

Figure 1. Energy Efficiency Program Focusing on Maximum Savings – Results

Assessing Equity-Related Trade-Offs

In an alternative scenario, the policymaking body may choose to spend the same budget of $577,528 on an energy equity initiative. Energy equity initiatives come in many forms. For illustrative purposes, this particular initiative provides the same kinds of energy efficiency services as the program in our baseline, but it directs all the funds to minority households because they are seen as historically or currently marginalized. In this case, the outcome-optimizing program manager at New Energy Power & Light would do the following:

- First, provide the easy energy savings to all interested minority households. Reminder: This intervention costs 2 cents per kilowatt-hour saved and is the least cost option all-around. Given the characteristics of New Energy and the energy-related assumptions

[10] One could also argue that the benefit of carbon reductions, regardless of their sources, accrues disproportionately to low-income households since vulnerable populations are generally thought to be at greatest risk of the negative consequences of climate change.

described above, this part of the program would save 1,049,825 kWh and cost $20,996 in program costs.

- Second, provide the moderate energy savings options to all interested minority households. Reminder: This intervention costs 6 cents per kilowatt-hour saved and is the next least cost option all-around. This part of the program would save 2,099,650 kWh and cost $125,979, leaving $430,552 in program funds available for additional work among minority households.
- Third, provide the complex efficiency upgrades that entail longer returns on their investment. The remaining budget will fund energy savings of 2,391,958 kWh, all among minority households.

Figure 2 summaries overall results for this program and presents a visual representation of where the energy savings, bill savings, and benefit of reduced carbon emissions fall.

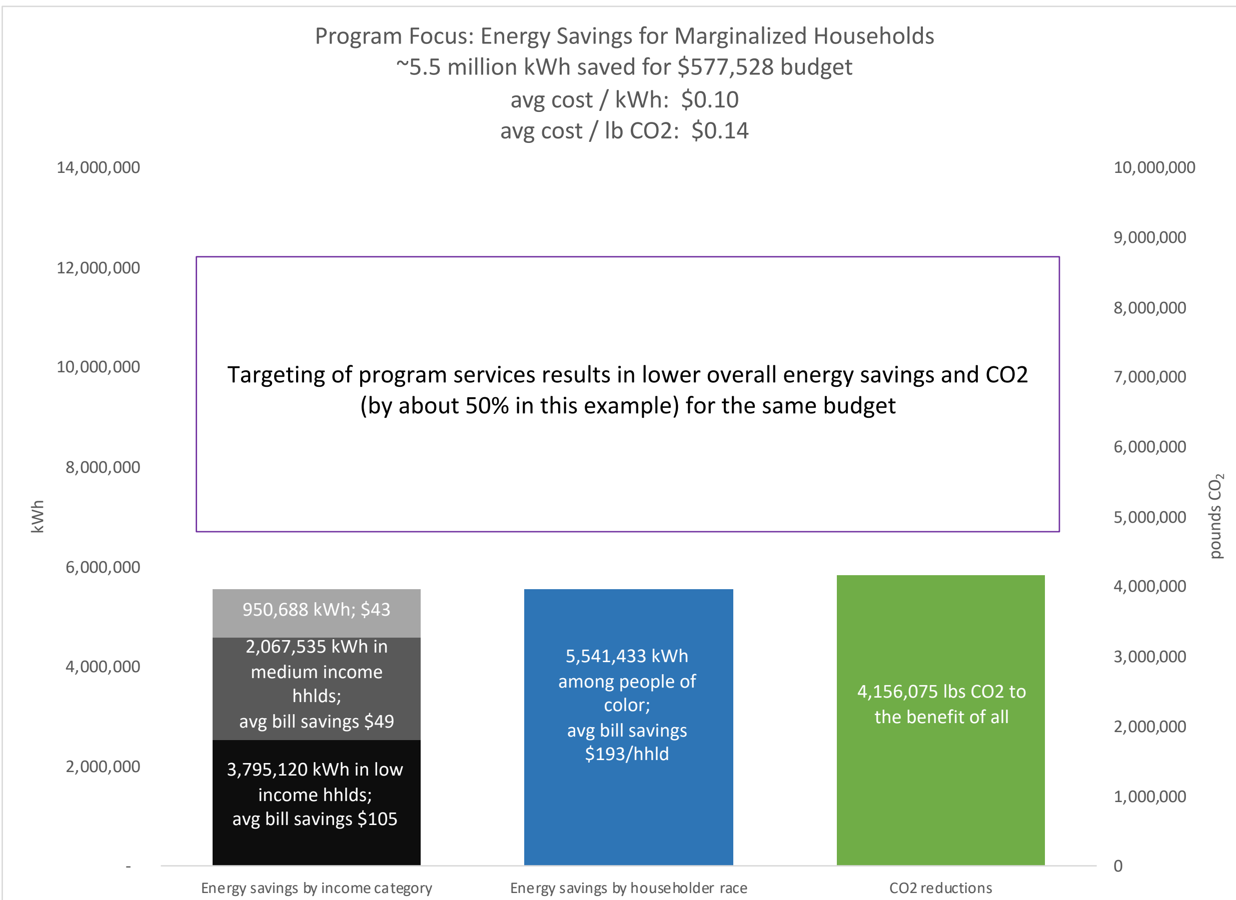

Figure 2. Energy Efficiency Program Focusing on Minority Households - Results

The total benefits of the program are $554,143 in annual bill savings for minority households (regardless of income), of which $252,321 accrues to households in low-income neighborhoods. In addition, carbon emissions are reduced by 4,156,075 pounds annually. Overall costs per kilowatt-hour saved increase from $0.05 for the energy efficiency-focused program to $0.10 for the program focused on minority households as the restriction on who is eligible causes the program to move beyond the easiest-to-obtain efficiency gains to more difficult and more costly savings.

How the Programs Compare and Why

This comparison illustrates that the two program scenarios could have very different outcomes for New Energy, as illustrated in Table 2. Not surprisingly, a standard energy efficiency program will meet traditional energy objectives more effectively than an energy program designed primarily to achieve equity objectives, whatever those equity concerns might be. Conversely, an equity-focused program will meet most equity objectives more effectively than a standard energy efficiency program. Objectives matter and result in differing outcomes.

Table 2. Program Comparison (Illustrative)

Metric	Standard Energy Efficiency Program	Energy Efficiency Program for Minority Households
Typical energy efficiency program objectives		
Total energy savings	Maximized (12 million kWh)	Half the value (5.5 million kWh)
Deferred need for additional generation	Full value (but probably not maximized in comparison to programs focused on peak demand)	Reduced value (unquantified by the model)
Climate benefits	Full value (but probably not maximized in comparison to a climate-focused initiative) (9.3 million lbs CO_2)	Half the value (4.2 million lbs CO_2)
Bill savings for society	Maximized ($1,238,000)	Half the value ($554,000)
Possible equity program objectives		
Bill savings for minority households	Two-thirds the value ($315,000)	Maximized ($554,000)
Climate benefits for minority households	Full value (9.3 million lbs CO_2)	Half the value (4.2 million lbs CO_2)
Transfer of economic benefits (as discounted or free equipment and services) to minority households	Fractional $146,975	Maximized ($527,528 minus program implementation cost)
Typical low-income program objectives		
Bill savings for low-income households	Partial $380,000	Partial if serving only minority households of any income $252,000
		Maximized in alternative design that serves only low-income households of any race $886,000

Metric	Standard Energy Efficiency Program	Energy Efficiency Program for Minority Households
Improved in-home health, comfort, and safety	Not included in this model, but both programs would provide a fraction of the benefits provided by a fully low-income-focused program	Half the value of climate benefits (4.2 million lbs CO_2); unquantified other health, comfort, and safety benefits

Interpreting These Results

The modeling results above are intended to illustrate the importance of considering the trade-offs being made when policymakers, regulators, or others require that programs achieve multiple objectives and to highlight the potential magnitude of trade-offs between energy, climate, and equity programs. The model above used a focus on historically marginalized communities defined by race for its illustration because racial data are easy to obtain and model. However, the same kinds of trade-offs can occur among other combinations of energy objectives and equity objectives, including those focusing on ensuring benefits for geographic areas identified by states or federal agencies as disadvantaged communities or environmental justice communities.

Some of the key considerations illustrated by the modeling exercise are:

Constraining or favoring potential participants reduces energy impacts. The energy-focused program is more effective than an equity-focused energy program at maximizing energy impacts, as well as associated climate impacts, because it makes the full range of energy-saving opportunities available. Equity programs that restrict or favor participation from only some energy users will use up the "low hanging fruit" of energy savings faster and need to seek impacts that are more challenging and more costly if funded at the same level or charged with the same scale of energy impacts.

In the illustrative example of New Energy, *energy savings, climate impacts, and bill savings were* ***twice as high*** *when the program concentrated on maximizing energy impacts and remained ambivalent about which households participated.* The modeled results in the New Energy example are driven by the actual distribution of race, income, and energy use in the United States, the existence of greater energy-saving potential in homes with higher energy use, assumptions built into the model about the distribution of cost-effectiveness across those savings, and the policy-driven budget assumed for a hypothetical program based on the cost of addressing the lowest two tiers of savings opportunities across all homes (as might happen when budgets are determined by potential studies).

The actual trade-offs between focusing program efforts on targeted population groups and maximizing aggregated energy impacts will depend on program and local specifics, beginning with the way the targeted populations are defined. A similar exercise to the New Energy modeling could be performed for a specific jurisdiction based on its definition of targeted populations (such as geographies labeled as disadvantaged communities, for example) and its population and energy characteristics. The point here is not that the New Energy model predicts what the trade-offs will be but that it illustrates that trade-offs could be sufficiently large to warrant further investigation and consideration by policymakers when directing programs to achieve energy results and simultaneously focus on particular population groups.

Restricting participation is the most effective way to maximize delivery of services to targeted groups… When the primary objective is a targeted distribution of the local benefits of energy efficiency upgrades—such as ensuring that specific types of households receive the inherent bill savings—the most effective approach is to limit eligibility to the targeted participants. In the illustrative example of New Energy, *total bill impacts for minority households were* ***75 percent higher*** *when a program intentionally limited itself to serving only minority households at a cost of overall effectiveness.*[11]

… except for climate benefits. The strategy of restricting program involvement to targeted population groups one wishes to serve <u>does not apply</u> to global benefits like climate protection.[12] The most effective way to reduce climate change for vulnerable populations is to reduce greenhouse gas emissions as much as possible <u>regardless where they are emitted</u>. As noted in the New Energy example, *the energy-focused program reduced carbon emissions* ***twice as much*** *as the equity-focused program*, which will result in twice the carbon benefit for minority households (or any other group considered to be vulnerable to climate change).

The trade-offs for any specific program effort will vary. That said, the most effective way to reduce future climate impact on any population group of concern is to reduce the causes of climate change without regard to where they are found. Concentrating climate emissions reduction efforts on selected populations will dilute the climate protective impacts for those populations because climate is a public good.

Meeting in the middle may provide middling results. Threading the needle between two objectives will involve compromises on both. The extent of the compromises depends on the degree of coincidence between the two objectives and where on the continuum between the objectives one chooses to land.

In New Energy's case, for example, one could implement a minimum spending requirement of 50% of the budget to be allocated to serve minority households. Doing so would double the share of program funds invested in minority households from 25% of the program budget to 50%, but at a reduction in total energy savings (and carbon reductions) of about 13%.

Again, these results are based on a specific set of modeled inputs. However, they do present a well-established principle that seeking multiple objectives will involve trade-offs unless the objectives happen to be perfectly aligned. The point of quantifying the New Energy results is simply to emphasize the importance of addressing trade-offs mindfully with priorities and optimization in mind. Clarity on how objectives compete with one another and choosing how to navigate those trade-offs makes it possible to optimize outcomes, while providing objectives that point in differing directions creates ambiguity that can stand in the way of program effectiveness.

Meeting the needs of low-income households and those designated as marginalized is not the same. Several existing equity-focused programs combine income-based and non-economic demographic characteristics in defining the population they choose to serve or prioritize, often using income and racial characteristics to define marginalized households. While there is some overlap between household economic conditions and social forces that lead to unfair outcomes, they are not the same. People find themselves with low resources for many reasons, and society has a long history of seeking to ensure everyone's basic needs are met to a

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[11] Actually, economic theory suggests that a fully equity-focused initiative would be most effective if it were not constrained to energy-related benefits or energy-specific transfers at all.
[12] This is also true of efforts to contain energy production costs for everyone through demand side management or demand response.

degree. Assistance programs seeking to meet basic needs and equity initiatives seeking to increase fairness are not the same and require different interventions. While it is understandable that they are sometimes combined for practical reasons, they should be treated distinctly in any analyses because, in reality, low-income assistance efforts are based on a third program objective alongside energy and equity. The New Energy model illustrates the inherent effects of energy and equity programs on low-income households but does not model a low-income optimizing approach.

Take-Aways and Next Steps for the Energy Field

The primary take-aways from the New Energy modeling and analysis are that initiatives with energy and equity objectives face trade-offs and that the scale of trade-offs could be substantial in some cases and warrant closer attention.

While small trade-offs may not be of concern, the potential scale of trade-offs between energy and equity initiatives is sufficiently impactful to warrant more explicit attention and choices. To the extent possible, the magnitude of any trade-offs should be considered with a clear vision for the relative priorities among the program objectives throughout programs' lifecycles, from initial conception to evaluation.

Due to the nascence of current efforts surrounding equity within energy programs, the tools and processes that are needed to optimize the realization of program objectives are not yet fully in place. The discussion below suggests some next steps.

Build on the New Energy Model with Additional Quantification of Impacts and Trade-Offs

The New Energy model presented in this paper used readily available public data to illustrate the need for greater consideration of trade-offs when programs seek to address energy (or climate) and equity objectives. Energy researchers, evaluators, and utilities are in a good position to further explore and quantify the trade-offs involved to help inform policy-setting and program design to ensure programs are optimized and ultimately cost-effective for the objectives they are seeking to fulfill.

There are at least two next steps to explore these issues further:

- The general concept of the New Energy model can be built out further with the use of actual program data on the degree and cost of achieving cost-effective or targeted levels of energy impacts in homes based on income tiers, housing type, and population categories by which targeted population groups are defined. Doing so will require collection and sharing of these data (in anonymized form) from potential studies, home energy audits, field studies, and/or program participant data, so researchers can use them for the modeling exercise.
- The population characterizations used in the New Energy model can be expanded to focus on the specific target groups prioritized by equity programs. Doing so would expand the comparisons beyond defining targeted populations just along racial lines as the New Energy model does. Conducting similar analyses based on the mix of characteristics being used to define disadvantaged communities and environmental justice communities would provide more direct comparisons. Again, this analysis will require data that is currently difficult to acquire. These data could be collected by programs, however, and then shared to allow for the research described here.

Develop New Tools to Support Planning and Calibration of Program Efforts

There do not appear to be tools in common use yet that would facilitate optimization of program efforts that seek a combination of energy and equity outcomes in ways that go beyond ensuring the basic fairness of programs themselves (i.e., efforts in the middle and lower ranges of Table 3 below).

Specifically, there would be value in the creation of tools that assess the relative cost-effectiveness of initiatives that seek energy or climate outcomes and strive to achieve broad social objectives that are not directly related to the energy or climate concerns. The energy efficiency field's cost-effectiveness tests would serve as good conceptual models. These tests allow for quantification of the relative benefit of using resources in various programs intended to save energy. Granted, such a tool or tools would need to be designed a bit differently. An initial wish list of features might include the ability to:

- Estimate and illustrate the trade-offs involved in balancing competing objectives so policymakers and program designers can make empirically informed choices about relative efforts to be made toward each goal and identify program interventions that optimize results;
- Quantify the relative equity benefits associated with a program in ways that allow for comparisons across different program models so that the most cost-effective interventions can be identified during program conceptions and design; and
- Allow for comparisons of energy and equity benefits from programs, ideally using a common benefit metric.

The energy efficiency evaluation industry is well-suited to build on these thoughts and create one or more tools to support the effective and efficient achievement of equity objectives. Such tools could be designed to support policymaking and funding decisions, portfolio and program design, and evaluation of the resulting programs. Ideally, such tools would be developed collaboratively with an eye toward consensus and uniformity across the industry and jurisdictions. They could then be used during program conceptualization and program design to ensure that public and ratepayer funds are used effectively and in alignment with the intended balance among any competing objectives.

Create More Clarity on the Meaning of Equity

Policymakers and programs have been pursuing a wide range of goals under the umbrella of equity. The spectrum of these goals ranges from ensuring that any given program effort is not inherently biased in a problematic way to seeking to overcome broader societal concerns using energy programs as a mechanism for doing so. Table 3 shows one possible way of thinking about this continuum.

Table 3. Range of equity-related goals being addressed in energy programs

Breadth	Coverage	Objective	Example
Narrow . . . . Wide	Program-specific	Ensure equal access by all (adjusted for potential benefit of participating)	Marketing and program infrastructure is designed to ensure it reaches all population groups with high potential energy savings from participating
		Ensure equal access by all regardless of potential benefit of participating	Marketing and program infrastructure is designed to reach all population groups
		Ensure equal participation	Extra marketing and focus on population groups that are less likely to participate
		Ensure equal results of participation	Extra marketing, enhanced benefits, and budget set-asides to ensure all population groups obtain proportional benefits regardless of overall savings potential or cost of delivery (or with allowance for a cost premium)
	Energy sector-specific	Provide energy programs to population groups that have been affected disproportionately by energy-related harms	Targeting energy programs to provide benefits to population groups that have been disproportionately affected by pollution from energy production by offering energy benefits unrelated to that pollution
	Societal (beyond energy)	Provide energy programs to population groups of concern with an intent of overcoming overall societal inequities	Targeting energy programs to provide benefits to population groups that have been disproportionately affected by transportation pollution, legacies of discriminatory housing practices, uneven health outcomes, and related societal concerns unrelated to energy

Clarity of the objectives for any given program is a key first step and necessary condition for ensuring that program design can actually address the objectives. It is also key to conducting the types of further analysis about trade-offs and create the tools that would help programs optimize their efforts between energy and equity objectives. Policymakers can facilitate effective and efficient implementation of their intensions with clarity on where programs' equity objectives fall on the continuum shown in the table above and then expanding on expectations and more specific goals from there.

Build on Existing Geographic Mapping of Areas of Concern

One of the most prevalent existing (and very helpful) tools to support equity programs is the mapping of geographies of concern to allow for geographically targeted program efforts.

Several states categorize Census tracts into disadvantaged communities, environmental justice communities, or similarly named geographies for funding set-asides and enhanced program efforts. For example, California—arguably one of the leaders in these efforts—compares selected demographic and pollution data for individual Census tracts to the rest of the state; these maps are then used to characterize Census tracts into disadvantaged communities (California Office of Environmental Health Hazard Assessment 2021). Policymakers and programs use these disadvantaged community designations to identify households or other utility customers for enhanced program services or efforts. These geographic mapping tools can be highly useful and allow for program targeting to ensure specific equity goals are addressed.

At the same time, the binary label of "disadvantaged community" to which the use of these tools sometimes defaults creates a one-size-fits-all designation that may not always be warranted or match specific equity concerns. Consequently, the power of the mapping is underused when equity objectives are characterized simply as serving disadvantaged communities more. For example, some of California's disadvantaged communities are characterized as such due to extensive groundwater pollution from non-energy sources. An enhanced energy offering in those communities may infuse cash or provide some conceptual compensation for past and on-going agricultural or industrial pollution, but no amount of program effort to upgrade energy-using equipment or enhance efficiency will help these particular Census tracts improve their groundwater and achieve delisting from the ranks of disadvantaged communities list.

Disconnects of this type could be resolved by more finely tuned geographic designations and an attempt to match targeted areas to the type of equity resolution desired. The program activities can then be designed to directly address the objectives and measured accordingly.

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