A new program framework that integrates workforce development with direct install delivery to achieve equitable outcomes

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ABSTRACT

Commercial customers in Geographically Hard-to-Reach (HTR), underserved, and disadvantaged communities face two key challenges: rising energy costs and limited access to program resources. The Central California Rural Regional Energy Network's (CCR REN) Commercial Energy Improvement Program (CEIP) addresses both by integrating workforce development with direct install (DI) program delivery. First, entry-level workers, with little or no experience, are recruited as Commercial Energy Advisors (CEA) from within the communities served. They are trained as a cohort and mentored by program staff. CEAs guide and support customers from initial education to project implementation, and beyond.

The integration of workforce development with DI project delivery strengthens program design in two ways. First, the framework mitigates the transactional nature of DI offerings, placing more emphasis on place-based, in-community solutions. Second, the framework creates real job pathways for CEAs by providing them training and the experience necessary to enter the energy industry. Combining in-community workforce development with DI enhances community capacity, expands local economic resilience, and demonstrates a scalable pathway for integrating equity into commercial portfolios that prioritize Resource Acquisition.

For practitioners, our framework provides a replicable approach to streamline fragmented program landscapes, increasing program participation. For policymakers it provides a framework for embedding equity and workforce development into commercial portfolio design. For researchers, it presents an opportunity to examine how trusted, community-based advising can shift participation dynamics, costs of service, and persistence of savings. The framework demonstrates that program design rooted in equity can deliver cost effective efficiency outcomes.

Introduction

CCR REN overview

CCR REN supports an equitable and affordable clean energy transition for underserved communities. By leveraging regional collaboration, trusted local relationships, and pragmatic responses to local and regional needs, CCR REN serves communities that have historically lacked access to energy efficiency programs.

CCR REN was authorized to begin implementation in September 2024 by the California Public Utilities Commission (CPUC) through D.24-09-03 (CPUC 2024). CRR REN's territory covers approximately 49,000 square miles across the Central Coast, San Joaquin Valley, and Eastern Sierra regions of California. CCR REN serves a footprint slightly larger than the state of Pennsylvania, about 31% of California's total land area, serves 14 of California's 58 counties, and is home to approximately 5.3 million Californians. Each CCR REN region has distinct social, political, economic, geographic, and climatic characteristics.

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To ensure every part of the territory is represented, and that unique, place-based solutions are advanced, five partner organizations collaborate as the CCR REN Leadership Team. CCR REN is administered by the County of San Luis Obispo on behalf of the partner organizations: the Association of Monterey Bay Area Governments (AMBAG), the San Joaquin Valley Clean Energy Organization, and The High Sierra Energy Foundation (HSEF). The County of Ventura holds an advisory role (CCR REN 2026).

CCR REN currently implements five programs across Equity, Codes and Standards, and Resource Acquisition segments. Equity programs focus on residential and workforce development, Codes and Standards programming supports increasing knowledge and energy code compliance across local public agency jurisdictions and stakeholders, and CEIP is CCR REN's Resource Acquisition program. CEIP is designed to deliver cost-effective[1] place-based services to commercial equity customers while also creating high-road clean energy jobs.

Overview of the paper

This paper explores CEIP's place-based program design which has been shown to cost-effectively deliver services to Hard-To-Reach (HTR), Underserved, and Disadvantaged Communities. This paper presents and discusses publicly available data regarding services to CCR REN HTR customers in the commercial sector and provides readers with an understanding of how CCR REN designed the CEIP program to increase access through place-based programming. Following program design, results are presented, and policy and research implications are discussed.

Initial Analysis of Publicly Available Program Data

The California Energy Data and Reporting System (CEDARS) is the tool used by ratepayer funded Portfolio Administrators (PAs) to report the outcomes of the energy efficiency programs they administer under the auspices of the CPUC. Every quarter PAs upload claims for each claimable energy saving project completed. Claims include details on the energy efficiency measures delivered, costs, energy and environmental benefits, and customer characteristics. Non-confidential characteristics are publicly available and include, but are not limited to, energy, environmental, financial, climate zone, and cost-effectiveness data. PAs also submit an annual report that presents a number of shared metrics detailing the savings and participation rates achieved by their portfolio of programs. CCR REN examined expenditure and energy saving impacts tied to Investor-Owned Utility (IOU) PA claims in climate zones served by the CEIP program with and without the HTR flag. This flag is used in CEDARS reporting to denote when a service was delivered to an HTR participant. CCR REN also examined annual reports to further understand service rates for HTR customers. This publicly available data was used to assess services across programs and IOU PAs operating in climate zones served by the CEIP program.

2016-2024 Commercial HTR Participation in Energy Efficiency Programs

To understand the level of service provided to commercial customers as part of California's Energy Efficiency Portfolio, CCR REN reviewed the annual energy efficiency reports submitted to the CPUC by each IOU that serves the CCR REN territory: Pacific Gas and

[1] Cost-Effectiveness is measured by the Total Resource Cost ratio and should be > 1.0.

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Electric (PG&E 2025), Southern California Edison (SCE 2025), and Southern California Gas (SoCal Gas 2025). Figure 1 presents the percentage of estimated HTR customers that participated in an energy efficiency program in a given year under Business Plan (BP) metric 171 from 2016 to 2024. The values presented are averaged across PG&E, SCE, and SoCal Gas.

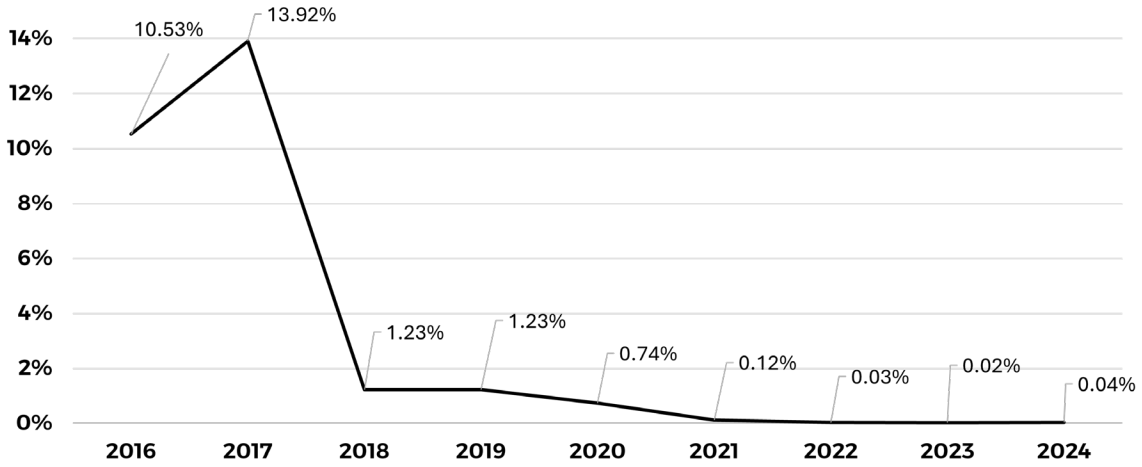

Figure 1. BP Metric 171, Average Percent of Hard-to-Reach Commercia customers participating in programs

The annual report data shows a decrease in the average percentage of HTR customers participating in programs beginning in program year 2018 and continuing through 2024. These values suggest reduced services for hard-to-reach customers throughout the combined territories of PG&E, SCE, and SoCal Gas. The validity of BP Metric 171 data, and the associated cause of this decrease in services is unknown and warrants additional research.

IOU Commercial Resource Acquisition Program Claims in 2024 and 2025

In addition to reviewing published annual reports, an analysis of 2024 and 2025 claims for PG&E (CEDARS 2024a, CEDARs 2025b), SCE (CEDARS 2024b, CEDARS 2025c), and SoCal Gas (CEDARS 2024c, CEDARS 2025d) was conducted. This analysis was completed to better understand expenditures within Commercial sector programs, segmented as Resource Acquisition, in each climate zone that the CEIP program serves (CZ 3A,3B, 4, 12,13,14 and 16). Claims data accessed through CEDARS was downloaded for Program Years 2024 and 2025. The data was then grouped by: Resource Acquisition Segment, Commercial sector, climate zone, total sector expenditures, HTR and Non-HTR expenditures, and percent expenditures on HTR customers. Table 1 below presents the findings of this analysis.

Table 1. 2024 Percent HTR Expenditures in CCR REN CEIP Territory

Climate zone	Total Expenditures	HTR	Non-HTR	HTR % Expenditure
3A	$5,951,104	$-	$5,951,104	0.0%
3B	$1,824,505	$-	$1,824,505	0.0%
4	$4,001,640	$8,584	$3,993,056	0.21%
12	$4,239,906	$-	$4,239,906	0.64%
13	$7,968,791	$268,795	$7,699,996	3.37%
14	8,943,116	$ 57,237	$8,885,880	0.64
16	$2,308,574	$ 31,548	$2,276,925	1.37%
Total	$35,237,636	$366,265	$34,871,372	1.04%

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Table 2 below presents 2025 claims data using the same approach defined for 2024.

Table 2. 2025 Percent HTR Expenditures in CCR REN CEIP Territory

Climate zone	Total Expenditure	HTR	Non-HTR	HTR % Expenditure
3A	$7,909,305	-	$7,909,305	0.00%
3B	$2,577,022	-	$2,577,022	0.00%
4	$6,774,770	$101	$6,774,669	0.00%
12	$4,533,512	-	$4,533,512	0.00%
13	$ 5,545,474	$213,753	$ 5,331,721	3.85%
14	4,041,889	$12,964	$4,028,925	0.32%
16	$ 437,678	$51,665	$386,013	11.80%
Total	$ 31,819,650	$278,483	$31,541,167	0.88%

Analysis

There were a number of patterns in the data presented in table 1 and 2 relating to HTR commercial customer participation in each climate zone. First, in both 2024 and 2025, approximately 1% of all expenditures were flagged as being associated with an HTR customer across climate zones, and we observed a slight decrease in HTR flagged expenditures from 2024 to 2025. Second, we see significant variations in levels of spending year over year in each climate zone, especially in climate zone 16, and for HTR participants. In climate zones 3A,3B and 12, there are no claims flagged as HTR either in 2024 or 2025.

Based on the data and analysis, there is a service gap for HTR commercial customers when looking at percent expenditures across HTR and non-HTR flagged claims. HTR commercial customers received no investment in some climate zones, and very low investments in other climate zones. In climate zone 16, the percent expenditures for HTR flagged claims jumped in 2025 but total investments in that climate zone dropped by a factor of 10. A number of questions immediately posed themselves: How accurate is the data and HTR flagging process? Is there corroborating evidence that a service gap exists? How deep is this service gap? Why does this service gap exist and is there a programmatic intervention that could help bridge this gap? Without primary research available that addressed the questions posed above, CCR REN sought industry feedback which resulted in the following anecdotal explanation for the existence of a service gap from a program implementation perspective: delivering services to small and medium hard-to-reach commercial customers is largely not aligned with 3rd Party pay-for-performance Resource Acquisition contracts that are designed to maximize Total System Benefit (TSB) delivery cost effectively, as measured by a Total Resources Cost (TRC) ratio that is greater than 1.0.[2] It is also reasonable to assume that some contracts have assurances and/or securities that introduce additional implementer risks tied to delivery. Implementers operating on these contracts take on levels of financial risk that guide action towards larger projects, often in non-HTR urban settings to mitigate risk of non-delivery and the associated financial penalties. This is because serving HTR customers who are smaller, in geographically remote areas, who

[2] Program Providers are only paid when a project delivers energy savings or Total System Benefit. All costs associated with program operations are “at-risk” and no guarantee is made for reimbursement if energy saving projects are not completed and reported to the CPUC.

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rent their facilities, or whose first language is not English tend to be more complex and yield smaller savings on a per project basis. Further, implementers no longer receive any performance bonus for qualifying customers as HTR for DI program implementation.

Historically the Net-To-Gross (NTG) value for Commercial HTR customers participating in DI programs was 0.85 compared to non-HTR values that ranged from 0.55 to 0.65 depending on the measure. With the 2026 Database for Energy-Efficient Resources (DEER) resolution approved by the CPUC in 2024 (CPUC 2024b), both HTR and non-HTR for commercial DI offerings now have an NTG of 0.70. This means that free ridership is now considered the same across HTR and non-HTR customer groups. More importantly, the increased NTG that could incentivize DI program providers to serve HTR customers by offsetting increased costs is no longer available. In the 2026 DEER Resolution CPUC staff acknowledged that the decision to modify the NTG ratio was made despite the small commercial customer sample size and that CPUC staff may consider further changes when better data becomes available (CPUC 2024b). The study exemplifies an emerging risk, that low HTR program participation can lead to a lack of data on which to base policymaking, which could inform further policy decisions that impact HTR services.

The realities of serving HTR customers, the regulatory context, and the contractual framing of 3rd party Resource Acquisition programs may lead to program designs that maximize cost-effectiveness and energy savings delivery while leading to reduced or eliminated services to HTR customers. The analysis of publicly available data, industry feedback, and the regulatory context all point to a service gap for HTR commercial customers which has led to a lack of data relating to HTR flagged projects in publicly available data.

CEIP Program Framework and Design Journey

Through CCR REN's partner organization's 70+ years of collective experience, the decision was made to issue a competitive solicitation for the CEIP Resource Acquisition program designed to address service gaps in the Commercial sector through a place-based program design that prioritized the local workforce. From the beginning of the program design process each CCR REN partner was in agreement that it was crucial for the commercial program to be designed to deliver resources to HTR customers in as cost-effective way as possible. Based on observed levels of service for HTR customers, conversation with program implementers, and a deep understanding of the regulatory context, the partners also agreed with the programmatic theory that in order for the program to successfully deliver place-based services, the design needed to include a local workforce footprint that would interface and leverage the capabilities of the CCR REN partners in each region.

The County of San Luis Obispo, in its role as the lead administrator for the CCR REN, issued a solicitation for Program Providers to propose a place-based design that delivered services from the Central Coast, through the San Joaquin Valley, and into the Eastern Sierra. The program design had to deliver 100% services to HTR customers, prioritize delivering services to all regions, deliver a TRC greater than 1.0 or explain why it was unable to do so (County of San Luis Obispo 2024), while also proposing an in-community workforce education and training approach that could be integrated into the different aspects of program delivery in order to ensure a local workforce footprint (County of San Luis Obispo 2024).The contract was designed using a time and materials approach with clearly identified key performance metrics and steps to resolve non-performance.

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The selected Program Provider proposed a unique place-based design approach and framework. Instead of viewing the goal of reaching a cost effectiveness threshold of a TRC of 1.0 and the Workforce Education and Training (WE&T) requirements as two opposing forces that would require lose-lose compromises, they proposed an integrative solution where WE&T activities would be place-based and become an integral part of the approach to meeting a TRC of 1.0. In addition, the design also recognized that each of the CCR REN partner organizations may play a critical role in trust-building activities within the communities being served.

The Program Provider proposed recruiting CEAs from each of the three regions the program would serve. CEAs would be structured as 1-year remote work paid placements. Candidates would not need to have experience in the energy field. They would only need a high school degree, and long-term job placement would be prioritized. The CEAs would be offered competitive pay, at $25 an hour, and receive over 300 hours of virtual classroom education, teaching them all of the core principles of customer interaction and commercial building energy auditing needed to be successful. The CEAs would then receive in-person training by professional staff on how to interact with participants and how to perform and document energy assessments in their communities. After the combination of traditional learning and in the field hands-on training, CEAs would go into the field to drive demand for the program in their communities. CEAs were envisioned to prospect for potential participants, leverage and build relationships in their communities, and provide initial energy assessments that could be used to qualify the customer as having eligible project opportunities. In the last phase of their placement, CEAs would receive practical job seeking skills, including resume building and job interview preparation.

Once a CEA identified project opportunities, the Program Provider would batch project opportunities and send a professional energy assessor to confirm project viability for multiple opportunities with one business trip, as well as collect the information necessary for engineering professionals to finalize a scope for an installing contractor. Projects would then be batch assigned to installing contractors to facilitate additional economies of scale.

This unique approach had risks. CCR REN expected it to be more costly at first since it would require CEAs to be hired, paid and trained before being able to provide field support services. In addition, hiring and training timelines were aggressive and uncertain, and there was a risk that a CEA would be trained only to find other employment. However, this innovative program design framework would allow CCR REN to test our theory that prioritizing place-based solutions and effectively integrating workforce development into a Resource Acquisition program had the potential for significant cost efficiencies and would lead to prioritized services to equity customers, as well as reduced customer acquisition and project implementation costs.

2025 Commercial Energy Improvement Program Delivery and Outcomes

2025 Program delivery journey

The first quarter of program implementation was spent standing up program administrative and implementation workflows, such as forms, templates, flyers, and CEA jobs postings. CEA hiring and training were high priorities for the program. As CEA hiring and training occurred, initial testing of customer acquisition processes and installation workflows occurred. By the end of Q2, one project was completed, program processes were evaluated, and CEAs began to conduct independent outreach in the field.

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In Q3, the focus was on scaling CEA customer acquisition. This was a crucial test of whether the CEA framework could deliver enough leads and qualified potential participants to sustain a batching approach to finalizing project scoping and installations. CEA in-community trust building and customer acquisition to enable project batching was confirmed as a critical framework to build the efficiencies that led to the cost-effective delivery of the CEIP program. By the end of Q3, CEAs had successfully delivered the project leads needed to achieve goals, and six additional projects were completed.

In Q4, the focus was to complete the installation of identified projects and to begin building a pipeline of projects for the next program year in order to create a steady state model of delivery. The program successfully completed all 2025 projects and CEAs built the pipeline necessary to enter 2026 with a strong backlog. Table 3 shows 2025 Outcomes for key metrics.

Table 3. CEIP 2025 Outcomes

Metrics	Goal	2025 Outcome
Total Resource Cost Ratio	1.03	1.65
% Projects for HTR Customers	100%	100%
Number of customers served	N/A	25
Total System Benefit	$2,406,400	$2,970,602
First year Net kWh Savings	-1,346,036	98,331
First Year net therms Savings	214,346	109,474
First Year Net Metric Tons CO2	N/A	614

The program exceeded TRC ratio goals, TSB goals, and met HTR goals. The kWh and therms goals reflect an initial expectation that electrification projects would account for a high volume of the projects. As discussed below, electrification adoption rates were not consistent with expectations.

Challenges

The program encountered a few challenges throughout the first year of operation. First, in the initial phases of customer acquisition trust was a key issue. Potential participants simply did not believe that a program would offer to install equipment at no cost. This barrier is common in communities that have low service penetration rates and low awareness of program offerings. Barriers associated with trust were initially overcome by direct outreach from CCR REN partner organizations to potential participants in order to assure them the program offering was indeed to be trusted. CEAs were then able to continue building trust and managed this barrier effectively.

Electrification adoption was lower than expected. While non-profits and small stores were willing to consider electrification measures, large water users such as hotels, motels, and restaurants, were reluctant to consider adopting any technology that could, in their mind, either jeopardize their business by limiting the availability of hot water or lead to increased utility costs. For the first year of program operation, CEIP offered both heat pump water heater fuel substitution measures and on-demand tankless retrofits and prioritized customer choice in determining which technology best suited their needs. In future years, CCR REN is exploring outreach and trust-building strategies to ensure beneficial electrification projects are scoped first.

A final implementation challenge the team faced in 2025 was the uncertainty of costs and timelines relating to permitting. Authority Having Jurisdiction's permitting documentation

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requirements, timelines, and costs varied significantly. This led to situations where the installation of projects had to be paused for weeks, while permit requirements were met.

CEIP Expenditure Data

As shown in Table 4, CCR REN's CEIP program expended $1.79 million to serve HTR customers in 2025. The CEIP program served the San Joaquin Valley (CZ 12 and 13) and the northern portion of the Central Coast (CZ 3). In the first year of the program, no customers were served in the Eastern Sierra portion of the CCR REN territory (CZ 14 and 16), and in the eastern portion of the Central Coast (CZ 4).

Table 4. 2025 Total CEIP HTR, and Non-HTR Expenditures (CEDARS 2026a)

Climate zone	Total Expenditures	HTR	Non-HTR	HTR % Expenditure
3A	$ 678,755	$ 678,755	$-	100%
12	$ 222,548	$ 222,548	$-	100%
13	$ 890,744	$ 890,744	$-	100%
Total	$1,792,047	$ 1,792,047	$-	100%

CEIP 2025 Impact

To understand the impact of CEIP, an analysis of the kbtu savings realized in each climate zone for HTR and Non-HTR customers was conducted. Table 5 shows that when combined with the kbtu savings realized by IOU programs, CCR REN programming delivered all kbtu savings to HTR customers in climate zones 3A and 12, as well as 64 percent of savings in climate zone 13. Across the CEIP program territory, CCR REN delivered 73.5 percent of HTR kbtu savings. The program cost-effectively increased the delivery of energy savings claims to HTR-flagged customers by more than 169 percent in the CCR REN territory. The CEIP program also cost-effectively delivered approximately 3.18 percent of all Kbtu savings in the territory.

Table 5. 2025 HTR and non-HTR kbtu savings within CCR REN and IOU Resource Acquisition commercial sector programs (CEDARS 2026a, CEDARS 2026b, CEDARS 2026c, CEDARS 2026d).

Climate zone	IOUs non-HTR kbtu savings	IOUs HTR kbtu savings	CCR REN HTR kbtu Savings	CCR REN Share of HTR kbtu savings
3A	105,816,116	-	4,511,967	100.00%
3B	21,970,077	-	0	0.00%
4	85,233,491	617	0	0.00%
12	55,668,071	-	1,375,972	100.00%
13	53,587,263	3,095,890	5,505,271	64.01%
14	31,178,556	113,950	0	0.00%
16	4,474,072	1,018,737	0	0.00%
Total	357,927,645	4,229,195	11,393,209	72.93%

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Policy and Researcher Interest

CCR REN's findings and experience with CEIP bring several policy questions and research points into focus.

- **Data Integrity:** Is the publicly available claims data flagged correctly? And are there opportunities to automate flagging of HTR, disadvantaged, and underserved claims to improve reporting accuracy and efficiency?
- **Contracting**: Are the current contracting structures used by IOUs for Resource Acquisition programming a factor in the limited services provided to hard-to-reach commercial customers?
- **Segmentation:** Did the shift to program segmentation in California impact Resource Acquisition services and energy savings being delivered to HTR commercial customers?
- **Service Level:** Are there specific customer groups, geographic areas, or building types where a service gap exists? Are there opportunities for creative program design elements to bridge this gap?
- **Minimum level of service:** Is there a minimum level of service that should be maintained for HTR customers across segments, sectors, and across climate zones? Is this necessary to build the data set needed for future evidence-based policymaking?
- **Beneficial Electrification**: What measure level assumptions and strategies work best in delivering cost-effective electrification, that does not risk increasing participants utility costs, to hard-to-reach commercial customers participating in Resource Acquisition programming?
- **Workforce Education and Training program integration framework**: to what extent can WE&T programs be integrated directly into the delivery of Resource Acquisition programs using the CEIP program design framework?

Conclusion

Three conclusions can be drawn from our experiences implementing the Commercial Energy Improvement Program in its first year of operation.

First, we have showcased what rural energy efficiency practitioners have argued for years, that programs can cost-effectively serve HTR customers in geographically hard to reach, underserved, and disadvantaged communities. Economies of scale can be built even with small programs, and programs can function effectively across entire territories while still being flexible enough to meet the needs of a diverse population.

Second, based on publicly available data, the 25 CCR REN projects increased kbtu saving outcomes for HTR flagged customers by 169% compared to the portfolio of Resource Acquisition programs run by three IOUs. Understanding why the publicly available data shows such a gap in delivery of services is critical. Whether it be due to on the ground factors that inhibit service delivery, due to data entry issues on the CEDARS platform, or due to the cost burden of data gathering, understanding this gap is important to developing new policies that ensure geographically HTR, Underserved, and Disadvantaged Communities receive services equitably and are not left behind in the clean energy transition.

Finally, the success of the CEIP programs shows that place-based tactics that rely on in-community partners are key to building trust and serving HTR customers Integrating a WE&T component, while leveraging partner organizations as part of program delivery allowed CEIP to overcome trust and awareness barriers while building the local workforce and place-based

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strategies needed to cost-effectively deliver energy savings to HTR customers who otherwise would have gone unserved.

With our place-based program design framework, CEIP was able to deliver a 1.69 x increase in energy savings for HTR customers, a TRC ratio of 1.65, and delivered services exclusively to hard-to-reach customers. The program placed three community energy advisors in full time positions prior to the end of their placement year and expects all four CEAs to find permanent work in the sustainability sector.

CCR REN hopes that our CEIP program framework can serve as a replicable and scalable proof of concept for a program design philosophy that integrates place-based design, workforce, and equity consideration into Resource Acquisition program delivery to achieve cost effective outcomes while increasing the delivery of services and creating meaningful workforce outcomes in Geographically HTR, Disadvantaged, and Underserved Communities.

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