

E-LAB FORGE NOTES

A NEW YORK ACCELERATOR FOR LOW-INCOME CLEAN ENERGY SOLUTIONS

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INTRODUCTION

INTRO TO E-LAB LEAP

e-Lab Leap is an ongoing initiative at Rocky Mountain Institute (RMI) dedicated to **empowering and improving the lives of low-income communities and households in a clean energy future**. Since 2015, e-Lab Leap has been working in the state of New York through a social change lab that engages a diverse group of organizations and brings them together in untraditional working partnerships to co-develop creative and new solutions that serve low-income populations. Participating stakeholders include low-income and consumer advocates; environmental groups; community-based organizations; federal, state, and local government entities; housing authorities; housing developers and managers; utilities; regulatory agencies; foundations; financiers; and distributed energy resource service providers. In convening e-Lab Leap Change Lab meetings, RMI draws on knowledge and experience we've gained from the Electricity Innovation Lab (e-Lab), a nationwide change lab we have been convening around electricity innovation for over three years.

In addition to the change lab in New York, e-Lab Leap engages in research and collaborations (R&C) to identify and support low-income energy solutions that can scale nationally. Our current R&C work is focused on supporting emerging business models that are being developed specifically to serve low-income customers. We kicked off this work with the publication "Breaking Ground," a profile of four emerging business models serving low-income customers and communities. Our webinar, "Clean Energy for Low-Income", builds on this research to highlight additional models and trends. Beyond research, support of business models takes place through consulting and intensive workshops. These workshops have included e-Lab's nationwide Accelerator and this event, e-Lab Forge.



WHAT IS E-LAB FORGE?

e-Lab Forge is a 48-hour workshop to advance business models that enable low-income communities to benefit from clean energy. e-Lab Forge is a project of Leap, an initiative at Rocky Mountain Institute dedicated to empowering and improving the lives of low-income households and communities in a clean energy future. The first e-Lab Forge in 2017 was convened in New York State, to support four teams in the concept stage of business development:

E-LAB FORGE 2017 OBJECTIVES:

- Critically advance 4 business models with the potential for major clean energy benefits to low-income households.
- Show meaningful and ongoing collaborations that persist after Forge.
- Host unique conversations to expand the understanding of the problem.
- Surface useful ideas and tools for all participants to take home.

- **Community Solar Project Aggregation Fund:** to develop a fund of pooled capital that provides tax equity and debt financing for community solar projects that serve low-income communities.
- **REVitalize:** to develop two business model variations that enable low-income households to share in equity ownership of solar assets, one in Buffalo and the other in Sunset Park, Brooklyn.
- **Long Island Green:** to develop proposed online marketplace to provide equal access to clean and affordable energy among all customers in Long Island.
- **Clean Energy for Affordable Multifamily Buildings:** to aggregate affordable multifamily buildings for combined energy efficiency and solar projects.

WHY E-LAB FORGE?

Today, nearly 50 million Americans live at or below the federal poverty line and many more have trouble making ends meet. Low-income communities are not a niche sector of the population, yet while many clean energy solutions are being developed to serve the public, these solutions are often inaccessible for low-income households. Even when resources like government incentives and utility programs are created to serve low-income communities, in order to be successful, these efforts still require the development of effective and sustainable delivery models that ensure high levels of adoption, deployment, and funding.

Low-income communities and households stand to benefit the most from greater access to clean energy in a future of increased economic uncertainty and climate change vulnerability. They also face the greatest barriers in accessing clean energy. Energy solutions that are critical for building economic and social resilience are often inaccessible and unaffordable to low-income communities.

Committed stakeholders who work at the nexus of clean energy and low-income communities are seeking to address this problem by developing holistic business concepts that combine effective delivery models with ways to access public and private capital to provide low-income families access to clean energy. However, these concepts face significant barriers to implementation. While a vibrant ecosystem of clean energy and tech incubators and accelerators exists today, there is a critical gap in resources and coaching for business and delivery concepts for clean energy solutions that are targeted specifically to low-income households.



e-Lab Forge is playing a role in filling that gap by providing a space and process for coaching concepts towards pilot. Rather than being exclusive products of individual entrepreneurs who keep their offerings under wrap until they go to market, successful low-income projects are by necessity often the product of semi-public collaboration, pooled resources, multi-lateral agreements, and broad sharing of market insights. e-Lab Forge is designed to support concept designs through collaborative rather than competitive processes.

HOW DOES E-LAB FORGE DEFINE BUSINESS MODELS?

We proposed the following terminology to establish common vocabulary for participants:

- **Technology:** the hardware or software that helps provide clean energy value for end users, like solar panels, storage components, electric vehicles, etc.
- **Mechanisms:** the enabling financial and policy tools that are helping to unlock access to technology. Examples include PACE loans, government incentives like SASH or MASH that help fund solar in California, or tax credits.
- **Business model:** Manufacturing the technology and establishing mechanisms alone won't ensure high uptake and participation by end users. Establishing an on-bill payment program, for example, doesn't mean that automatically people will enroll and begin to experience benefits. A full delivery or **business model** is a plan for the full-chain of transactions between stakeholders, including **ongoing funding and financing, customer engagement and acquisition, and service delivery**, that ultimately deliver technologies and clean energy benefits to end-users.

CONVENING PRINCIPLES

e-Lab Forge borrows from the convening methods of e-Lab Accelerator, a working meeting that Rocky Mountain Institute convenes at the national level to advance teams throughout North America working on high-impact and innovative projects at the electricity system's distribution edge.

The format for e-Lab Forge is based on two premises:

1. No single organization or individual today has all the knowledge and resources required to successfully address the complex barriers low-income communities face in accessing clean energy. ***e-Lab Forge brings together a diverse set of stakeholders including community-based groups, financiers, legal experts, regulators, utilities, and environmental justice organizations to provide teams a more complete understanding of the landscape of low-income energy issues. Faculty experts, from finance, law, and government, provide coaching and feedback to the teams as they prototype new models.***
2. The opportunities and problems we face in connecting clean energy benefits with low-income communities are not ones we've ever faced before. Best practices for business models that meet the diverse needs of low-income communities don't yet exist. Rather, our charge is to generate and test those potential models quickly to provide foundation for scaling. ***At e-Lab Forge, teams are brought through a rapid-cycle prototype process to draft initial concepts, receive feedback from experts and peers, and iterate on their developing solution.***



While significant portions of the agenda focused on progressing the work of teams, sessions such as learning conversations, plenary tools, and paired walks helped ensure all participants went home with new connections and insights to apply to their individual work. Highlights from learning sessions can be found on page 9.

THESE NOTES

This document is a summary of the learning sessions and work sessions that took place at e-Lab Forge 2017. The event was convened under modified Chatham House rules. Individual teams have received detailed notes of their respective work sessions and conversations; these notes document key takeaways for public consumption.



TEAM MEMBERS

PARTICIPANTS

eLab Leap workshops bring together the “microcosm” of stakeholders needed to make sense of the diverse challenges that emerging business models face, and who together can identify opportunities (including cross-sector ones) to help advance a concept forward. Individuals should be open to the eLab process and have a personal willingness and interest to work in a participative, creative, and systemic way and help the group to meet the ambitious objectives of the day.

This workshop engaged 61 participants, representing 51 organizations, including not-for-profit, private sector, government, law, finance, utilities, financiers, and community based organizations. The workshop was an invite-only event in which individuals with specific experience were recruited in order to inform the work of the teams. 31 faculty experts, from finance, legal, and other backgrounds provided the teams with coaching and feedback. RMI and Reos Partners convened and facilitated the event. The following is a list of participants and organizations, organized by team or faculty role:

Long Island Green Solar Exchange	Empower Solar
	Long Island Green
	The Nature Conservancy
	PSE&G
REVitalize: Harnessing REV for a Just Transition	NYC-EJA
	The POINT CDC
	PUSH Buffalo
	Solar One
	UPROSE
Clean Energy In Affordable Multifamily Buildings	Association for Energy Affordability
	Interstate Renewable Electricity Council
Community Solar Project Aggregation Fund	Cooperative Energy Futures
	High Noon Advisors
	Hunt Green LLC
	Resonant Energy
	Solar Alliance Freedom
	Solar One
	Solstice
	Southern Tier Solar Works
	Surdna Foundation
	Working World

Faculty Experts

Alliance for a Green Economy

Amalgamated

Citi Group

City of New York

ConEd

Crow's Nest Consulting

CT GreenBank

Cutting Edge Capital

Energy Programs

EPRI

GRID Alternatives

Nixon Peabody

Natural Resources Defense Council

NY Green Bank

NYC Economic Development Corporation

NYCEEC

NY Department of Public Service

NY Lawyers for the Public Interest

NYSERDA

Office of the Governor

Pace Energy and Climate Center

Sunvestment

Sustainable Capital Solutions

US Department of Energy

Willdan Energy Solutions

Winston and Strawn LLP

LEARNING SESSIONS

Throughout Forge, industry experts within the faculty shared their knowledge in informal half-hour learning sessions. The highlights are outlined below:

LEGAL CONSIDERATIONS IN THE DEVELOPMENT OF COMMUNITY-OWNED RENEWABLES

Shiva Prakash, New York Lawyers for the Public Interest

Critical legal considerations for communities seeking to develop community-owned renewables fall into three main categories. First, the regulatory landscape; the design and feasibility of business models will be influenced by evolving high-level energy policy like REV, specific state-level shared solar laws and the value of DER regulatory decisions, and finally local land use and zoning law. Second, governance and organizational structure; projects will need to determine what legal structure their business will have guided by considerations of governance, financing, flow of benefits, and liability. Third, project finance and raising capital; there are emerging solutions, such as partnership “flip” models, to address the unique challenges, such as use of tax credit equity and limitations under securities law, of LMI communities and community ownership models regarding project finance and raising capital.

KEY INSIGHTS ON LEGAL CONSIDERATIONS IN THE DEVELOPMENT OF COMMUNITY-OWNED RENEWABLES

- Community ownership can mean different things for different stakeholders: for some it may mean that all financial benefits from the project flow directly to community members, for others it may mean that key decisions are solely made by community members. The priorities for the vision of community ownership must be established early on to guide everything from the legal entity structure to the financing and investment sources to the host sites and anchors.
- If possible, shaping and refining the legal structure and business model for a community owned renewable energy project is best done as an iterative process in parallel with figuring out your financing options. One is likely to affect the other and therefore having an understanding of that interplay as the project concept develops is important and can save time later on.
- Sometimes practice follows policy and sometime policy follows practice. While the feasibility and form of community owned renewable projects are very much impacted by existing federal, state, and local policy, there is often room to work creatively within those frameworks and develop examples that demonstrate where and how policy should shift to support the value of these types of projects.

CURRENT REGULATORY TRENDS AND WHAT THEY SIGNAL ABOUT THE CHANGING ELECTRICITY INDUSTRY

Karl Rabago, PACE Energy and Climate Center

Last year, 91 distinct utility rate case proceedings were filed around the nation to increase fixed charges. Why? Utilities are struggling to find new ways to make revenue because the “old way” of making returns purely through large capital infrastructure investments is no longer working.

The traditional utility business model is based on two assumptions: customers will continue to demand more and more energy, and large, centralized plants are the best way to meet that demand. Today, we face a set of conditions that upend that traditional business model:

- Energy efficiency is pervasive, and building efficiency codes are getting more aggressive.
- Distributed generation is cost effective and are getting cheaper. Unlike centralized plants that get cheaper the bigger you build them, distributed and renewable technologies get cheaper the more we make them.
- Local resilience is a bonafide design criteria for energy systems. It has become salient to ask: “How do we survive the next hurricane?”
- Externality accounting (e.g. cost of carbon) is emerging as a legitimate practice.

KEY INSIGHTS ON REGULATORY TRENDS

- Higher demand charges could have a disproportionate impact on low-income households.
- Instead, incorporate low-income customers into a new revenue paradigm as part of the solution. As a starting point, the efficiency response and DR participation of low-income customers can be worth as much to the distribution grid (or more, depending on location) as from other customers.

Counter to the traditional utility growth model, many utilities are facing declining load factors (and can't justify large infrastructure purchases) with peakier loads and new resilient design criteria (that instead, justify investments at the distribution grid).

Raising demand charges is one response to a changing world: If you can't cover costs by charging per kWh, you could achieve revenues by charging per customer. But this isn't the only response utilities can take. Some innovators are using pilot demos to spot test alternate utility revenue models. And some states are considering entire regulatory transformations. In NY, Reforming the Energy Vision (REV) is introducing a performance based revenue model for utilities that incents utilities to focus on performance (e.g. reliability, safety and improved demand-side management) rather than growing their rate base.

LEVERAGING THE REAL ESTATE FINANCING ECOSYSTEM TO FUND ENERGY UPGRADES FOR MULTIFAMILY PROPERTIES

Ben Healey, Connecticut Green Bank

Multifamily property owners face uncertain returns for investing in energy efficiency relative to the risks and the transactional frictions and costs associated with such projects. For a typical property, an energy retrofit is expected to reduce total operating costs by a single-digit percentage. Investing in multifamily building energy retrofits also faces several barriers, including access to capital and alignment of incentives and capital refresh cycles. One key recommendation to address these barriers and increase investment in multifamily efficiency projects is to focus on long-term planning around refinancing and refresh cycles, which should allow energy projects to get integrated into broader building upgrades. Energy projects can certainly get done outside of the refresh cycle, but in those cases, a careful analysis of the existing property capital stack is needed, or structuring an off-balance sheet solution.

KEY INSIGHTS ON REAL ESTATE FINANCING

Standalone energy financing is much more challenging than integrating such projects into traditional real estate financing mechanisms

- Especially for affordable multifamily properties, complicated capital stacks make investing in energy projects a struggle.
- Property owners have broader building upkeep and asset valuation concerns, so energy upgrades should be packaged along with other capital improvements rather than “sold” solely on the basis of potential savings.

INTRODUCTION TO THE LEAN STARTUP INNOVATION

Clay Phillip, Crow's Nest Consulting

The “lean” startup innovation approach regards startups as businesses with a completely different set of needs and processes than their big-business counterparts. Unlike large operating businesses, startups are searching for a business model. Doing this effectively requires developing deep understanding of the ecosystem they are entering and the customer problems that needs to be solved. However, large businesses and organizations working on new innovation can apply lean startup innovation methods too. In order to expend fewer resources and make progress quickly, startups and large organizations practicing lean innovation should focus first on testing the problem via customer and stakeholder discovery, and then test possible solutions via the formation of minimum viable products and proofs-of-concepts, breaking down larger, complex problems into parts and iteratively testing for successes and failures. The validation and invalidation of hypotheses about problems, solutions, and product/service - market fit leads to a more robust and sustainable business model that is more attractive to investors and more likely to succeed in the market. This approach is especially relevant for the development of low-income business models, where the complexity of the challenge is high, the human capital is finite, and the financial capital is scarce.

IMPACT INVESTMENT: A LANDSCAPE REVIEW

Amir Kirkwood, Amalgamated Bank

Impact investing refers to investments into companies, organizations, and funds with the intention to generate a measurable, beneficial social or environmental impact alongside a financial return. The global impact investing market is projected to be \$70 billion in size, and is particularly relevant to the work of improving access to clean energy in LMI communities as it is a pool of funding that can't be accessed by many other companies. Most impact investors seek a return on their capital and establish metrics to evaluate both the financial performance and degree of environmental or social impact achieved by their portfolio companies.

LEVERAGING THE COMMUNITY REINVESTMENT ACT FOR RENEWABLE ENERGY AND ENERGY EFFICIENCY

Bruce Schlein, Citi

Before the Community Reinvestment Act (CRA) was enacted in 1977, banks were accepting deposits from LMI communities but not lending back out to them. The CRA attempted to change this pattern by requiring banks to meet the credit needs of communities in which they operate. Today, the CRA can be leveraged to facilitate investments in renewable energy and energy efficiency measures in LMI communities, as long as there is adequate demonstration that the financial benefits are passed through to LMI customers. As an example, multiple smaller community solar projects could together have the potential to access CRA investments, but only if 50% of subscribers for each project is LMI.

NET ZERO RETROFIT INITIATIVE FOR AFFORDABLE HOUSING

Greg Hale, Office of the Governor

To help New York State meet Governor Cuomo's goal of cutting greenhouse gas emissions by 80% by 2050, the New York State Energy Research and Development Authority (NYSERDA) is implementing the RetrofitNY Initiative to revolutionize the way existing buildings are retrofitted. RetrofitNY will catalyze the market through demand aggregation (of multifamily affordable housing units), partnership with forward thinking building owners

and industry players, and the development of financing and regulatory solutions. Within the next few months, RetrofitNY will release an RFP to launch a competitive prototype design process through which a number of selected industry solution provider teams (including architects, engineers, construction companies, manufacturers and other specialists) will work on specific prototype buildings to create impactful technical solutions for those buildings that will dramatically reduce their net energy usage and create more comfortable, healthier and better-looking environments for their residents. Aggregating affordable housing owners will focus their collective market power to influence the design and cost of retrofit solutions, specific to the affordable housing market. The goal is to achieve a large scale, self-sufficient (i.e., non-subsidized) net zero energy retrofit industry, which could represent an annual market opportunity of over \$1 billion in New York's affordable housing sector alone. If all goes well, the solutions that emerge from the design process will be implemented on the prototype buildings beginning next year.

WHAT IS THE UTILITY BUSINESS MODEL AND HOW DOES IT AFFECT LMI COMMUNITIES?

Josh Gould, ConEd

As regulated monopolies, utilities have an obligation to serve all paying customers, with however much energy they demand. The traditional utility model –where utility returns are earned on capital investments which traditionally exclude energy efficiency – can therefore disincentivize the utility from investing in energy efficiency measures for LMI residents. Bill credits to LMI customers can also disincentivize energy efficiency efforts and do not cover LMI customers who are not enrolled in government assistance programs. Progressive utilities are seeking ways in the short-term to serve LMI customers within the present regulatory landscape while simultaneously working to change policies and utilities' regulatory structure to incentivize energy conservation and better support for LMI customers in the long-term. ConEd's ongoing [LMI RFI](#) is seeking input from stakeholders in ConEd territory to co-create those approaches.

AGGREGATION OF COMMUNITY-OWNED ASSETS

Brendan Martin, Working World

Because infrastructural developments (i.e. farms, utility projects, businesses, homes) are built to generate profits for investors, capital and equity from these projects often flow to individuals and corporations rather than to the communities using them. What if clean energy infrastructure were owned by communities instead of profit-maximizing investors? Community-owned solar projects, for example, can achieve emissions reductions while economically empowering low-income communities. The key to implementing and scaling community-owned projects is group them into a portfolio to attract capital that would otherwise would be unavailable for small projects.

CLEAN ENERGY INCUBATORS & ACCELERATORS: A LANDSCAPE REVIEW

Beth Hartman, EPRI

Bringing clean energy technologies and businesses to market is uniquely challenging. In response, short-term “accelerator” programs and longer-term “incubator” programs have come to play a critical role in the clean energy startup ecosystem. Accelerators (days-to-months in duration) focus on “accelerating” existing concepts and businesses with resources (e.g. seed funding) and mentorship, often in exchange for equity or other benefits. Incubators (months-to-years in duration) focus on “incubating” disruptive ideas to concept and business with resources such as co-location and shared resources and equipment to allow for company and technology development. Unlike most clean energy business accelerator and incubators, e-Lab workshops including e-Lab Forge and e-Lab Accelerator foster early-stage ideation and problem-solving, generating

disruptive ideas for pilot. In addition, e-Lab programs emphasize multi-stakeholder perspectives in the co-creation of solutions. For example, at Forge, ideas are championed by teams, multiple collaborators interested in sharing their individual resources to bring a solution to market, and not individual entrepreneurs.

THE E-LAB CHANGE MODEL: HOW TO GROW AND NURTURE NETWORKS FOR CHANGE

Mark Silberg, RMI

RMI's Electricity Innovation Lab (e-Lab) is a network of thought leaders and decision makers focused on transitioning the US electricity system away from fossil fuels and towards efficiency, renewables, and distributed energy resources. e-Lab focuses on increasing the capacity of stakeholders to collaborate and test new concepts and methods for addressing critical regulatory, technical, and market barriers. Building trust is critical for stakeholders to work together in untraditional ways. This is especially true in the additionally complicated context of developing LMI-focused solutions. This learning session presented leading research on network management—how to build communities of practice for change, and offered real-world examples from e-Lab. In particular: what is a network, and how does it differ from other organizing and community-building? How do effective network leaders behave? What is their role? What are best practices? How do funders measure success? How do you communicate that success?

CUSTOMER ADOPTION: SCALING CLEAN ENERGY UPTAKE THROUGH PEOPLE-FIRST STRATEGIES

Rachel Gold, RMI

Many clean energy programs aren't fully subscribed, including some programs with rich incentives and good customer economics. This suggests that in a world where customers have choice about their energy consumption and production, classical economics may not be enough -- trust, information, access, sexiness, and other product characteristics may win the day. This challenging environment is driven by the nature of electricity and energy products; they're difficult to see, complex to explain, and have typically been sold as a commodity product by regulated, monopoly companies. Unsurprising then, that customer acquisition is often one of the largest "soft cost" categories for clean energy programs.

However, best practice programs around the nation -- those that successfully drive program uptake beyond a limited number of customers -- tend to feature three key factors:

- The program offerings and marketing are tailored based on an understanding of what customers want;
- Offerings are visible, leveraging social capital and social structures to make offerings a part of something that customers care about; and,
- Offerings are accessible, described in narrative language that is simple to understand and memorable.

With LMI clean energy programs, working with community based orgs is a promising way to design programs based on community member needs and feedback, to identify "champions" within the community who can help inform peers about existing programs and benefits.

DIFFERENT MODELS OF GRID ALTERNATIVES

Peter Mandelstam, GRID Alternatives

GRID Alternatives (GRID) has provided low-income households with solar energy in a number of different geographies, from California to the tri-state area. GRID has used a number of different funding sources to meet

the clean energy needs of low-income communities, including public funding, like Single-family Affordable Solar Housing (SASH) in California, grant funding (e.g. Wells Fargo), and donor funds. Volunteer and workforce training are key components of the GRID model, allowing for both job training as well as an opportunity to get financiers and decision-makers further invested in solar energy by participating in installations first-hand. GRID has completed more than 8800 systems including single-family, multi-family, and community solar projects across the United States.

NEW MOBILITY SOLUTIONS

James Newcomb, RMI

Electric cars, especially when combined with self-driving vehicles, may become more popular than personal internal combustion engine vehicles before 2020. At high penetration, electric vehicles (“EV”) on the grid may prove to serve as a grid asset similar to other distributed load-shifting services. To date, incentive structures and programs for EVs have catered primarily to higher-income early adopters, excluding lower-income communities. Through effective policy and carefully-structured financial incentives, various EV car shares and personal vehicles are beginning to enter LMI communities and multi-family garages, extending their market reach along with potential economic and environmental savings.

TEAM NOTES

COMMUNITY SOLAR PROJECT AGGREGATION FUND

PROBLEM STATEMENT

49% of U.S. households are unable to host solar PV systems due to either renter/landlord split incentives or unsuitable roof conditions. Community solar could make up half of all distributed solar resources country-wide by 2020, but only by developing new LMI community solar business models to overcome the various financial and regulatory barriers in place for this underserved market.

The Community Solar Project Aggregation Fund (the Fund) seeks to establish a pool of capital to finance community solar projects that have difficulty accessing capital, in order to extend traditional solar financing to LMI community projects. Current barriers to these projects include lack of upfront capital, smaller project size, and customers with perceived riskier credit profiles.

The Fund is initially focused on providing financing to enable LMI community solar projects in three markets: Massachusetts, Minnesota and New York.

TEAM MEMBERS

- Cooperative Energy Futures
- High Noon Advisors
- Hunt Green LLC
- Resonant Energy
- Solar Alliance Freedom
- Solar One
- Solstice
- Southern Tier Solar Works
- Working World

BUSINESS MODEL CONCEPT OVERVIEW

The Fund will create pools of capital from multiple investors to provide debt and tax equity to finance community solar projects that serve LMI communities. Initially, the Fund is targeting a \$25 million pilot; the Fund's size will expand after this initial trial period. By establishing key criteria for these projects, the Fund hopes to make the financing process easier for developers by having a pool of funders identified as interested in funding projects that meet stated underwriting/investment criteria. These criteria are meant to maximize LMI access within a conventionally structured project finance transaction. While the Fund recognizes an additional need for projects to access development funding in order to implement solar projects, the Fund will not be providing development funding as part of its scope.

The Fund will enable debt and equity financiers to invest in a pool of projects that meet their risk appetite. Different project "prototypes" can be developed based on predetermined investment criteria.

- **Debt:** All debt transactions will be handled by a fund manager to ensure that projects financed by the Fund meet the established underwriting criteria. The Fund will manage a pool of money that is lent out to various projects.
- **Equity:** The Fund is in the process of determining the most efficient way to allocate tax equity to the projects that the Fund would debt finance. One option is to pair a individual tax equity investor with a single project; another is to create a pool of tax equity monies that would invest in a number of projects.
- **Development:** Philanthropic and other granting organizations, including state and federal, will be approached to help fill the critical pre-development and operations stages of shared solar projects, which are essential to bring them to the finance stage.

WHAT ADVANCED AT FORGE?

- Identified design criteria for projects that the Fund would support, including the following options:
 - First and foremost, cooperative ownership models that emphasize participation and input from community members
 - A minimum carve-out of LMI subscribers for the project

- A minimum reduction of retail electricity prices for project subscribers
 - Alternative underwriting criteria to traditional methods
 - Aggregation of multiple projects within one financing structure
 - Rates and fees that result in reduced energy bills for LMI households.
 - Flexible early termination clauses for cooperative members
 - Close collaboration with community groups for site selection, education, awareness, and/or workforce development
- Identified a spectrum of community ownership models that balance project finance viability with community participation, and could be supported by the Fund. At one end of the spectrum, projects would enable full community equity ownership of assets. At the other end, projects would have a formal process to ensure community input into the planning process. Features of models that support varying degrees of community participation include:
 - Structuring the project as a co-op or coop-like entity that serves local community subscribers
 - The use of municipal, non-governmental, or community-based organizations as the nominal asset owners
 - Encouraging and soliciting community opinions and engagement on aspects of the community solar system
- Identified possible strategies for project risk-mitigation including:
 - Incorporating anchor sponsors (community-centered institutional offtakers) to reduce the perceived risk of LMI residential customer delinquency and defaults
 - Stocking waiting lists of participants to reduce the risk of revenue gaps
 - Incorporating credit enhancements or loan-loss reserves
- Created the initial architecture and design criteria for the Fund as a basis for developing grant proposals and securing funding for collaborators to create the Fund. Determined next steps, which include action items to further clarify the following questions:
 - At what stage should projects be when approaching the Fund for collaboration?
 - How will the Fund balance 'minimizing risk to attract private capital' and 'maximizing community benefit'?
 - Does the Fund play a role in providing technical assistance, pre-development funding, or bridge financing?



PROGRESS SINCE FORGE

- Members of the team are drafting a proposal outlining the overall structure of the Fund and how it will function. The proposal will be presented to the rest of the team for review and iteration.
- The team is setting up a governance structure to define the responsibilities and decision-making authority for the core team, the steering team, and specific working groups.
- The team is developing a fundraising strategy to secure the necessary capital to develop the initial infrastructure of the Fund and to get the Fund operational.

KEY INDUSTRY TAKEAWAYS

In the near future, the Fund could serve as a critical model for other renewable energy aggregation funds by:

- Increasing financier comfort with less-traditional projects, through structured risk mitigation strategies and alternative underwriting criteria.

- Enabling-low income communities to retain the majority ownership of the clean energy assets and associated benefits.
- Supporting a range of ownership models that incorporate community asset ownership, participation, and decision-making in varying degrees.
- Establishing clear criteria for community institution offtakers and project developer participation.
- Establishing clear criteria to determine whether or not a project is financeable by the Fund.
- Demonstrating to policy makers the parameters of what is needed to inclusively scale community shared solar programs.

REVITALIZE: HARNESSING REV FOR A JUST TRANSITION

REVitalize began as a partnership between NYSEERDA and NYC-EJA in 2015 to develop new sources of funding to support ground-up community energy planning. The partnership was established at the first meeting of Leap's NY Social Change Lab in June 2015 with the goal of creating community-generated, clean energy plans that bring economic and environmental justice to all members of the community. The initiative secured funding through philanthropic grants; PUSH Buffalo and UPROSE are two of the four partners being funded by these sources.

TEAM MEMBERS

- NYC-EJA
- The POINT CDC
- PUSH Buffalo
- Solar One
- UPROSE

PROBLEM STATEMENT

Across New York State, LMI communities are growing more interested in community equity ownership of solar and other renewable assets, in order to keep decision-making power within the community and ensure that benefits from projects flow directly to local households and businesses. Currently, low-income households and the community-based organizations who serve them face many barriers to owning solar assets. They often do not have the initial development funds required to plan and manage solar projects, meet the credit requirements to qualify for capital loans, or have the income or ability (in the case of non-profits) to benefit from tax credits. Few models exist today that overcome these barriers; communities who have identified equity ownership as an explicit goal are breaking new ground by creating and testing new models in different regulatory or community environments.

REVitalize: Harnessing New York's Reforming the Energy Vision ("REV") for a Just Transition is a coalition of projects advancing community shared ownership of solar. Two REVitalize projects, from PUSH Buffalo (PUSH) in Buffalo and UPROSE in Sunset Park, Brooklyn are developing models that enable their respective communities to own community-sited solar:

- **UPROSE**, an environmental justice organization in Sunset Park, Brooklyn, is partnering with the MTA to develop a 450 kW solar canopy on a local MTA parking lot. They seek to develop a set of ownership options that the community can collectively choose between, with a robust understanding of the tradeoffs between different legal and financial structures.
- **PUSH Buffalo** is currently developing a small solar project on the roof of School 77, a former school site in West Buffalo. To date, the project has secured a NYSEERDA grant and the verbal commitment of a tax equity investor to pay for the initial capital costs of the solar panels. The ownership agreement with the tax equity investor



has yet to be finalized. Traditionally, the tax equity investor holds 99% of the ownership for the first 7 years, in order to capture the full tax benefits. After that time, the ownership flips to the developer, in this case PUSH Buffalo. Given this typical arrangement, PUSH Buffalo seeks to develop:

- An ownership agreement that enables the community to retain major decision-making power even within the first seven years.
- A schematic for how ownership will transfer to the community after the flip, and a legal/financial understanding for how revenue streams will flow from the project to different stakeholders.

WHAT DOES “COMMUNITY OWNERSHIP” MEAN TO REVITALIZE PROJECTS?

“Community ownership” can mean different things to different communities. At Forge, participants supported the two REVitalize teams to clarify what community ownership could mean to their respective communities, and to define the outcomes they seek from community ownership of renewable assets. These discussions are prerequisite to the design of any functional ownership model that will meet the needs of communities.

For these teams, community ownership is defined as “*self-determination, where the community has the first and last say over what the values [of the project] are over time.*” This definition is to serve as core design criteria for any future financial and legal ownership structures.

Teams seek the following outcomes from community ownership:

- Control and governance over the solar asset
- Bill savings: reduced household energy expenditures compared to business as usual
- New revenue streams from potential profits, to support the local economy
- Local workforce support and training
- Increased energy resilience during climate and other events
- Assurance against shutoffs, especially for health and life-saving equipment
- An educated community with increased awareness around program options and potential community benefits and liabilities to enable participants to make informed decisions.

BUSINESS MODEL

UPROSE:

Community input and direction is one of the most important ingredients in UPROSE’s design process for the project. At Forge, UPROSE developed a “schematic” model to share with community stakeholders as a tool for discussing key components and potential trade-offs of any future revenue model. Based on those discussions, UPROSE can make updates to the schematic.

In this initial schematic:

- Funding for the system comes from a combination of a tax equity investor, a debt lender, and the NY SUN solar incentive. UPROSE is interested in exploring an agreement with a tax equity investor, provided an agreement can be reached that outlines clear ways for the community to provide input into critical decisions, even in the first years when the tax equity investor has 99% ownership.
- The MTA is willing to provide conditional site access for the array
- Owners will be primarily long-term low-income residents who receive the ability to vote and a share in profits in exchange for an ownership fee to the project LLC.
- At this point, UPROSE would prefer maximizing subscribers from low-income households in the community as well as local institutions (e.g. church, non-profits, businesses with long and strong neighborhood ties). To ensure community inclusion and benefits, an ideal institutional off-taker would have demonstrated connections to the community.

- UPROSE will discuss with community leadership the option for including other subscribers like businesses and higher-earner community members as a way to reduce risk profile of the project, and potentially to enable different subscriber rates (higher for non-low-income) to bring down the cost of participation for local households.

PUSH Buffalo:

Like Sunset Park, PUSH Buffalo aspires to create a solar project that both shares revenue streams with community members, and provides community members discounts from current energy expenditures. At Forge, the team discussed how to balance (i) optimizing profits with (ii) minimizing subscriber fees, and a framework for thinking about the two:

- **Subscribers** pay for the energy from the project (e.g. presumably less than what they typically pay for energy) and achieve reduced electricity bills. On one end of the spectrum, projects focused on maximizing savings to subscribers would focus on minimizing project costs, and streamlining profits to the asset owner in order to retain the majority of savings benefit to subscribers.
- **Owners** are equity partners and receive a share of any profits in exchange for a membership fee. On the other end of the spectrum, projects focused on maximizing profits would also focus on minimizing project costs, but may also pursue higher-income subscribers and corporates who can afford to pay higher energy prices, increase profits to community equity partners, and reduce perceived risk to investors.

There are cooperative models that exist (Coop Power, Cooperative Energy Futures) that serve participants who are both owners and subscribers. PUSH Buffalo's next steps include discussing with community members their priorities along this continuum and how open they are to including diverse subscribers of different income levels to improve revenue flows after the flip, as this could set precedence for future projects.

PUSH Buffalo also discussed a potential role for PUSH to create an LLC dedicated to developing and managing solar projects in the future, and a method for including community input into the creation of those projects. Given this aspiration, the team itemized key considerations that would guide a model for scaling:

- **Valuation of distributed energy resources:** NY State is currently undergoing a Value of DER proceeding that could transform how solar assets are valued and compensated for future generation. Given the uncertainty of compensation rules in the future, how can savings best be forecasted?
- **Legal structure:** What structure would enable PUSH Buffalo to continue to develop LLC projects down the line?
- **Mitigating risk to future investors:** The team identified a method of developing robust subscriber waitlists to reduce the perceived risk of interruptions to future revenue flows. Is the community open to incorporating non-LMI subscribers to reduce perceived project risk? What does that mix look like and how does it continue to preference benefits to LMI households?



WHAT WAS ADVANCED AT FORGE?

- Defined community ownership as **self-determination, when the community has the first and last say over what the values are over time.**
- UPROSE: Developed a schematic model as a foundation for near-term discussion and decision-making with community members.
- PUSH Buffalo: Developed a timeline of next steps to address key questions, including the option to include storage at the School 77 project, and the next steps for PUSH Buffalo to finalize the ownership agreement with the tax equity investor.

KEY INDUSTRY TAKEAWAYS

- Communities will have different definitions for what community ownership means for them. They may want to make the decisions around selection, location, and size of asset, identification of institutional offtaker, range of subscription offerings, and more. A lot of time is saved upfront when communities articulate what decisions are most important to them. (RMI is developing a framework for communities to discuss “ownership,” in order to speed the process for communities to develop their design criteria and increase awareness of existing ownership structures that meet different design criteria).
- Some communities may be reticent to engage with tax equity investors because of fear of ceding control and input into key project decisions, given 99% ownership upfront by the partner investor. At Forge, UPROSE discussed a model where the degree of community control over a project may flex over time to correlate with investor and community needs at different points in the project development and funding process. One possibility could be:
 - As the community forms an LLC, they have full agency (“self-determination”) over the by-laws and the terms it wishes to propose to investors.
 - During negotiations with potential investors, the community may choose to cede some decisions or cease negotiations, depending on whether the terms are acceptable.
 - During term of legal “99% ownership”, decision-making differentiated between investor and members per contract. After flip, all decisions return to members.

PROGRESS SINCE FORGE

- UPROSE has received executive decisions from the organization’s board on a series of questions related to project components and business model design based on the schematic generated at Forge. This schematic proved useful in identifying points where community input was required and articulated the tradeoffs between various project design commitments.
- UPROSE has been able to use the schematic generated at Forge to identify where in the model community input is required, and to articulate and communicate tradeoffs to stakeholders between various project design options. UPROSE has since received executive decisions from its board providing guidance on key project components and business model design going forward.

LONG ISLAND GREEN SOLAR EXCHANGE

PROBLEM STATEMENT:

Long Island has a relatively high number of residential solar installations in NY State as compared with other regions in the state, with over 24,428 systems installed (214.23 MW) as of 2016. However, few systems have been installed in LMI communities. *Solar Exchange* is a proposed online marketplace to provide equal access to clean and affordable energy among all customers in Long Island. Solar Exchange will manage the siting, financing, construction, subscription, and ongoing customer relations of community solar installations in markets with high electricity costs in order to streamline the project development and installation process, reduce costs, and enable the participation of LMI households. With a goal of dedicating at least 20% of subscriptions of each installation to LMI households, Solar Exchange hopes to improve access to renewable electricity and reduce electricity bills for LMI households.

TEAM MEMBERS

- Empower Solar
- Long Island Green
- The Nature Conservancy
- PSE&G

BUSINESS MODEL CONCEPT OVERVIEW:

As initially conceived at Forge, Solar Exchange will manage four main work streams to enable widespread and equitable adoption of community solar. Streamlining development and management processes will reduce costs

and simplify community solar participation for customers, while enabling LMI participation. Options for providing cheaper costs to LMI households include: reduced rates for defined LMI households; peer-to-peer funding assistance, where higher income customers help cover initial participation costs for LMI peers.

Solar Exchange will serve the following four functions:

1. Site Acquisition for Community Solar Arrays:

- Acquire sites such as large commercial rooftops, multiple rooftops within residential communities, schools, municipal buildings, non-profits, faith-based organizations, parking lots and open land. Individual sites must be large enough to accommodate 500kW solar arrays.
- Compensate site owners through lease/rent, shared power, or other financial arrangements.
- Maximize the value to the community and minimize acquisition cost, by targeting certain types of sites.

Solar Exchange is uniquely qualified to conduct site acquisition, given their pre-existing relationships with community stakeholders.

2. Project Management of Community Solar Installations

- Manage all aspects of design, permitting and construction of the solar installations.
- Streamline all aspects of project management to decrease the costs of the solar systems, and thus lower the energy bills of those subscribed to the community solar system.

Solar Exchange's team includes Empower Solar, a solar developer who has been operating in Long Island for over a decade, a regulatory expert who is well versed in NY state regulation, and several other renewable energy professionals.

3. Solar Exchange Marketplace

- Provide a cloud-based management platform that enables interested customers (both residential and small commercial) to access community shared solar installations.
- Enable customer subscription, accounting, and other customer service functions via the platform.

4. On-Going System Support

- Monitor all solar assets in its portfolio to ensure solar production targets are met and the system is performing as designed.

WHAT ADVANCED AT FORGE?

- Determined the top activities of the Solar Exchange, and the value proposition to future customers.
- Identified specific stakeholders for Solar Exchange to engage, and scoped initial exchange/proposal to those stakeholders.
- Categorized potential host sites and preliminarily determined the host site needs and the ways Solar Exchange could meet those needs.
- Prioritized next steps to get the Solar Exchange Marketplace up and running, including action items for addressing the following key questions:
 - What are the best sources for initial seed funding? What will be the host site acquisition strategy?
 - What will the marketing strategy look like for host sites and off-takers?



PROGRESS SINCE FORGE

- Solar Exchange has been incorporated, and the company is being staffed.

- The team has begun developing a business plan and determining their operational strategy.
- The team has had promising, preliminary conversations with potential funders for funding both their projects and the company.
- The first project site was selected in Section 8 housing in Eastern Long Island, and it is currently in the design phase.

KEY INDUSTRY TAKEAWAYS

1. In order to serve LMI populations in Long Island, initial community solar installations may provide energy to both “market rate” residential customers or small commercial anchor tenants as well as LMI to decrease the overall perceived risk of the portfolio and attract financing partners. Projects can be structured to “make the case” for serving a greater number of LMI customers in subsequent phases.
2. Additional funding streams, such as impact investments, could be available to companies who are mission driven to serve LMI communities. By mixing combining LMI communities with market-rate customers, projects are able to tap into these additional funding streams while ensuring they have a customer mix that meets traditional financiers’ standards.
3. A customer portal that streamlines solar offerings, inclusive of billing, and simplifies the process for the customers can increase access for traditionally hard-to-reach market segments.
4. Different types of host sites will require tailored offerings; a solar project built on a school will have different needs than a solar project on a parking lot, for example.



CLEAN ENERGY IN AFFORDABLE MULTIFAMILY BUILDINGS

PROBLEM STATEMENT

Energy efficiency projects are often implemented separately from solar PV projects, and storage projects, and even demand response upgrades. When thinking about scaling DERs broadly, planning and installing projects one DER at a time leads to major missed opportunities including:

- Optimally sizing PV arrays and storage for energy loads that have received efficiency upgrades.
- Simplifying customer engagement by approaching customers with integrated EE + Solar PV DER packages.
- Streamlining audits, design, and installation across multiple DERs.

These lost opportunities are especially grave for low income households and affordable housing providers, who stand to benefit the most from “right-sized” solutions and costs.

This partnership between GRID Alternatives (GRID) and Association for Energy Affordability (AEA), seeks to scale combined efficiency + solar (and possibly storage) projects to affordable multifamily buildings in New York City to deliver the following benefits:

TEAM MEMBERS

- Association for Energy Affordability
- Interstate Renewable Energy Council

- Greater energy and financial savings to low-income households and providers of affordable housing from integrated project offerings.
- Access to third party capital for project financing.
- Health benefits and greater comfort to households from higher performance housing.
- Job training for LMI community members through training in installation and maintenance of clean energy and energy efficiency equipment.

BUSINESS MODEL

At Forge, Clean Energy in Affordable Multifamily Buildings discussed three important additions to traditional solar and efficiency delivery models for multi-family housing:

1. *Aggregates multiple projects into a single pipeline:* By aggregating efficiency and solar projects across multiple buildings and portfolios of buildings into a single pipeline, the project seeks to:
 - a. Achieve economies of scale through reduced cost of delivery.
 - b. Incent the participation of financiers who would otherwise be deterred by small project size and deal complexity.

Buildings and customers will be grouped together into projects based on criteria such as project size, type of utility billing structures, and building ownership.

2. *Standardizes efficiency and solar projects:* By pre-screening buildings and providing standard offerings with preselected efficiency measures and solar product options, the Project seeks to simplify the customer experience while streamlining design, permitting, and construction mobilization costs.
3. *Leverages existing partner network:* By leveraging AEA's extensive network of property portfolio managers in NYC, AEA and GRID can market to and vet promising leads for project enrollment. In addition, GRID Alternatives maintains an active pipeline of solar projects and partners, which serve as additional opportunities for project origination.

At Forge, the Project developed a framework for developing standardized solar and EE offerings for a particular building or set of buildings. Using simplified data inputs such as the number of residents, the building type, size of the rooftop, financial mechanisms and other project characteristics, the framework would generate a set of standard provisions and other product options. This detailed information would then be given to providers so that they could initiate project development, preferably with already identified financial partners.



WHAT ADVANCED AT FORGE?

- Defined the potential benefits of this business model to an array of stakeholders:
 - **Building residents:** A simple and easy-to-understand offering that delivers increased cost savings, and other pass-through benefits, due to lower cost achieved by economies of scale.
 - **Affordable Housing providers:** Lower cost of EE + solar installation, streamlined process and access to capital.
 - **Financiers:** Larger pool of projects that support greater return on investment, lower incremental cost of due diligence, contracting, and reduction of risk through a portfolio approach.
- Developed a framework for segmenting NYC multi-family buildings into different customer types to target, including:
 - Owners, by property type and ownership structure
 - Renters, including master-metered, direct-metered, sub-metered

- Determined the team should explore whether behind the meter or community solar would deliver greater financial benefits from solar to housing providers and residents: In a community solar project, multifamily buildings could lease their rooftops to community solar projects. Benefits could come from lease income (with off-site market-rate subscribers), and/or from participating in the project as subscribers. In order to test this hypothesis, the team discussed the need for:
 - Further comparative analysis and financial modeling for both rooftop “export” and rooftop behind-the-meter approaches
 - A pilot with a set of master-metered multi-family buildings
 - A pilot with multi-family buildings active in demand response programs
- The team itemized key questions to address through initial testing with target stakeholders, including:
 - Methods for mitigating and defining credit risk.
 - Different roof-leasing models, including variable rates based on location and other factors.
 - Methods for quickly and cheaply identifying viable rooftop sites.
 - Appetite for building owners to standardize solar agreements that offer solar energy to offtakers on a must-take basis.
 - Criteria for financiers to finance different product offerings.

KEY INDUSTRY TAKEAWAYS

- Standardizing offerings are vital and near indispensable for attracting financiers and scaling DERs across multiple building sites. Despite the many nuanced differences among multifamily buildings in New York, it is important to determine standardized offerings based on defined characteristics (e.g., building and customer type, ownership, and financial criteria) to support the aggregation of projects into broader pipelines and deploy at scale. Financiers will be more willing to fund a portfolio of standardized projects than a collection of retrofits and solar installations for unique buildings. Service providers will benefit from lower cost customer acquisition with pre-packaged technical offerings.
- Under business as usual, solar and EE are financed separately for multiple reasons:
 - Solar companies typically try to minimize interaction with homeowners in order to save costs. Tailored energy efficiency evaluation and implementation is by nature more time-consuming and requires more customer involvement.
 - Solar and efficiency are often provided by different companies which have not been integrated; each company tends to bring its own financing to the table.
 - The revenue stream for solar is seen as more forecastable and financeable. For a given size panel and roof, a financier can easily estimate the projected revenue given weather data and solar valuation. Efficiency includes many different options with different outcomes in terms of energy reduction. Further, these energy savings may rely on behavioral changes. Financiers may not have the same level of comfort with efficiency as they do solar, and fewer financiers will participate, meaning there’s little competition bidding pricing down. With perceived risk, pricing will also be higher to compensate for that risk.
 - The market value for efficiency and solar differs. The value of solar can be easily quantified via avoided cost or state-authorized compensation mechanisms (“value of DER”). EE does not have an equivalent market, and financiers see a layer of complexity in capturing the financial benefit of



- EE. In EE financing, the lenders' repayment is tied to energy savings -- that is, the savings differential between actual energy consumption and the expected baseline.
- The financing approaches for solar and EE also differ because of the outsized role that tax equity and the ITC currently plays in solar projects. Since EE projects cannot benefit from ITC, a different financing approach (and, therefore, different financial players) may be necessary. The Community Reinvestment Act ("CRA") may provide a mechanism for energy efficiency financial support. CRA can also be claimed in certain solar projects.
 - While traditional behind-the-meter solar could bring benefits to LMI tenants, other business models could offer greater or different financial benefits to LMI tenants. Leasing multifamily building rooftops for community solar projects with some or all energy sold to off-site customers, for example, might actually provide greater pass-through benefits to tenants. These models should be tested to maximize benefits to LMI communities.
 - Initially, advancing this business concept will require leveraging existing EE and solar programs and customer networks to establish pilot projects. Success in these initial projects will unlock the potential for scaling by demonstrating financial viability and social impact to financiers and other key stakeholders.

