



Home Economics

Working Toward a Retrofitted Nation

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At 57, Elizabeth Rothman was just a few years older than her house's furnace when she decided the 1960s Coleman heater — vintage logo and charm notwithstanding — had to go.

For years, Rothman had let her inefficient heater suck up needless kilowatt-hours of energy as her 1919 bungalow leaked warm air into cold Seattle nights. But like most Americans, she figured why fix what's not broken? Besides, the cost of upgrading her heater, boiler and windows could easily run into five figures.

Single-family homes like Rothman's account for 84.4 percent of residential energy consumption in the U.S. By 2020 the residential sector will consume nearly a third of the country's energy. Including multi-family and office buildings, the built environment accounts for nearly half of all greenhouse gas emissions in the U.S. — a heavier carbon footprint than transportation.

A campaign to retrofit the country's aging housing stock and commercial buildings could make a major dent in reducing emissions nationwide. But despite all the talk of energy independence during the 2012 presidential campaign, retrofitting buildings received only passing mentions from President Obama. Republican challenger Mitt Romney's energy platform did not mention it at all.

Yet Democrats, Republicans, environmentalists and financial institutions alike agree that the country must become more energy efficient — not just for the environment, but for the bottom line.

On a macroeconomic level, energy retrofits could create jobs that won't be sent overseas. During its first term, the Obama administration deployed \$5 billion through the Recovery Act to weatherize 788,000 homes as of January, following growth in the country's green jobs sector from 2.1 million jobs in 2003 to 2.7 million in 2010.

Energy efficiency retrofits can also help homeowners save on utility bills. That extra cash can pad savings, fund home improvements or help balance a struggling checkbook. Much of the stimulus funding specifically targets low-income housing, putting cash in homeowners' pockets for a child's education or simple household expenditures.

But while there are literally millions of houses like Rothman's that run on ancient furnaces, until now there have been few vehicles to make retrofitting easy. In Rothman's case, the \$8,000 loan she needed to finance her new heater did not come from a traditional lender. It came through **Community Power Works**, an energy efficiency program run by the City of Seattle, in partnership with a local community development financial institution (CDFI) named **Craft3**. This pioneering program allowed her, like nearly 3,000 others, to pay back low-interest loans through

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installments tacked onto her monthly energy bill. In effect, loans on the retrofit were paid back with energy savings.

“It was so easy to pay that I totally forgot about it,” Rothman said. “It was invisible to me.”

Rothman paid off her loan on schedule and the upgrade has already inspired her to make other improvements; she is tiling some floor and repainting the entire interior. She has already raised the appraisal value of her home by \$125,000.

That’s exactly what everyone from homeowners to financial institutions wants to hear. Energy efficiency retrofitting is good for your pocketbook and for the planet. So why isn’t everyone doing it?

NO SILVER BULLET

While the market for green new construction has grown, many of the country’s older cities like Philadelphia, Chicago and New Orleans are dominated by 20th-century stock.

The U.S. Green Building Council’s efficiency certification program, known as **LEED**, has helped make green architecture a part of the development mainstream. Buildings are given LEED certification if they pass a host of criteria, from using high-performance lighting and materials to locating buildings near public transportation.

In 2008, LEED expanded to focus on greening existing buildings as well as new construction. The cumulative total of LEED-certified square footage for existing buildings now exceeds that of new construction. In 2011 the LEED Steering Committee’s founding chairman **told reporters**, “Greening existing buildings will be the future of the industry in the U.S.”

That future depends on financing. Retrofitting the country’s vast building stock would be a no-brainer, but it’s easier to accomplish in theory than in practice.

Rothman needed a push to buy her heater. “I might have been *able* to do this before Community Power Works, but I didn’t feel as if I was able to,” she said. “The price would have definitely made me hesitate.”

That’s where the unique public-private partnership between the local CDFI, Craft3, and the City of Seattle came into play. The non-profit lender is one in a growing class of CDFIs looking to homeowners as the next underserved market to reach. CDFIs work in pursuit of a “double bottom line” with both financial and social returns. They lend to affordable housing developers, health clinics and businesses operating in low-income communities, precisely because these are institutions that have good returns for investors and community members alike. But now, as more homeowners seek



financing for retrofits, these veterans of traditionally risky markets are stepping in to invigorate efficiency-minded builders.

CDFIs could help bring retrofits to a much broader audience of homeowners. Public and private ventures to accomplish this goal have been ambitious: Philadelphia's GreenWorks established a target in 2009 to retrofit 15 percent of city housing stock by 2015, but a 2012 progress report says the goal is only 10 percent complete. (The report notes the actual percentage is higher because the city does not track private market housing retrofits, only publicly funded projects.) And the program, like many similar initiatives across the country, is supported by stimulus grants that may expire if Congress does not renew funding at the end of this year.

In cities such as Seattle and Philadelphia, whose GreenWorks program is similar to Community Power Works, the verdict is still out on how to scale up these partnerships that have big potential but little precedent.

"There is no silver bullet program," said Katherine Gajewski, director of Philadelphia's Office of Sustainability, "and there is no quick and easy pot of money." But to meet aggressive carbon emissions reduction targets the city set in 2009, she said, "We really need to think about how to update our existing built infrastructure."

MISSION + MARKET

Domestic oil production peaked near the end of 1970. Three years later, the Arab oil embargo produced a set of consequences that sounds familiar today: Rising fuel prices, political unrest abroad and a resurgence of environmental issues in the national political discussion. Moved to action, the federal government passed the National Energy Act and spurred energy conservation programs among the nation's states and utilities. Market-driven approaches, such as tax incentives for energy efficient appliances, began to emerge by the 1990s. After roughly 40 years in the national consciousness, however, energy conservation has failed to attract investment from the financial sector on a meaningful scale.

These days, efficiency is big business in the consumer market. Consumers bought 280 million energy-saving appliances in 2011, chipping \$23 billion off their collective energy bill, the U.S. Environmental Protection Agency reported. Dishwashers and dehumidifiers had near-100 percent market penetration last year. While other appliances had market penetration as low as 21 percent, many had sated at least half of the market.

That same year, Deutsche Bank [published the results of an 18-month study](#) that looked at nearly 19,000 retrofitted affordable housing units in New York City. The bank found what advocates had long suspected: Investments in efficiency paid off. On average, retrofitted units saved 19 percent on fuel bills and 7 percent on electricity. Yet despite the seemingly widespread consensus, advocates have struggled to build a significant market demand for retrofit jobs that go beyond the scope a new Energy Star refrigerator. In simple terms, more Americans want a granite-topped kitchen counter than a new electric heat pump.

Part of the challenge is officially known as the “income valuation credibility gap.” This means property owners are less likely to pour money into energy efficiency without enough data to promise a timely payback. That uncertainty troubles lenders, too.

“It can be challenging to lend exclusively against energy efficiency savings,” said Amy Brusiloff, a senior vice president of Bank of America. Brusiloff works in CDFI Lending & Investing and is a member of the bank's Global Environmental Group.

Most lenders prefer secured loans, typically tied to real estate for collateral. So unless the borrower is investigating energy efficiency options for a building not encumbered with a mortgage, or the borrower is able to refinance a building's mortgage to include the cost of the energy efficiency improvements, chances for financing are scarce.

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“We need to level the playing field to value a saved kilowatt as much or more than a generated kilowatt.”
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Non-profit CDFIs can manage more risk by aggregating different sources of capital, including grant dollars, government funding and borrowed capital. They are not subject to the same regulations as banks, for example, and can extend loan repayment dates.

“It’s not the norm to lend exclusively against energy efficiency savings, but that’s what makes our work with CDFIs so impactful. Through our partnerships, we are able to design creative solutions to help address some of the most pressing issues in our country,” said Dan Letendre, a CDFI

executive at Bank of America. “Our program is helping – we’re providing direct financing to stimulate energy efficiency and jobs in low-income communities.”

Bank of America is the leading investor into CDFIs, with \$1.1 billion in 240 clients across all 50 states, as well as Puerto Rico and the District of Columbia. When Bank of America designed its Energy Efficiency Finance Program to help low-income communities, they naturally turned to CDFIs. As the bank sees it, CDFIs offer an efficient, innovative option for borrowers.

Last year, Bank of America announced its Energy Efficiency Finance Program, committing \$55 million with 10 CDFIs around the country in the form of flexible, long-term loans and operating grants. As part of the investment, recipients are required to collect data on their loan programs, including contributing it to a national database.

The added step of documenting the results in a national database is “crucial,” said Living Cities investment officer Amy Chung. Finding auditors can be difficult, and the quality of contractors and service providers can impact the results of retrofits. Fluctuating energy prices and even shifting weather patterns can also alter the equation. More standardized data could help clear that up, Chung said, and warm up the water for more private investment.

Bank of America chose participating CDFIs through a competitive submission process including a committee composed of bank and industry leaders. Along with the Seattle program, other CDFIs are located in Philadelphia, Baltimore, Boston Los Angeles, Chicago, San Francisco, New York and the bank’s of Charlotte, N.C.

Power Play

Energy retrofitting is good for your pocketbook and for the planet. A 2011 study by Deutsche Bank found that on average, retrofitted units saved 19 percent on their fuel bills and 10 percent on electricity.



280 MILLION

Number of energy efficient appliances purchased in 2011



\$23 BILLION

Amount of money collectively saved

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So far the investments have yielded a diverse crop of projects. For example, The Reinvestment Fund (TRF) in Philadelphia is working with the city to administer low-interest loans for energy efficiency throughout the region. The goal is to cut energy use in participating commercial buildings by at least 25 percent. Since the program's launch in 2010, it has moved more than \$19 million from the department of energy into building retrofits, leveraging private and state dollars along the way.

One TRF project, a residential development called Paseo Verde, will deliver 120,000 square feet of energy efficient housing to a long-neglected section of North Philadelphia. It is aiming for LEED-platinum, and will be Philadelphia's first project certified under the U.S. Green Building Council's Neighborhood Development program.

Yet even with support from the city and private partners like Bank of America, TRF still struggles to maintain a sustainable source of income to fund its low-return work. It relied on stimulus grants and funding from the Department of Energy to get the project off the ground, and there are no clear signs that the funding will be renewed at the end of the year.

Losing stimulus funding may throw some lenders into turmoil temporarily, but it could also create opportunities. The Recovery Act put the fate of this market largely in the hands of city governments — bureaucracies not typically known for their efficiency.

“Everything is going to shift very fundamentally,” Gajewski said. Large commercial projects can require millions of dollars in upfront capital, so a municipal retrofits program might need \$10 million or more on hand to remain solvent. Funding currently comes sporadically from grants and investments, an arrangement Craft3’s executive vice president Adam Zimmerman likened to prehistoric hunters starving for months at a time and then killing a big animal.

“If we want CDFIs to be a feature on the landscape and a source of credit for emerging markets,” Zimmerman said, “we’ve got to figure out how to make funding more reliable.”

Obama’s reelection last month practically guarantees that investment in energy efficiency programs will continue on some level. “The next step is [to] really ramp up our efficiency in buildings,” Obama said in [a pre-election interview for MTV](#). “If we had the same energy efficiency as Japan, we would cut our energy use by about 20 percent.” With Republicans still in control of the House, the administration’s environmental policies will likely continue to draw scrutiny from the right. Yet more than a third of all homes weatherized using stimulus dollars were in states won by Mitt Romney in 2012 — a testament to the bipartisan appeal of energy efficiency.

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RIDING THE MOMENTUM

Jeff McCord and his wife Rosemary Woods started burning biodiesel instead of standard oil about eight years ago to heat their 1946 home in West Seattle’s Gatewood neighborhood. The two self-described environmentalists became enamored with high-efficiency hot water systems during a trip to Europe, McCord said, and looked into upgrading their own. They had already begun to install mat tile insulation in their attic when the complexity and upfront cost of a full-house retrofit became overwhelming.

“It just seemed to be cost prohibitive for us to do enough good things at once to make the systems work together,” McCord said. At first, efficiency was incentive enough to pursue a retrofit. But when the new radiant heater kicked on, the family knew it was worth it. “We could tell what a wonderful comforting type of heat it provides,” McCord said. Instead of coming in bursts and dissipating quickly, “It’s that sort of omnipresent low heat that permeates the furniture and walls of the room.”

In simple terms, more Americans want to pay for a granite-topped kitchen counter than for an efficient electric heat pump.

That happy medium has even affected McCord's daily life. "In the past there's always been that battle for the thermostat," he said, "where I'm turning things down and she's turning things up." Should he want to adjust the dial, however, he could do so from his iPad — an added bonus for tech-savvy McCord, who designs iPhone games. The McCords will pay back their \$30,000 Craft3 loan over 30 years of payments tacked onto their utility bills.

"We're really looking forward to the wintertime for the first time ever," McCord said, laughing.

Craft3 had been helping single-family homeowners finance upgrades to their septic tanks systems since 2007. The CDFI eyed energy efficiency as an analogous project where the savings were more direct. As Zimmerman put it, "When you put in a septic tank you don't save any money — you just save fish."

Most of Craft3's initial growth was a result of the Recovery Act, but as momentum picked up it was able to raise money from the likes of Wells Fargo, JP Morgan Chase and the non-profit Living Cities. Bank of America gave Craft3 \$14.2 million, mostly in low-interest loan funding, intrigued by the CDFI's unique on-bill loan repayment structure.

This sort of cooperation between energy efficiency providers, conservation lenders and utilities has been slow to catch on elsewhere, but it demonstrates the power of financing retrofits through a local community-based player like a CDFI.

Forming those relationships is not easy. "There's a huge size mismatch," Zimmerman said. CDFIs are just not on utilities' radar, he said, even in a city with relatively progressive environmental policies. Their clients are such a small proportion of the utilities' customers that it can be hard to get a company's ear, let alone convince it to invest in programs like on-bill financing. "We need to level the playing field," Zimmerman said, "to value a saved kilowatt as much or more than a generated kilowatt."

Energy code could help correct the current misalignment. According to Seattle's energy code official, Duane Jonlin, code has broad purview but moves slowly. There is a balancing act between forcefully encouraging energy efficiency through more stringent code and avoiding a code so draconian that it would make demolition and new construction simpler and more profitable.

How to do that, however, is not a question anyone has been able to answer. Seattle's laws require commercial building owners to track and report their building's energy efficiency rating to the city. Apartment building owners are required to disclose their rating to interested tenants. But while the reporting requirement heightens awareness of efficiency, energy-conscious commercial tenants say not enough is being done to improve ratings.

Code should be more holistic, Jonlin said, so that it covers ongoing energy consumption instead of stopping after construction. Utilities typically finance only above-and-beyond improvements — once something is required, it is expected. Under a so-called outcome-based code, however, building owners would have flexibility as to how they save energy, as long as they deliver the same overall savings.

“It's a carrot that experienced, progressive owners and designers will take advantage of,” said Ric Cochrane, head of Preservation Green Lab, a sustainability think tank connected to the National Trust for Historic Preservation. “We're not saying everybody will do it, but we're proposing it as an alternative energy code compliance path.”

Moving institutions and changing public policy takes time. But motivated building owners are forging ahead regardless.

Architect Edward Mazria leads an initiative called [Architecture 2030](#), whose goal is to make all new buildings carbon-neutral by 2030. The initiative works by getting private companies to work together, share data and use their economy of scale to leverage change. The key to this strategy's longevity, Mazria said, is that it is not mired in politics like government-driven programs.

There may be an equivalent for the residential market. Cochrane believes that if enough small buildings with similar characteristics can band together, their collective square footage could mimic the economies of scale that attract energy service companies to large commercial projects like hospitals and universities. These regional hubs could layer on top of existing homeowners' networks to deliver shared opportunities, the way Architecture 2030's districts do for cities.

“Let's address communities as communities,” Cochrane said. “We have this perfect alignment of the owners' immediate needs, the utility's long-term investment interests and actually delivering these deep savings.”



CDFIs could play an important role here, too. The energy efficiency market is full of uncertainty. From unreliable contracting costs to fluctuating energy prices and shifting weather patterns, there are many unpredictable variables. More standardized data coming from an organized network of local or regional CDFIs could attract more private investment, industry players said.

“We collectively had this expectation that the energy efficiency market would take off,” said Chung. “But markets take time.”

It has taken Craft3’s on-bill program years to show signs of success. The CDFI has very few customers struggling to make their payments, despite a customer base that, by design, includes households many private lenders would consider too risky. So far it has made 2,084 energy efficiency loans, keeping with the mission of a CDFI and not denying financing to households based simply on credit scores.

Initially the program appeared to be flagging. One year after Seattle’s Office of Sustainability and Environment announced Community Power Works would create 2,000 jobs and retrofit as many homes, Seattlepi.com reported only three homes had been retrofitted and just 14 jobs were created. But the pace picked up, and to date the project has funded more than 100,000 hours of work done by more than 700 workers, 95 percent of whom are local. That has amounted to retrofits for 300,000 square feet of commercial space, 1,192 single and multi-family residential units, as well as projects in four hospitals and 26 municipal buildings.

Corey Fitch is one of the local contractors who has benefited from the program. His company, Sound Home Performance, specializes in residential retrofits for energy efficiency. It has worked with Community Power Works since the program's beginning in 2010.

"There's a huge demand right now," Fitch said. "Everyone has concerns about what happens when programs go away, but I think we're proving the model." Between January and June, Fitch said, his business accounted for 500,000 kilowatt-hours of annual energy savings. His two-truck operation is currently scheduled three months out, and has added three full-time employees to the payroll.

One young family — a couple with a baby — called Fitch for basic house maintenance on their 1940s Beacon Hill home. "I asked them about their vision for the house," he said, "and they told me, 'We're going to die here.'" They could not afford an overhaul from a traditional bank, so they took out two low-interest loans to fund a 78 percent cut in their energy consumption.

"When they're 80 and they're in that house," Fitch said, "their utility bills are going to be next to nothing."

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REACHING FOR EFFICIENCY

The building sector was responsible for nearly half of the increase in U.S. carbon emissions between 1990 and 2000, according to the Energy Information Administration. Efficiency improvements in recent years have steadily cut that contribution, but population and economic growth guarantee a continued rise in the absolute amount of energy that buildings consume.

In Seattle, Department of Energy grant funding for Community Power Works ends May 31. The program will continue in some form after that point, program manager Joshua Curtis said, but just what it will look like remains unknown. Zimmerman said the CDFI could sell part of its portfolio to a secondary market — that is, other investors could buy partially paid back energy efficiency loans from Craft3, providing the CDFI with a steady stream of cash. If they were able to strike such a deal, it would bode well for the future of residential energy efficiency investment.

Both Community Power Works and the similar Clean Energy Works Oregon are pursuing partnerships with their respective state governments to secure a reliable source of funding. In seeking stronger state support, the programs must stand on their value as catalysts for economic development and emissions reductions. Their value to consumers is three-fold: Rebates, convenience and quality assurance. Without ARRA funding, it is likely the rebate will diminish.

Energy Suck

Though transportation dominates the debate about the country's collective carbon footprint, the reality is that single-family homes are nearly as large a source of carbon emissions.

(US Dept. of Energy, 2008)



28%
Transportation



32%
Industrial



22%
Residential



19%
Commercial

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Successful CDFI programs bring together project design and financing, clearing a path for interested consumers — no need to chase down separate auditors, contractors and financing on your own. But they should advertise more, Zimmerman said, to show a wider audience where that path is.

“There has to be a much more concerted, powerful sales message across all kinds of building stock,” Zimmerman said, “about what energy efficiency can deliver.”

Philadelphia has placed ads on regional train cars that speak to comfort. The EnergyWorks ads [simply read](#), “AHHHH.”

Ironically, in proving up the community development potential of investments in energy efficiency, CDFIs risk boxing themselves out of the very market they helped sustain. They currently serve people with credit scores from bad to sterling, so their business model could suffer if they have to take only those rejected by bigger investors. Isolating “a portion of the portfolio because it doesn’t fit the metric of bigger investors,” Zimmerman said, “is something we’re trying to avoid.”

CDFIs and their partner programs will have different responses to the potential loss of Recovery Act and other public funding. As market knowledge grows along with building emissions, the impact of such programs on private investment in energy efficiency remains to be seen. CDFIs weathered the financial crisis soundly,

and national interest in energy efficiency has only grown since. This emerging market could fulfill decades of expectations, or just as easily become a missed opportunity.

Elizabeth Rothman is one customer who wants to see the CDFI stick around. Her installation wrapped up earlier this year, about a month after her energy audit. While she is eager to see her savings over the winter, Rothman said the upgrade has already paid off.

“When I came home on a nice summer day and it was noticeably cool in the house,” she said, “that was exciting.” >



ABOUT THE AUTHOR

Chris Bentley is a Chicago-based writer, photographer and filmmaker. His work has appeared in the *New York Times*' Green blog, ScienceDaily, *New Scientist*, *The Architect's Newspaper*, Chicagoist, *Time Out Chicago*, *Chicago Tribune's* TribLocal, AOL's Patch.com, the *Northwest Indiana Times*, *Chicago Jazz Magazine* and elsewhere. A graduate of the Medill School at Northwestern University, where he was a 2010-11 Comer Scholar for climate change reporting, Chris is interested in the environment and sustainability issues.

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ABOUT THE ILLUSTRATOR

Tim Pacific is an award-winning graphic design student entering his senior year at Rutgers University in Camden. In addition to his schoolwork, Tim is an active freelance illustrator. His work can be seen in AIGA Philadelphia's SPACE, which features a recently completed series of hand-lettered postcards. Among his design philosophies, Tim believes strongly that concept comes first and you should absolutely judge a book by its cover design.