Unlocking Residential Electrification with Inclusive Utility Investments: Resource Ipswich Final Report

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Key Takeaways

This pilot IUI program:

- Enabled HVAC electrification in all participating homes
- Eliminated 84% of upfront costs for customers
- Maintained 20% savings over historic energy costs
- Mitigated over 400 tons of lifetime CO2

General Overview & Pilot Objectives

CET and IELD have collaborated to deliver an Inclusive Utility Investments (IUI) program in Ipswich, MA. In July 2023, IUI was offered to limited customers as an expanded service to the decarbonization assessment program, ReSource Ipswich. As the first of its kind service in Massachusetts, CET and IELD set out to:

- Demonstrate the use of IUI across multiple customer types (e.g., homeowners, renters, single-, multi-family)
- Validate the potential for IUI to finance priority measures (weatherization, whole-heat pumps, and heat pump water heaters) for delivered fuel and natural gas customers
- Develop collateral to disseminate learnings and facilitate scale-up to other utilities

Design

Following positive results of the 2022 feasibility study[1], a pilot was designed to demonstrate the impact and viability of IUI for different customer segments and to test program processes, procedures, and tools prior to opening up to the utility's entire customer base. The pilot was designed with a capital investment ceiling of $100,000 and targeted serving 4-5 customers that represented different customer segments needing a combination of weatherization and heat pumps. In particular, the implementation team aimed to serve a multifamily property with one or more renters, a homeowner with oil (i.e., only eligible for Ipswich ELD's incentives), a homeowner with natural gas (i.e., eligible for both Ipswich ELD's and the investor-owned utility program's incentives), and a low-income customer. Because the program was not yet being advertised, customers meeting these criteria were identified from the pool of recent energy audit recipients. The utility contacted short-listed candidates and if they were interested, CET followed up to begin the process. During the pilot, eligible measures included weatherization, heat pumps and hot water heaters.

Results

Of the 6 initial project candidates, 3 projects have completed (Table 1). The three completed projects are single family homes with oil heat. Three additional projects were assessed but ultimately did not proceed with measure implementation.

Table 1. Pilot customer characterization

	House Type	Size (ft^2)	Heating	Customer Type	Measures Installed
Home 1	Single Family	1,782	Oil Heat	First Time Homebuyer	Weatherization Whole Home Air Source Heat Pump
Home 2	Single Family	2,200	Oil Heat	Low-Income Customer	Weatherization Whole Home Air Source Heat Pump Heat Pump Water Heater
Home 3	Single Family	3,200	Oil Heat	Heating System End of Life	Weatherization Partial Air Source Heat Pump
Home 4	Duplex/ Multifamily	960	Natural Gas	Renter	None
Home 5	Duplex/ Multifamily	960	Natural Gas	Renter	None
Home 6	Single Family	1,694	Mixed	Heating System End of Life	None

Customer projects completed in an average of 6 months (Table 2). Approximately 50% of project time is accounted for in the measure-installation and invoicing phase.

Table 2. Pilot project phase timelines

Service	Description	Timeline
Customer intake, audit, and issue Preliminary Offer	Perform audit and model results, generate the IUI Preliminary offer for review and submittal to the utility and customer.	1-2 months
Contractor quotes and issue Final Offer	Perform customer follow-up, review contractor quotes, and remodel the project with actual costs, generate and submit the IUI Final Offer for utility and customer approvals.	1-2 months
Measure Installation and Invoicing	Install measures, verification, and submit invoices.	2-3 months

The total average gross project cost is $35,370 (Figure 1). The data shows that the average upfront customer cost is $6,217, while the average utility incentive amounts to $6,112. The average IUI financed cost stands at $23,041. In all three instances, heat pump installation was the primary contributor to upfront costs, where cost of the heat pump could not be recovered within 80% of the measure life and within 80% of the estimated savings. Costs beyond what can be recovered within the tariff parameters result in customer up front costs.

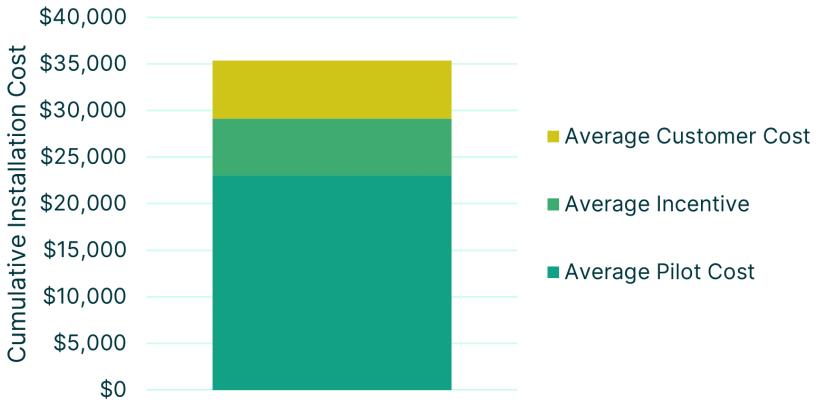

Figure 1. Home decarbonization cost and financing breakdown

Project Energy Savings

Projects yielded average estimated annual therm savings of 1,171 (Figure 2). Estimated average annual carbon savings is 7.8 tons per year or 141 tons over the lifetime (Figure 3). Fewer savings are associated with the partial heat pump installation in Home 3.

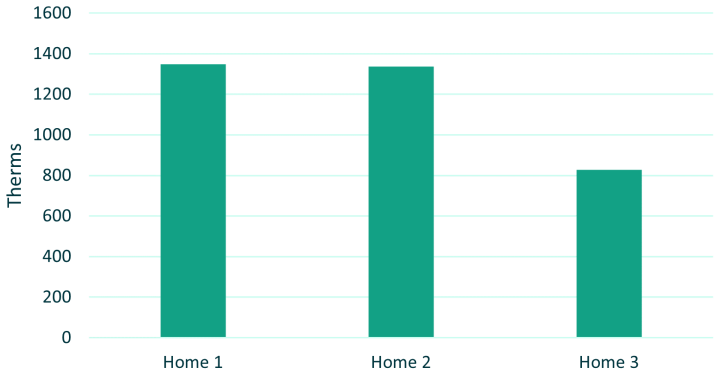

Figure 2. Annual estimated savings

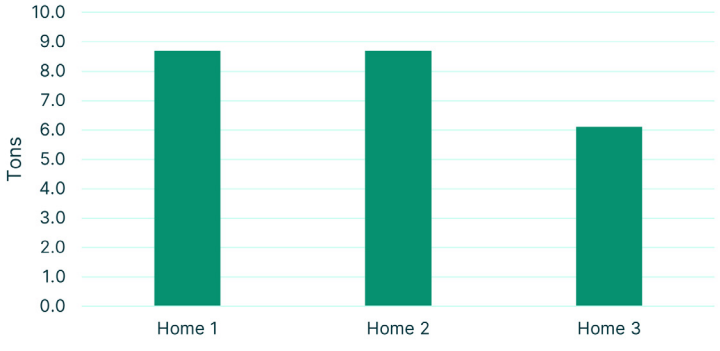

Figure 3. Annual estimated carbon savings

Media & Events

Articles:

- American Public Power Association
- The Boston Globe

Media	Metrics
Boston Globe Article	4,891 reach on Instagram 3,549 reach on Facebook 37 impressions on LinkedIn
Press Release: Town of Ipswich Introduces Novel Mechanism to Bring Clean Energy Upgrades to Homes	317 views on the press release on our website 115 Instagram Impressions 175 People reached on Facebook 1,096 impressions on LinkedIn
Sustainability Defined | Sponsor Copy	https://sustainabilitydefined.com/supplychainhumanrights TOB sponsor mention is at 43:40
Inclusive Utility Investments Webpage	98 page views
Inclusive Utility Investments Municipal Toolkit Webpage	90 page views

Case Studies

ReInvest Case Study Template - 3 Bunker Hill Rd

Municipal Toolkit

As part of developing a repeatable and scalable program for municipal utilities in Massachusetts, CET kept a process document for all steps in developing the program, from feasibility study to launching the pilot. The team converted the process document into an IUI Municipal Utility Toolkit, aimed at illuminating key tasks and providing a roadmap for utilities to launch IUI programs. Key program development tasks, description of work undertaken by or for Ipswich ELD, and timelines are shown in Table 3.

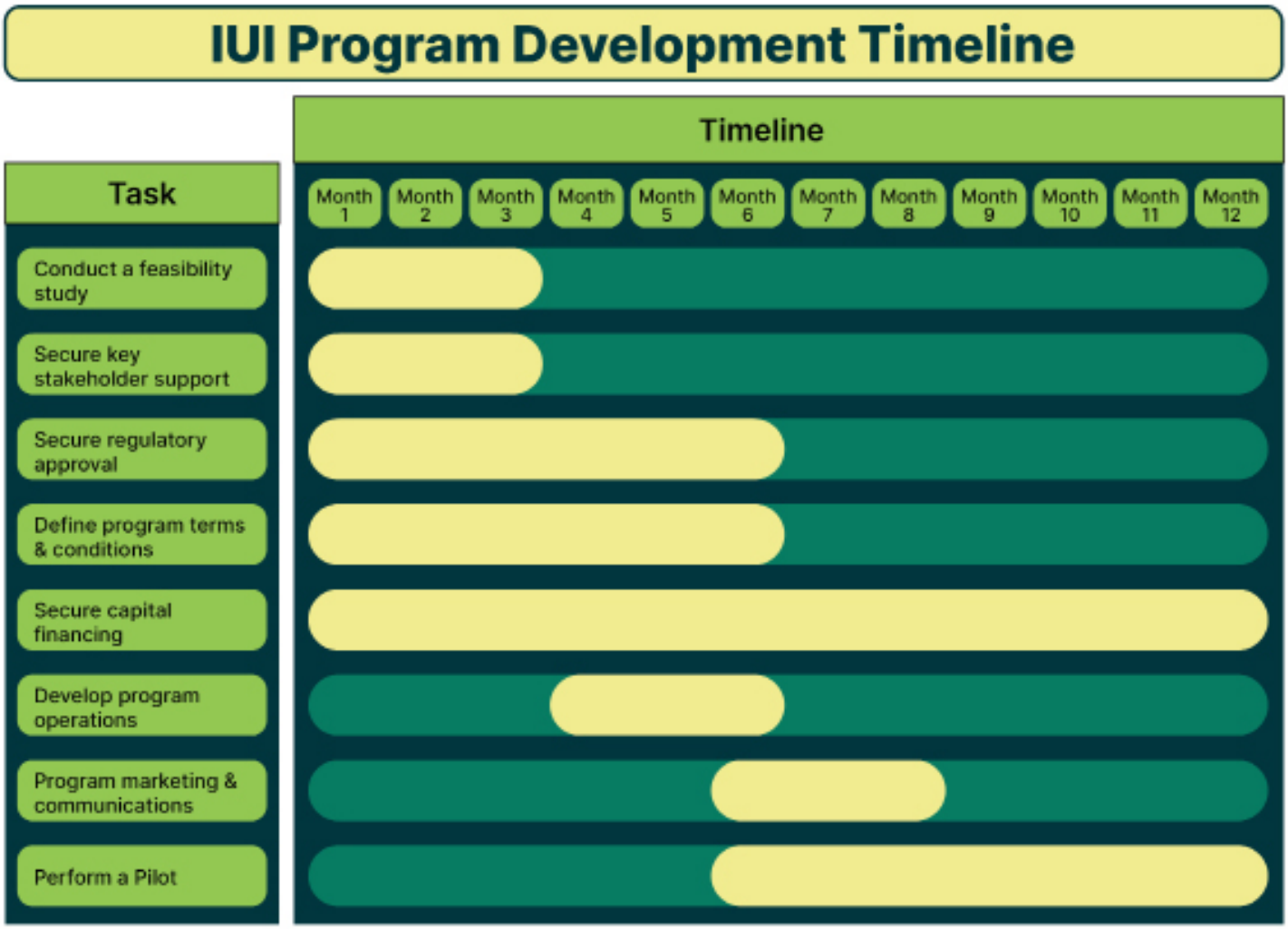

Figure 4. IUI Program Development Timeline

Lessons Learned

The pilot was a critical opportunity for testing tools, processes, and procedures in a lower pressure, lower volume context. Customers were told they were the first in a program still under development, helping set expectations for an imperfect process. The implementation team learned several lessons that will improve the full-scale program.

Customer and contractor communication is critical to measure installation. While customers were the main point of contact for contractors, additional follow up was often required with contractors to explain program rules and billing requirements. Contractors were often intrigued about the program and willing to participate once they understood the process.

Securing capital is the most time-consuming step. In the case of Ipswich, the utility's bylaws required a favorable town vote before they could access a line of credit. This was not immediately known to the implementation team, and it meant the town's meeting and voting calendar would dictate the timeline for applying for the USDA's Energy Efficiency and Conservation Loan, setting the production-scale implementation timeline back approximately 9 months.

Up-front customer costs are likely to continue. The cost of whole home heat pumps in this geography will likely continue to yield up front costs for customers. This should be considered in future marketing. Additional funding sources for income-eligible customers will help mitigate customer cost burdens.

Tariffs are more effectively applied by measure than as single line item. Initial versions of the model generated a single tariff with two to three terms as individual measures were repaid. When multiple measures are installed, showing each measure individually was more effective. Additionally, this improvement allows the utility to add tariffs independently, as measures are implemented. This improves the timeline for cost recovery for the utility and accommodates measures installed on varying timelines.

Measure installation timelines vary widely. Completed projects took, on average, approximately 6 months to complete (Table 2). The longest activity was in measure installation and invoicing (2-3 months) where contractor installation timelines are impacted by fluctuating demand, heating seasonality, and scheduling constraints. Customer and contractor coordination also contributed to timeline delays. Moving forward, the team anticipates efficiency increases in the early stages of service delivery, by implementing process improvements identified during the pilot.

Some customer segments are easier to serve. Of the 6 projects initiated during the pilot, three projects have been completed, at the time of submittal (Table 1). Single family, oil heat customers were relatively straightforward to serve, bolstered by collaboration between a single decision maker and single incentive/investment provider (IELD). The pilot team was challenged to move renter and natural gas customers past the early stages of the service, and as a result, projects dropped out before installation could occur. Programs that strive to serve these customer segments will need to be strategic and intentional about reaching these customers and supporting them throughout the service delivery process.

Conclusions

One of the more daunting aspects of the building energy transition is that it relies on individual residents to make elective investments in their homes. With IUI, we have demonstrated that utilities can accelerate this transition by investing in energy efficiency, electrification, and renewable energy improvements for their customers.

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