Electricity Innovation Lab
ROCKY MOUNTAIN INSTITUTE

BREAKING GROUND

NEW MODELS THAT DELIVER ENERGY SOLUTIONS TO LOW-INCOME CUSTOMERS

BY COREINA CHAN, KENDALL ERNST, AND JAMES NEWCOMB

ROCKY MOUNTAIN INSTITUTE

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SUGGESTED CITATION

Coreina Chan, Kendall Ernst, and James Newcomb, *Breaking Ground: New Models That Deliver Energy Solutions to Low-Income Customers* (Rocky Mountain Institute, 2016), http://www.rmi.org/elab_leap_resources.

EDITORIAL/DESIGN

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Images courtesy of iStock unless otherwise noted.

ACKNOWLEDGMENTS

Thank you to the diverse group of organizations who participate in e-Lab Leap.

Thank you also to the experts and innovators who provided perspective and insight into this brief report. They include:

Isaac Baker, Co-Director, Co-op Power
Susan Spencer, CEO, ROCSPOT
Kieran Coleman, Associate, Rocky Mountain Institute
Mcgowan Southworth, Founding Partner, Brooklyn Power
Herve Touati, Managing Director, Rocky Mountain Institute
Chris Neidl, Director, Solar One
Danny Kennedy, Managing Director, CalCEF
Cisco DeVries, CEO, Renew Financial
Umber Bawa, CEO, Rabble
Karl Rabago, Executive Director, Pace Energy and Climate Center

DISCLAIMER

e-Lab is a joint collaboration, convened by RMI, with participation from stakeholders across the electricity industry. e-Lab is not a consensus organization, and the views expressed in this document are not intended to represent those of any individual e-Lab member or supporting organization.

ABOUT US

ABOUT ROCKY MOUNTAIN INSTITUTE

Rocky Mountain Institute (RMI)—an independent nonprofit founded in 1982—transforms global energy use to create a clean, prosperous, and secure low-carbon future. It engages businesses, communities, institutions, and entrepreneurs to accelerate the adoption of market-based solutions that cost-effectively shift from fossil fuels to efficiency and renewables. In 2014, RMI merged with Carbon War Room (CWR), whose business-led market interventions advance a low-carbon economy. The combined organization has offices in Basalt and Boulder, Colorado; New York City; Washington, D.C.; and Beijing.

ABOUT e-LAB

e-Lab is a multiyear, multistakeholder forum to address complex electricity system challenges no individual stakeholder can solve alone. e-Lab supports practical innovation across traditional institutional boundaries to overcome barriers to the economic deployment of distributed energy resources in the U.S. electricity sector. e-Lab participants convene and collaborate on solutions and engage in on-the-ground projects that address the biggest challenges facing the sector: new business, pricing, and regulatory models; grid security; customer engagement; and grid integration of low-carbon renewable energy. These changes are critical steps towards a more resilient, affordable, and sustainable electricity system. Please visit http://www.rmi.org/eLab for more information.

ABOUT e-LAB LEAP

e-Lab Leap is working to empower and improve the lives of low-income households and communities in a clean energy future.

INTRODUCTION

New business models are emerging to serve low-income customers who have previously been unable to access distributed energy resource (DER) options such as rooftop solar.[i] Learning from models that have successfully served higher-income customers, these new "species"[ii] of DER business models are adapting and evolving to meet the needs of low-income customers.

In this report, we profile four examples of new types of arrangements that are unlocking the potential for low-income customers to participate in and benefit from DERs:

- The Co-op Owner Model allows low-income customers to choose between pre-pay and pay-as-you-go subscriptions for community solar, and the opportunity to co-own projects over time.
- The Building Co-op Model leverages existing building co-op entities to provide low-income tenants pass-through access to loans, incentives, and other benefits.
- The Worker Co-op Model leverages local human resources to reduce overall project costs to low-income participants. Members have an option to co-own projects over time.
- The Tenant Load Flex Model enables low-income customers to participate in load flexibility programs in exchange for reduced utility bills.

We investigate the different approaches these business models use to address barriers and obstacles that have historically prevented low-income customers from accessing the benefits of DERs that are available to their higher-earning counterparts. We also identify "next-frontier" opportunities for next-generation models to better serve these customers.

BACKGROUND

DERs, especially solar PV, are quickly becoming cost-competitive from a life-cycle perspective when compared with the price of energy from conventional sources. As DER technology and soft costs continue to fall, exciting new opportunities are emerging for electricity consumers. With the benefit of federal, state, and local policies that encourage adoption of clean energy solutions, many households in the United States are considering options such as residential rooftop solar, community solar, or battery systems as viable economic energy solutions. However, these options are inaccessible to many low-income customers who stand to benefit most from the environmental and economic advantages of DERs. These customers—30% of families and climbing[1]—face formidable obstacles to accessing and adopting many of the emerging DER options. These include: lack of up-front capital, limited appetite for tax credits, poor housing conditions, lack of home ownership, and barriers to financing due to low credit scores.[2]

[i] We refer to low-income households and communities as "low-income customers;" the arrangements that enable access as "business models;" and the businesses, community organizations, and government agencies that provide services in these business models as "providers." DERs are demand- and supply-side resources that can be deployed throughout an electric distribution system to meet the energy and reliability needs of the customers served by that system. DERs can be installed on either the customer side or the utility side of the meter.

[ii] Thank you to Chris Neidl, from Solar One, who shared this terminology with us.

On the supply side, DER providers are challenged to develop the marketing and engagement strategies required to succeed in serving low-income customers. The needs of low-income customers vary across income levels, housing types, and states, and across urban and rural contexts. Many providers question whether it's worth it (for financial, grid, or other benefits) to serve such hard-to-reach customers, especially when other market segments offer lower-hanging fruit. For now, the majority of existing DER business models target middle-class and wealthier customers; by default, the upfront cost, financial structures, credit requirements, and ownership arrangements of these business models are often incompatible with low-income needs.

In addressing these challenges, a handful of business models are emerging to provide low-income customers access to a wider array of clean and renewable energy solutions. This report profiles four examples of business models that enable innovative service providers to circumvent the barriers on both supply and demand sides. We identified these models over the course of multiple interviews in our research for RMI's e-Lab Leap and Shine programs. Our conversations with key stakeholders in these models reflect the following key motivations and mindsets around empowering low-income households in a clean energy future:

1. **If we want to see a complete transition away from fossil fuels to efficiency and clean energy in the United States, we are going to have to engage the participation of low-income households.** Not only do low-income customers make up close to a third of the nation's households, they also account for over 20% of residential energy use in the U.S., by conservative estimates.[iii]

2. **Contrary to popular belief, low-income households are a market opportunity.** Models such as the four we profile here are developing the market's capacity to (1) leverage the collective buying power of low-income households, (2) access valuable low-income sourced grid assets like efficiency and demand flexibility, and (3) engage low-income customers as active participants and investors as well as consumers and beneficiaries.

3. Either by default or by design, today's evolving energy landscape will impact choices available to low-income customers around how they use, source, and pay for energy (as well as how they are compensated for their participation in the market). **Proactive innovation can help ensure that low-income customers are not continually marginalized or isolated from clean energy options and benefits.**

[iii] The 2009 Residential Energy Consumption Survey estimates the combined household site energy use of households with incomes less than 150% of the federal poverty line to be 20.8% of total national residential energy use. (Summary Household Site Consumption and Expenditures in the U.S.—Totals and Intensities, 2009. http://www.eia.gov/consumption/residential/data/2009/) However, this does not include many households who struggle to make ends meet. Many federal and state assistance programs use the definition of 200% times the poverty line for households to qualify.

HOW NEW MODELS SERVE LOW-INCOME CUSTOMERS

The four business models we profile here are tailored to their specific business and policy environments, but take similar approaches to innovation that could be foundational to scaling similar models nationally or serve as the basis for new models. In general, these models apply one or more of the following building block concepts to serve low-income customers:

- Transform: They identify nonconventional sources of value, and provide pathways for tapping into that value
- Reorganize: They introduce new third-party stakeholders and/or establish new relationships between existing stakeholders to enable different transactions and resource exchanges
- Aggregate: They access many customers at once to encourage economies of scale and other efficiencies to reduce costs
- Diversify: They incorporate a portfolio of different customer types to manage and reduce risk

In this section, we provide a diagram of each model that maps the goods, services, and monetary flows between stakeholders to illustrate the distribution channels, stakeholder relationships, and key activities involved. Some specifics of each model are omitted or simplified to preserve intellectual property. We also provide a summary of how building block concepts are implemented across the four models.

image courtesy of Romy Purshouse

CO-OP OWNER MODEL

OFFERS PRE-PAY OR PAY-AS-YOU GO SUBSCRIPTIONS, WITH AN OPPORTUNITY TO CO-OWN

Type: Low-Income Community Solar

Co-op Power is a consumer-owned energy cooperative in the Northeast that targets neighborhoods and communities with low-income households to develop sustainable community solar projects. Its approach enables households to participate both as energy subscribers (who benefit from bill savings) as well as project co-owners (who benefit from project revenue). Co-op Power initially created this model for a project currently under development in Massachusetts, with similar community solar projects planned in New York.

HOW IT WORKS

Project Development & Structure

- The project owners, Co-op Power and the Tax Equity Investors (TEI), form a limited liability corporation (LLC) to own and operate the community solar project. The LLC serves as a special purpose vehicle (SPV), a legal limited partnership structure that protects the owners from project risk.
- The TEI owns 99% of the LLC for the first 5–7 years, during which it earns federal investment tax credits (ITC), depreciation benefits (modified accelerated cost recovery system, MACRS), and solar renewable energy certificates (SRECs), while Co-op Power owns a 1% stake. After the TEI recovers its desired return on investment, 95% ownership of the LLC flips to Co-op Power and its members, who continue to capture revenue from the project.
- Initial project capital is raised from a combination of subscriber prepayments (20-year subscriptions), loans from a senior debt provider, and equity from a TEI. Project revenue is generated through a combination of subscription fees (one-third from the anchor tenant) and SREC sales in Massachusetts.
- Low-income customers have the option of pay-as-you-go subscriptions, or using the Massachusetts Solar Loan Program to purchase presubscriptions.
- Ongoing project costs include interest payments to the senior debt provider, cash payments to the TEI, insurance, taxes or payments in lieu of taxes (PILOTS), asset management fees, and operation and maintenance fees.

Project Operations

- Co-op Power assists communities by providing additional resources, including financial, technical, and legal expertise and guidance, for developing community-owned solar projects.

HOW IT SERVES LOW-INCOME CUSTOMERS

- Low-income customers can co-own solar assets through the cooperative structure, which shields them from operational and financial risks of full equity ownership. Co-owners benefit from revenue generated after the ownership flip. Subscribers benefit from bill savings through virtual net-metering credits.
- The model targets communities and neighborhoods with mixed-income households, and aggregates this diverse customer base to enable sizable, cost-effective projects.
- Subsidized loans give low-income customers the opportunity to prepay subscription costs at low interest rates, in this case, through the Massachusetts Solar Loan Program.

FIGURE 1:
CO-OP OWNER MODEL: ACTORS AND RESOURCE FLOWS

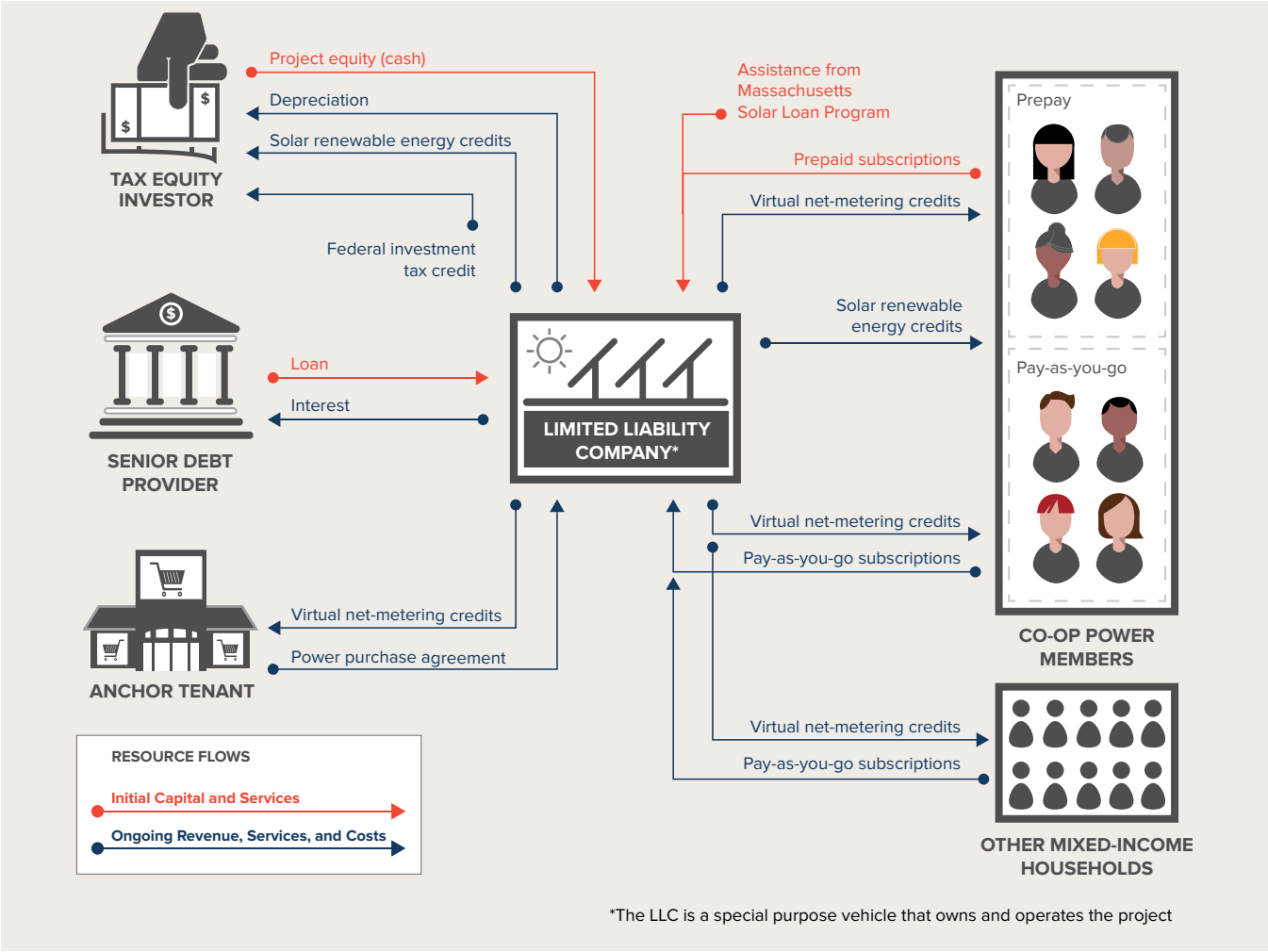


FIGURE 2:
CO-OP OWNER MODEL: HOW OWNERSHIP FLIPS

BUILDING CO-OP MODEL

LEVERAGES EXISTING BUILDING CO-OP ENTITIES TO PROVIDE LOW-INCOME CUSTOMERS PASS-THROUGH ACCESS TO LOANS, INCENTIVES, AND OTHER BENEFITS

Type: Multifamily Rooftop Solar

Brooklyn Power is an energy services provider in New York that works primarily with building co-ops to install on-site solar PV, storage, and efficiency measures, iterating on a model it initially developed to enable solar for a mixed-income building co-op in Sunset Park, New York City, in 2013. The building co-op enables the project to access bank loans, and passes tax incentives and other benefits on to tenants. Brooklyn Power is currently deploying this and similar models across New York City.

HOW IT WORKS

Project Development & Structure

- Building co-ops are member-owned cooperative corporations that own and operate residential buildings (i.e., like in much of New York City). In this model, a preexisting building co-op owns the on-site solar PV project and acts like a special purpose vehicle (SPV) to distribute benefits to co-op member-owners while protecting them from project risk. The building co-op structure secures project debt and passes through project costs and revenues to individual households through the co-op's balance sheet.
- Project capital for the solar system and submeters is raised through a loan from a local bank. The loan is based in part on the credit standing of the building co-op, as opposed to relying on the credit history of individual tenants.
- Brooklyn Power's special expertise in local rate structures and incentives helps the building co-op achieve very short payback periods on its projects (e.g., 2.5 years on the Sunset Park project). To reduce overall project costs, Brooklyn Power accesses all available solar incentives at the federal, state, and city level. State and federal income tax credits reflect on individual tenants' tax statements for up to 5–6 years, passing through at a rate proportional to the tenants' ownership share in the cooperative. Other incentives pass on to tenants through reduced co-op fees. Some incentives pass to vendors and installers in the form of rebates for upfront project costs.
- The project generates revenues through a combination of: net-metering credits (realized as bill savings), reduced demand charges (through rate structure changes), and reduced meter-reading fees.
- Ongoing project costs include interest payments to the bank and operation and maintenance costs.

Project Operations

- Brooklyn Power acts on behalf of the building co-op as the project developer, contracting vendors and installers and securing project capital on behalf of the project owner. Brooklyn Power also offers organization and maintenance and submeter reading services to the building co-op.
- Meter configurations are tailored on a per-building basis, but generally, projects are master-metered at the building level, with submeters installed for individual units and common areas. The building co-op owns the submeters, whereas the utility owns the building's master meter. The building co-op can use Brooklyn Power's meter-reading software to bill tenants, build an energy engagement platform for tenants, and provide advice to individual households to help them manage their energy load.

HOW IT SERVES LOW-INCOME CUSTOMERS

- The model transforms the building co-op into a “front-end” vehicle that holds primary financial liability (is the signatory on project debt), which enables individuals of varied credit ratings and histories to participate.
- It aggregates low- to moderate-income customers to enable entire buildings to benefit from renewable energy.
- Brooklyn Power intends to build on the initial solar project to help tenants access long-term energy independence and resilience (through other DERs like load management strategies and energy storage).

FIGURE 3:
BUILDING CO-OP MODEL: ACTORS AND RESOURCE FLOWS

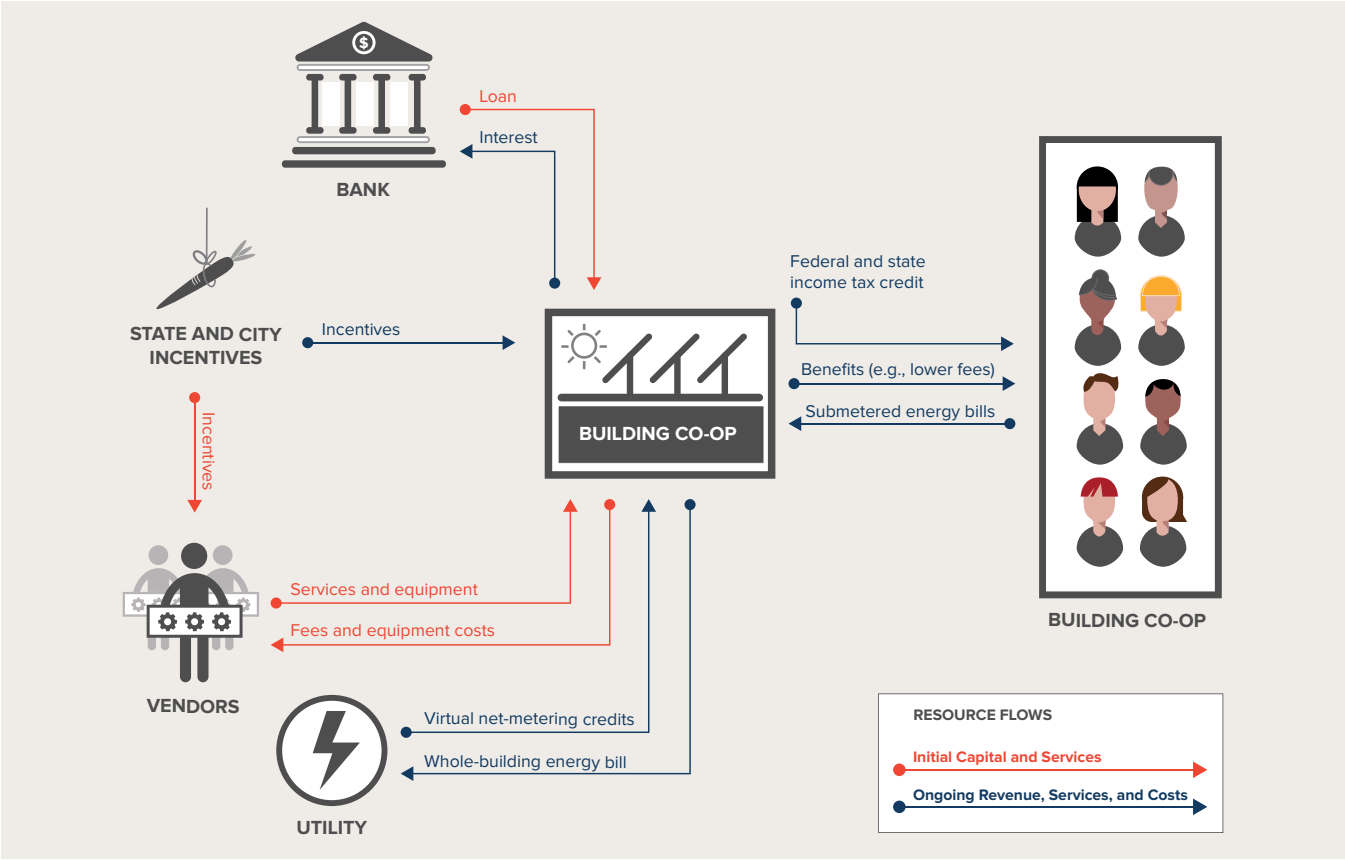
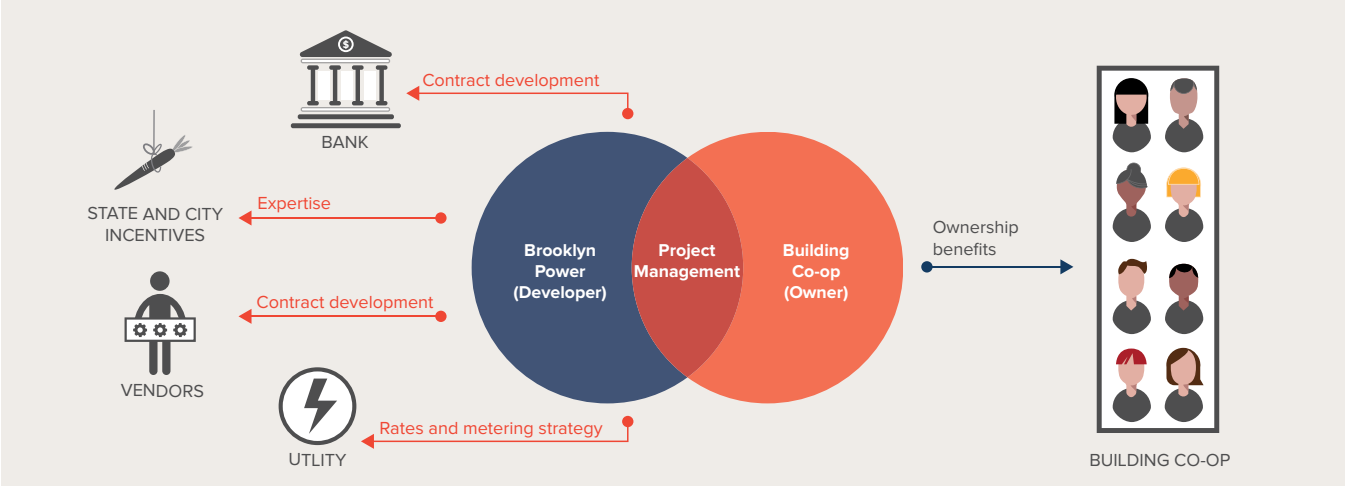


FIGURE 4:
BUILDING CO-OP MODEL: HOW THE PROJECT IS MANAGED



WORKER CO-OP MODEL

ENCOURAGES LOCAL ECONOMIC DEVELOPMENT WHILE LEVERAGING COMMUNITY RESOURCES TO REDUCE OVERALL PROJECT COSTS, WITH AN OPPORTUNITY TO CO-OWN

Type: New York Low-income Community Solar

Rochester's Solar Power Organizational Team (ROCSPOT) is a nonprofit community development and solar awareness organization in Rochester, New York. ROCSPOT leads pre-development and community support activities, with support and strategic advice from RMI's Shine community solar initiative. This model allows residents of Rochester, including low-income customers, to subscribe to solar electricity supplied by multiple megawatt-scale community solar projects located on the local distribution grid. A ROCSPOT Worker Cooperative would be established to perform project construction at the outset, operation and maintenance, as well as subscription acquisition services, for the lifetime of the projects. The worker cooperative could also provide energy efficiency retrofits for households participating in the projects, thus addressing their broader energy needs. This model is under development by ROCSPOT and Shine. It will be realized through a request for proposal (RFP) process.

HOW IT WORKS

Project Development & Structure

- ROCSPOT helps reduce upfront costs for the project by: identifying and performing due diligence on a portfolio of sites; acquiring initial subscribers (e.g., households and anchor tenant(s)); and engaging local city and county administrations to support a low-cost and low-risk solar policy environment.
- With the support of the City of Rochester, ROCSPOT organizes a competitive tender, or RFP, for a portfolio of multi-megawatt projects (to drive economies of scale), and selects vendors responsible for financing, engineering, procuring, and constructing the project.

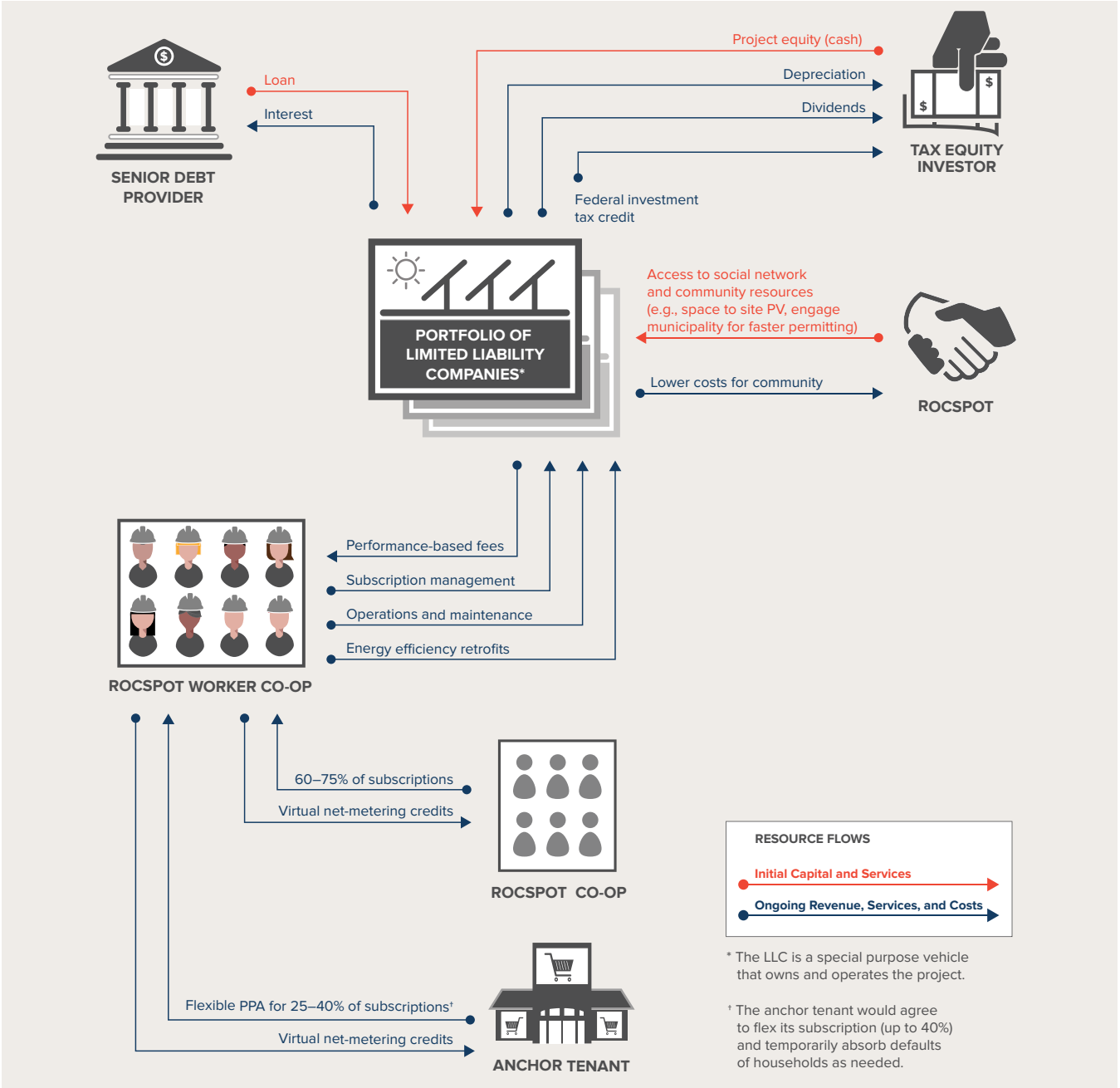
Project Operations

- The winning sponsor selected would subcontract ongoing subscriber acquisition, operations and maintenance, and energy efficiency retrofit projects to ROCSPOT's Worker Cooperative for the life of the project. The sponsor would also subcontract a specialized bill manager to interface with the utility, processing net-metering credits, billing, and payments. The Worker Cooperative would be incentivized to maintain at least 100% subscription through a performance-based contract.
- The subscriber base would be a mix of 25% low-income, 45% sponsor-determined subscribers, and 35% investment-grade anchor tenant (municipal, university, hospital, or other). The anchor tenant would agree to "flex" its consumption to temporarily absorb defaults by households as needed, giving the Worker Cooperative time to subscribe additional households if required.
- Ongoing project costs paid by the sponsor would include dividend and interest payments to the tax equity investors, retainers for operation and maintenance and subscriber acquisition efforts, and bill management. The Worker Cooperative would also reduce operational costs for the duration of the project by leveraging local knowledge and relationships to maintain subscription for initial and future projects.

HOW IT SERVES LOW-INCOME CUSTOMERS

- Local clean energy jobs are created through the Worker Cooperative for constructing, maintaining, and marketing these and future projects.
- The model transforms community resources (e.g., local knowledge, local networked relationships, work performed) into value streams that reduce overall project costs, sourcing human resources through a competitive RFP process.
- Lower costs enable cost-competitiveness. That cost reduction, alongside project credit enhancement through a "flex" anchor, enables participation by diverse subscriber types (including low- and moderate-income households).
- Local residents would be trained and employed in project development, construction, operation and maintenance, and marketing, among other skills for the PV systems.

FIGURE 5:
WORKER CO-OP MODEL: ACTORS AND RESOURCE FLOWS



TENANT LOAD FLEX MODEL

PROVIDES LOWER-COST HEATING SERVICES TO HOUSING AUTHORITY TENANTS IN EXCHANGE FOR HEATING DEMAND FLEXIBILITY

Type: Multifamily Load Flexibility

An energy services provider in France is developing this model. It offers housing authority tenants lower-cost heating services (e.g., electricity for radiators, water heaters) and shared access to PV and storage in exchange for some control of their energy demand (i.e., demand flexibility). The model is adapted to French regulations, rate structures, and low-income housing, but many similarities exist between the French and U.S. contexts. The model is currently being implemented in France.

HOW IT WORKS

Project Development & Structure

- In France, housing authorities (HAs) have existing relationships with a large number of low-income tenants. The energy services provider negotiates a commercial and industrial rate electricity contract (e.g., lower supply rate, higher demand charge) with the utility on behalf of the housing authority and its tenants. Electricity purchased within the mandates of this contract is intended to operate heating equipment only.
- The provider offers tenants contract terms (e.g., lower rates) that encourage load and/or demand flexibility of heating and hot water services, and provides controls for equipment (e.g., radiators and water heaters) to enable demand flexibility.
- The housing authority signs a power purchase agreement with the energy service provider for PV and storage assets behind the meter. These assets are used to further reduce the cost of providing heating services. Tenants share cost reductions.

Project Operations

- The negotiated commercial and industrial rate structure charges users different electricity rates based on when and how much electricity is being used. This rate structure enables tenants to be compensated for shifting their demand profile. The utility, in turn, benefits from reduced strain on grid assets and is more likely to be able to defer significant rate-based infrastructure investments.
- The energy services provider generates revenue through contract arbitrage and the sale of ancillary and other services to the utility or wholesale energy market. Project costs include providing demand flexibility controls and ongoing operation and maintenance costs.
- The HA manages billing and customer relations with tenants through existing networks, lowering overhead costs. Lowering tenants bills and reducing arrears through cost reduction aligns with the HA's mission.
- Utilities benefit from cost reductions associated with demand flexibility.

HOW IT SERVES LOW-INCOME CUSTOMERS

- Low-income customers have lower-cost heating bills due to participation in the contract.
- The energy services provider creates a new relationship with the utility, the HA, and tenants that gives tenants lower-cost heating rates and access to DERs, grants utilities access to valuable demand flexibility, and supports HA's missions to help low-income customers financially.
- Low-income customers' energy load flexibility is recognized and valued as a grid asset.

FIGURE 6:

TENANT LOAD FLEX MODEL: ACTORS AND RESOURCE FLOWS

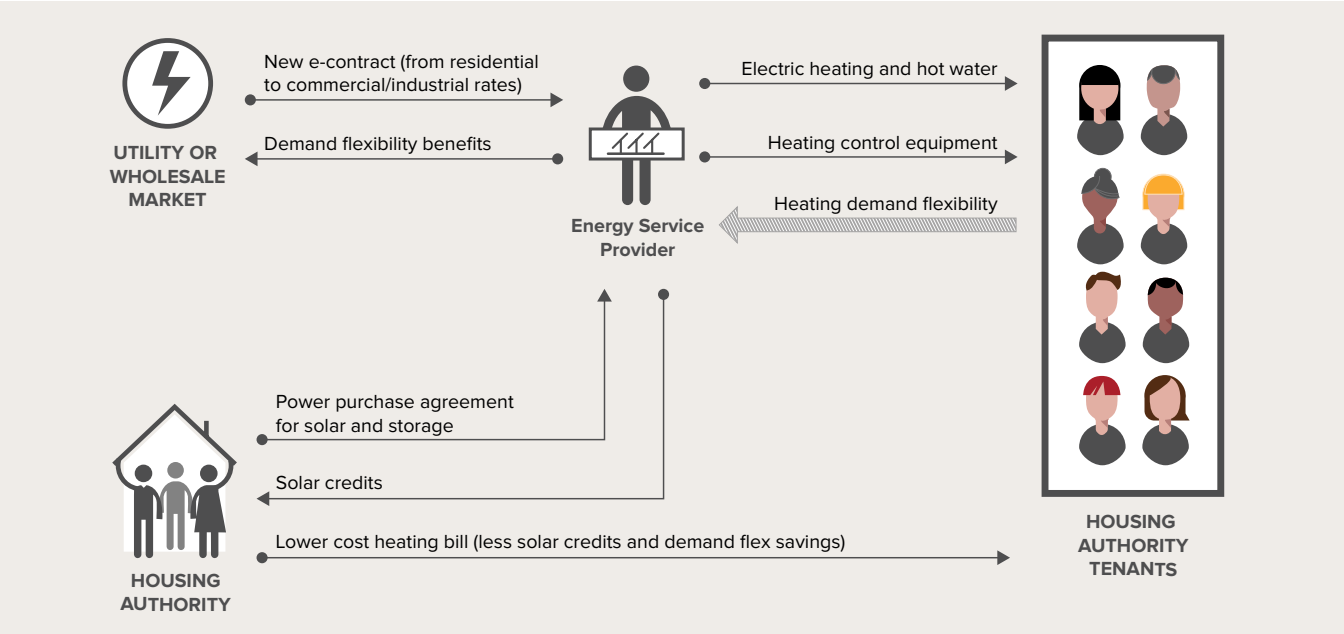


TABLE 1:
SUMMARY OF HOW BUILDING BLOCK CONCEPTS ARE IMPLEMENTED ACROSS THE FOUR MODELS

	TRANSFORM Identify nonconventional sources of value, and provide pathways for tapping into that value	**REORGANIZE** Introduce new third-party stakeholders and/or establish new relationships between existing stakeholders to enable different transactions and resource exchanges	**AGGREGATE** Access any customers at once to encourage economies of scale and other efficiencies to reduce costs	**DIVERSIFY** Incorporate a portfolio of different customer types to manage and reduce risk
CO-OP OWNER MODEL		• Leverages an existing loan program to enable participants to prepay into a community solar project • Enables low-income customers to co-own a community solar project through a co-op entity	• Targets multiple households in neighborhoods and communities to create sizable projects	• Offers several subscription models to serve a range of incomes and abilities to pay • Targets mixed income communities
BUILDING CO-OP MODEL	• Captures the value of low-income customers' tax burdens	• Leverages the existing building co-op as a "front-end" vehicle that holds primary financial liability for the project	• Targets whole buildings with many tenants	• Targets buildings with mixed income tenants (low to moderate)
WORKER CO-OP MODEL	• Creates and institutionalizes local clean energy jobs through the Worker Cooperative for constructing, maintaining, and marketing these and future projects • Leverages community resources (e.g., local knowledge, local networked relationships, work performed) to reduce overall project costs	• Enhances project credit worthiness by introducing a "flex" anchor, which enables participation by diverse subscriber types	• Identifies and aggregates many customers quickly through local social networks	• Develops a mixed portfolio of low-income, market-determined, and anchor subscribers
TENANT LOAD FLEX MODEL	• Values heating loads and load flexibility of low-income customers as grid assets and provides controls to manage loads	• Establishes a new third-party relationship benefitting utilities, housing authorities, and low-income tenants	• Aggregates many customer loads at once in order to offer lower-cost heating services to tenants	

GROWTH OPPORTUNITIES FOR NEXT-GENERATION BUSINESS MODELS

These models are examples of innovative approaches to meeting the needs of low-income customers in specific and local financial, political, regulatory, and physical environments. By necessity, they engage a broader constellation of participants who, through common interests and incentives, provide the collective resources required to overcome financial and other hurdles.

As these and other models become established and evolve, we expect to see further innovation in the development of arrangements that enable low-income households to benefit from DERs through:

1. Additional financial, legal, and organizational structures that enable low-income households to benefit today from DERs given current regulatory and business environments.

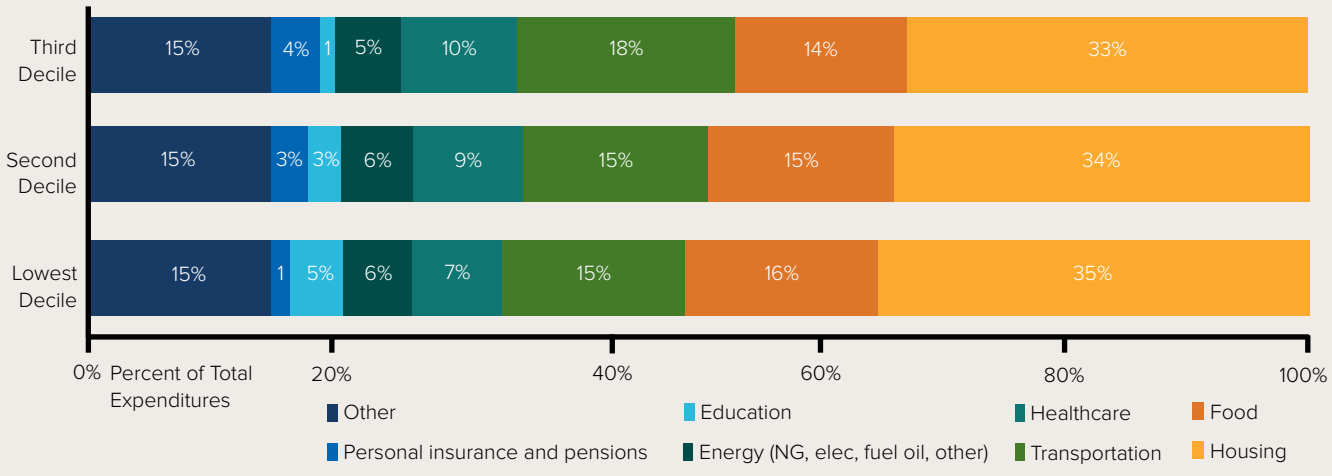
2. New policies, incentives, and funding mechanisms we should consider going forward to more successfully support low-income customers to participate in an energy transformation.

Scaling adoption of DERs across low-income customer segments will require more than "typical" entrepreneurs with new product or service offerings. Next-generation innovators must also include intrapreneurs—innovators within government, utilities, NGOs, community organizations, and other organizations—who understand the cross-collaboration required to foster an environment conducive for low-income customers to access DERs.

Based on our ongoing work with some of these innovators, we see the following six areas emerging as opportunities for next-generation innovators to address. We are interested in exploring these through additional research and partnership work through the e-Lab Leap program:

1. Innovate across multiple customer cost categories
   It is a challenge for low-income customers to prioritize electric utility bills when so many other costs—some greater—compete for household time and resources, and contribute to the complexity of making ends meet.

FIGURE 7:
HOUSEHOLD EXPENDITURES BY TYPE FOR THE LOWEST THREE DECILES OF U.S. HOUSEHOLD INCOME[6]



Although Figure 7 shows energy costs as percentages of household expenditures, household energy burdens, i.e., energy costs as percentages of household incomes, for the lowest, second, and third deciles are much higher: 22%, 9%, and 7%, respectively.

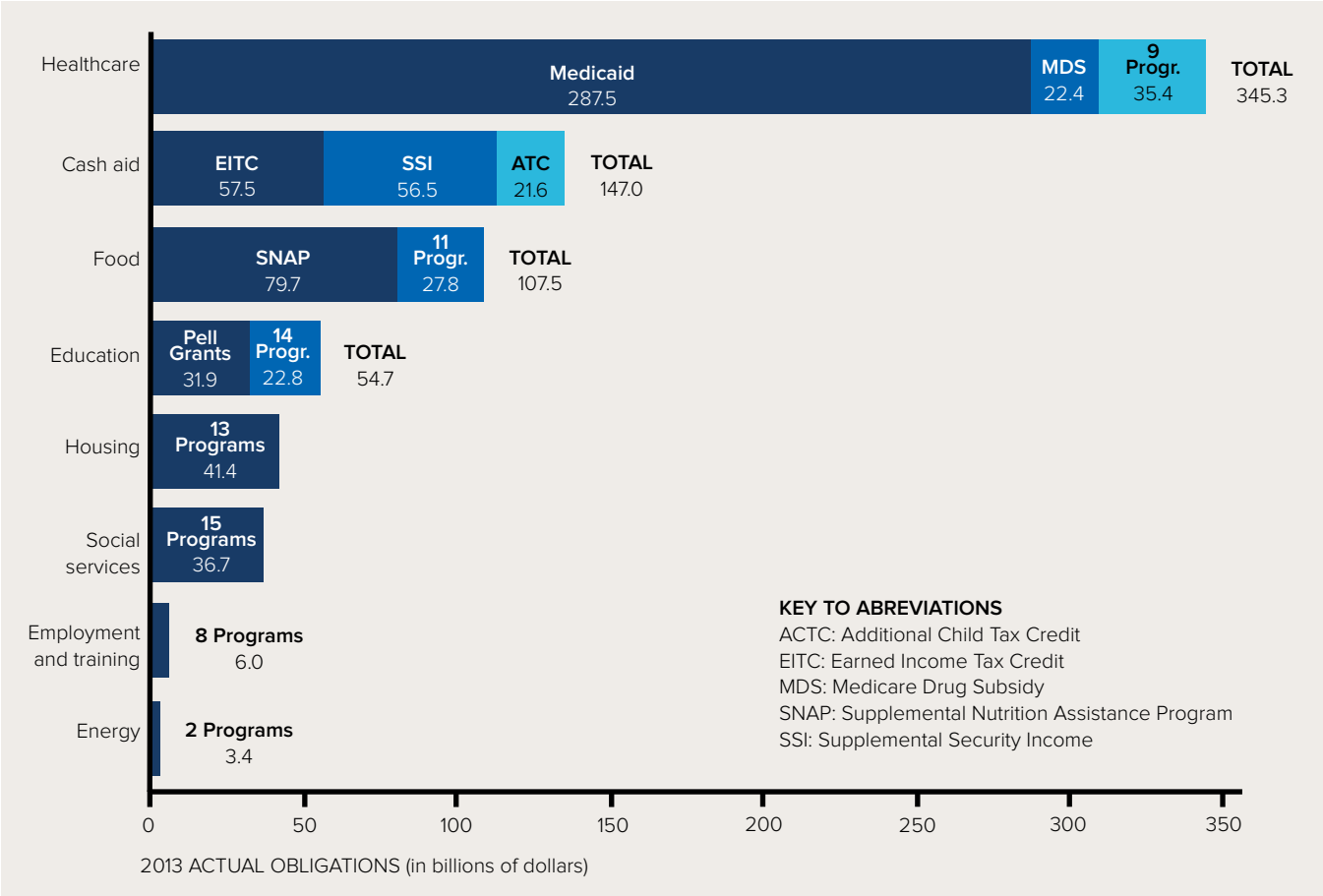
Understanding how DERs unlock greater and lasting cost reductions across other household cost categories beyond electricity bills—like rent and mortgage, heating, transportation (including car payments, insurance, and gas), phone, and internet and broadband access—will enable next-generation business models to have a greater impact on customer quality of life, and cultivate greater customer demand and participation. For example, a model for integrated services could provide community solar, energy efficiency services, and car sharing services, simplifying transactions for customers and lowering the cost.

2. Similarly, link to other (larger) government and institutional budgets

In 2014, the federal government spent $3.7 billion on energy bill assistance and weatherization for low-income households,[3] $51.3 billion on low-income housing assistance,[4] and $301.5 billion on Medicaid.[5] Understanding how DERs play a role in helping to meet government and NGO object ives in other low-income sectors like healthcare, affordable and quality housing, and climate change impact mitigation and resilience could enable program synergies and higher impact on low-income household quality of life per dollar spent. Government collaboration across sectors is not a

FIGURE 8:

REPORTED FEDERAL OBLIGATIONS FOR LOW-INCOME PROGRAMS BY TYPE OF ASSISTANCE, FISCAL YEAR 2013[7]



novel idea, but champions are still challenged to coordinate sector budgets successfully at scale. In some cases, program changes require resource-intensive congressional or interagency interventions. Just as emerging business models are testing new contractual arrangements that enable collaboration between multiple stakeholders, next-generation models can pilot novel approaches that validate the use of coordinated DER programs to meet other nonenergy impact objectives.

3. Test new metrics for assessing low-income credit risk besides FICO scores

   Today, FICO credit scores are the predominant metric used by lenders to assess individual and household credit risk, and to determine whether prospective borrowers are credit worthy and likely to make or default on payments. The models we profiled are promising in part because they are able to circumvent these conventional credit requirements, largely by creating or leveraging intermediary entities (like building co-ops) whose credit can be assessed in lieu of assessing individual households' credit.

   The shortfall of using FICO scores to access credit worthiness is that this method indiscriminately disqualifies many households who have low credit scores—and in some cases no bank accounts and zero credit histories—but who are committed to and financially capable of making payments on time. The Worker Co-op and the Co-op Owner models have the potential to become proof-of-concepts that (1) the ability of low-income households to make payments are not necessarily correlated to their FICO scores, and (2) DERs are helping to provide savings and/or revenues to low-income households that make it easier to make timely payments. This learning should provide insights on the metrics and characteristics of households that more accurately assess the risk profiles of customers, and raise investor confidence in lending directly to low-income households in next-generation models.

4. Engage an emerging class of impact investors who have appetite for risk and experimentation

   Emerging DER business models are testing new concepts and validating new value propositions for a diverse set of stakeholders. Today, they have the opportunity to tap into a growing pool of investors who, in turn, have different risk profiles than traditional investors and have different expectations of returns and/or time horizons on payback. Some of these investors are impact investors, who seek beneficial social and environmental impacts in addition to financial returns.[iv]

   To date, the majority of impact investors have been accredited high-net-worth individuals, or institutional investors like foundations, pension funds, and fund managers. However, recent regulatory developments such as the JOBS Act enable startups and later stage pre-IPO companies to leverage online crowd investment platforms to raise as much as $50 million from both accredited and nonaccredited investors, effectively expanding the pool of eligible lenders and/or equity investors to include the general public. These and other developments in the impact investment space open up exciting opportunities for low-income DER business models to:

   - Directly benefit a greater number of low-income customers,
   - Channel financing to innovative and impactful projects that may otherwise face prohibitively expensive costs of capital,
   - Enable unconventional business models to receive financing due to a new or more flexible investor base,

[iv] The Global Impact Investing Network estimates that there is currently $29.4 billion of impact investment allocated in North America. Signs point to a rapid growth in impact investing, with $15.2 billion having been invested globally in 2015 and $17.7 billion committed in 2016. Forty-seven percent of impact investment in 2015 targeted both social and environmental goals.

- Develop and demonstrate new social and environmental impact metrics, and
- Validate proofs-of-concept and cultivate greater confidence in low-income service models with a broader range of conventional lenders.

5. Leverage other sources of value

The values and services being monetized in the electricity system are evolving. As we transition to an electricity grid with increased DERs and DER services, we are developing increasingly complex interdependencies between customers, utilities, and other service providers related to adopting and integrating DERs into the grid.

Transactions are no longer strictly bilateral (i.e., between utilities and customers, electrons in exchange for utility bill payments), but reflect a growing understanding of:

- The potential for customers and other players to become providers of DERs and other grid-related services,
- The values (above and beyond electrons) that DERs provide to the grid and to other stakeholders and end users, and
- How different participants can be compensated for their role.

New business models like the Tenant Load Flex Model are only beginning to assess what low-income customers have to offer and how they can participate in critical value streams like: energy efficiency, load flexibility, energy storage, and renewable energy generation. In Brownsville, a low-income neighborhood in New York City, ConEdison's Brooklyn Queens Demand Management project is exploring ways to develop and compensate customer-side demand management, storage, and renewable generation to avoid significant utility-side infrastructure investments and expenditures that would otherwise be required to meet rising energy demands. In arrangements like these, low-income customers and community stakeholders have additional bargaining chips they can bring to the table: valuable physical assets like real estate for siting DERs and shareable personal assets like vehicles; social assets like political influence and access to trusted, established customer networks; and human resources like skills, expertise, and sweat equity. There is a lot of room for investigation around how new value streams can be monetized and incorporated efficiently and competitively.

6. Meet long-term community needs beyond energy savings

Low-income barriers to accessing affordable clean energy are entrenched in broader systemic issues that disadvantage low-income customers, such as lack of quality housing, education, employment, and healthcare. The models we have profiled here test two initial approaches to providing long-term ancillary benefits at a local level, and there can be more:

1. The co-op models enable low-income community ownership of DER assets that can serve as recurring and long-term revenue sources.
2. The Worker Co-op Model cultivates training and long-term job development opportunities.

Going forward, new DER business models are an opportunity for providers to identify and serve broader community needs for low-income customers beyond individual household energy savings.

OUTLOOK & ENDNOTES

OUTLOOK

The stage is set for further evolution of innovative business models to deliver clean energy solutions to low-income households and communities. Recent experience with new approaches has already highlighted key areas of focus that are likely to be the building blocks for new companies, cooperatives, and nonprofit approaches alike. Targeted customer engagement, innovative finance approaches, and streamlined project execution are all essential components for these new models. But the diversity of community needs and opportunities will likely inspire an equally diverse range of approaches. Many of these will fruitfully engage and empower local stakeholders to participate not only in sharing the benefits of next-generation energy solutions, but also in creating the businesses and institutions that deliver these solutions.

ENDNOTES

[1] Families at twice the poverty rate. Carmen DeNavas-Walt and Bernadette D. Proctor for the U.S. Census Bureau, "Income and Poverty in the United States: 2014" (United States Department of Labor, 2015). https://www.census.gov/content/dam/Census/library/publications/2015/demo/p60-252.pdf

[2] GRID Alternatives, Vote Solar, and the Center for Social Inclusion, Low-Income Solar Policy Guide. http://www.lowincomesolar.org/why-act/unlocking-participation/

[3] https://liheapch.acf.hhs.gov/Funding/funding.htm

[4] Federal Housing Assistance for Low-Income Households, Congressional Budget Office, https://www.cbo.gov/publication/50782#section0

[5] https://www.cbo.gov/about/products/budget_economic_data#2

[6] "Deciles of Income before Taxes," Consumer Expenditure Survey, Bureau of Labor Statistics, May 31, 2016. Web. June 14, 2016

[7] Brown, Kay. Federal Low-Income Programs: Multiple Programs Target Diverse Populations and Needs. Rep. no. GAO-15-516. U.S. Government Accountability Office, Aug. 31, 2015. Web. June 14, 2016

GET INVOLVED

e-Lab Leap is working to empower and improve the lives of low-income households and communities in a clean energy future.

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