The City of Berkeley Just Transition Residential Electrification Pilot Program

Final Two-Year Pilot Report

and Replicable Playbook for Public Agencies

Rebuilding Together East Bay Network

with the Construction Trades Workforce Initiative and the City of Berkeley

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A Letter from the Chief Executive Officer

Dear reader,

Two years ago, the City of Berkeley invested in the belief that our community could electrify the homes of its low-income neighbors and make the work itself a source of good careers for local workers. The following report will detail both the investment into the community and the building of a community to ultimately prove this organizing belief.

Berkeley residents opened their doors and their utility bills to their neighbors who volunteered as Climate Coaches. Homeowners trusted Rebuilding Together staff and partner organizations through the assessments, permits, and construction in the midst of their busy schedules and the rewarding demands of caring for their families. Emerging local contractors, most of them minority- and women-owned firms, took on the demands of certified payroll and prevailing wage to help prove out the idea that high-road labor is not a barrier for contractors but a way to grow your business. And the City of Berkeley stayed at the table through every complication that a first-of-its-kind effort inevitably threw at them.

This work has more authors than any cover letter can hold (but please do read the special thanks section). Our deepest thanks go to the homeowners and families of Berkeley who welcomed this program into their lives; to our Climate Coach volunteers, interns, and externs; to the crews and owners of our contractor partners; to Construction Trades Workforce Initiative (CTWI) and the Building and Construction Trades Council of Alameda County (BTCA); to the City of Berkeley's staff and leadership, whose patience and rigor made the program better at every review; to our partners in research, policy, and community wealth building who sharpened our thinking by challenging our assumptions and methods; and to the clinicians, occupational therapy faculty, and clinical students who taught us to understand a home the way its resident lives within it. To the staff of Rebuilding Together East Bay Network: this report is a time capsule of your incredible growth and transformational impact. It is so impressive, and I am unbelievably proud of what you accomplished together.

With gratitude,

J.W. Frye

Chief Executive Officer, Rebuilding Together East Bay Network

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Note for Readers of This Report

This report documents both a direct install program and an iterative building of an implementation framework. Readers of this work will no doubt run the gamut from policy makers to small contractors, climate activists, labor unions, landlords, students, community-based organizations, healthcare professionals, and residents looking to improve their own homes. With this in mind, we sought to balance the information in Section II to include both what was required by the City of Berkeley (the City) in the contract and what was inquired into by the various stakeholders throughout the process.

There is no way to cover every aspect of the program or to include every bit of data collected. Our hope is that this report seeds the start of a larger conversation around energy transition: the means, the methods, and the methodologies, rooted in sound and reproducible economic and environmental justice.

On Reproducing This Work

Some of this will be hard to reproduce in the exact same way. Rebuilding Together East Bay Network (RTEBN) played several roles at once: program administrator, general contractor, and a direct services provider with long-standing trust among Berkeley's low-income homeowners. Elsewhere, those roles may be held differently and by different institutions. The useful question is which functions must exist, and who in your community can hold them. Section III and its Appendix build on the experiences of the prior sections and are intended to give a framework of roles, tools, and approaches that will be helpful to practitioners and jurisdictions. As you will find in the following document, the organizing principle of this work is to be collaborative and iterative, and we are confident that, approached this way, this will be an uplifting and useful document no matter your orientation or interest in the work.

Questions about this report, the playbook, or the program model may be directed to Rebuilding Together East Bay Network at info@rtebn.org or rtebn.org/just-transition.

I. Introduction / Executive Summary

The Just Transition Residential Electrification Pilot tested whether low-income home electrification can deliver three benefits at once. The homes become healthier and safer for the residents who live in them, the work itself builds high-road careers for a broader range of workers and contractors, and the housing runs on affordable, efficient, clean energy. Over two years under contract with the City of Berkeley, Rebuilding Together East Bay Network and its partners ran that test in 44 Berkeley homes. The following sections detail the results, the lessons, and a framework for the agencies and practitioners who will carry this work forward.

A $1.5 million contract from the City anchored the funding, and the program braided every additional source each home qualified for over that anchor, with the lion's share of the braided dollars arriving through health and home-access funds. Just Transition scopes were stacked onto visits another program was already paying for, and homes where a single intervention served both health and energy goals were prioritized, so each dollar in the braid did more than one job. The delivery design pointed the money at the conditions low-income households actually present. Aging panels and deferred maintenance were treated as design inputs rather than disqualifiers, per-intervention prices were fixed at a single shared bid walk, and the work was aggregated by intervention type so one trade could move across many homes at predictable cost. By close-out, $1,190,209.02 had reached homes as direct funding, including $90,209.02 the program moved from its own administrative budget so more homes could be electrified.

Caption: Kel-Aire crew.

Before reaching households, the program had to read the historical, economic, and social factors it was walking into. Older adults and low-income homeowners, and especially families of color, have long been targeted by predatory lending and discriminatory practices, so an offer of tens of thousands of dollars of work at no cost is met with fair skepticism. Earning trust was part of the

job at every stage of the program. Volunteer Climate Coaches began it, enrolling neighbors in discount programs and walking through utility bills on the first visit, and the design kept earning it from there, with a comprehensive assessment built around the household's own priorities, one consistent point of contact through construction, and a rule that no homeowner was ever left to negotiate a scope change with a contractor. The relationship continues past close-out, and every household knows who to call.

Caption: 1-888 Heat Pumps crew.

Inside the pipeline, a comprehensive whole-home assessment run by energy specialists alongside clinicians and Certified Aging-in-Place Specialist (CAPS) technicians established each household's own priorities and the conditions the home actually presented. Taken together, the 44 assessments became a landscape scan of the eligible housing stock and a tiered implementation plan matched to the funding. The delivery underneath ran as rounds of grouping and sifting. The program drew groups of homes out of the assessed pool, sent each group through direct work, and each round either finished a home's jobs or delivered the home into the next group, until 8 aggregated scope-of-work orders, sequenced by field data and utility dependencies and paid against clear benchmarks, had carried 158 interventions into 37 households.

The pilot held every contractor, union and non-union alike, to one job quality bar, and it built two pathways to reach it. A firm could join a union agreement that carries wages and benefits with it, or stay independent while the program taught the back-office practices that public work demands, with certified payroll verified against the crews on site before each payment was released. An RFQ went to more than 400 firms, 8 submitted qualifying applications, and 5 were selected by blind scoring. Most of the selected firms, union and non-union alike, were minority- and women-owned, and they won the highest-value bids in the program on merit; no single firm carried more than 25 percent of the work.

Caption: Net Electric crew.

Group-scale communication looked efficient on paper, but in our experience the program worked best, and ran more efficiently, when communication happened one-to-one or in small cohorts, homeowner by homeowner and firm by firm. Where the program scaled, it scaled the framing and the tools that carry those conversations rather than the communications themselves, and readers will see that pattern throughout the report.

The table below gathers the pilot's results in one place, with the full detail in Section II and every intervention and cost enumerated home by home in Appendix II.C. On the climate side, this report estimates from what was installed. The 55 appliance conversions installed by the program support a working outcome of roughly 53,000 kg of carbon dioxide (CO2) avoided annually, above the high end of the contract goal of reducing 30,496 to 50,744 kg (a working outcome on stated assumptions, Appendix II.F). The actual usage and reduction numbers will take roughly six months of monitoring, as new household habits settle and the seasons turn toward winter heating, and the program is collecting utility bills for the months following each close-out, alongside the appliance data captured there, so that reading can be made.

The pilot at a glance:

Measure	Result	Where detailed
Total interventions delivered	202 line-item measures and electrical scope elements from both pilot and implementation phase	Appendix II.C
Households receiving direct-install work	37, with the 7 assessed households that declined served through other RTEBN programs	II.1.4; II.1.5
Home assessments	44 (from a waitlist of 65)	II.1.4; Appendix II.C
Appliance conversions installed	86 total • 24 heat pump HVAC systems	II.3.1

Measure	Result	Where detailed
	• 15 heat pump water heaters • 12 induction ranges • 9 induction cookware • 9 range hoods • 17 windows	
Electrical interventions installed	72 total • 51 circuits • 14 main meter panel upgrades • 4 smart panel upgrades • 3 feeder upgrades	II.2.3; Appendix II.C
Direct funding delivered	$1,190,209.02, including $90,209.02 reallocated from administration	II.1.1; Appendix II.C
Administration	$309,790.98 of the $1,500,000 anchor contract	II.1.1
Emerging contractors selected	5, from 8 qualifying applications after an RFQ distributed to more than 400 firms	II.2.2
Aggregated scope-of-work orders	8, awarded at rates set at a shared bid walk	II.2.3
Labor standards	Certified payroll verified every pay period, matched to the crews on site	II.2.1
Pilot within a pilot	4 whole-home projects, $162,582.74 of direct funding	II.4; Appendix II.C
Rebates	5 applied across 4 homes; 1 secured, $5,800	II.1.2
Climate working outcome	Roughly 53,000 kg CO2 avoided annually on stated assumptions, above the high end of the contract target; utility-bill collection is ongoing, with actuals published in the mid-2027 addendum	II.3.1; Appendix II.F
Administrator playbook	The full replication model with its A1 to A15 toolkit	Section III; Appendix I

The pilot tested its own design as it went, and the lessons ran in both directions. Running the aggregation styles side by side showed that aggregation by intervention type was the quicker and more cost-effective path. Making weekly installation productivity a bid criterion shortened the time spent administering the interventions, which let the program invest more in direct costs. Coordinating meter and service upgrades among homeowners, electricians, and the utility proved the hardest operational work of the program. The rescission of the Inflation Reduction Act funding and an uneven rebate collection removed two layers the braid had expected to carry weight, and the contract itself took months longer to execute than anyone intended. Each of these experiences is written into the sections that follow, and into the playbook in Section III.

Caption: Micah Electric crew on-site.

Section III turns this experience into a framework, carrying the full administrator playbook that was developed and revised across the two years of the pilot, with the forms, templates, and tools we used gathered in its appendix. In the spirit of the whole report, it is collaborative and iterative, a jumping-off point for the next jurisdiction rather than a finished answer.

II. Key Program Areas

II.1 Resident Equity

II.1.1 Funding Braiding

Much of public benefit work is defined by how an organization identifies and leverages multiple funding sources, so that projects are completed and programs remain resilient year over year. A fully electrified low-income home in the East Bay carries something like $75,000 in direct costs, with an additional 25 percent in administrative costs, and we have yet to find a single funding source that pays for all of it. The pilot's deepest whole-home package came in at $74,782.00 of direct funding (Appendix II.C, Home 01).

Designing the braid started from the total money available, in this case the City of Berkeley's general funds, and worked backward. From that ceiling, the team identified what the City needed in terms of homes addressed and the types of work provided, and then built the funding matrix for the homes the program would enter, mapping which sources could pay for which measures, in which households, under which rules. Households qualified on income and owner-occupancy, and the anchor contract's terms were reconciled against each braided source's wage and eligibility rules up front, so the Job Quality Standards could be met under every dollar in the braid.

Early investigations reshaped the scope this matrix had to serve. The pilot initially intended to serve both multi-family and single-family housing, and its first inquiries into the multi-family segment, where landlords tend to bundle upgrades into larger capital projects and public subsidy raises double-funding questions, led the program to focus on single-family electrification. For related reasons of cost and complexity, the program also veered away from solar and battery work for all but the pilot-within-a-pilot homes.

With the scope set, the City's contract anchored a stack of federal, state, and philanthropic sources, so that a single home could draw from every program it qualified for and health and safety repairs could ride alongside the energy work. Cost sharing was designed into the braid from the start. Where another program paid for mobilization or site set-up, Just Transition scopes were stacked onto visits that were already happening; where a source paid for the non-energy health benefits of the same intervention, homes with dual outcomes were prioritized. In practice, the lion's share of the braided funding came through health and home-access dollars, followed closely by housing preservation funds, and the work often carried both purposes at once: a health initiative provided the electric clothes dryers, rewiring scopes removed unsafe hazards, and a heat pump water heater satisfied a code enforcement citation. This is how a $1.5 million contract put roughly $1.19 million of direct funding into homes and, with the braided sources layered over it, produced an estimated $1.35 million of delivered work.

Over the two years, the braid also had to absorb federal shifts. One initial consideration, though never the only one, was that the pilot could serve as a working model for programming that federal Inflation Reduction Act dollars were expected to carry; disbursement of those funds was paused by executive order in January 2025, and much of the underlying funding was rescinded by Congress that July. Applications to several federal and regional programs did not land, including a Department of Energy equity electrification proposal with a union partner, an EPA proposal, and a regional climate grant whose implementation dollars ultimately excluded Berkeley. Sources that were not a one-to-one match for electrification had to carry more of the scope, which delivered the work but raised the complexity of financial and grant management considerably. The rebate layer was expected to carry part of the load as well. The program went in with expectations for per-measure rebates from TECH Clean California, the federal HEEHRA program, BayREN, and others, and the experience of actually securing them proved to be both a technical and a programmatic challenge, treated fully in Section II.1.2.

Braiding worked, and braiding proved fragile. A replicating agency should anchor on the most durable local source available, treat federal layers as upside rather than baseline, and budget honestly for the administrative capacity that managing many sources requires, because that capacity is what keeps a program resilient year over year. The allowable-expense matrix that maps which braided source can pay for which measure appears as Figure 2 in the Section III playbook, and in full in the Braided Funding Report (Appendix I, A1).

Because the bulk of implementation fell in the fiscal year ending June 30, 2026, the braid reaches its final accounting through reconciliation at the end of August 2026 and the single-audit process from September through December 2026, which formally identifies each program and funder. The table below states the pilot's working estimate of the braid, on the same footing as the working outcomes elsewhere in this report, and an addendum will restate it from the audited financials when the audit concludes in December 2026. Across the portfolio, more than 13 homes received at least one braided funding source in addition to the program's direct funding.

Braided funding stack over the pilot (working estimate):

Source	Amount	Status / what it paid for
City of Berkeley Just Transition contract (anchor)	$1,500,000	$1,190,209.02 direct funding (Appendix II.C) + $309,790.98 administration

Source	Amount	Status / what it paid for
HUD Healthy Homes Production (HHP)	$36,000	Received
HUD Older Adult Home Modification Program (OAHMP)	$30,000	Received
Utility / state rebates (including California Energy Smart Homes (CESH))	$5,800	1 rebate approved during pilot (see Section II.1.2)
PG&E Energy Savings Assistance (ESA)	$27,675	HVAC, heat pump water heater, and main panel upgrade delivered at Home 04, valued at the program's approved rates
Solar and battery (GRID Alternatives partnership)	$64,000	Solar and battery at 2 pilot-within-a-pilot homes (see Section II.4)
Total leveraged beyond the anchor (1.D.2 metric)	$163,475	

II.1.2 Rebates and Incentives

Rebates occupy their own place in the funding design because they work in the opposite direction from the rest of the braid. The grants described above put money into the work before or while it happens. A rebate pays the program back after an appliance is installed, one measure at a time, once the paying program has approved its own application on its own timeline. For a program delivering the work at no cost to the household, the practical consequence is that the program fronts the full cost of every installation, and whatever rebates arrive later come back as recovered contingency rather than as revenue the budget can count on.

At design time, the rebate layer looked substantial. The pilot planned to reserve per-measure incentives from TECH Clean California, BayREN, and other utility and state programs, and the anticipated federal HEEHRA rebates were expected to carry a meaningful share of measure costs. Reservation forms were filed for the programs available, and the tracking portal carried each home's rebate documentation alongside its permits so that claims could follow completion. In practice, the layer under-delivered. The design had assumed rebates and incentives would return 6 to 8 percent of the program's direct costs. Of the 5 rebates the program applied for across 4 homes, one was realized during the pilot period, a $5,800 claim on the fully electrified pilot-within-a-pilot home, where complete documentation had been captured at close-out, a return of under half of one percent.

The reasons were mostly not of the program's making. The federal rebate programs never became available in time, with disbursement paused in January 2025 and much of the funding rescinded that July. Programs that did operate carried eligibility rules and documentation requirements written for market-rate retrofit customers, and their reimbursement timelines sat poorly against a construction cash flow that had already advanced payment to small contractors.

Administering reservations, claims, and appeals across several programs is itself a staff function, and one the budget had not sized for a layer that kept shifting.

For practitioners designing the next program, the pilot's experience condenses to a planning posture. Treat rebates as upside rather than baseline, in the same spirit as the federal layers of the braid. Assign the reservation and claims work to a named role with time budgeted for it. Capture nameplate data, invoices, and completion documentation at every close-out as a standing requirement, because some claim windows open only after a project has ended, and by then the records either exist or they do not. And where a rebate program's terms conflict with serving low-income households, say so to the program's administrators. Eligibility rules and documentation requirements are policy choices, and public comment is one of the few tools an implementer has to change them.

II.1.3 Community Outreach

RTEBN came to this work with a longstanding relationship with Berkeley's low-income homeowners, built over decades of home repair and direct services, and it also brought a pipeline of homes that had already undergone health and safety upgrades, making them strong candidates for this electrification pilot from the outset. The outreach design started from that experience rather than from a blank page. Checking assumptions against data and research was one of several things the team did. Alongside it, the team looked at outreach efforts across the Rebuilding Together national affiliate network and at other home-visiting programs, including Rising Sun's Green House Calls and PG&E's former Ambassador program, to see where others had found success and where they had run into challenges.

The aim was to key in on the program's inherent advantages, learn from adjacent models, and work out how the activities themselves would be funded. Each round of outreach then generated information, and the information shaped the next iteration on the same themes. The community this practice gathered included the households receiving services alongside the public agencies, community-based organizations, and other partners who already serve them, each needing to understand the program offering and how to participate in it.

Some conditions were clear from experience and were confirmed along the way. In our experience, one-to-one communication is the most effective way to reach the households this program served. The discount and assistance programs a household may qualify for each carry their own eligibility rules, applications, and renewal cycles, and coaches routinely sat down with neighbors who were eligible for programs they had never enrolled in. One-to-one work is also the most staff-intensive kind of outreach, in a budget already committed to construction and administration, and a program that wanted kitchen-table conversations with every client could not simply hire its way to them.

Heavier than any budget line were the historical and social factors, and they deserve to be named plainly. Older adults and low-income homeowners, and especially families of color, have been and continue to be targeted by predatory lending and discriminatory practices, from redlining and its long aftermath to home-improvement fraud, abusive financing schemes, and scams aimed at the home equity of seniors (Mapping Inequality, University of Richmond Digital Scholarship Lab, including the 1937 Oakland-Berkeley security maps; U.S. Department of Justice v. Countrywide Financial, 2011; Consumer Financial Protection Bureau, Suspicious Activity Reports on Elder Financial Exploitation, 2019). A stranger at the door making what sound like unbelievable promises, tens of thousands of dollars of work in your home at no cost, resembles the opening line of schemes many of these households have already survived. Outreach in low-income neighborhoods carries a burden of proof that it rarely carries in middle- and higher-income households, and no amount of messaging polish removes it.

Out of that experience, the peer scan, and the funding map came the Climate Coach model, which is best understood as network design rather than canvassing. Resident volunteers were recruited from the community, trained by RTEBN, and sent to their neighbors' homes to walk through energy bills, enroll households in every discount and grant program they qualified for, and introduce the Just Transition electrification offer. Each visit tied together incentives that usually reach households separately, so a single conversation could deliver a utility discount, bill assistance, medical-equipment protections, and a path to electrification.

Caption: A heat pump condenser.

The design sits at a confluence of factors, most of them reporting and financial, that worked with and against one another to frame the pathway to completing the work. Neighbors helping neighbors counteracted an extractive history, with a trained neighbor rather than a marketer opening the conversation, visits led by RTEBN's Community Lead, and a clinician referral pathway for anything touching finances or medical equipment. At the same time, marketing this program to households, contractors, and the general public would have required more resources than the program had, so a volunteer aspect that could jumpstart a network effect was required somewhere in the design; had it not lived here, it would have had to play a bigger role somewhere else. Coach service met the requirements of the SeniorCorps RSVP grant to onboard older adult volunteers from the community, which is how the one-to-one communication the program valued was carried without a staffing cost the budget could not hold.

Within the visit itself, trust was earned in increments rather than requested up front. Each coach worked from a workbook binder that scripts the conversation without making it impersonal, and each step delivered something a household could verify on its next utility bill. The home visit follows six steps:

1. Welcome and introductions, including consent to discuss finances and general medical information.
2. PG&E bill review: reading the rate schedule, spotting enrolled programs, and identifying unpaid balances.
3. CARE / FERA: eligibility screening and enrollment or renewal (a 20 percent or greater monthly discount on gas and electricity for income-qualified residents).
4. Medical Baseline: screening for qualifying medical conditions and devices, which adds discounted energy allotments and priority outage notification.
5. LIHEAP / REACH: bill assistance for households with past-due balances, including up to $800 toward owed energy bills.
6. Just Transition / energy efficiency: introducing the pilot's no-cost electrification offer and capturing the household details that feed the assessment pipeline.

Only at the last step did the conversation turn to electrification, and the ordering mattered. By the time the offer was broached, a household had already talked through its bills with a neighbor, been connected through staff to reduced utility rates, and had clinicians visit at no cost to make wellness and in-home access modifications. The offer of a whole-home upgrade arrived after a series of smaller promises had already been kept, which is why outreach often served as the program's first delivery of benefits and as the front end of the referral pipeline described in Section II.1.4.

Beyond the household, the same design gave the rest of the network a way in. Partner agencies and community-based organizations referred the households they served into a pipeline they could trust and shared education materials co-branded with the City and Ava Community Energy. Group informational sessions and virtual public workshops carried the program to residents, agencies, and partners, while partnerships with electrification education specialists and appliance manufacturers fed the same consistent body of material. The coaches widened the program's reach through their own networks and served as ambassadors to funders and media. One cost-effective design answered a confluence of constraints and opportunities, and each trained coach, enrolled household, and partner referral made the next conversation easier to start.

Caption: A Climate Coach loading in induction cookware to deliver to the doorsteps of Just Transition homeowners.

To keep the volunteer pipeline full, coaches were trained in person and virtually, with sessions recorded so new volunteers could onboard on their own schedule, and training covered the visit protocol, the discount programs, bill literacy for both PG&E and Ava service, and the boundaries between what a coach explains and what gets referred to staff or a clinician. The model matured over the pilot. By the second year, staff and interns led homeowner visits and managed referral-list data, while volunteers concentrated on tabling and community events and received hands-on manufacturer training so they could coach neighbors on the new appliances themselves.

Documentation. The Climate Coach workbook binder (visit checklist, program guides, enrollment forms, and inserts) and the recorded virtual training (Climate Coaches Training, May 13, 2024, RTEBN YouTube channel: youtu.be/6jt9osLzzvc) are included in Appendix II.A, together with training agendas, sign-up sheets, and coach packets.

Outreach results over the two-year pilot:

Measure	Year One	Final (2-year)
Climate Coach sign-ups	18	23

Measure	Year One	Final (2-year)
Coaches completing home visits	6	8
Coach trainings held	3	4
Coach home visits completed	8	10
Public workshops, virtual	2	3
Utility assistance program enrollments facilitated (CARE/FERA, Medical Baseline, LIHEAP/REACH)	3	5

From the field. One pilot-within-a-pilot homeowner, after their own home was electrified, volunteered as a Climate Coach and went to neighbors' homes to teach them about electrification firsthand. That same coach was instrumental in reshaping the program's tools, turning the coach visiting survey and assessment into a physical binder that could be gone through page by page with a homeowner and returned to on later visits.

II.1.4 Comprehensive Audit Assessment

Every home in the pipeline received a comprehensive whole-home energy and health assessment before any scope of work was written. The assessments were run by energy specialists working alongside clinicians and CAPS-certified home repair technicians, with occupational therapy faculty and students integrated into the process. That mix mattered. Beyond recording appliances and amperage, the assessment established each household's priorities collaboratively, surfaced health and safety conditions that funding could address alongside the energy work, and identified the homes where electrification would deliver dual outcomes.

Assessment was also where the program met the realities of deferred maintenance. Assessors regularly encountered conditions such as pest evidence, mold, and blocked egress, and each finding was routed through a defined escalation path to RTEBN's licensed occupational therapist and the Safe at Home program for wellness visits and remediation. For an administrator without RTEBN's three decades of client relationships in Berkeley, this may be the hardest part of the pipeline to replicate, because identifying and preparing eligible homes is the precondition for everything that follows.

Individually, the assessments produced pre-populated scope-of-work documents, so contractors later validated conditions on site rather than re-collecting data. Collectively, they produced the landscape scan, a program-wide dataset of housing types, common conditions, homeowner priorities, and eligible funding that let the team group homes by work type, estimate costs, and plan the order of the work. The landscape scan was then organized into the tiered aggregation framework, dividing the pool into budget bands so the available funding could be matched to the number of homes each tier could reach.

The pipeline over the full pilot:

Pipeline stage	Count	Notes
Referrals reviewed (waitlist)	65	Climate Coach visits, existing client list, agency referrals

Pipeline stage	Count	Notes
Comprehensive assessments completed	44	
Households receiving direct-install work	37	
Households declined but served through other RTEBN programs	7	Out of the 44 assessed homes

Tier distribution of assessed homes:

Tier (estimated scope cost)	Homes	Share
Under $20k	16	43.2%
$20k to $24k	6	16.2%
$25k to $30k	4	10.8%
Over $30k	11	29.7%

Documentation. The assessment instrument and scope-of-work packets are in the playbook appendix (Appendix I, A3); the tiered aggregation framework is A4. The homeowner survey instrument and anonymized per-home data are in Appendix II.

II.1.5 Homeowner Education

Homeowner education ran from first contact through long after the crews left. Before construction, each participating household received an in-depth consultation covering the scope of work, the sequencing and timeline, what to expect from multiple contractor visits, and how the new appliances would improve air quality, safety, and comfort. Educational materials were co-branded with the City, developed in partnership with electrification education specialists, and included both a full appliance operation and troubleshooting guide and a quick-reference version written for the household refrigerator door rather than the filing cabinet.

The education carried more than comfort with new machines. In the Bay Area, the transition these households made is becoming a requirement, with the regional air district's zero-NOx standards reaching small water heaters in 2027 and furnaces in 2029 (Bay Area Air Quality Management District, Regulation 9, Rules 9-6 and 9-4), so a failed gas appliance will increasingly mean an electric replacement on an emergency timeline. Households with the least financial cushion face that moment hardest, and a homeowner who already understands the equipment, the electrical panel behind it, and the bill that follows is far better placed when it arrives.

At installation, installers walked each homeowner through the operation of their new equipment at appliance activation, and RTEBN staff followed up by phone afterward. The program treated homeowner education as part of the climate work itself. An induction range that intimidates its owner, or a heat pump run on the old thermostat habits, does not deliver its expected savings. Manufacturer partnerships extended this approach, bringing demonstration models on site so older adults could try the new technology hands-on before and after installation.

For each household, the education ran as a sequence of conversations that followed the work. Homeowners came off a waitlist of 65 Berkeley residents, informed about the program through RTEBN's network and its established relationships, and the first calls stayed deliberately light, saving detail for the site visit. Over the pilot those calls grew into full question-and-answer

sessions led by the program coordinator. At assessment, each household's own wishlist opened the appliance conversation, so the selection of equipment began from what the household wanted rather than from a catalog.

Confirming the scope of work always took one more visit, because the specifics of removing one appliance and placing another can only be shown in person, and older adults in particular need time to build a trusting relationship with the contractor who will work in their home as well as with the administrator. Questions were routed to the program administrator, never into negotiation with a contractor, and every contractor was trained to refer them there; 3 of the 37 served households also came to the RTEBN office for additional educational support on top of their home visits. No work began until the Homeowner Agreement was signed. From there, scheduling ran on prepared answers to the questions every household asks ahead of a crew's arrival, what time, how long, whether interior access is needed, whether anything must be moved, whether the power will be off, and who to call, because prepared answers protect the relationship, reduce administrative cost, and keep crews working. Contractors plan their jobs weeks ahead, while homeowners, especially those with medical needs, carry appointments and caregiver schedules that can interrupt a project; in one case a homeowner was away indefinitely during a severe medical emergency, and the job was completed with her family's approval and a family friend's coordination.

Close-out returned the home to the homeowner deliberately. After the city inspection, staff and the contractor walked the home with the household, demonstrated how each new system operates, and handed over the manuals and warranties with the manufacturer registrations already completed, and the homeowner signed off that the work was done. A follow-up call afterward checked on the equipment and the bills. The rebate conversation ran the same way, in person and by phone, because rebate applications required extensive reporting from household demographics through final inspection; 2 homeowners came to the office for rebate support, 1 home visit was made, and of the 5 rebates applied for across 4 homes, 1 was secured, for $5,800 (Section II.1.2).

The relationship continued after close-out, and homeowners are all knowledgeable of the best contact to get a hold of. Concerns about any appliance in their scope of work go to RTEBN, which logs the issue and routes it to the contractor, the manufacturer, or its own staff. For many households, a single, consistent point of contact mattered as much to trust as any document the program produced.

The program's emphasis on homeowner education also highlights the staff education required to deliver it. RTEBN's homeowner education track operated alongside a parallel education process for RTEBN's own staff. The Program Coordinator, who started as a Climate Coach intern with no prior background in contracting or electrification, was responsible for translating technical scope-of-work and appliance information into terms homeowners with the same lack of experience could understand and act on. Learning alongside the homeowners they served, the coordinator absorbed the electrification training, contractor walkthroughs, and appliance selection process well enough to explain each clearly to residents. By the first month of implementation, the coordinator facilitated installations from initial site visit to close-out, and by the end of the implementation phase they could independently develop and deliver homeowner educational resources, growth RTEBN recognized with a promotion to Program Manager.

Documentation. The Homeowner Education and Communication Packet is in the playbook appendix (Appendix I, A15). Troubleshooting guides, program handouts, and education process memos are in Appendix II.

Caption: A heat pump installation with its connected lineset and service disconnect.

II.1.6 Resident Experience

From the homeowner's side, the program worked because commitments were made clearly and kept in order. Enrollment came with a signed grant agreement that spelled out eligibility, license to enter, and the rule that no change could increase cost without written program consent, protections that ran in the homeowner's favor as much as the program's. Budget parameters and household priorities were set before any contractor visit, so the scope that got built reflected what the household actually wanted within what the program could fund. Every on-site change request routed back through the administrator, which meant no homeowner was ever negotiating with a contractor at their kitchen table.

The experience was engineered around the people in the households the program served: seniors, people with mobility constraints, multigenerational homes. Visits were scheduled around the household, several contractors might pass through one home across the sequenced passes, and a consistent point of contact at RTEBN carried the relationship the whole way. Client satisfaction was measured with before-and-after surveys designed into the program from the start.

From the field. The program's first completed measure was a single electrical outlet, which allowed the homeowner to retire a gas stove for an induction range.

Caption: One of the 8 homes that received a new range hood, and one of the 3 homes worked on by SolidRock Development Group, the general contractor for this program. Planning for this specific range hood took careful consideration, as this home was three stories high, with the kitchen being on the first floor. Since the kitchen wall was against an exterior wall, a building permit was required with thorough instructions not to exceed extremely narrow property lines.

From the field. One pilot-within-a-pilot home received full electrification as part of a rebuild from the original frame, braided across multiple funding partners. It shows what a whole-home approach can accomplish when partners plan a home together.

II.1.7 Data Analysis / Lessons Learned / Recommendations

The Resident Equity results are gathered in the executive summary's at-a-glance table and enumerated home by home in Appendix II.C. Over the two years, 44 homes were assessed, 37 were served through 158 interventions, and the $1.5 million contract produced an estimated $1.35 million of delivered work across the braided sources.

Lessons learned. First, outreach that delivers an immediate benefit outperforms outreach that promises a future one: enrolling households in discount programs at the door built the trust that the construction phase relied on. Second, the assessment carried the program, with pre-populated scopes, tiering, and health escalations all flowing from a single well-designed visit.

Third, an administrator with existing community relationships holds a structural advantage, one that a new implementer will likely need to replace with referral partnerships and deep experience serving low-income households.

Caption: The crawlspace of a home receiving a ducted mini-split.

Recommendations. Fund the outreach-to-assessment pipeline as its own program element with its own metrics, not as marketing overhead. Keep a clinician and occupational therapy capacity attached to assessments in any replication. Build the tier framework into the funding design from day one, so the budget conversation with the funder is about how many homes per tier rather than a single average cost.

II.2 High Road Jobs

II.2.1 Labor Standards

The pilot required the same job quality bar of every contractor, union and non-union alike. The bar included prevailing wage at or above the current county rates for each trade and classification, registered Joint-Labor Management Apprenticeship programs, DIR/DAS-registered apprenticeship programs, especially accredited MC3 graduates who are accepted into an apprenticeship program. The standards were drawn from the Bay Area Residential Decarbonization High Road Training Partnership's recommended labor standards, adapted with legal review, and shaped in-house by staff with direct small-contractor experience so the bar would be high but accessible.

Caption: Before, during and after photos of a heat pump water heater installation. Home 22 (pictured above) entered the program after reaching out past the initial site survey period, due to being out of town for several weeks. Fortunately, the homeowner was able to receive a heat pump water heater, a 3-zone ductless heat pump mini-split, a vent, and dedicated circuits. The homeowner had just received a main panel upgrade, which allowed enough room on the existing panel. Kel-Aire was the main installer, with Net Electric as the acting electrical contractor. During a site survey check performed by RTEBN, the homeowner's nephew bought both crews meals as thanks for working on his uncle's home.

The standards carried weight in large part because they were verified. Contractors self-certified through weekly certified payroll with signed statements of compliance; the administrator then independently reconciled those records against wage determinations, payroll journals, and timesheets; and site checks matched the workers named on payroll to the crews actually on site. In the second year the program added standing on-site monitoring so labor standards were observed in practice rather than only reported on paper. Every pay period in the program is documented, and wages met or exceeded the required minimums on every verified row, 136 wage rows covering 1,169.5 project hours and 26 workers across the five contractors, with the certified payroll records that back that statement carried in the appendices (Appendix I, A6; wage tracking data in Appendix II.G).

Standard	Required by design (RFQ)	Verified in implementation
Prevailing wage	Current county DIR rate for every worker and subcontractor, by trade	Wages at or above DIR scale; certified payroll (WH-347 / A-1-131) each pay period
Apprenticeship	Registered Joint-Labor Management Apprenticeship programs, DIR/DAS-registered apprenticeship programs, especially accredited MC3 graduates who are accepted into an apprenticeship program	Apprentices worked pilot jobs, registered in DIR-approved programs
Medical benefits	At least Covered California Silver; contractor pays at least 75% of premium	Fringe and benefit contributions documented on every certified payroll
Focused hiring	Efforts to hire priority workers: disability, under 80% AMI, justice-involved, veterans, formerly homeless	Tracked through program outreach and intake
Verification	Weekly certified payroll, record-keeping, administrator oversight	Signed statements of compliance plus on-site checks matching payroll names to crews

Documentation. The certified payroll form and review checklist are in the playbook appendix (Appendix I, A6); the Job Quality Standards and signatory pathway are A5.

II.2.2 Small Contractor Technical Assistance and On-Ramping

Prevailing wage compliance is one of the main barriers keeping small and emerging contractors out of public work, and in our experience the barrier is usually not the wage itself but the internal back-office operations it demands. The pilot treated the back office as a program-design problem it could solve, and built two pathways to the same bar. A contractor could become a union signatory, joining a collective bargaining agreement that carries wages, benefits, and the union's skilled-workforce pipeline with it; or a contractor could maintain their non-signatory

status and meet the Job Quality Standards directly, with the program teaching the back office that makes compliance possible.

Caption: When a panel is not up to code, at complete capacity, or simply doesn't have enough service, the last resort would be to install a main panel upgrade. Careful coordination between the program administrator, homeowner, contractor, and PG&E is necessary to complete this extensive process. Even if a new heat pump just needs 15 amps to run, RTEBN ensured the families of this program became one step closer to electrification. The home pictured above is this exact scenario. Not only did this work require the panel upgrade and the installation itself, RTEBN also removed the tree and replaced the water spigot (center photo).

Recruitment was designed to bring emerging contractors in rather than screen them out. A pre-RFQ information packet went out well ahead of the official solicitation, followed by an open period in which interested contractors met one-on-one with the administrator, saw where they already met the standards and where they did not, and learned how to close the gap through either pathway. The RFQ itself was distributed to more than 400 contractors; 4 firms came through pre-information meetings, 8 submitted qualifying applications, and 5 were selected by blind scoring that favored a history of serving low-income households, covering the required trade mix. Each selected firm then received individualized onboarding: prevailing wage requirements, certified payroll preparation, invoice structuring, and worker classification and wage verification, plus targeted workshops such as bid procurement training and utility application training delivered by peers. Here the one-to-one principle from Section I was at

work. The program standardized the framing and the tools, then delivered them firm by firm, because each back office needed something different to reach the same bar.

The outcomes speak to what the program set out to prove. 3 of the 5 selected contractors were minority- or women-owned, the non-signatory firms reached full certified payroll compliance, and the small firms union and non-union alike did not merely participate, they won on merit, securing the highest-value bids in the program. One non-signatory contractor voluntarily agreed to a post-program financial audit, and the program's results were presented back to the regional High Road Training Partnership with a signatory minority-owned contractor at the table. This is the repeatable on-ramp to public work the pilot was designed to produce. The two-pathway structure is diagrammed in Figure 3 of the Section III playbook.

Caption: RTEBN and 1-888 Heat Pumps staff at the ribbon-cutting ceremony for one of the Pilot-Within-a-Pilot homes.

II.2.3 Job Order Sequencing

The pilot organized construction for repetition and efficiency while keeping each home's scope its own. Work was aggregated along three dimensions: by intervention type, so a contractor could run the same installation across many homes; by home, so a property's full scope could be delivered in one mobilization; and by geographic cluster, cutting travel and set-up costs. Before any aggregation was created or a contractor went into the field, a single shared-home bid walk with all selected contractors set the approved per-intervention rates, with deliberate redundancy so at least one firm bid every intervention and most interventions were bid by several, giving both the funder and the contractors cost predictability. The rates were informed by field actuals from the pilot-within-a-pilot homes described in Section II.4. Aggregation itself was an administrative act. Contractors did not bid on packages; their bidding ended at the shared walk.

The administrator composed the sorted work into packages at the approved rates and awarded each as a single contract the firm mobilized once.

Sequencing was driven by field data and by each measure's dependencies, and the first award was chosen to generate that data. The first aggregated scope was a count of heat pump water heaters, awarded at roughly 60 to 70 percent of the number the program anticipated, because that measure demands as much electrical capacity, cost, and complexity as any other intervention, so its site visits tested each home's capacity and opened each home's site-specific scope. Awarded first did not mean built first. Mini-splits led the construction because they carry no circuit, panel, or utility dependency, so crews kept working while PG&E applications were pending, and the water heaters completed after or in parallel with their dedicated circuits, in parallel with the first mini-splits where a home needed no panel or service work. The water heater visits generated the panel, service, and structural data that organized the later electrical work, and the heaviest lifts, main-panel and service upgrades requiring both City building-authority and utility coordination, were batched and managed as their own track. Electrical delays also set the number of mini-splits awarded to the first HVAC contractor. The more of its water heater homes waited on the electrician, the more mini-splits the firm was given, so it worked continuously. Site visits ran in three passes so the scope was developed by professionals, validated independently before expensive work was assigned, and sorted by electrical need.

From the City permit records, the 37 direct-install homes sorted by electrical need as follows:

Description	Homes Served	Share
Homes without electrical work	6	**16.2%**
Homes with electrical circuitry	30	**81.1%**
Homes with smart-panel upgrade	4	**10.8%**
Homes with main meter panel upgrade (utility application required)	13	**35.1%**

Source: City permit tracking sheet, reflecting the implementation-time sorting that drove sequencing. Four deep-scope pilot-within-a-pilot homes whose permits were filed by partner organizations are sorted from program records. Final delivered electrical work per home is enumerated in Appendix II.C, whose summary classifies by delivered scope.

Caption: SolidRock Development Group's progress for Home 19, who received a HPWH, 2:1 ductless heat pump mini split, dryer, and all necessary electrical and plumbing work.

Payment followed delivery, with a 10 percent deposit on acceptance, 20 percent at commencement, 30 percent at the start of on-site work, 30 percent on completion, and 10 percent retention held until building-authority approval. Payment for any period released only after the payroll verification checklist cleared for every worker in it. By the pilot's end, every participating home had received at least one intervention, and every home's scope of work was complete except one, where the main panel upgrade waits on PG&E and is scheduled to finish in the fall of 2026. All whole-home aggregated scopes were closed out. The bid-sheet structure, with its per-intervention rates and productivity column, appears as Figure 4 in the Section III playbook.

Lessons learned. Multi-party coordination of PG&E meter and service upgrades, aligning the homeowner, the electrician, and the utility, was the single hardest operational challenge of the pilot, and perhaps the strongest argument for a dedicated administrator as central coordinator.

II.2.4 Contractor Experience

Caption: The remnants of a decommissioned furnace. This particular home had an extremely narrow crawlspace that was even further constricted by a concrete slab. The crew had to demolish the slab, remove the old furnace, install the new heat pump, connect it to the new dedicated service disconnect, and then pour in a new concrete slab to protect the crawlspace from downpour.

From a contractor's perspective, the program was demanding, and it was built to be worth the demands. The demands included weekly certified payroll, site checks against payroll, written approval before any scope change, sequenced visits that put multiple firms through the same house, and a program administrator functioning as general contractor with the coordination and oversight that implies. In return, contractors received a pipeline of aggregated work instead of one-off jobs, fixed bid pricing, technical assistance that upgraded each firm's back office into public-work readiness, and payment tied to clear benchmarks rather than negotiation.

Because small firms often cannot float public-agency payment cycles, the program paid a construction advance against each aggregation and then benchmark installments. The pilot's experience argues that the funding agency must in turn pay the administrator in advance and on time, since delays upstream land hardest on the smallest firms downstream. The program's dual role as administrator and general contractor also carried liability and insurance implications that a replicating agency should resolve explicitly at design time rather than discover mid-program.

II.2.5 Data Analysis / Lessons Learned / Recommendations

Metric	Result	Source
Pay periods with verified certified payroll	All (136 verified wage rows across the five contractors)	Payroll records (2.A.1; Appendix II.G)
Apprenticeship hours / utilization	40 hours (one Inside Wireman 2-A apprentice)	Payroll + DIR registrations (Appendix II.G)
Minority- or women-owned firms among selected contractors (union and non-union)	3 of 5	Program records

Lessons learned. Verification worked best when it was treated as a service to the contractor. Firms that knew exactly what would be checked built compliance into their pricing and routines from the first week. Individualized onboarding tended to outperform group training for back-office skills. On-site monitoring in the second year caught in practice what paper alone would have missed. And blind scoring, paired with a genuinely open pre-RFQ period with technical assistance, helped change who could win the work, not just who applied.

Recommendations. Fund the technical assistance as a permanent program line, since it is what converts labor standards from a barrier into an on-ramp. Set the minimum open period between pre-RFQ release and RFQ at three months. Track payment turnaround as a formal program metric with a target. However a program adapts the delivery model, run the full process on a representative sample of homes before committing the portfolio, so the tiers, rates, and administrative framework are checked while the cost of being wrong is still small; the Aggregation and Sequencing Workbook (Appendix I, A13) carries the full adaptation guidance, including whole-home and zonal mandates and the transformer-capacity constraint on zonal service upgrades. A distinct further set of recommendations covers frameworks designed but not implemented in this pilot, so that replicating agencies can see the full intended architecture:

- A multifamily and congregate housing track, community wealth-building structures, and expanded apprenticeship pipeline commitments, each drafted by RTEBN and held for a future program cycle.

II.3 Climate Justice

II.3.1 Greenhouse Gas (GHG) Emissions Reductions Goals and Measurement

The contract set a quantified goal: reduce 30,496 to 50,744 kg of CO2 annually by converting residential gas appliances to clean electricity. Meeting a quantified goal requires measurement, and the pilot approached measurement the way it approached construction, by staying within its competence. RTEBN administers programs and builds in homes; it does not certify emissions calculations. The program therefore reports the two things it can stand behind: the count of gas-displacing conversions it completed, and the primary data a qualified analyst needs to measure the reductions those conversions produce.

Measure	Completed	Gas appliance displaced
Heat pump water heaters	16	Gas water heater
Heat pump HVAC systems	25	Gas furnace or wall heater
Induction ranges	12	Gas range
Electric dryers	2	Gas dryer
Total conversions installed	55	

The verification data was designed into the program rather than assembled afterward. Utility bills are collected from each served household for the months following its close-out, joining the home's pre-conversion billing history, and nameplate and configuration data were captured at each close-out, so actual pre- and post-conversion usage can be measured as the homes are lived in rather than estimated from engineering assumptions. Appendix II.F carries a methodology workpaper with the standard bottom-up structure a verifier would apply, annual gas displaced per measure at published emission factors less the emissions from added electricity at the local grid factor, with every assumption stated in an editable cell. The City or its analyst can run that workpaper against the collected bills and own the result. Appendix II.F states the working outcomes on these assumptions: roughly 53,000 kg of CO2 avoided annually, above the high end of the contract's target range, and on the order of 795 lifetime metric tons over an assumed 15-year service life. Its assumptions are benchmarked against the federal emission coefficients published by the U.S. Energy Information Administration and against E3's Residential Building Electrification in California study, with the citations, the displacement caveat, and the grid-factor sensitivity stated in the appendix itself.

Measurement posture. This section reports installed measures, the verification data collected for them, and the working outcomes modeled in Appendix II.F. Per-intervention actuals, read from billed usage after the six-month monitoring period, will be published in an addendum scheduled for mid-2027 release; reductions become measured program results there, not before.

Counts are installations tallied from Appendix II.C and include the partner-delivered conversions marked there. Two heating systems entered homes without prior heat and one induction range replaced a non-operable electric stove; the displacement caveat is carried with the working outcomes in Appendix II.F.

II.3.2 Return on Investment (ROI)

The pilot evaluates return on investment through two lenses, following the standardized ROI and total cost of retrofit analysis developed under deliverable 1.H.5, and it presents both as follow-up methodology rather than as settled results. An accurate reading needs roughly six more months of utility bills, performance audits, and operational usage. With every major system replaced at once, each household settles into new habits for cooking, heating, and hot water on its own schedule, and the reading has to cross seasons, from summer into fall and winter, before heating-driven usage can be assessed. The financial inputs run on the same clock, with reconciliation of the braided funding completed at the end of August 2026 and the single audit running from September through December 2026. The per-intervention actuals will be published in an addendum to this report scheduled for release in mid-2027.

II.3.2.1 Energy Affordability ROI

A key goal and value of this program was to provide cost benefits where possible, and not to increase bills, for residents. Bill savings through electrification cannot always be guaranteed in the Bay Area, where electricity rates run high and the mild climate keeps heating loads modest, so the affordability question is treated with the same care as the climate question. For the income-qualified homeowner, the question is whether the electric home costs less to run each month, and the answer depends on the measure mix, the rate plan, and how and when the household uses its energy, which is why bill guidance, discount-program enrollment, and customer education were built into the program.

The method follows the standardized analysis developed under deliverable 1.H.5. For each measure, the gas costs avoided are priced at current PG&E gas rates, and the electricity added is priced at the household's actual rate plan, including CARE and FERA discounts where enrolled and time-of-use schedules where they apply. The net impact is presented by measure mix rather than as a single average, because a home that replaced only a water heater and a home that electrified everything sit in different positions on their bills. Appendix II.F states the gas displaced by measure: 180 therms per year for a heat pump water heater, 300 for heat pump HVAC, 30 for an induction range, and roughly 510 for the typical whole-home bundle of water heater, HVAC, and range. The dollar reading, priced on each household's actual tariffs and discount enrollments, follows in the addendum from the bills collected over the months following close-out.

II.3.2.2 Program ROI

For the funder, one of the returns on investment measured is the amount of CO2 reduced, and the question for this metric is dollars per ton. The report presents it two ways, and the distinction matters. The whole-program basis divides all program dollars by lifetime tons of CO2 reduced, which is honest about total cost but unfair as a carbon-abatement comparison, because those dollars also bought resilience benefits, including workforce development, health and

safety remediation, and program infrastructure, along with non-energy benefits (NEBs) such as improved indoor air quality and safer home access, none of which are accounted for in this figure. The measure-cost basis counts only the direct installation costs of the gas-displacing measures. Readers comparing this program to carbon-abatement benchmarks should use the second figure; readers budgeting a replication should use the first. The whole-program figure below is a working outcome from Appendix II.F, and the measure-cost basis follows in the addendum once costs are reconciled and reductions verified against billed usage.

The City's return also improved while the program ran. Making weekly installation productivity a bid criterion shortened the time spent administering each intervention, and the administrative savings were returned to the work, with $90,209.02 moved from the administrative budget into direct costs to purchase additional appliances beyond the planned scope. Those additional measures are a meaningful part of why the working outcome in Appendix II.F reaches and exceeds the high end of the contract's target reductions, at roughly 104 percent of the 50,744 kg high target.

Basis	Dollars	$ per lifetime metric ton CO2
Whole program	$1,500,000	$1,886 (working outcome, Appendix II.F)
Measure costs only	Mid-2027 addendum	Mid-2027 addendum

II.3.3 Data Analysis / Lessons Learned / Recommendations

Lessons learned. The pilot's climate math was shaped more by sequencing and completion than by technology choice: measures that could proceed without utility dependencies delivered their reductions on schedule, while gas-displacing measures gated behind service upgrades carried their emissions months longer than planned. Utility coordination can therefore affect the climate result as much as it affects the schedule. Second, homeowner education protects the climate result, because any reduction a verifier will eventually measure assumes the appliances are used, and used efficiently, and the program invested accordingly.

Recommendations. Meter a sample of homes in any replication so modeled reductions can be validated against measured usage. Capture nameplate and configuration data at close-out as a standing requirement. Report dollars per ton on both bases, whole-program and measure-only, to keep the comparison honest in both directions. In future programs, it would be informative to develop a methodology able to calculate total benefits, including resilience benefits and non-energy benefits (NEBs), into program ROI. The program's home-access and fall-prevention work carries its own six-month follow-up, and pairing that visit with the utility-bill reading would let a single follow-up serve both the health and the energy assessments.

II.4 Case Study: The Pilot within a Pilot

Before fixing sealed-bid prices across the whole program, the team needed to know what this work actually costs in the field with current prices and high road labor standards. The answer came from a small set of homes the program ran as a pilot within the pilot, delivered ahead of and alongside the competitively selected cohort, where RTEBN acted as general contractor and the work was priced by time and materials rather than by bid sheet. These homes carried the program's deepest scopes, and they were chosen in part because their conditions called for a whole-home approach.

Caption: Girls' Garage and RTEBN working on one of the pilot-within-a-pilot homes.

Across 4 homes, this work delivered whole-home electrification packages that went beyond the standard program scope. One home was fully electrified as part of a rebuild from its original frame. Solar and battery work, which the wider program had set aside on grounds of cost and complexity, was carried here through a partnership with GRID Alternatives that bundled 2 client projects into a single project cost. Each home braided multiple funding partners, and one produced the program's only realized rebate during the pilot period.

Much of the rest of the program was calibrated on what these homes revealed. Real per-intervention costs from the pilot-within-a-pilot work informed the rates set at the shared site walk and recorded on the approved bid sheet, and the cost bands in the tiered aggregation framework, so the approved rates the administrator later composed aggregations against reflected field actuals rather than estimates. Early site conditions in these homes, including hazards that paused work until they were disclosed and resolved, produced the advance site-condition disclosure protocol that governed every later visit. The pricing figures in the Section III playbook trace back to this work.

As a comparison of delivery models, the case study points both ways. Time-and-materials delivery reached homes whose conditions no fixed bid could responsibly price, and it consumed administrative attention in proportion. Aggregated bid-sheet delivery moved faster and priced predictably, and it depended on the cost knowledge of the time-and-materials homes generated. The intervention-type aggregations proved by far the quicker and more cost-effective path; per-home delivery earned its place by what it made possible in the homes that needed the most. Of the six projects eventually awarded to a single contractor, one home drew on the work of the

program administrator, partner organizations, and subcontractors together, paid for by five separate funding sources. The program's close-out strategy reflected that division, directing roughly the final 15 to 20 percent of spending to time-and-materials completion work in homes already served, and a replicating agency can treat the split as a design tool rather than a compromise.

PwP per-home costs are now published in Appendix II.C (Homes 01-04; $162,582.74 total direct funding). Reference that table here rather than duplicating it.

Caption: City of Berkeley Mayor Adena Ishii cutting the ribbon in celebration of the first whole-home electrification project.

Rebuilding Together East Bay Network

City of Berkeley Just Transition Electrification Pilot Program

The Contractor Onboarding System: a replicable playbook for program administrators.

Purpose and How to Use This Packet

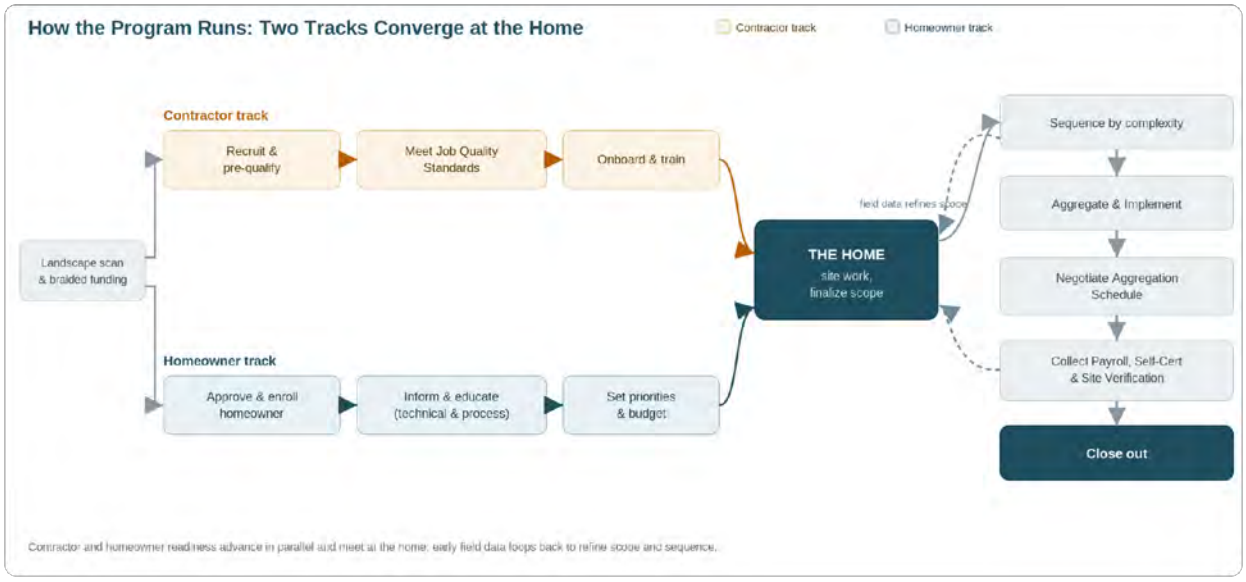


Figure 1. Funding, contractor readiness, and homeowner priorities converge at the home, where scope is finalized and refined.

This playbook is a guide for a program administrator to design and run a direct install electrification program. Its focus is the part of that work that most determines whether the program succeeds: selecting, onboarding, and managing the contractors who perform the installations.

A direct install program is demanding to run because it must balance four things at the same time:

- The funding behind each home.
- The built environment of the home itself.
- The client's priorities.
- The requirements placed on contractors.

These are interdependent and in constant flux from the first scope to the final inspection. The funding a home qualifies for shapes what the scope can include; the built environment sets what is feasible and what it costs; client priorities decide what matters most within that envelope; and contractor requirements, including labor standards and capacity, govern who can do the work and how, and accordingly how well. A change in any one moves the others, so the real task is keeping them aligned as conditions change.

The program manages this by advancing two readiness tracks in parallel. A contractor track prepares construction employers to meet the program's Job Quality Standards, while a homeowner track carries the client side, the built environment, and funding eligibility. As Figure

1 shows, the two tracks converge at the home, where the four dimensions are reconciled into a single scope of work and then refined as field data comes in.

Within that whole, this document develops the contractor side in the most depth, with the homeowner track and the wider implementation steps included as the context that contractor selection, onboarding, and management depend on. It is written so any administrator can adapt the approach to their own jurisdiction.

How to Use This Playbook

Part 1 defines the administrator structures of what the program needs and how it must be done, standing up the education and communications frameworks that contractors will move through.

Part 2 defines the onboarding and implementation phase: the document sets, requirements, and communication protocols that carry selected contractors through delivery. The steps are sequential, but the program is iterative; assessments, scopes, and sequencing are refined as field data comes in. Adapt the specifics to local conditions, especially your funding sources, prevailing-wage rules, permitting authority, utility, and the trades active in your region.

Throughout, shaded callout boxes carry one of three things: a pointer to relevant documentation, a lesson learned, or a story from the field.

Part 1: Program Structure and Contractor Roles

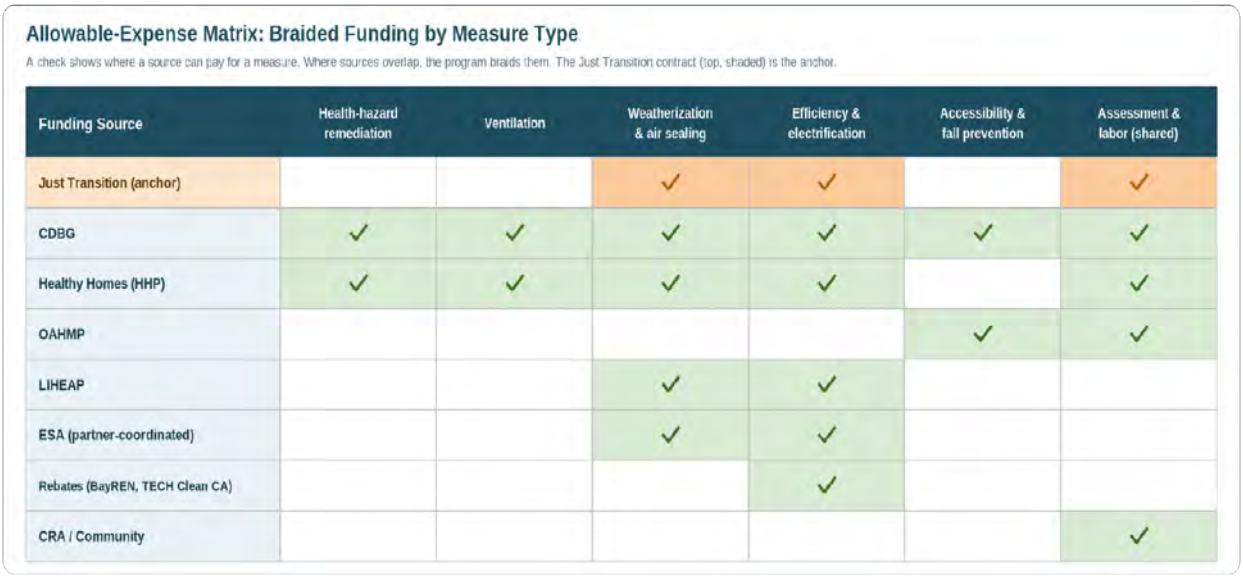
This part is where the administrator decides what the program needs and how it must be done, then stands up the education and communications frameworks that contractors will move through. Each step establishes a piece of that foundation before any contractor is onboarded.

Step 1: Establish the funding foundation and eligibility

Begin by establishing what pays for the work, who qualifies, and the terms contractors will work under. At this stage:

- Identify the base funding source and its allowable expenses.
- Map the other programs whose funds can be braided in to complete a full scope of work in a single home.
- Set the eligibility criteria that determine which households the program can serve.
- Compare wage requirements across the braided sources and reconcile them with your Job Quality Standards, so the standards you hold contractors to can be met under every source in the braid.

The result fixes both what the program can fund and the standards contractors are later selected against and paid under.



Allowable-Expense Matrix: Braided Funding by Measure Type

A check shows where a source can pay for a measure. Where sources overlap, the program braids them. The Just Transition contract (top, shaded) is the anchor.

Funding Source	Health-hazard remediation	Ventilation	Weatherization & air sealing	Efficiency & electrification	Accessibility & fall prevention	Assessment & labor (shared)
Just Transition (anchor)			✓	✓		✓
CDBG	✓	✓	✓	✓	✓	✓
Healthy Homes (HHP)	✓	✓	✓	✓		✓
OAHMP					✓	✓
LIHEAP			✓	✓		
ESA (partner-coordinated)			✓	✓		
Rebates (BayREN, TECH Clean CA)				✓		
CRA / Community						✓

Figure 2. Allowable-expense matrix: which braided source can pay for which measure type.

Documentation. The full braided funding model and allowable-expense matrix are documented in the braided funding report, included in the Appendix. In the pilot, the City of Berkeley Just Transition contract anchors HUD-derived sources (Community Development Block Grants, Healthy Homes Production, and the Older Adult Home Modification Program) plus supplemental funds, with households qualifying on income and owner-occupancy.

Supporting documents: Braided funding report (A1); eligibility criteria and intake screening (A2); comprehensive home assessment (A3).

Step 2: Assess existing conditions and run the landscape scan

With the funding and eligibility framework set, assess every candidate home and collate its existing conditions into a landscape scan of the whole pool. This depends first on reaching and identifying eligible households. For each home:

- Capture the existing conditions and the likely intervention types.
- Confirm the funding the home qualifies for.
- Bring the funding matrix from Step 1 back in to prioritize homes and intervention sets with dual outcomes, where a funding source pays for benefits beyond the energy work.
- Assign a high-level aggregation or implementation approach.

These assessments are not final scopes. Together they build the program-wide dataset you use to group homes by work type, estimate costs, and plan the order of the work. This is what sets up contractor identification and onboarding directly: the trade mix shows which contractors to recruit and how many, which feeds the procurement in Step 4, and the tiered scopes become the concrete work those contractors bid on at orientation and are onboarded to deliver in Part 2.

From the field. Drawing on more than thirty years of direct services in Berkeley, RTEBN already had many eligible households which had previously undergone health and safety upgrades that were identified as good candidates for electrification upgrades. It set a target number of homes, weighed it against the total funding, and turned the 44 assessments into the tiered framework, where dividing the budget by each tier's cost gives the number of homes that tier can reach. The assessments were run by energy specialists alongside clinicians and CAPS-certified home repair technicians, so the program could favor bundles with dual outcomes, where funding also covers the non-energy health benefits of electrification. Each tier's cost reflects the braided funding and the anticipated contractor sequencing, not just the raw measure costs.

Documentation. Working with a program administrator with existing relationships and trust with local low-income households which have already undergone some home upgrades was a critical advantage to this program's success. Many qualifying homes need other critical renovations that are of highest priority to homeowners and were not covered under this program; because RTEBN had a pipeline of clients it had known and worked with, many of those priority improvements had been made and these homes were more ready for electrification. An administrator without that local history should lean harder on a strong referral list from the agencies that do serve these households, and on deep acumen in working with low-income households, because identifying and preparing eligible homes is the precondition for everything that follows.

Supporting documents: Comprehensive assessment and scope-of-work templates (A3); tiered aggregation framework (A4).

Step 3: Define the Job Quality Standards and Pathways

How you implement Job Quality Standards depends on your jurisdiction and the priorities of your community. To set standards that are fair to workers and that ensure the program delivers quality outcomes:

- Start from your area's prevailing wage. It is a normalized, negotiated cost for labor and the most defensible baseline to build on.
- Account for the different rate structures: residential rates, and rates that vary by the specific subtask and the skill level of the technician or tradesperson.
- Build a technical understanding of each discrete intervention. Knowing the work in detail is what lets you price it accurately and design the program around specific jobs, trades, and workflow rather than generic labor.

High road construction labor standards typically include prevailing wage, apprenticeship utilization, and healthcare and retirement benefits, and, if the project is large enough, Project Labor Agreements. The Berkeley Just Transition project provided two pathways so that contractors can participate, both union and non-union, with both pathways requiring the same compliance bar. These standards are the bar every contractor is selected against, onboarded into, and held to through delivery.

Note: this project built on the collaborative effort over several years by the Bay Area Residential Decarbonization High Road Training Partnership, co-facilitated by Rising Sun Center for Opportunity and CTWI. This group developed a set of recommended Residential Building Decarbonization Labor Standards for use in publicly funded residential decarbonization programs.

Pathway Option 1: Become a union signatory contractor

A signatory contractor has signed a collective bargaining agreement, often called a Master Labor Agreement, with the local union for its trade. In doing so it agrees to pay prevailing wages, contribute to the union's healthcare benefit and pension funds, and follow the trade's apprenticeship and dispatch rules. Becoming a union signatory contractor is encouraged but not

required; it makes the contractor a high-road employer and opens the union's skilled-workforce pipeline. To pursue this path:

- Contact the local union's organizer or business representative for the trade.
- Review the agreement and what it will require of the business, including wage and benefit costs and how workers are dispatched.
- Sign the agreement, then bring existing crew in (often with a skills assessment that sets journey or apprentice status) or hire through the union hall.
- The exact route varies by trade, so the union representative is the authoritative guide.

More details on this pathway can be found in A5, Job Quality Standards and Union Signatory Onboarding Pathway with Regional Trade Contacts.

Pathway Option 2: Help contractors understand and meet the Job Quality Standards

Many small contractors may not feel prepared to go union, so the program also needs a path that helps them understand and meet the standards that union contractors have already mastered. The administrator leads this in two moves. First, determine and explain the standards: define exactly what the Job Quality Standards require, prevailing wage, apprenticeship utilization, and benefits, and communicate them so every contractor understands the bar. Second, build a path that educates contractors on both the standards and how to achieve them, including:

- Employee and employer education on prevailing-wage requirements and worker classifications.
- Certified payroll each week, using a form such as federal WH-347 with a signed Statement of Compliance.
- Connections to state-certified apprenticeship and BTC-approved apprenticeship readiness (MC3) programs.
- A submission schedule for certified payroll and required documentation.
- Support responding to RFQs and RFPs, so the contractor can win future public work.

Each weekly certified payroll record should include, for every worker: name and address; Social Security number; work classification code; straight-time and overtime hours by day and date; actual per diem wage paid to each owner, journeyworker, and apprentice; fringe benefits; and journeyworker or apprentice level.

Tell contractors what will be verified

Give contractors the verification checklist at onboarding so there are no surprises at payment. The administrator runs the same review on every payroll period before any payment is released, and for each worker in the period confirms:

- Prevailing wage met: base hourly rate, overtime rate, and fringe or cash-in-lieu meet or exceed the current DIR determination for the worker's classification and DIR code.
- Certified payroll form on file: federal WH-347 or California A-1-131.
- Signed Statement of Compliance on file.
- Payroll journal or pay stubs on file, as independent proof of what was actually paid.
- Timesheet on file.
- Site-check verification: an independent visit confirming the named workers were on site on the recorded date, reconciled against the payroll.

The contractor self-certifies with the certified payroll form and signed Statement of Compliance; the administrator then independently reconciles those records against the DIR rates, the contractor's own payroll journal or pay stubs, and timesheets, and periodically verifies workers on site. The administrator logs each period on a payroll verification record and signs a certification that the payroll for the periods reviewed is correct and complete. Because contractors know this review is coming and exactly what it covers, they can build compliant payroll into their pricing and back-office routine from the first week.

From the field. RTEBN worked with its program partner CTWI to provide union support throughout the program and to help contractors interested in the union pathway navigate it, connecting them to the relevant Bay Area locals: IBEW 595 for electrical, UA 342 for plumbing, SMW 104 for sheet metal and HVAC, Laborers 304, and Carpenters 713. The Construction Resource Center and Emerald Cities Collaborative are available and offer tools, academies, and workshops that train small contractors in both back-office operations and the electrification process.

Supporting documents: Job Quality Standards and union signatory onboarding pathway (A5); certified payroll form and review checklist (A6).

Step 4: Recruit and pre-qualify contractors

Determine the contractor mix the project requires by trade and intervention type from the landscape scan, then run a transparent procurement designed to bring emerging contractors in:

- Release a pre-RFQ information packet with as much time in advance as possible (at least three months; the pilot's open period ran roughly four), showing the types of work available and the Job Quality Standards.
- Hold an open period for interested contractors to meet with the administrator, ask questions, see where they already meet the standards and where they do not, and learn how to close the gap through either pathway. Provide one-on-one support particularly to small and emerging contractors who would not otherwise be able to participate in a project of this scale.
- Release the official RFQ, which contractors already understand and know how to complete.
- Score responses blindly, using a matrix that favors contractors with a history of serving low-income households and a commitment to meet or exceed the Job Quality Standards.
- Select the number of top-scoring contractors needed to cover the required trade mix.

Designing the open period this way lets contractors enter at whatever readiness level they are at: a start-up or experience-ready firm builds capacity through readiness support, while a firm that is already shovel-ready goes straight to the RFQ without the support, as Figure 3 shows.

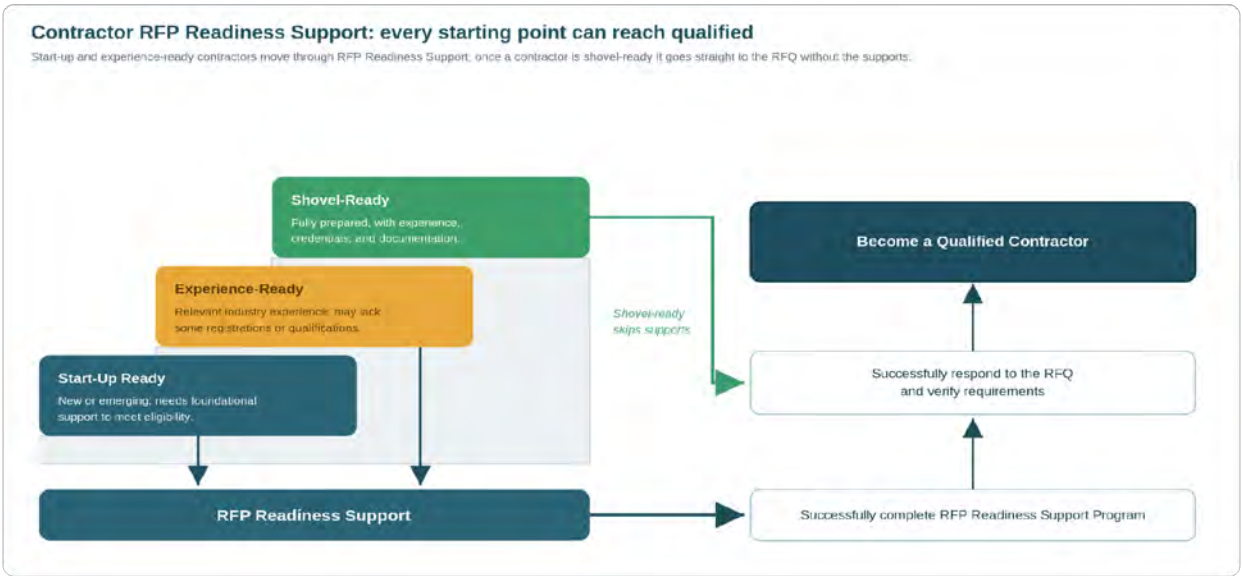


Figure 3. Start-up and experience-ready contractors move through RFP Readiness Support; a shovel-ready contractor goes straight to the RFQ.

From the field. The target mix was two HVAC and two electrical contractors. Reaching that coverage meant selecting five contractors in total, which included one general contractor. Scoring was done blindly by administrators and community-based organizations.

Supporting documents: Pre-RFQ packet, RFQ, and blind scoring matrix and instructions (A7); contractor agreement (A8).

Part 2: Onboarding and Implementation

This part is the active phase: onboarding selected contractors and delivering the work, with the document sets, requirements, and communication protocols that keep contractors, homeowners, and the administrator aligned from first orientation through close-out.

It helps to think about implementation holistically, starting with cost. Each intervention is bid through a sealed bid process that fixes the average cost per intervention, which gives the program cost predictability across the entire implementation. Contractors do not bid on aggregations; their bidding ends with these per-intervention prices, and the administrator later composes and awards the aggregated work at the approved rates. The jurisdiction or agency pays the program administrator in advance for the full, aggregated cost of the scope of work. The program administrator then allocates that funding to contractors in installments, disbursed against the following program benchmarks as set out in the bid documents:

- 10 percent deposit on acceptance of the estimate (up to $1,000).
- 20 percent at project commencement.
- 30 percent at the start of on-site work.
- 30 percent on the day installation is completed.
- 10 percent retention, held until building-authority approval.

The bid sheet itself captures the work and its pace. It follows the columns below, drawn from the program's sealed bid template; its final column, anticipated units per week, is the productivity measure:

Job type	Materials description	Material cost	Labor classification	Labor cost / units per week
Electrical service upgrade (major)	Upgrade existing 125A electrical service to a 200A smart load-center; SPAN Smart Panel (200A, 120/240V split-phase) recommended	$5,150	Inside Wireman (ELEC-100)	$3,250 / 2
Plumbing labor	Plumbing modifications to support installation or relocation of a heat pump water heater: cap and remove gas line, reroute domestic lines, new pressure regulator, expansion tank, condensate kit, ball valve	$450	Residential Plumber (PLUM-102)	$778 / 4

Figure 4. Bid-sheet columns from the program's sealed bid template with sample line items. The final column carries the production rate. Rates were for implementation in 2026 and based on real implementation costs from the Pilot within a Pilot (see Section II.4 of the accompanying Final Two-Year Pilot Report).

That productivity column matters most for the administrator's own cost. For a city or CBO, the time spent in implementation is itself a fixed cost, so limiting the calendar time you are in implementation, not just the unit prices, is key to reducing the program's total cost. Reading the units per week lets you sequence and staff the work to compress that calendar.

Step 1: Onboard and orient the selected contractors

Onboarding opens with a short group phase, then deliberately narrows to a one-to-one process. Bring the selected contractors on together for two shared events:

- Hold a group orientation covering program goals, documentation expectations, labor and certified-payroll requirements, and the sequencing strategy.
- Have all contractors walk one shared home and submit a fixed bid across the interventions to be completed, which calibrates pricing and creates the approved bid sheet.

Use the orientation to explain how the work will be laid out, because it shapes who starts first. The program sequences by complexity and lets real field data, not projections, drive decisions. The first aggregated scope is awarded for the intervention that tests each home hardest, and the contractor who can meet the production rate for that intervention is the natural first mobilization, while the rest of the pool is staged behind the data that early work produces.

After the kickoff and the shared bid walk, communication, training, and onboarding become a one-to-one process. From here the administrator works with each contractor individually, on its own trade, scope, and schedule, using the shared expectations and communication norms set in the group phase to manage every contractor consistently through delivery.

From the field. A kickoff with all five subcontractors set shared expectations, and a single shared-home fixed-bid exercise established the approved bid pricing used across the aggregated work orders. Heat pump water heaters led the awards, at roughly 60 to 70 percent of the anticipated program total, because each install requires a dedicated 30A circuit, works within the space considerations of the home, and carries rebate requirements, so its site visits tested every home's capacity. Only one contractor could meet the production rate, which made that firm the natural first mobilization, and its early visits surfaced the panel and service upgrades that organized the later work.

Supporting documents: Contractor agreement (A8); approved bid sheet (A11); aggregation and sequencing workbook (A13).

Step 2: Set up and train contractors on the documentation and portal tool

This is where the one-to-one process begins in earnest. Stand up the tracking tool and bring each contractor onto it individually:

- Set up a single tracking tool, even a spreadsheet-based portal, for site data, photos, scopes of work, and permitting and rebate documentation.
- Pre-populate scopes from the assessments so contractor visits focus on validation, not duplicate data entry.
- Train each contractor one-on-one and trade-specific, capturing only what is relevant to their scope and flagging where their work meets other trades.

Training one contractor at a time keeps each session on that trade's own fields and its hand-offs to others, and it is also how the program captures the early field data that drives sequencing. As the first installs go in, the portal records the panel, service, and structural findings that determine which homes need heavier electrical or HVAC work and in what order, so the tool is at once the record of delivery and the intelligence that organizes the phases ahead.

The portal is the backbone for managing contractors through delivery, so onboarding them onto it now is what makes later coordination and oversight possible.

> **From the field.** Reference tools: the Excel-based portal and CRM board, and the standardized Project Management Pack. In the pilot, RTEBN pre-populated scopes from its assessments so contractor visits focused on validation and sequencing rather than duplicate data collection.

Supporting documents: Tracking portal or CRM and the Project Management documentation pack (A9).

Step 3: Sequence site visits and finalize scopes of work

The landscape scan gives the administrator the general picture: housing types, common conditions, homeowner priorities, and the funding each home can draw on. It is not an install-level scope. Every contractor reads a given install a little differently, and most administrators are not general contractors or energy specialists, so the real scope is developed by sequencing the right professionals to each home to validate and finalize the pre-populated scope on site. For each home, the visiting contractor resolves everything site-specific (changing conditions, owner readiness, equipment placement, permitting, rebates, and funding) and documents feasibility, constraints, existing equipment, alternatives, load calculations, amperage for future appliances, cross-trade coordination notes, and labeled photos.

Sequence the visits so the scope is both developed and validated, and so that even with fixed per-intervention prices the incentives push each contractor toward the most cost-effective approach. The levers are which homes each contractor takes and who confirms that the costly work is necessary:

- Send the lead-intervention installer to more homes than their award covers, and allow the contractor to select the most cost-effective jobs that require the least customization and prep work to get started. Over-assigning visits rewards the contractor for finding homes where the install avoids costly electrical work, and the data they gather sorts every home by how much electrical work it needs and surfaces rebate eligibility.
- Sequence a first electrical contractor for wiring and the lighter sub-panel upgrades, where a subpanel is enough to support the new equipment. Because this contractor is instructed that another contractor will perform main-panel or service upgrades, its recommendation that a home needs that heavier work reads as validation rather than an upsell.

- Route the major electrical work, main-panel and service upgrades, to a second electrical contractor, so the most expensive and complicated work is independently confirmed as necessary before it is assigned.

Disclose known site conditions to contractors before any visit, and hold regular cross-trade coordination meetings on shared homes. This is the first sustained exercise in managing contractors in the field: it develops scope through professionals rather than the administrator, validates the costly work by separating who recommends it from who performs it, and compensates the lead installer for the added site-assessment load by letting them concentrate on the jobs that fit them best.

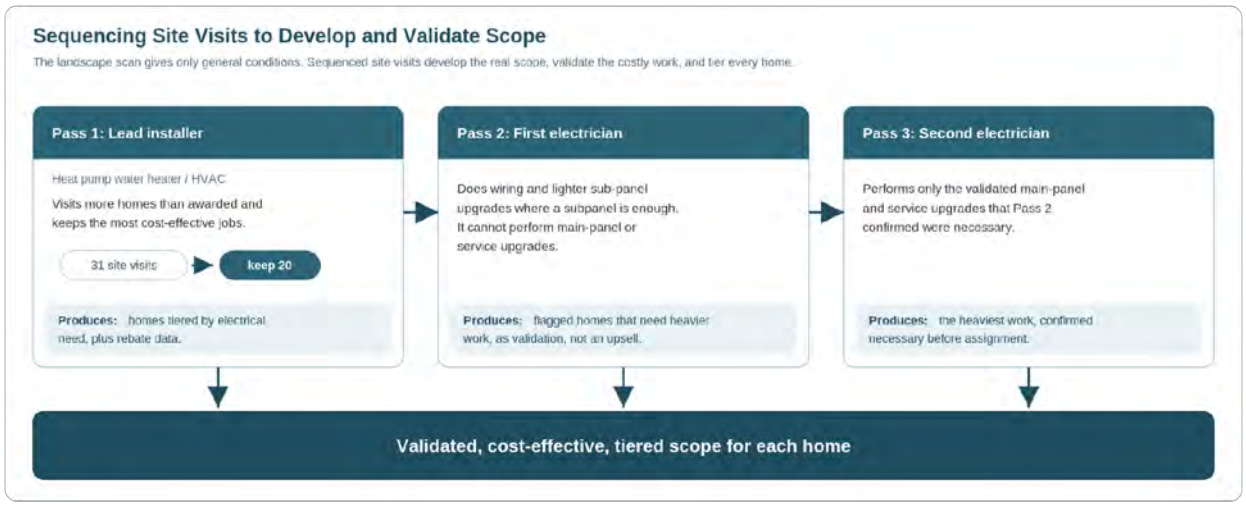


Figure 5. Sequencing site visits across three passes develops, validates, and sorts the scope for each home.

From the field. RTEBN gave its heat pump water heater installer an aggregated scope of 20 homes but sequenced 31 site visits, asking the contractor to keep the 20 most cost-effective jobs. That steered selection toward homes that needed only a dedicated 30A circuit rather than a panel or service upgrade. A first electrical contractor then handled wiring and the sub-panel upgrades that could support the water heater and mini-split, while all main-panel and service upgrades went to a second electrical contractor, so the heaviest electrical work was validated as necessary before it was assigned.

Lesson learned. Disclose site conditions before the visit. After a contractor raised concerns about vectors, mold, and environmental safety, RTEBN formalized an advance disclosure protocol, and weekly meetings kept HVAC and electrical scopes aligned on panel capacity.

Supporting documents: Comprehensive assessment and scope-of-work templates (A3); advance site-condition disclosure protocol (A10); aggregation and sequencing workbook (A13).

Step 4: Manage the homeowner relationship

The homeowner track runs in parallel with the contractor work and has to be ready before any contractor mobilizes. The administrator carries this relationship directly and keeps it from disrupting the budget or a contractor's scope:

- Enroll each homeowner under a signed grant agreement before work begins, with eligibility and owner-occupancy verified.
- Make sure contractors understand the agreement terms: license to enter, eligibility and occupancy, hold-harmless provisions, and no cost-increasing change without the administrator's written consent.

- Educate the homeowner on the technology and the process so they know what to expect, including that several contractors may visit the same home across the sequenced passes.
- Set budget parameters and rank homeowner priorities before the contractor's visit, so the scope that gets built fits both the household's priorities and the program budget.
- Route every on-site change request back through the administrator; homeowners cannot direct or change a contractor's scope directly, which protects both the contractor and the budget.
- Coordinate access and scheduling around the household, especially where occupants are seniors or have limited mobility, so each sequenced visit and install lands on a home that is ready.

Because the program is direct install, in occupied low-income homes, this relationship is also where trust is built or lost, so a single, consistent point of contact through the administrator matters as much as any document.

> **Lesson learned.** Set budget parameters and rank homeowner priorities before the contractor's visit. Doing so reduced iterative scope revisions and kept each home aligned with both homeowner priorities and the program budget.

Supporting documents: Homeowner grant agreement (A12); eligibility criteria and intake screening (A2); homeowner education and communication packet (A15).

Step 5: Map aggregation-specific permitting, then sequence the work

With scopes now known and homes already sorted by electrical need from the site visits, map permitting to the aggregated work: which homes need main-panel or service upgrades (the heavy, building-authority-plus-utility lift), which need only a subpanel or a single circuit (lighter), and how those cluster across contractors and neighborhoods. Then sequence by complexity, driven by real field data rather than projections:

- Start with the lowest-permitting interventions to begin quickly and surface each home's panel, service, and structural needs.
- Plan electrical service upgrades around the heaviest permitting lift, since they require both building-authority and utility coordination and carry the longest lead times.
- Use lighter-lift options where load allows; a subpanel in lieu of a full panel replacement can cut processing, delays, and cost.
- Bring HVAC heat pumps into design and permitting on their own track, accounting for structural placement and whole-home electrical load. Unlike a heat pump water heater, which cannot go in until its circuit is ready, a heat pump HVAC system can be mechanically installed before the electrical work is finished and connected later, so it does not have to wait on a panel or service upgrade and can be sequenced earlier or in parallel.
- Where a homeowner is likely to add more electric appliances later, consider a full panel upgrade to avoid future hardship, balancing immediate cost against long-term benefit.

Aligning the sequence means holding several variables together at once: building-authority permitting, utility coordination, each contractor's availability and units-per-week production rate, seasonal and logistical constraints, and whole-home load management. Sequencing is also how the administrator manages contractor workflow, keeping crews productive and coordinated across the homes they share, and it is iterative: as more homes are scoped, the plan is refined rather than fixed up front.

From the field. Starting with heat pump water heaters allowed work to begin immediately and generated the data that organized later electrical and HVAC work; installing SPAN subpanels in lieu of full replacements reduced processing, permitting delays, and cost, which ultimately allowed for more interventions than would otherwise have been possible. Where water heater homes waited on electrical work, additional mini-splits were assigned to keep the first HVAC contractor continually working.

Supporting documents: Aggregation and sequencing workbook (A13).

Step 6: Aggregate scopes and pay against them

Organize work into aggregated scope-of-work orders rather than one-off jobs. Aggregation happens at the administrative level, composed at the approved rates and awarded as single contracts. Aggregate along three lines:

- By intervention type (all of one measure to the best-fit contractor).
- By home (a property's full scope bundled for a single mobilization).
- By geographic cluster (nearby homes with similar needs grouped to one contractor to cut travel and mobilization).

Each order lists the interventions and homes covered, the approved scope, and aggregated pricing from the approved bid sheet, with a total not-to-exceed amount. Pay against the aggregated scope:

- Pay as a construction advance against the aggregation, then in the installments set out in the bid documents: a deposit on acceptance, and payments at commencement, at the start of on-site work, and on completion.
- Hold retention (for example, 10 percent) until building-authority approval, released at completion and acceptance.
- Require written approval for any change to approved scope or pricing before the work is performed.

To be paid, the contractor schedules and completes work in coordination with the administrator, pulls or coordinates permits, passes inspections, submits required documentation, and complies with labor and reporting requirements, including the certified payroll from the Job Quality Standards pathway. Payment for a period is released only after the payroll verification checklist in Part 1, Step 3 clears for every worker on it. Tying payment to coordinated delivery, inspections, documentation, and verified certified payroll is the program's main lever for managing contractor performance.

Expect to refine the aggregations as field data accrues: clusters, pricing, and contractor assignments tighten over the program as more homes are scoped and sequenced, rather than being locked at the outset. Each round of work either finishes a home's jobs or delivers the home into the next group of work.

Documentation. See the Aggregated Scope of Work Order template and the approved bid sheet. In the pilot, work orders carried a total not-to-exceed amount, were paid by construction advance against the aggregation, applied 10 percent retention, and required written approval for any adjustment before execution.

Supporting documents: Aggregated scope-of-work order template and approved bid sheet (A11); certified payroll form (A6); close-out packet (A14).

Step 7: Close out responsibly

Close-out reconciles labor compliance, spends the last of the budget precisely, and finishes each contractor cleanly. Two records that have been accumulating all program long now come together: the weekly certified payroll and the field checks of who was actually on site.

- Reconcile labor compliance first. Assemble each contractor's full run of weekly certified payroll reports, each with its signed statement of compliance, the declaration page.
- Match that payroll against the field records your staff gathered on site, the names and activities of the technicians actually working, and confirm that every worker observed on site appears as a participant on the certified payroll for that period. Resolve any name or classification discrepancy before releasing final payment or retention.
- Once the aggregated, bid-sheet-priced scopes are substantially complete, stop adding new homes and contractors and get those scopes as close to finished as possible before drawing down the rest.
- Direct only the remaining funds, roughly the final 15 to 20 percent of project spend, to time-and-materials work on homes already served, priced by time and materials rather than the bid sheet, so the final dollars are spent to the exact amount and every electrification pathway in a served home is completed.
- For each contractor, confirm completed work and final inspections, complete portal documentation, collect the final certified payroll, and release any retention.

Lesson learned. Shift to precision-level spending at the end. Once the aggregated, bid-sheet scopes were substantially complete, RTEBN added no new homes or contractors and directed the remaining funds to time-and-materials infill in homes already served, which closed out the budget cleanly.

Supporting documents: Certified payroll form and review checklist (A6); close-out packet (A14).

Sections I and II report what the pilot did and what was learned. This section passes the model on. It gives a program administrator, anywhere, the complete playbook for designing and running a direct-install electrification program on this model. It is written so any administrator can adapt the approach to their own jurisdiction, funding sources, prevailing wage rules, permitting authority, utility, and trades.

The playbook is incorporated here in full as deliverable 1.G.13: Purpose and How to Use This Packet; Part 1, Program Structure and Contractor Roles (Steps 1 through 4: funding foundation and eligibility, existing-conditions assessment and landscape scan, Job Quality Standards and pathways, recruit and pre-qualify contractors); Part 2, Onboarding and Implementation (Steps 1 through 7: orient contractors, documentation and portal, sequence site visits and finalize scopes, manage the homeowner relationship, map permitting and sequence the work, aggregate scopes and pay against them, close out responsibly); and Figures 1 through 5.

Administering the Program: Experience and Recommendations

The pilot's administrative experience belongs in the playbook because the administrator carries much of the weight in this model. Four lessons from two years of administration, offered to funders as much as to implementers.

Contract early and protect the calendar. The pilot lost months between council approval and a fully executed contract, and more when mid-program scope decisions required re-mapping deliverables to invoices. Time spent before signature carries through the whole program calendar, and protecting that calendar is the least expensive schedule protection available to funders and administrators alike.

Keep deliverables stable. Mid-program changes to who performs a task (for example, moving scopes of work in-house) may be the right call operationally, but each one forces a renegotiation of the deliverable-to-budget map. Build a defined change process into the contract so adjustment does not become administrative drag.

Match invoicing frequency to small-organization cash flow. Quarterly invoicing against a reimbursement model strains a nonprofit administrator that is simultaneously advancing payments to small contractors. The program's experience argues for advance payment to the administrator with periodic true-up, and for invoice periods defined by the work rather than the calendar.

Fund the coordinator. The single hardest problem in the pilot, multi-party utility coordination, was solved by having a dedicated administrator as every party's single point of contact. That role should be an explicit, funded line item in any replication, not an assumed overhead.

Appendix I. Administrator Playbook Appendix (A1 to A15)

Incorporated as published.

- A1. Braided Funding Report
- A2. Eligibility Criteria and Intake Screening
- A3. Comprehensive Assessment and Scope-of-Work Packets
- A4. Tiered Aggregation Framework
- A5. Job Quality Standards and Union Signatory Onboarding Pathway with Regional Trade Contacts
- A6. Certified Payroll Form and Review Checklist
- A7. Pre-RFQ Information Packet, the RFQ, and the Blind Scoring Matrix Instructions
- A8. Contractor Agreement and Personal Services Contract
- A9. CRM and Standardized Project Management Packet
- A10. Advance Site-Condition Disclosure Protocol
- A11. Aggregated Scope-of-Work Order Template and Bid Sheet
- A12. Homeowner Agreement Packet
- A13. Aggregation and Sequencing Workbook
- A14. Close-Out Packet (final inspection, final certified payroll, retention release)
- A15. Homeowner Education and Communication Packet

Appendix II. Supporting Information, Forms, and Data for Sections I and II

Only material not already carried in the playbook appendix. Where a form or tool exists in Appendix I, the report references it there.

- II.A Climate Coach Packets.
- II.B Resident data: homeowner survey instrument
- II.C Per-Home Interventions and Cost
- II.D Contractor TA and pre-training: memos on contractor pre-trainings (procurement and certified payroll training; utility application workshop; manufacturer informational presentations)
- II.E Sequencing supplements: PG&E application guide
- II.F GHG Reduction and ROI: Working Outcomes and Methodology
- II.G Raw data: Resident Equity, High Road Jobs (incl. wage tracking 2.A.1), and Climate data sets.