Powering More than Energy: Capturing Hidden Benefits of Programs

Kimberly Jaeger Johnson, Eileen Hannigan, Emily Morris,
and Xijun Zhang, E Source
Jennifer Mitchell-Jackson, Grounded Research
Stefani Penn, Industrial Economics, Inc. (IEc)

ABSTRACT

In the wake of rising utility rates and Governor Newsom's 2024 executive order addressing California's energy affordability crisis, program administrators (PAs) are seeking new ways to demonstrate the full value of energy efficiency (EE) programs—especially the non-energy benefits (NEBs) that traditional cost-effectiveness metrics overlook (OGC-GN, 2024). This paper describes two recent California studies that develop and pilot methods to quantify and monetize a wide range of NEBs. The Statewide Equity NEBs Study, led by Southern California Gas Company (SoCalGas) with statewide partners[1], responded to a California Public Utilities Commission (CPUC) directive by creating a standardized NEB quantification framework for equity-focused programs spanning Investor-Owned Utilities (IOUs), Regional Energy Networks (RENs), and Community Choice Aggregators (CCAs). The REN Benefits Calculator Study, led by the Southern California Regional Energy Network (SoCalREN)[2], built a practical "benefits calculator" to integrate program data and research inputs, assigning dollar values to diverse program outcomes such as improved affordability, health and comfort gains, climate resiliency, and local economic development. Both efforts aim to equip program administrators with the ability to capture and communicate a more complete portfolio of program value beyond energy savings. Initial results demonstrate that many NEBs can be credibly monetized using defensible data and methods, laying a foundation for incorporating NEBs into regulatory and planning frameworks and expanding the definition of program success to include equity, resilience, and community well-being.

Introduction

California's recent policy shifts have put a spotlight on energy affordability and resilience. Governor Newsom's executive order signaled potential cuts to ratepayer-funded EE programs, especially those deemed not cost-effective (OGC-GN, 2024). Traditionally, IOUs must meet strict cost-effectiveness tests for EE programs, whereas RENs and CCAs—which run gap-filling, equity-focused programs—have not been held to the same requirements. However, with affordability concerns rising, even RENs and CCAs are now under pressure to demonstrate value beyond energy savings so their programs don't face budget reductions. In this context, California PAs—encompassing IOUs, RENs, and CCAs—strive to quantify the full spectrum of NEBs that their programs deliver. NEBs are the important but historically non-monetized

[1] Partners include a Statewide Equity Working Group with research support from IEc and E Source.
[2] Grounded Research and E Source led this study.

outcomes of EE programs, such as participant utility bill savings, improved health and comfort, enhanced community resilience, and local economic growth. Capturing these "hidden" benefits is crucial for painting a complete picture of program value and for justifying the continuation of initiatives that advance equity and sustainability goals.

To address this need, the Statewide Equity NEBs Study and the REN Benefits Calculator Study were launched in California. The Statewide Equity NEBs Study, driven by a policy mandate, focuses on developing a consistent framework to evaluate NEBs across multiple PAs. It is concentrated on a pre-defined set of NEB indicators (selected via stakeholder input) and ensured each could be defined consistently for any program. The REN Benefits Calculator Study is creating a practical tool to calculate and monetize a broad range of benefits from REN programs. The study takes a bottom-up approach, looking at existing REN programs and capturing benefits that could be directly calculated from available data or well-supported assumptions, within a structure that groups benefits by who is impacted (participants, partners, communities). Despite differences in scope, both studies share an overarching goal: to expand the understanding and valuation of program impacts beyond energy savings and provide PAs with concrete ways to integrate NEBs into their decision-making and communications. The following sections outline each study's objectives and approach, compare their scope and methodologies, discuss how key NEBs are identified and quantified, and summarize the findings, challenges, and recommendations that emerged.

Study Overview

Statewide Equity NEBs Study: This effort responds directly to CPUC Decision D.23-06-055, which called for developing consistent NEB metrics for equity-focused EE programs across all PAs (CPUC, 2023). The study encompasses over 50 market rate (non-income-qualified) equity segment EE programs serving disadvantaged or hard-to-reach customers (for example, those in designated Disadvantaged Communities, rural areas, and moderate-income households) across multiple sectors—residential, commercial, public, and more—administered by California's IOUs, several RENs (e.g., 3C-REN, BayREN), and at least one CCA. Throughout 2025, a statewide Equity Working Group with representatives from IOUs, RENs, and CCAs met regularly to prioritize which NEBs to include and to guide the development of quantification methods.

Eleven NEBs emerged as the top priorities for equity programs: 1) Utility bill savings: lower bills due to program participation, 2) Improved comfort: improved indoor environmental conditions, 3) Improved participant health: reduced respiratory symptoms due to improved indoor air quality, 4) Increased participant job access: increased technical and soft skills for disadvantaged workers that lead to job attainment, 5) Broader economic development: increased local revenue, 6) Improved societal health: reduced outdoor air pollution, 7) Increased jobs: creation of new energy efficiency jobs, 8) Reduced utility shut-offs: reduction in financial stress due to energy affordability, 9) Increased property value: more attractive buildings due to energy efficiency upgrades, 10) Increased productivity: more comfortable and productive work environment, and 11) Enhanced community resilience: buildings and infrastructure are less vulnerable to disruptions in energy supply. Of these, three —increased property values, community resilience, and productivity gains—were de-emphasized or handled qualitatively due

to either limited relevance to equity goals or difficulties in measurement (for instance, concerns that rises in property value might inadvertently contribute to gentrification).

The primary output of this statewide study will be a comprehensive NEB Quantification Handbook – essentially a standardized framework with documented methodologies for each prioritized NEB. This handbook is intended for broad applicability across IOUs, RENs, and CCAs, establishing a common set of NEB definitions and calculation approaches that any PA can apply to estimate the added benefits of their programs. By design, this model aims to enable all PAs to incorporate a consistent set of NEBs into their reporting, planning, and regulatory filings, particularly as California moves toward equity-focused metrics by 2028.

REN Benefits Calculator Study: In parallel, a separate study is underway to develop a REN-specific, program benefits calculator. RENs operate portfolios of EE programs that often emphasize outreach, workforce development, and serving public agencies or market segments not be fully served by IOUs. These programs frequently produce many benefits beyond the standard resource savings captured by the CPUC's Total System Benefit (TSB) metric. The REN Benefits Calculator, still in development, is a functional, user-friendly tool that integrates actual program data (e.g., energy savings, participant counts, incentives provided) with secondary research values to monetize a comprehensive set of program benefits. The tool organizes benefits into standard categories and uses defensible inputs (values from credible sources) for each benefit algorithm.

The study defines ten specific benefit types that REN programs can produce that span multiple beneficiary groups—namely participants, partners, and communities. These are: 1) Cost Savings: Utility bill savings, free equipment/labor, reduced maintenance, and lower business operating costs, 2) Direct Financial Support: Grants, rebates, and incentives provided directly to participants, 3) Revenue Increase: Increased sales revenue from program activities, 4) Community Support: Avoided community costs from reduced emissions and progress toward GHG, decarbonization, or resiliency goals, 5) Community Wellbeing: Reduced demand for social services, improved access to community services, and enhanced resiliency and preparedness, 6) Health: Improved individual and community health through reduced pollution, heat exposure, and better air quality and nutrition access, 7) Education & Training: Workforce training and practical energy efficiency learning for home and workplace application, 8) Local Economy: Increased wages and local spending driven by cost savings and financial support, 9) Building & Housing Conditions: Higher property values, increased tax revenue, and more stable, comfortable, and resilient buildings, and 10) Natural Resource Conservation: Reduced use of water and other resources, and avoided infrastructure costs. For each benefit type identified, the team developed a specific calculation method to express the outcome as a monetary value, using inputs from program tracking data, annual reports, evaluation findings, or external research.

The REN Benefits Calculator is a model based on one REN's 2024 program results in both the residential and public sectors, demonstrating how to calculate first-year and lifetime NEB values for each benefit category. The calculator is designed to be adaptable and replicable: other RENs could plug in their own program data and local parameters to produce parallel analyses. The REN Benefits Calculator shows how a PA can internally quantify its portfolio's NEBs using available data and credible assumptions—providing a template that others might follow to capture the full value of their programs.

Shared Objectives: Despite differences in scope and format, both studies seek to equip PAs with robust, practical tools for understanding, quantifying, and communicating their programs' broader value. Table 1 provides a side-by-side comparison of the components of each study:

Table 1. Study Component Comparison Table

Study Component	Statewide Equity NEBs Study	REN Benefits Calculator
PA Application	Framework considers all PA types (IOUs, RENs, CCAs) based on 50+ programs statewide (residential, commercial, public, etc.) for consistent valuation and reporting of equity-focused program benefits.	Pilot model based on a single REN's program portfolio (starting with residential and public programs with plans to expand to other sectors) to be adapted and scaled by other RENs.
Objective	Develop a handbook to standardize NEB quantification methods and meet CPUC equity policy requirements by 2028.	Build a practical tool (calculator) that monetizes the full range of NEBs from REN programs, demonstrating how to integrate program data with research-based values.
Program Scope	Market rate (not low income), Equity segment EE programs for disadvantaged or hard-to-reach customers across multiple PAs.	EE programs across all segments (Equity, Market Support and Resource Acquisition) targeting underserved markets.
Key Deliverable	NEB Quantification Handbook – a detailed framework documenting methodologies for calculating each prioritized NEB. Intended as a reference that any PA can use to apply NEB valuation to their programs with available data and credible secondary sources.	REN Benefits Calculator– a pre-populated spreadsheet model that integrates existing program metrics with external data values to compute dollar values for each benefit category. Aggregates results to the portfolio level. Designed so that other RENs could use key parameters and replicate the analysis in a manner that could be customized for their programs.

Note: NEB = non-energy benefit; PA = program administrator; IOU = investor-owned utility; REN = regional energy network; CCA = community choice aggregator, CPUC = California Public Utilities Commission; EE = energy efficiency.

NEB Categories and Metrics

While both studies target a broad spectrum of benefits, each subdivides and quantifies NEBs somewhat differently. When combined, the NEBs identified through both efforts address seven overarching categories: 1) Affordability, 2) Health and Comfort, 3) Economic Benefits, and 4) Resilience and Community, 5) Property and Infrastructure, 6) Productivity, and 7) Natural Resource Conservation. Notably, Productivity benefits such as better student or worker performance were acknowledged in the Statewide Equity NEBs study but remain challenging to

monetize in the REN Benefits Calculator, and Natural Resource Conservation like water savings was explicitly quantified only in the REN Benefits Calculator since the Statewide Equity NEBs study focused more on energy than other natural resources. Table 3 lists these high-level NEB categories and examples of metrics considered in each study's analysis.

Table 3. High-Level NEB Categories and Examples of Metrics in Each Study

NEB Category	Benefit Level	Metrics	Metric Examples (not comprehensive)	Statewide Equity NEBs Study	REN Benefits Calculator Study
Affordability	Participant	Utility bill savings	Energy cost reductions	X	X
	Participant	Reduced utility shut offs	Avoided service terminations for non-payment	X	
	Participant	Maintenance & equipment savings			X
	Participant	Direct financial support	Grants, rebates, incentives to participants		X
Health & Comfort	Participant	Improved home or building comfort	Better temperature control	X	X
	Participant	Participant health improvement	Fewer asthma or respiratory illness symptoms, access to healthy foods	X	X
	Societal	Societal health benefit	Cleaner air, fewer hospital visits, avoided premature mortality	X	X
	Societal	Community well-being	Improved emergency preparedness, reduced need for social services, greater safety in homes		*
Economic Benefits	Participant	Increased job access for participants	Training or hiring of program participants	X	
	Societal	Job creation & retention	Total jobs added in the community	X	
	Societal	Regional economic development	Increase in local revenue for partners or businesses or job-	X	*

			years from program investment		
	Participant	Education & workforce training outcomes	Workforce development outcomes, such as certifications or skills gained		*
	Societal	Local economy benefits	Wages earned, increased local spending from cost savings and incentives		*
Resilience & Community	Societal	Avoided emissions costs		X	X
	Societal	Progress toward community climate/resiliency goals	More resilient buildings		X
	Societal	Climate adaptation capability	Better capability to handle extreme weather	X[a]	
Property & Infrastructure	Participant	Increased property values from efficiency upgrades		X	X[a]
	Societal	Community tax revenue gains from increased property values		X	X
Productivity	Participant	Improved productivity due to improved environments	Better student performance or workplace productivity	X	X[b]
Natural Resource Conservation	Societal	Water savings from efficiency measures			X
	Societal	Avoided water infrastructure costs			X

Note: X = This category was quantified or incorporated into the framework for the Statewide Equity NEBs Study or the REN Benefits Calculator study; * = This category was considered but not yet incorporated into the REN Benefits Calculator; planned for 2026 research; a = This category was recognized as important but not yet linked to quantifiable metrics; b = This category was not explicitly monetized in the REN Benefits Calculator but acknowledged qualitatively as a co-benefit.

Methodological Approaches and Data Considerations

Both studies relied on a mix of program data and external research to estimate NEBs, but the specifics of their methodologies differ according to their purposes.

Data Inputs and Tools: Each study combined program-specific data with reputable external sources to ensure credible NEB estimates. For instance, the Statewide Equity NEBs Study drew on data from utility customer information systems and results from established research, such as the statewide Energy Savings Assistance program's NEI study (Evergreen Economics 2025), to obtain parameters for health and comfort benefits. It identified economic multipliers using tools like the U.S. Bureau of Economic Analysis's RIMS II (BEA 2018) or IMPLAN models (IMPLAN Group 2022) to estimate job creation and regional economic impacts from program spending, utilized California Employment Development Department (EDD) statistics for wages and job metrics (EDD 2026), and applied EPA tools such as AVERT and COBRA (EPA 2026) to translate energy savings into avoided emissions and associated public health benefits. The REN Benefits Calculator similarly integrated the REN's own program performance data with external values: for example, it used the CPUC's prescribed Social Cost of Carbon (CPUC 2024) figures to monetize avoided CO_2 emissions, public health cost factors from sources like the US Center for Disease Control for pollution-related health improvements, and other peer-reviewed values (e.g., cost of an asthma emergency room visit, value of a kilowatt-hour of reduced air pollution) for its calculations. In both studies, an emphasis was placed on using defensible, peer-reviewed input values. Every assumption—whether the dollar value of removing a ton of CO_2, the value of a kWh avoided at peak, or the economic value of improved health outcomes—was drawn from reputable research or official government estimates, with citations documented in each study's methodology. This practice was intended to lend credibility to the resulting NEB valuations and to make it easier for stakeholders (including regulators and evaluators) to review, replicate, and update the calculations over time.

Data Limitations and Gaps: A key challenge faced by both efforts was that many desirable NEB metrics require data that PAs have not historically collected or shared. For example, one important affordability-related NEB is the reduction in customer utility shut-offs (disconnections due to non-payment) attributable to EE programs; however, PAs typically do not track which program participants avoided bill delinquency or disconnections. Estimating this impact would require linking program participation data with utility billing and arrearage records—data that utilities possess but may hesitate to share in detail due to privacy concerns. Similarly, quantifying health outcomes (like fewer asthma attacks or improved indoor air quality) would ideally use granular public health and participant data that are often unavailable at the program level. Both studies addressed such gaps by using informed proxies and averages. For instance, if direct health outcome data were not accessible, the studies drew on broader epidemiological research (e.g., "weatherizing 100 homes is statistically associated with preventing *X* asthma-related emergency room visits per year" based on prior studies). The Statewide Equity NEBs working group carefully assessed data availability for each prioritized NEB. If a particular metric's data requirements were too impractical or costly, the method was adjusted to use more readily available proxy data, or that NEB was flagged as a longer-term measurement goal. The REN Benefits Calculator, operating with a limited dataset, noted several potential benefits that remained unquantified in dollars—such as comfort improvements, increased property values or tenant retention rates, and educational impacts—due to a lack of tracked metrics or robust valuation formulas. In some cases, the calculator used generalized

values (e.g., state-average energy rates, typical usage profiles, or default emission factors) when REN-specific program tracking data was not available, which can reduce precision. Both studies underscored that many real benefits likely occur without being captured in current metrics, simply because the data needed to monetize them either does not exist or is siloed and difficult to obtain.

Ensuring Practicality and Transparency: Both the Statewide Equity NEBs Study and the REN Benefits Calculator Study were designed with an emphasis on user-friendliness and transparency. The Statewide Equity NEBs Study handbook has clear instructions, standardized definitions, and formula templates so that PAs can follow step-by-step procedures to calculate NEBs for their own programs. The intent is to avoid creating a "black box" model—each calculation is documented and explained so that users understand how results are derived. During development, the working group conducted trial calculations ("pressure tests") with sample program data to ensure the methods were practical and that PAs would be able to supply the required inputs. This iterative vetting process led to refinements, such as simplifying overly complex models and highlighting where expert judgment or additional research might be needed to fill data gaps.

Likewise, the REN Benefits Calculator was developed as a pilot Excel-based tool, accompanied by detailed methodology documentation that outlines all inputs, sources, and calculations for the calculator. This spreadsheet format was chosen to make the tool accessible to program staff without specialized software and to allow easy annual updates. SoCalREN program staff reviewed draft results to check that the outputs were plausible and useful for communication. The tool can present results in multiple ways (e.g., total dollar value of NEBs per program or for the portfolio; breakdowns by who benefits or by type of benefit), which helps tailor messaging to different stakeholders—such as regulators, local government partners, or the general public. Transparency is ensured by documenting each input source and calculation step within the workbook tool, so users can trace how each value is computed and adjust assumptions as needed.

Importantly, both studies view their current methodologies as a starting point that will evolve over time. They emphasize balancing analytical rigor with the *feasibility* of implementation in real-world program contexts. In practice, this means beginning with simpler, conservative estimation techniques that use available data, and then improving precision as more data become available or as new research provides better valuation methods. Both projects recommend that PAs start integrating NEB-related data collection into their regular operations (for example, adding survey questions about participant comfort, health, or economic situation at program entry and exit) to build a stronger empirical basis for future NEB quantification. They also suggest enhanced collaboration—among PAs and with other agencies—to obtain needed data in ways that respect privacy (for instance, sharing aggregated, anonymized billing and arrearage data to estimate avoided shut-offs, or partnering with public health departments to track community health indicators in program areas). In summary, each study's methodology was crafted to be as rigorous as possible while remaining practical for PAs to implement, with full transparency about data sources, assumptions, and uncertainties so that the NEB valuation process can be both credible and replicable.

Key Findings and Common Recommendations

Key Findings: The two studies each provided insights into the magnitude and importance of NEBs, even though their end products differed (a handbook vs. a calculator). The Statewide Equity NEBs study did not produce a single number for total NEBs, but it identified a clear set of priority benefits and detailed methods for quantifying them. This process underscored that equity-focused programs deliver meaningful benefits in areas like bill savings, comfort, health, and economic opportunity, which are highly valued by stakeholders and can be estimated using existing research and data. It also highlighted which potential benefits are most challenging to quantify (such as community resilience or individual productivity improvements) and laid out a roadmap for developing those metrics in the future. The REN Benefits Calculator study, by contrast, actually put dollar figures on many of these benefits. The results revealed that the REN's programs yielded multi-faceted returns: for example, significant bill relief for participants and public agencies, quantifiable public health benefits from emissions reductions, and modest but noteworthy contributions to local economic activity and climate goals. At the same time, some benefits remained intangible or unquantified due to data limitations, reinforcing findings similar to the Statewide Equity NEBs Study that certain "softer" benefits (like improved comfort or education outcomes) need further data collection or methodological development before they can be robustly monetized. Both studies found that incorporating even a subset of NEBs can substantially improve the apparent cost-effectiveness and stakeholder appeal of EE programs that might otherwise appear marginal under energy-only metrics. This suggests that broader adoption of NEB valuation could help protect and expand programs that advance equity and sustainability objectives.

Shared Challenges: Several common challenges emerged across both studies, underlining the difficulties of fully capturing NEBs in program evaluations. First and foremost is the lack of consistent data on many high-value NEBs. Many outcomes—comfort, health, resilience, education, and overall community well-being—are not routinely tracked in program databases, which means their benefits often go unmeasured. Both studies had to rely on proxy data or general estimates to monetize some impacts, and even then, the precision of those estimates is limited. For example, without utility-provided data on arrearages and disconnects, it is challenging to quantify how EE programs reduce financial stress and prevent shut-offs for participants, even though stakeholders consider this a critical benefit. Similarly, without longitudinal health surveys or partnerships with public health data systems, improvements in participant health can only be roughly estimated from literature values rather than measured directly.

Another challenge is the immaturity of certain NEB quantification methods. Established monetary values exist for some impacts (e.g., the social cost of carbon for climate benefits, or epidemiological cost factors for pollution-related health events), but other NEBs lack consensus on valuation techniques. For instance, how should one quantify "community resilience," or the value of increased comfort and productivity? Both efforts noted that some of these concepts need clearer definitions and methodological development. There's also a risk of double counting benefits if definitions and boundaries are not clearly delineated—for example, an efficiency

project might simultaneously improve comfort, health, and productivity, but careful accounting is needed to ensure these distinct benefits are not conflated or counted more than once.

Lastly, both studies had to balance analytical rigor with practical feasibility. A highly complex and precise model for NEBs might be ideal in theory, but if it requires data that PAs cannot obtain or demands analytic resources that programs don't have, it won't see widespread use. Both the handbook and the calculator were designed to be as straightforward as possible (given the complexity of NEBs), favoring transparency and ease-of-use over perfection. This meant using a phased approach: start with the most important and tractable NEBs and simpler methods, then refine and add more categories over time. In doing so, both teams acknowledged that NEB quantification is an evolving practice that will improve as it is iteratively tested, refined, and scaled up.

Recommendations: Despite these challenges, the studies converged on several common recommendations for PAs and policymakers looking to integrate NEBs into program assessments. Table 4 summarizes the core challenges identified and the corresponding recommendations that both efforts emphasized.

Table 4. Common Challenges in NEB Quantification and Shared Recommendations

Core Challenge	Context in Both Studies	Shared Recommendation
1. Limited NEB data availability	Many high-value NEBs (comfort, health, resilience, education, community well-being) are not systematically tracked, leaving significant program impacts unquantified.	Focus on a manageable set of critical NEBs initially, and build data collection efforts (surveys, tracking fields) into programs to capture those outcomes. Incorporate NEB indicators into routine program reporting to develop data over time.
2. Immature or unclear methods	Standardized monetization methods are lacking for several outcomes (e.g., resilience, productivity, certain health impacts), leading to uncertainty.	Prioritize quantification of NEBs with well-established causal connections and valuation methods. Treat less-certain benefits qualitatively in the near term. Clearly document assumptions and acknowledge areas where more research is needed to monetize benefits.
3. Inconsistent definitions, risk of double-counting	NEB categories can overlap (e.g., one action might yield both health and economic benefits), and different PAs might define benefits differently, undermining comparability.	Establish clear, consistent definitions and boundaries for each NEB. Use frameworks that distinguish between participant-level vs. community-level benefits to attribute impacts without double-counting. Promote industry consensus on NEB definitions through collaborative working groups.

4. Rigor vs. feasibility trade-offs	Methods that maximize analytical rigor can be data- and time-intensive, which may be impractical for many program administrators with limited budgets and capabilities.	Adopt a phased approach: start with simple, credible estimation techniques that use available data and require minimal additional resources. Over time, refine and expand methods as data access, stakeholder buy-in, and analytical capacity grow.
5. Use of proxies and assumptions	Both studies had to rely on generalized inputs (averages for energy rates, generic multipliers, etc.) where program-specific data were missing, which can reduce result precision.	Whenever possible, update default assumptions with localized or program-specific data. Regularly revisit and revise proxy values (e.g. region-specific health statistics, local wage rates) as better data become available to improve accuracy.
6. Data sharing and privacy	Certain valuable data (e.g., customer billing and arrearage records, health outcome data) are not easily accessible due to privacy regulations or institutional silos.	Develop protocols for using aggregated, anonymized data to estimate sensitive participant outcomes. Pursue partnerships or data-sharing agreements with utilities, public health agencies, and other stakeholders to secure access to relevant data while protecting privacy.
7. Program diversity	Equity and REN programs vary widely (e.g., direct installations vs. outreach or training), so no single NEB metric applies universally, and some benefits do not pertain to all program types.	Use a common overarching framework that can be customized: define a menu of potential NEBs, but allow each program to select and report those that are pertinent. Ensure the framework/tool is flexible enough to accommodate different program designs while maintaining consistency in definitions.
8. Many recognized benefits remain unquantified	Both studies identified numerous benefits that are known to exist (e.g., greater tenant satisfaction, improved community pride, educational outcomes) but could not be monetized with current data/methods.	Be transparent about which benefits are included quantitatively versus qualitatively. Label unquantified benefits clearly as areas for future work. Invest in targeted research or data collection to bring these into the quantifiable realm over time, rather than ignoring them entirely.
9. Need for transparency & credibility	Gaining regulator and stakeholder trust is critical, especially since NEB valuation is relatively new and can be perceived as subjective.	Document all data sources, assumptions, and calculation steps in a transparent way (e.g., in methodology guides or embedded tool notes). Ensure that methods are replicable by others. By making the process clear and open to scrutiny, PAs can build confidence in the NEB estimates and facilitate broader adoption.

10. NEB quantification is evolving	Both studies view their outputs as initial steps. NEB valuation techniques will improve with continued use, feedback, and new research (especially as the concept of resilience is further defined).	Treat NEB measurement as a continuous improvement process. Update and refine the framework and tools regularly, incorporating new data, better methods, and stakeholder input. This adaptive approach will gradually expand the scope and accuracy of NEB valuations and keep them aligned with evolving policy goals.

Implications for Policy and Future Integration

The development of these NEB quantification methods comes at an opportune moment. California regulators and policymakers are increasingly open to broader measures of program value, especially as equity and decarbonization goals take center stage. The CPUC's recent decisions on equity-focused portfolios explicitly acknowledge the importance of NEBs and anticipate that PAs will begin tracking and reporting on NEBs as part of their performance metrics. While to date the state's formal cost-effectiveness tests still emphasize traditional energy and capacity benefits, the work from these studies provides tools and an evidence base that can inform a shift in how program success is measured. For example, it is conceivable that in the near future an "Equity Program Scorecard" could supplement energy savings metrics with indicators like the number of households avoiding bill arrearages or the estimated dollar value of health improvements achieved through a weatherization program. This would mark a significant shift from viewing EE initiatives purely as energy resource programs to viewing them as platforms for delivering energy equity and broad societal benefits.

Beyond CPUC proceedings, the insights from these studies may also feed into state-level energy and climate planning. California's Senate Bill 100 mandates integrating Non-Energy Impacts (NEIs) – such as health, resilience, and workforce development – into long-term energy strategy modeling by 2026 (CEC, 2023). The NEB categories quantified in these two studies (affordability, climate resiliency, health, economic development, etc.) align closely with the NEI dimensions that the California Energy Commission is examining for policy analysis. The methodologies and values developed here could serve as a starting point for establishing standard statewide NEI monetization approaches. For instance, if the REN Benefits Calculator determines that the social value of a kilowatt-hour saved in a disadvantaged community is, say, double the value of the energy alone when health and climate benefits are included, state planners might incorporate a similar "NEB adder" when evaluating future program proposals or setting funding levels. In this way, these studies help build a quantitative bridge between high-level policy goals and on-the-ground program metrics.

There are also practical implications for program design and portfolio management. By illuminating which programs create which types of NEBs, administrators can make better-informed decisions to maximize total value. For example, if a certain retrofit program yields especially large health benefits, a PA might collaborate with public health agencies or seek additional funding from health-focused grants to expand that program. If a workforce training initiative shows strong economic multipliers (e.g., job placements and increased income for

participants), it could justify scaling up that effort with support from economic development funds. In essence, systematically accounting for NEBs enables a more holistic business case for EE programs: instead of saying "this program saves X kWh," administrators will be able to say, "it saves X kWh and delivers valuable co-benefits worth $Y to the community." Such framing can attract new allies and funding streams—like climate resilience grants or public health funding—into the energy efficiency sector.

Conclusion

The two studies discussed in this paper underscore that the definition of program success in the energy efficiency realm is evolving. Both efforts illustrate how quantifying NEBs can change the conversation around programs that may fall short on traditional cost-effectiveness but excel in delivering benefits that matter to customers, communities, and policymakers. By taking a pragmatic, data-driven approach to monetizing these benefits, program administrators can better demonstrate how their initiatives power more than just energy savings. Going forward, continuous improvement will be key: as new research emerges (for example, improved methods to quantify resilience or educational impacts) and as stakeholders provide feedback on what resonates, the NEB valuation approaches can be refined and expanded. California's efforts to systematically value NEBs will be closely watched by other states and regions. If successful, they could catalyze broader adoption of NEB-inclusive valuation, ensuring that energy efficiency and other clean energy programs are recognized and funded for the full suite of benefits they deliver to individuals, communities, and society at large.

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