A Lender's Journey into Green Home Renovations: A Case Study

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ABSTRACT

The fix and flip industry, valued at $50-70 billion annually and comprising 5-10% of residential sales, provides a unique opportunity for decarbonizing the residential sector (ATTOM Team 2021). Renovators, who are already securing capital for substantial renovations, are well-positioned to introduce comprehensive energy retrofits, often in older, less energy-efficient homes, and within low to moderate-income (LMI) communities. The bulk of literature shows a market premium for green homes, yet why aren't fix and flippers, real estate investors, and other professionals adjusting their businesses accordingly? The fix and flip industry has developed a bad reputation for only applying "lipstick jobs" by focusing on cosmetic updates that generate more resale value. How can we change the industry by educating, incentivizing, and facilitating fix and flippers to invest in high-performance retrofits and capture additional value in the resale?

This paper outlines a lender Roc360's efforts to explore market gaps for enabling small renovator investors to implement green projects profitably and at scale through small field studies and customer pilots. It emphasizes a holistic approach involving contractors, government programs, appraisers, rating agencies, real estate brokers, lenders, and other stakeholders to understand and value green homes. Key findings highlight the need for improved appraisals, government incentives, and contractor training. Addressing these issues could empower small-scale renovators to undertake affordable green renovations on a large scale, improving older housing stock and increasing the availability of high-performance homes for the low to moderate-income (LMI) sector.

INTRODUCTION

Various market statistics indicate that the green building movement has seen greater advancements in multifamily and commercial buildings, as well as high-end homes, while the middle-market single-family sector remains the "last mile" of green building adoption. A potential reason for this is due to the more challenging project economics for smaller scale homes, and the complexity and high costs of meeting green standards such as LEED and Passive House. For example, the commercial sector has significantly advanced in acquiring green certifications, with about 30% of U.S. office spaces holding a green designation like LEED, versus less than 5% of residential homes, per Statista (2022).

The residential sector offers a significant chance for environmental improvement, with U.S. homes contributing to approximately 20% of all greenhouse gas emissions (Goldstein, Gounaridis, & Newell 2020). Of the 144 million homes in the U.S., around 85 million are single-family detached. The median year of construction for homes is 1979, meaning many were built before green building standards were introduced in the 1970s, of which these early standards were quite weak and have evolved to much higher standards present in modern building codes (Census 2020; NAHB 2023). Thus, there's a vast opportunity to update older

homes to current energy codes, enhancing energy efficiency, air quality, and resident comfort.

Intro to Roc360

Since funding its first residential real estate investor loan as a private lender in 2014, Roc360 has revolutionized financing for small-scale "mom and pop" real estate investors, disbursing over $10 billion in loans for residential renovations, primarily for fix-and-flip properties, single-family rentals, and 1-4 multifamily buildings. Recognizing a niche for expedited, affordable financing, the company has effectively replaced traditional "hard money" lending with institutional capital, enabling broader access to renovation funding. Roc360 caters exclusively to investors and businesses, not to consumers and homeowners. Having funded loans in 46 states, Roc360 supports over 3,000 renovators undertaking 7,500+ projects annually.

Two years ago, Roc360 launched its green initiative, aiming for adding sustainability to up to 100% of its financed projects. This initiative responds to increasing pressures from investors and homeowners alike to adhere to Environmental Social Governance (ESG) standards, manage rising energy costs, and decrease carbon footprints. As a financier of residential renovations, Roc360 is in a prime position to drive eco-friendly practices by screening construction loan applications for opportunities to green the scope of works and offering guidance and incentives to renovators.

Reviewing Roc360's project portfolio revealed that while many renovations incorporate energy-saving features like new windows, insulation, and appliances, there's significant room for deeper energy efficiency improvements. Renovators often opt for like-for-like replacements of fossil fuel systems and overlook more comprehensive measures such as enhanced insulation and air sealing, mainly due to a lack of awareness. Roc360 views renovators as a pivotal force in transforming the aging residential housing stock through affordable green renovations. Since renovators typically work on 5-10 homes a year, educating them could have a broad and enduring impact. This approach contrasts with government and utility programs that target owner-occupied homes, often requiring residents to invest tens of thousands of dollars and undergo construction on their homes as they occupy them, which can be a significant deterrent.

Roc360 provides financing for two primary types of single-family renovation projects – FF (fix-and-flip properties) and SFR (single-family rentals owned by landlords).

Fix and Flip Industry (FF). The fix and flip industry involves investors renovating older properties for profit, representing about 8 to 9 percent of U.S. home sales, or 250,000 to 300,000 homes annually (ATTOM Team 2023). Common renovations like updating bathrooms and kitchens are standard for maximizing returns. Renovations often lead to some increased energy efficiency such as newer appliances. Larger renovation projects often require bringing insulation levels up to modern building codes, thereby improving homes previously having little to no insulation. Moreover, there is value in extending the lifespan of existing buildings compared to a new building due to the high up-front carbon intensity associated with new construction. It can take 38-50 years for a new energy efficient home to offset the embodied energy of the building process (PGL 2011). Despite the potential for environmental impact, there's a notable absence of a concerted effort to promote energy-efficient retrofits in the fix and flip industry.

Single Family Rental (SFR). Single-family rentals have emerged as one of the fastest growing investment sectors over the past three decades. The number of single-family rentals increased from 10.9 million in 2001 to 14.3 million by 2021 (Hermann 2023). Small investors, owning fewer than 100 properties, dominate this market, accounting for nearly 80% of all investor home purchases. Larger investors, with portfolios of 100 to 1,000 properties, constitute only 8% of the market (Malone 2022). Institutional investors, though currently holding less than 5% market share in 2022, are becoming increasingly significant players. Predictions by MetLife IM suggest that institutional ownership could surge to 40% by 2030, indicating a notable shift in the market dynamics (Campbell 2022).

A "split incentive" problem in the single-family rental market stems from landlords lacking motivation to invest in energy-efficient upgrades, as they don't directly benefit from lower energy bills or higher rents. Conversely, tenants, who would benefit from reduced energy costs, might hesitate to invest without the assurance of long-term occupancy to enjoy the upgrades' payback. The emerging "green lease" model addresses this issue by allowing landlords to include solar energy costs through addendums like power purchase agreements, thus aligning incentives by enabling landlords to increase their Net Operating Income from solar revenues and energy retrofits, while offering tenants energy savings and a more comfortable home.

What is a Green Home? The concept of a "green home" varies widely. At one extreme, highly sustainable buildings such as Passive Houses and Earthships utilize recycled or natural materials, achieve net-zero energy consumption, and incorporate renewable energy sources like solar. While these models represent the pinnacle of green building, they may not be practical or affordable for the average homebuyer. Conversely, on the simpler end, green homes may only involve weatherization measures. Given this broad spectrum, organizations like RESNET, Pearl Certification, the U.S. Green Building Council, and the Department of Energy play crucial roles in defining and standardizing what constitutes a green home through third-party ratings.

"Green" homes are also referred to as High-Performance, energy-efficient or sustainable homes, and a number of other terms. For the purposes of this discussion, "green homes" will be the term used for homes that have implemented any energy-efficient or sustainable retrofits. Roc360's green program specifically targets three tiers of energy retrofits, designed in alignment with the Department of Energy's (DOE) residential goals and the Building Performance Institute's (BPI) green building science principles. These levels are selected for their potential high impact while maintaining feasibility and affordability for investors focused on renovation.

Table 1. Roc360 Green Program Energy Retrofit Scopes

Level 1 - Efficiency	Level 2 - Electrification	Level 3 - Renewable
Air sealing & insulation Energy Star appliances Smart thermostat LED lighting Low flow water fixtures	Heat pump HVAC Heat pump water heater Electric panel upgrades	Solar EV ready outlet

Note: Each subsequent level builds upon the last by adding more features. The best practice involves prioritizing energy efficiency first, followed by electrification, and finally, solar.

LITERATURE REVIEW & MARKET RESEARCH

Understanding Market Reactions to Green

The amount of nuance and variables can be overwhelming when trying to interpret the value of green. The regionality of climate and best building practices also make it hard to quantify a green premium that can be used across the country. One of the most comprehensive studies comes from Dalton and Fuerst (2018) in their meta-analysis of 42 unique studies. They found a weighted mean premium of between 6% and 7.6% for both rental and home sales. This study used data from multiple countries as well as combining the residential and commercial sectors. For residential properties specifically, Dalton and Fuerst (2018) found an average sales premium of 5.5% and a rental premium of around 8.2%. [1]

More regional studies have been conducted that show a premium for green homes but are often limited to specific U.S. cities. In Massachusetts, Myers (2019) writes that, much like car purchases, home buyers were sensitive to energy costs when buying a home often having a purchase price discount of $1,000 to $1,200 per $1/MMBTU increase in heating cost. Aroul, Hanz, and Yang (2020) found that in Fresno, CA, homes with green retrofits sold for 4.1% more than other renovated properties. The authors hypothesized that the increase is due to buyers in this region, known for its especially hot summers, appreciating the value of energy savings.

Ratings and third-party verifications can play a major role in helping stakeholders understand valuable green features as well as verify to what degree a home is higher-performing. Argento, Bak, and Brown (2019), working in conjunction with Freddie Mac, observed that rated homes sold for 2.7% more than unrated homes, with those boasting higher ratings fetching premiums of 3-5% compared to their lower-rated counterparts. Fincham (2022) found Pearl Certified homes in Boston MA, Charlottesville VA, Phoenix AZ, and Grand Rapids MI, were associated with a 4.72% premium. Adomatis (2018) observed homes with a LEED certification averaged a premium of 2.19% in Northern California, while (Hallman 2017) found homes with a green designation averaged a 6% lift and those with the LEED designation averaged an 8% lift.

Feature-specific studies can also be a useful tool in understanding the value of green. Hoen (2011) and Hoen et al. (2015) found solar panels can produce sales premiums of $15,000 to $17,000 respectively. More recently, Shen et al. (2020) found that homes in 23 states with air-source heat pumps saw premiums between 4.3 and 7.1% or between $10,000 and $17,000. Homes in 23 states with air-source heat pumps saw premiums of 4.3-7.1% or between $10,000 and $17,000 (Shen et al 2020). These studies can be useful not only for homeowners but also for appraisers who rely on such data to justify adjustments when comps are absent.

Financing and Government Incentives

The motivation to make homes more energy efficient is important not only from a climate perspective but also from an economic perspective. The inability to afford utility bills ranks as the second most common cause of homelessness, with the primary reason being the inability to

[1] Dalton and Fuerst indicated more data would be needed to make a more accurate inference for these percentages, but this range also aligns with other studies and is relevant until more reliable data is available.

pay rent (AHEEA 2022). Governments, nonprofits, utilities, and other organizations are motivated to find solutions for decarbonizing homes and lowering energy bills.

Currently, there is a gap in the adoption and efficacy of many energy efficiency programs. Allcott & Greenstone (2017) found that programs in Wisconsin only reached 58% of predicted energy savings. In terms of efficient spending, the programs studied had a deficit of around 4% when it came to the rate of return per subsidy dollar. The research claims that if these programs were better calibrated they could increase the return of each subsidy dollar by 250%. Other programs have had a history of mismanagement and inefficient spending (CBS 2010). With a significant increase in funding coming in the next few years due to the passing of the Inflation Reduction Act, states have opportunities to explore new ways of allocating resources in more effective ways to reach mandates such as the Justice40 Initiative, a requirement that 40% of all spending related to climate and clean energy go to disadvantaged and marginalized communities.

Government incentives and regulations vary widely across regions and can have a significant impact on return on investment (ROI) for real estate investors. Types of government incentives encompass:

- **Direct Financial Benefits:** Options such as rebates
- **Tax Relief:** This includes tax credits, sales tax exemptions, and property tax exemptions
- **Preferred Financing:** This covers low-interest loans and programs for low-income individuals

Special green consumer financing options, like the Property Assessed Clean Energy (PACE) program, Fannie Mae's HomeStyle Energy Mortgage and Freddie Mac's GreenCHOICE Mortgages, are accessible for homeowners looking to make energy-efficient upgrades. However, there are no green financing programs tailored for professional "mom and pop" renovators.

ROC360 AS A CASE STUDY

The Green Pilot Program - Background

This case study revolves around Roc360's efforts to design and pilot a green retrofit program to convert some of their existing borrower's renovation projects (both FF, SFR) to include green building measures in their scope of work. The pilot projects aimed to explore whether:

- Renovators could be influenced to include green scopes and which factors would incentivize or hinder them from implementing green
- Renovators could be educated to implement green scopes successfully and change the way they do business for future projects
- Green projects would be proven profitable and sell faster on the market, the project economics would be favorable to renovators
- A proven model for a green renovation project could be scaled and sold to convert the rest of the borrower base and attract other renovator borrowers

Results from Interested Borrowers.

Roc360 engaged with 15 customers whose projects were well-suited for green upgrades. These customers were selected because they were experienced renovators, repeat borrowers, and they had recently submitted loan applications requiring little additional investment to adjust a couple of key line items in their scope that could significantly improve the homes' green standards e.g., converting to a heat pump instead of replacing the old HVAC system with another natural gas system. Roc360's green team conducted 30-minute introductory video chats with these 15 borrowers to introduce them to the green program. 14 out of the 15 borrowers expressed interest in incorporating green upgrades into their scopes, though many also had concerns.

Brief findings from these discussions:

- **All** required their appraisal to reflect a higher After-Repair Value (ARV) as close to 1-to-1 to cost before agreeing to proceed, so their construction loan sizes could increase
- **4 Customers** needed a quick turnaround and connectivity with contractors who could do the work at affordable rates tailored for professional renovators, rather than higher retail prices aimed at consumer homeowners
- **4 Customers** needed help with accessing rebate programs
- **5 Customers** needed a clearer, more proven process with guaranteed profits than what the pilot was offering and wanted to see if green would be a better fit for future projects
- **2 Customers** wanted solar SFR solutions for DSCR mortgage loans, monetizing tax incentives and tenant billing for solar electricity revenues[2]
- **3 Customers converted their project scopes to Roc360's green program requirements**

THREE KEY MARKET GAPS

During the pilot projects, three critical questions or market gaps were identified, forming the core of this case study.

(1) Where is the "V" Value? - When Roc360 approached its customers with the idea of greening its scope, the first critical question always arose: "Will I make money?", or more specifically ***"Does the market value green?"*** Presenting scholarly research was not persuasive enough for clients seeking tangible evidence and a proven model of profitability. Investors wanted assurance that their green investments would at least break even, ideally offer a competitive edge in the market, and, optimally, yield a profit. This paper will refer to this concern as the "V" Valuation question. The "V" is fundamental in the realm of real estate investing, where home values as well as access to financing heavily rely on the property's appraised Value, or in the case of construction loans, the ARV.

[2] A DSCR (Debt-Service Coverage Ratio) loan is a type of non-QM mortgage loan that allows real estate investors to qualify for financing based on the cash flow of their rental property rather than their personal income

(2) How do I pay for it? - The subsequent concern for customers involves: “How do I pay for it?” Will Roc360 offer incentives like rate discounts for green renovations? Are there governmental programs available to subsidize the additional costs of greening? Moreover, what is the financial outlay for implementing green measures, and are these costs manageable? Addressing these queries, the second focus of this case study delves into the availability of incentives for adopting green practices.

(3) How do I implement it? - And finally, once many customers are ready to move forward with green, they run into the third crucial question which is: “How do I implement green?”, and more specifically “How can I find affordable green contractors?” Many of their preferred HVAC contractors were not familiar with electrification measures such as heat pumps, and many subcontractors are not familiar with air sealing and more advanced insulation measures. Meanwhile, skilled green contractors can be hard to find, and consequently, significantly pricier.

Question 1 - Where is the “V” Value? (Appraisals, Ratings, Marketing)

One of the core aspects of Roc360’s business is the “V” or valuation. Borrowers and underwriters both rely on appraisals to de-risk the loan and ensure that the renovation project is a good investment. Multiple aspects of the appraisal process proved difficult to value green.

The first issue - Walk-by effect. The first issue, termed the "walk-by effect", refers to the challenge of appraising green retrofits due to their often invisible nature and a general lack of awareness. Key energy-efficient upgrades like superior insulation and air sealing can go unnoticed if appraisers are not explicitly informed or cannot inspect inside walls, attics, basements, and crawl spaces. Similarly, advancements such as upgraded HVAC systems or heat pumps may be overlooked due to unfamiliarity with the technology and its advantages. This underscores the need for appraiser education on high performance homes.

The second issue - Lack of market comps. The second issue concerns the scarcity of comparable market data (comps) for green retrofits. Appraisers typically rely on comps to adjust property values, but green features often go undocumented due to several factors. Homeowners may not recognize the value of their home's energy-efficient features, and real estate agents might lack the expertise to effectively market them. Many Multiple Listing Services (MLS) lack fields to highlight green features or certifications, or real estate agents don’t include green features in their listings. The industry faces a "chicken or egg" dilemma: appraisers cite a lack of demand for green features, so they don't collect or share related data, using this absence of data as proof of no demand. Without green features consistently collected and displayed in MLS listings, understanding market reactions will be difficult, as stakeholders have no way to identify properties with energy-efficiency features.

The third issue - Lack of green qualified appraisers. An examination of Roc360’s Appraisal Management Company (AMC) panel, which includes over 10,000 appraisers, revealed that fewer than 10 had identified themselves as knowledgeable in green practices. Yet, when reached out to, none of these appraisers possessed the credentials necessary to accurately assess green properties. Curiously, many appraisers were accepting assignments that they are mandated to have competency in but were unequipped or uninformed to the point of ignoring many green

features in their subject property as well as in the market comps. For example, homes with fully owned solar systems would be appraised with no additional value. Other features such as premium HVAC systems, upgraded building envelopes etc. went ignored or unnoticed.

Roc360's appraisal pilot study

Roc360 began a pilot project asking the following questions: How much additional information or education would a "regular" appraiser need to feel comfortable enough to evaluate a high-performance home? And, would they assign additional value for green if they had the information?

The primary option for being trained in green appraisals involves obtaining designations from bodies like the Appraisal Institute (AI) or McKissock. However, acquiring these credentials can be time-consuming and expensive, requiring several days or weeks of commitment. Roc360 explored whether its appraisers, tasked with estimating the ARV based on a construction scope, could be better equipped to evaluate green homes with additional information. The aim was to mitigate the "walk-by effect" by highlighting otherwise overlooked green features, compelling appraisers to account for these enhancements in their valuations.

Roc360 approached over 35 appraisers in the New York and New Jersey areas, yet only six felt sufficiently confident to undertake an appraisal assignment for a green home. Notably, even some appraisers with education in high-performance homes did not feel comfortable enough to accept the assignments. Roc360 compensated $250 in additional fees for these specialized green assessments. Appraisers were also provided with a comprehensive "Green Package", which included details on the home's energy efficiency, a completed AI Green Addendum, a PEARL Certification Report, Discounted Cash Flow statements projecting energy savings from efficiency features and solar panels using the PV Value Tool, and references to academic research underscoring the value premium of high-performance homes.

Table 2. Roc360 Appraisal Pilot Results

Home Location	Original ARV	Green ARV	Green Scope Cost
East Orange, NJ	$433,000	$450,000	$17,500
Marlton, NJ	$300,000	$332,000	$21,700
Teaneck, NJ	$710,000	$710,000 Appraised [3] $730,000 Sold for	$8,000
Park Ridge, NJ	$690,000	$704,000	$4,000
South River, NJ	$505,000	$530,000	$11,200
Houston, TX	$235,000	$265,000	$22,400

[3] The appraiser hired for the green appraisal was ill equipped for the assignment and appraised it at the same ARV as the original work scope ($710,000). The home, after implementing all the green retrofits, sold for $730,000.

The pilot study's outcomes surpassed initial expectations. Before the study, Roc360 consulted with numerous appraisers and industry experts, who largely believed that green features would not affect property values due to a lack of comps and value that “just didn’t exist” in the industry. Contrary to these expectations, the study demonstrated that appraisers, when provided with detailed information on green features (the "green package") and motivated to thoroughly investigate using all three appraisal methods and seek out comps through direct inquiries with real estate agents, were able to attribute additional value to homes for every dollar spent on green enhancements.

Note for industry background - The appraisal industry uses three primary appraisal methods:\

1. The **Comparables (Comps) Approach** evaluates property value based on sale prices of similar properties in the area, adjusting for differences to determine a fair market value.
2. The **Cost Approach** estimates property value by calculating the cost to replace it minus depreciation, adding land value, useful for new or unique properties.
3. The **Income Approach** values income-generating properties based on rental income and expenses, using methods like Direct Capitalization or Discounted Cash Flow Analysis.

Post-study (informal) interviews with appraisers revealed insights into their process for valuing green features. They highlighted difficulties in locating suitable comps, which required them to put in additional work to source comps from further locations and contact real estate agents for additional information on properties' energy efficiency features not listed on the MLS. Appraisers found the certification and cash flow statements in the Green Package valuable, and they were able to utilize the cost and income approaches alongside the comps method in a blended strategy to accurately appraise the value of green features. While they had not yet experienced demand for green valuations, appraisers indicated that a consistent opportunity to earn extra fees for green appraisals could motivate them to seek specialized training in this area. Indeed, one appraiser went ahead to complete the McKissock green appraisal certification following the pilot inquiry. Although this pilot study was limited, primarily conducted in New Jersey with attempts to include New York, the initial findings suggest that providing detailed information on a home's green features can overcome the walk-by effect and appraisers were able to find value for green. Roc360 plans to expand its appraisal study to more states (NY, TX, IL, PA, FL) as part of its broader initiative to pilot green projects.

Market Transformation Opportunity. Recognizing the additional value of green features in appraisals could be a pivotal market transformation factor, encouraging renovators to build greener homes by enabling them to secure larger loans and command higher sale prices. However, the scarcity of appraisers skilled in evaluating green properties creates a cycle of insufficient incentive: appraisers lack motivation to specialize in green valuations without demand from lenders. This situation is compounded by the difficulty in completing appraisals without comparable sales data for green features, which won't accumulate until lenders, appraisers, and real estate agents consistently recognize and document the value of these features. Innovative lenders and appraisal companies, along with policy initiatives, could help break this cycle. Looking ahead, the introduction of a new digital Universal Appraisal Dataset (UAD) form in 2025, which includes a mandatory field for Green Ratings, promises to integrate

the assessment of green features into standard appraisals.

Question 2 - How do I pay for it? (Government & Financing Incentives)

Roc360 conducted a comprehensive review of government incentives and financing solutions to mitigate the extra expenses of green renovations for its clients. The aim was to identify subsidies that, when paired with increased ARV, could offer extra profit, and motivate borrowers to adopt greener methods in their future projects.

Compendium of incentives in NJ and NY

Roc360 compiled a list of residential incentives in New Jersey and New York, but found many were unsuitable for its renovators. Straightaway, those offering less than $1,000 were considered not worth pursuing. Among more lucrative programs, eligibility restrictions disqualified small renovator businesses by only allowing owner-occupied properties and excluding LLC-operated renovations or targeting low to moderate-income (LMI) requirements without clear guidelines for small renovators aiming to serve this sector.

Among the available incentives for energy retrofits, only four programs targeting high-performance (HP) home features, such as heat pumps and hot water heaters, were found to be suitable in New Jersey and New York. Of these, three required pre-qualified contractors.

		Type of program			Target for Roc	
	Total Incentives	HP program	Solar program	LMI or Owner Restriction	Over $1k	**Best Fit for Roc customers**
NJ	14	10	4	2	6	**2**
NY	18	13	5	3	12	**2**

The first issue - Incentives for which renovators could be eligible. Among the incentives for green home renovations, most are written to target owner-occupied single-family properties or larger multifamily projects. This oversight leaves the in-between class of "mom and pop" single-family renovators out of eligibility. However, small-scale renovators could significantly contribute to LMI initiatives. Small-scale renovators often work in LMI communities, with Roc360's average home values ranging from $350,000 to $400,000, below the U.S. median. Many oRoc360 customers expressed interest in partnering with government incentive programs to access affordable housing projects at special rates or lower purchase prices by meeting specific affordability, location, or high-performance standards. Some customers have already worked with programs like Newark Land Bank or the National Community Stabilization Trust. The Inflation Reduction Act of 2022 marks the most significant investment Congress has ever taken of nearly $400 billion into climate mitigation (White House 2023). Despite this

potential, it remains uncertain whether small renovators will be able to tap into these programs anticipated to roll out by early 2025.

The second issue - The complexity and expense of qualifying for rebates. Programs offering $1,000 or more in rebates (making them more worthwhile) to renovators often come with complex qualification requirements, such as the necessity to use utility-approved contractors who typically charge a significant premium. Interviews with preferred contractors in NY and NJ revealed that the challenge of adhering to stringent program standards led to higher pricing. Roc360 explored the Home Performance with Energy Star (HPwES) rebate for customers but faced hurdles due to the program's extensive requirements and contractors' reluctance to participate. Partnering with X, a leading HPwES contractor in NJ, Roc360 aimed to help a borrower qualify for a project.[4] Despite X's experienced team, the weatherization work needed to qualify for an expected $4k rebate was quoted at $14,000, which was an unattractive offer for the borrower. Financially, it was impractical for the borrower to substantially increase their insulation budget for a mere $4k subsidy, given the added complexity and delays it would introduce to their project (which turned into a pilot study, see below under Question 3 - Pilot).

Third issue - Need for financing incentives. Roc360 investigated government financing programs for green projects, discovering PACE, Fannie and Freddie's green mortgage programs targeted at consumer improvements, but found no equivalent for business construction loans for renovators. Outreach to Wall Street investors, including global banks, asset managers, and insurance companies, revealed interest in purchasing green project loans to fulfill ESG goals, yet they were not prepared to offer a premium. The best potential offer to trade ESG loans at a 25 basis points premium was insufficient to significantly impact the market or enable rate discounts for renovators. A meaningful discount, around 200 basis points, translating to approximately $6k in interest savings for an average 1-year renovator construction loan (which includes property acquisition), could help renovators cover the extra $15-30k green project costs. Despite an increasing call from Wall Street for ESG projects, the market has not adjusted to pay more for them yet a green scope does cost significantly more.

Addressing the shortage of financial incentives for renovators, Roc360 is seeking alternative strategies to provide rate discounts or increased capital access. For Single-Family Rental (SFR) borrowers, who aim to boost leverage in their investment models, Roc360 is considering the inclusion of solar revenues in Debt Service Coverage Ratio (DSCR) calculations. Currently, DSCR loans are limited by their income-to-expense ratio yet are not reaching their Loan to Value (LTV) limits in a higher interest rate environment. Income for DSCR has traditionally been restricted to monthly rent payments. However, Roc360 has identified a potential regulatory change that could redefine income inclusions for DSCR calculations. Section 203 of the Cleland-Dole Act (2022) contains Enhanced Loan Underwriting Methods, enabling Veterans Affairs—representing approximately 15% of the mortgage market—to incorporate energy savings into DSCR loans, may pave the way for solar revenues to be recognized as legitimate income, offering a new precedent for financing structures.

[4] Company name changed for anonymity.

Question 3 - How do I implement it? (Green Contractor Solutions, Education)

Within the construction and real estate sectors, there's a widespread lack of knowledge regarding green building science, particularly among HVAC and insulation professionals. Common misconceptions persist, like the belief that heat pumps are ineffective in colder climates like New York and New Jersey, or that blown cellulose insulation attracts pests and rodents.

Roc360's Contractor Bids Field Test

Roc360 conducted a field test on two properties—a 2-bedroom, 1-bathroom, 864 square foot home in Beacon, NY, and a 3-bedroom, 3-bathroom, 2,300 square foot home in Edison, NJ—to assess the market's capacity for providing knowledgeable and cost-effective green renovation services, specifically for insulation, heat pump, and solar projects. For each property, contractors from three different specialties evaluated the homes, proposed work scopes, and submitted bids. [5]

Table 3. Results for Beacon, NY pilot home – contractor bids

Type	Range of prices	Scope	# Bids received
Insulation	$4,800- $17,500	All included air sealing, insulating attic and basement	3 bids/ 4 consults, 1 no show
HVAC	$13,800- $25,600	All were central heat pump systems; some would keep existing ductwork while others required new ductwork	5 bids/ 6 consults
Solar	Cash $23 - $37,000 Financed $29,000- $39,000	All systems were around 7.5 kw	5 bids / 5 consults

Table 4. Results for Edison, NJ pilot home – contractor bids

Type	Range of prices	Scope	# Bids received
Insulation	$6,200- $14,000	All scopes included the attic, basement, and old insulation removal but with differing materials	5 bids/ 5 consults

[5] The homeowners for both homes did intend to retrofit their home if the proposals were a good fit, so each contractor was brought out to the project in good faith.

HVAC	$10,000- $31,000	The proposals ranged from a handwritten bid on notebook paper to a typed-up invoice	3 bids/ 4 consults; 1 no show
Solar	Cash $32,700- $41,150	10 kw -13.8 kw system	3 bids/ 4 consults; 1 no show

The field test revealed notable differences in contractor quotes. Solar contractors were the closest in terms of their recommended scopes and pricing, while HVAC and insulation bids varied greatly. Proposal formats varied from detailed documents to mere handwritten notes, and many contractors were unfamiliar with or dismissive of available government and utility rebates due to the perceived hassle and red tape involved. Insulation contractors varied in their adherence to BPI standards for air sealing and insulation, with some unwilling to offer cellulose insulation in place of fiberglass batts.

Another significant challenge was contractor responsiveness. Despite initial consultations, Roc360 struggled with follow-ups, encountering frequent non-responses and scheduling difficulties, particularly in Edison, NJ. In the Beacon, NY market, it was easier to find 15 reputable contractors who agreed to bid on the project, with fewer no-shows and unfulfilled bids. In contrast, Edison, NJ required contacting 36 contractors to secure 15 willing to bid, and ended with more no-shows and missing bids, despite making multiple phone and email attempts to get the contractors to follow through with the proposal. These field tests highlight market inefficiencies that less persistent customers would be unwilling to face in engaging contractors for green retrofits, underscoring the need for improved contractor education.

Roc360's "Teach them to Fish/ DIY" Pilot for Weatherization

Roc360 identified a gap in the availability of cost-effective, utility-approved insulation contractors for the HPwES rebate in NJ, which offered up to $5,000 but received a bid of $14k from the best available approved contractor—deemed too expensive. To address this, Roc360 tested a "teach them to fish, or DIY (do-it yourself)" hypothesis, aiming to train its professional renovator borrowers, already familiar with insulation work, to meet advanced weatherization and BPI standards, with the hope to be able to reduce the cost of the incremental green weatherization scope to align more closely with the available government subsidy of $5,000. Roc360 ran a pilot for a motivated borrower and hired two BPI energy experts to train their borrower's GC and contractor team, to complete the weatherization scope for a project site in South River, NJ to meet the BPI standards required for the HPwES rebate.

The pilot encountered several hurdles, notably with organizing the project implementation with the borrower's contractor team, such as ensuring all attic electrical work was finished before starting air sealing and insulation. Additionally, there were issues with missing specialized tools and the unavailability of essential rental equipment, for example, a blown insulation machine equipped with a 100-foot hose capable of dense packing. Complex tasks like dense packing cellulose and applying two-part spray foam in intricate rim joist spaces proved too difficult to master quickly, highlighting the immense challenge of scaling such a DIY

approach to meet BPI standards across varied home structures. Eventually, the BPI consultants had to bring in their preferred contractors to complete the most complex tasks left in the scope to qualify this home for the HPwES rebate.

As a follow up, Roc360 is initiating a second pilot that refines the initial training model by assembling a team of five BPI-certified expert contractors. These experts will be responsible for conducting energy audits, outlining project scopes to comply with HPwES standards, and executing the work, while the borrower's contractors participate as observers or "interns" on the very first project. This revised "Train to Fish/DIY" strategy acknowledges the need for a more extended training period, envisioning a series of closely monitored projects where the first is heavily supported by the expert team to ensure compliance and foster learning.

DISCUSSION AND FUTURE RESEARCH

The sample size for each aspect of Roc360's pilot study is too small for any applicable models or inferences. Instead, this case study acts as an exploratory study in the market of green retrofits, when it comes to fix and flippers, renovators, and "mom and pop" real estate investors.

In this paper, Roc360 identified three pivotal questions from its customers: 1) Where is the "V" value? 2) How do I pay for it? And 3) How do I implement green? Addressing these questions could bridge critical market gaps, potentially catalyzing the market by empowering small-scale renovators to undertake affordable green renovations on a large scale. This could improve older housing stock and the low to moderate-income (LMI) sector. These areas represent crucial levers for potential market-wide impact, affecting not just the renovation industry but the broader residential real estate sector.

Roc360 believes that there are enormous opportunities to invest in these three solutions:

- **Appraisals:** There's a pressing need to equip appraisers with the methods, resources, and education required to accurately value green or high-performance homes. Enhancing the housing market's understanding of the value (V) factor for green properties could motivate broader investment in green retrofits by raising home values.
- **Incentives:** Expanding government support for small-scale renovator investors is crucial. Tailoring incentives to be more accessible to them and creating new programs offering access to affordable financing—translatable into rate discounts for investors—could help offset the higher costs associated with green renovations.
- **Contractor Training:** Implementing innovative and ambitious training programs is essential to cultivate a larger workforce of BPI-certified green contractors. Increasing the availability of skilled green contractors would likely enhance service quality, affordability, and customer satisfaction, reducing the current constraints caused by the scarcity of contractors and variability in service standards.

For future research, Roc360 plans to broaden its appraisal study across more states, and further develop its customer and contractor pilot programs. These pilots aim to refine Roc360's insights into market gaps and obstacles, facilitating the enablement of cost-effective green home renovations on a larger scale.

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