Solar Market Pathways
Final Report

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Executive Summary

The Solar Market Pathways program supported the development of successful and replicable solar deployment plans and strategies, and inspired and helped others across the country initiate or improve their own solar strategies based on lessons learned and promising practices. This report shares how the Institute for Sustainable Communities (ISC), as the national coordinator, created and fostered a strong peer network that enabled the transfer of ideas, peer support, and lessons learned between Solar Market Pathways projects. This network accelerated learning and allowed awardees to advance their innovations—building on each other's successes and mistakes, and effectively streamlining resource use.

Within this report, we document the project results and impacts of Solar Market Pathways, which are broad reaching and include jumpstarting the community solar market in the Chicago region, creating comprehensive deployment plans in nascent markets in Duluth and Utah, facilitating regional market development in the northeast, and using solar+storage to build community resilience in cities like New York and San Francisco.

ISC created a curated program website, solarmarketpathways.org, that features the best tools and resources developed through Solar Market Pathways, as well as top resources from others in the field. It shares case studies that carefully document each project's three-year journey—lessons learned, key takeaways, and tools to help others replicate these successes in their own communities. It also features the following six key innovation areas, which ISC identified and developed over the course of the project.

1. Building Resilience with Solar+Storage
2. Catalyzing Community Solar
3. Expanding Engagement and Participation
4. Growing Nascent Markets
5. Increasing Higher Education Investment Potential
6. Working with Utilities

This report documents ISC's targeted replication strategy focused on resilient solar, community solar, and collaborative procurement, which helped others across the country accelerate their efforts to deploy solar. We detail our dissemination of Solar Market Pathways products and experiences that reached an estimated 10,000 solar stakeholders across the country. We also include the challenges and lessons learned related to replicating approaches in real time and with a broad cohort of projects.

The tools and strategies developed through the program are replicable models for communities and new markets across the U.S. to reduce costs and increase the affordability and accessibility of solar. Moving forward, ISC continues to work with communities across the U.S. to advance a sustainable energy future, the important findings of this work will shape and inform our efforts.

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Background

The Solar Market Pathways program, led by the Institute for Sustainable Communities (ISC) sought to create tools, strategies, and approaches that cut across a range of market challenges and deployment barriers for solar energy. The 14 Solar Market Pathways projects took place across different geographies, within a wide range of regulatory frameworks and markets—from the advanced California market to emerging markets in Vermont and Illinois and the nascent markets of Utah and Virginia. While some projects were focused on advancing solar deployment in particular places, others built out strategies or approaches applicable across geographies.

SOLAR COST AND DEPLOYMENT TRENDS

The goal of all 14 Solar Market Pathways projects was to accelerate solar deployment and reduce costs. Nationally, solar has been the fastest growing source of new electricity in the U.S. since 2014. In five years alone, the cost of solar has decreased 60% and there are now more jobs in solar energy than in coal. In 2011, the U.S. Department of Energy (DOE) launched SunShot goals to drive innovation and make solar energy cost competitive with traditional energy sources by 2020 (U.S. Department of Energy 2016). In September 2017, DOE announced that the solar industry had achieved the department's 2020 utility-scale solar cost target three years ahead of schedule, making it easier and more affordable for Americans to power their lives with solar (U.S. Department of Energy 2017).

While the hard costs of solar are declining quickly with technological innovations, soft costs still make up a significant portion of the costs to deploy solar, accounting for nearly 64% of the installed system cost (U.S. Department of Energy, n.d.). Soft costs include expenses such as customer acquisition expenses, permitting and interconnection fees, and installation labor. These expenses are included in the overall cost a customer pays for solar and can create barriers to solar access.

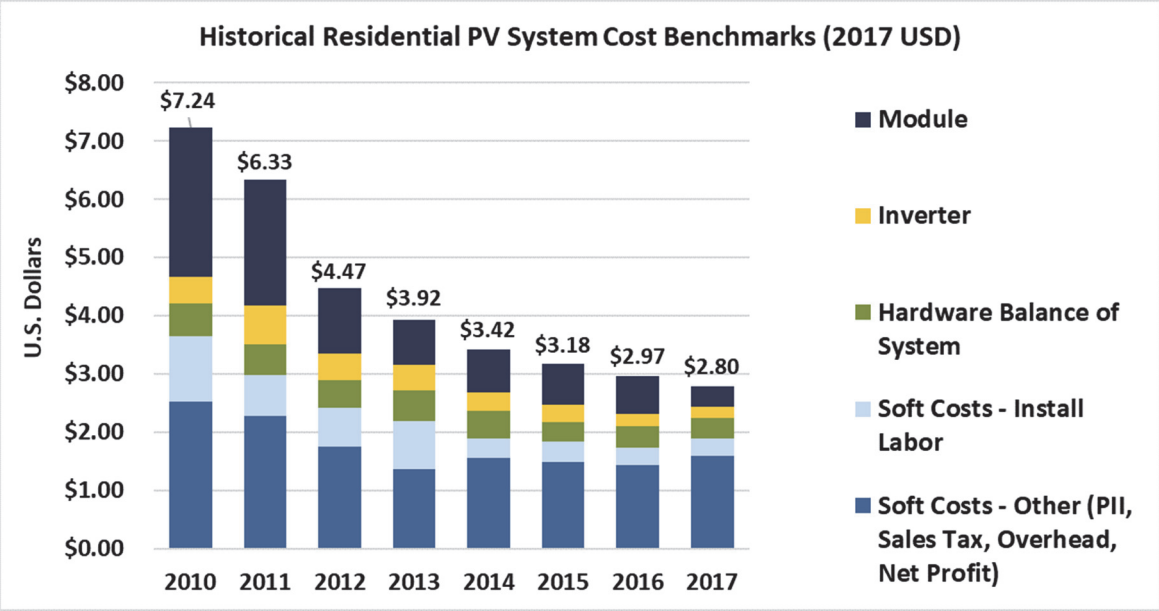

Figure 1. Cost trends for solar hardware and soft costs. Solar Tribune. "*Innovations Spur Era of Rapidly Declining Solar Costs.*" https://solartribune.com/residential-solar-cost-trends/

Solar Market Pathways projects set out to tackle soft cost challenges. Each Solar Market Pathways project provided a tailored, yet highly replicable approach to overcome identified soft cost barriers, and the evidence of their impact on markets will be pronounced over time as these markets continue to mature. No longer purely technical or economic in nature, the extant challenges to widespread solar market growth are more cultural, educational, and political. The notion that soft cost issues will resolve themselves as markets grow is unfounded – these entrenched challenges are precisely what impair markets from becoming mature and require a more nuanced approach to overcome.

PEER NETWORKING: ACCELERATING REPLICATION, TRANSFER, AND SCALE

A unique aspect of the Solar Market Pathways programmatic design was that it sought to support 14 projects and to create replicable models and scaleable results. DOE selected projects that would create replicable tools and approaches, and Solar Market Pathways connected those projects through a learning network that facilitated the transfer of knowledge, ideas, and information. This network was overseen by a national coordinator tasked with accelerating knowledge sharing within and beyond the network. These types of learning communities provide a powerful platform for both individuals and projects to share experiences, leverage resources, and combine forces to drive collective change. ISC used a suite of best practices, as identified by the nonprofit organization Grantmakers for Effective Organizations, for peer learning and network building that included in-person workshops, virtual affinity groups, an online peer-sharing platform, and staff devoted to serving key network "backbone" functions.

SOLAR MARKET PATHWAYS INNOVATION AREAS

The 14 Solar Market Pathways projects addressed key issues facing the clean energy field and worked to expand access to solar by developing new tools, replicable plans, and promising practices. Over the three-year journey, ISC identified project themes and created six areas of innovation the projects were working across. These innovation areas are featured on the Solar Market Pathways website and house curated tools and resources that help others replicate successes in their own communities.

Building Resilience with Solar+Storage: As the cost of energy storage is decreasing, there are increasing opportunities to couple solar with battery storage to improve disaster preparedness and emergency operations. This technology creates additional value for system owners, communities, and the grid. While storage technology has improved in reliability, affordability, and availability, there continue to be many barriers to increasing storage deployment, such as permitting, interconnection, financing, and project development. At the outset of Solar Market Pathways, there were limited solar+storage model projects and programs, educational resources, permitting guides, and project design tools. Projects in New York, San Francisco, Salt Lake City, and Duluth have all significantly contributed to catalyzing solar+storage.

Catalyzing Community Solar: Community solar is a relatively new concept and a promising mechanism for expanding access to solar energy, giving customers alternative pathways to access solar by enabling them to share solar generation from an on- or off-site solar energy system with multiple end users. While the number of community solar programs across the country has grown, there remains enormous potential to expand, improve, and replicate these programs nationwide. Solar Market Pathways projects worked to develop and implement programs in markets that had not previously had community solar, identify best practices and consumer preferences to improve existing program models, and to expand and improve utility-administered community solar programs.

Expanding Engagement and Participation: Solar energy has long been considered out of reach for many residents in the U.S. However, costs have fallen and new business and financing models have emerged to better serve low-income households and multi-family and rental housing markets. Engaging with different market segments requires a targeted approach and an understanding of the specific barriers—legislative, financial, educational, or cultural—that need to be addressed. Solar Market Pathways projects worked to create and refine business models to better serve low- and moderate-income households, develop stakeholder-driven plans to accelerate solar deployment in communities, and reach and engage new stakeholder groups, such as housing organizations, emergency managers, and social service providers.

Growing Nascent Markets: While solar markets are booming across the U.S., there are communities, states, and regions that have not yet experienced much—if any—solar deployment to date. These nascent markets are often in the early stages of evaluating and adopting policies, programs, and tools to attract solar development and overcome barriers to uptake. Several Solar Market Pathways teams pioneered market improvements to increase solar adoption in nascent markets by analyzing and responding to market barriers and opportunities, demonstrating the potential of solar through groundbreaking pilot projects, spurring local solar demand, and supporting the solar workforce.

Increasing Higher Education Investment Potential: In the U.S., colleges and universities—which account for billions of dollars of investment nationally—are well positioned to invest substantially in solar projects due to their unique combination of power consumption, land ownership, finance capacity, and commitment to education. For these institutions, solar offers a pathway to advance campus sustainability goals, achieve energy independence and price stability, and realize a return on investment. Solar installation also offers important educational and research opportunities for students and faculty. Several Solar Market Pathways projects worked to coordinate collaborative procurement programs that pool the purchasing power of large institutions; engage students in project design; develop ongoing renewable energy curricula and research opportunities to attract and engage students, faculty, and staff; and encourage the adoption of university board and local community policies that enable solar deployment.

Working with Utilities to Advance Solar: As solar deployment grows, the economic impact on utilities and the challenges they face in managing the grid also increase. This makes it increasingly important for solar advocates and developers to understand those effects and challenges to be able to work collaboratively with utilities to find equitable and practical solutions. Solar Market Pathways projects made progress toward that goal by developing comprehensive strategies to integrate solar into a utility's electricity supply, creating and refining utility-based community solar models, and promoting best practices and greater consistency in utility interconnection policies and procedures.

Introduction

The goal of Solar Market Pathways was to support the development of successful and replicable solar deployment plans and strategies, and to inspire and help others across the country to initiate or improve their own solar strategies. ISC advanced this goal as the national coordinator for the program by: 1) supporting all 14 projects through a mix of technical assistance, peer-learning/networking services, and knowledge products; and 2) synthesizing, sharing out, and promoting replication of the promising practices.

OUR APPROACH

ISC served as the Solar Market Pathways national coordinator, working closely with our partners, Regulatory Assistance Project (RAP) and Interstate Renewable Energy Council (IREC). We also engaged the National Renewable Energy Laboratory as part of the technical assistance team, and the Clean Energy Group and Paulos Analysis to support dissemination and replication activities. The national coordinator team was responsible for managing the technical assistance (TA) program, maintaining the Solar Market Pathways website, hosting a virtual networking platform, organizing annual peer learning workshops, and implementing dissemination and replication strategies.

As further described in the Project Results and Discussion section of this report, our approach as national coordinator strengthened individual projects; assisted them in overcoming barriers and finding solutions; fostered productive peer connections that improved the outcomes of individual projects and the program as a whole; and focused on strategic dissemination and replication efforts to ensure that the resources, tools, and lessons learned are delivered and contextualized to have the greatest impact and ultimately inspire replication and scale.

The work of the national coordinator was organized as five tasks, summarized below. Additional details on the accomplishments under each task is provided in the next section of this report (Project Results and Discussion).

Task 1. Initiate Network

During the first six months of the project, ISC developed a case management system to track technical assistance, created an online peer-learning site on Basecamp, and initiated relationships with the 14 projects. ISC conducted needs-wants assessments with each project team to inform initial activities and the design of the network. We also established our systems of communication, including a quarterly call for the Solar

Market Pathways coordinating team, which comprised DOE and all principal investigators.

This initial phase involved commencing the projects and forming a network with the 14 awardees. ISC fully mobilized our internal team including our program director and program officer and established all administrative systems, completing a comprehensive assessment of awardee needs and wants, and establishing the communication and collaboration platforms to support the network. We also implemented a case management system to track project goals, progress, and best practices.

Task 2. Build Learning Network

The goal of this task was to establish strong communication among the projects, ISC, and DOE. In order to achieve this, ISC hosted the first annual Solar Market Pathways peer learning workshop, developed and disseminated project profiles, created three affinity groups, and built out the Basecamp platform to provide space for the various kinds of discussions and information exchange across the network.

Task 3. Support Network

This task focused on sustaining the network, maintaining and expanding Basecamp, supporting regular affinity group meetings, responding to technical assistance requests, and holding our second and third annual peer learning workshops.

As projects began to generate products and results, ISC developed a communications plan designed to share these resources and experiences with the most relevant audiences. Working closely with our partners, we identified priority conferences, meetings, and audiences to engage in. We strategically used our respective networks to disseminate Solar Market Pathways promising practices and lessons learned. As part of this task, ISC completed a meta-analysis of replication opportunities across the 14 projects in collaboration with our partners at DOE. We identified the priority replication areas and audiences and designed a set of activities to advance each area.

Task 4. Promote Replication and Plan for the Future

Building from the results of the meta-analysis, ISC and our partners developed a plan to promote the replication of three Solar Market Pathways priority practices (see Appendix 2). We continued to implement our communications plan and spent the third year focusing on dissemination of results, producing publications, presenting at conferences, and leveraging our networks to elevate the work of the Solar Market Pathways awardees.

Task 5. Project Management

This task continued through the full life of the project and included overall management and administration of tasks and timelines—including the management of staff, subcontractors, reporting, and financial systems—to ensure the workplan was executed with excellence and in support of project goals and objectives.

ISC met the following go/no go criteria at the end of 2015 and 2016:

- **BP1.GNG1** – Learning Network has been created, Topic A awardees are engaged in, and deriving discernible value from, the Network.

  Criteria Met: All awardees have contributed some content to the communications and collaboration platform; at least three affinity groups have formed and met at least two times; feedback following Leadership Academy demonstrates that at least 75% of attendees learned new information or made new connections through the workshop; and feedback from TA engagements includes specific examples of how the support benefitted the awardee/project.

- **BP2.GNG1** – Learning Network is providing significant value for participants; models and best practices are captured and are being disseminated effectively through multiple channels.

  Criteria Met: Awardee participation in the Learning Network, including the communication and collaboration platform, affinity groups, and Leadership Academies, has increased in year two; feedback following workshops demonstrates that at least 75% of attendees learned new information or made new connections through the workshop; feedback from TA engagements includes specific examples of how the support benefitted the awardee/project; Solar Market Pathways lessons and best practices have been disseminated to the broader solar community through at least five different outreach channels/outlets.

Project Results and Discussion

Through Solar Market Pathways, 14 projects worked for more than three years on innovative approaches to accelerate solar deployment and drive down soft costs. ISC supported and strengthened these efforts while simultaneously broadening and deepening their impact.

STRENGTHENING PROJECTS AND OVERCOMING BARRIERS

Fundamental to reaching the goals for Solar Market Pathways was ensuring that the 14 projects were technically sound and served as robust models for replication.

To help awardees overcome barriers as they encountered them, ISC developed a flexible technical assistance (TA) program designed to be responsive to the needs of the projects. We completed 36 TA requests, including financial modeling, GIS modeling, tool development, workshops, and legal support (for complete list of TA engagements, see Appendix 1). This TA filled clearly identified gaps for the projects and furthered the awardees' understanding and/or technical expertise on a wide array of relevant solar issues, such as:

- Interconnection best practices (Wasatch Solar Project and Northeast Solar Energy Market Coalition)
- Solar valuation and rate design methodologies (Wasatch Solar Project and Vermont Energy Investment Corporation)
- Financial tools and new financial models for underserved markets (Center for Sustainable Energy, Cook County, the Council of Independent Colleges in Virginia, the Midwest Renewable Energy Association, and CivicPACE)
- Solar mapping and market potential assessments (Cook County and Ecolibrium3)
- Intersection of solar with local fire codes, building codes, permitting, and zoning (San Francisco and the City University of New York's Sustainable CUNY)

Each of the TA final products were made available to all awardees through the network to ensure learnings and insights were shared across the program. In several cases the results of TA engagements were adapted to become stand-alone products valuable to a broad audience.

***Box 1*. Examples of Completed TA Engagements**

IREC developed and published Priority Considerations for Interconnection Standards based on a memorandum they created for the Wasatch Solar Project. Prior to the TA, numerous solar projects in Utah were facing major delays, costly upgrades, and the solar market was suffering. IREC's in-depth analysis of Utah's interconnection processes, as well as its ability to facilitate healthy dialogue on technical issues between the utility engineers and the Wasatch Solar Project, led to the identification of some immediate next steps to address the delays and costs Utah had been encountering. These next steps are helping to ensure long-term market growth in Utah, while addressing the near-term growing pains.
In the early stages of their project, the Council of Independent Colleges in Virginia (CICV) wanted to assess the likely impacts of a tariff proposed by the Appalachian Power Company on solar project economics for CICV member colleges, and to compare the proposal to national best practices and principles for fairness in utility tariffs. CICV also requested a technical report outlining the impact of rate design on solar project economics for CICV members located in Virginia utility territories with high demand rate structures. With assistance from the Regulatory Assistance Project, the CICV team was better able to understand the profound impacts that net metering tariffs and retail rate design can have on the economic feasibility of customer-installed solar projects. The best and standard practices from other parts of the country equipped CICV and its members to better participate in rate design discussions with their utilities or with utility regulators. This assistance also influenced CICV's later decision to include energy storage as an option in its request for proposals for solar procurement.
In June 2017, the Community Solar Value Project (CSVP) team hosted the Utility Forum in Colorado, which brought together representatives from 30 utilities from across the country, solar developers, community organizations, and nonprofits to discuss topics such as community solar pricing, procurement, storage, and outsourced vs. in-house program design. Regulatory Assistance Project helped the CSVP project team plan and execute on this forum, which is one of CSVP's most meaningful industry engagements and a top Solar Market Pathways accomplishment. The forum exposed utilities interested in community solar to the CSVP's project outcomes and facilitated a dialogue and sharing of successful practices on how to incorporate solar+storage and demand response strategies into utility-owned community solar programs. RAP's assistance contributed to the success of the forum, helping shape the agenda, increase attendance, and extend its resources, allowing for more breakout groups and more interaction among attendees.

In addition to technical assistance, the national coordinator team also worked to strengthen and support projects through a variety of capacity-building programs. This

included annual peer learning workshops that provided an opportunity for the awardees to learn from national experts, receive additional technical assistance, and gain in-person insights on promising practices and lessons learned from their peers. In post-workshop surveys, awardees reported that these workshops exposed them to new ideas and information that helped move their projects forward, that the workshops helped them collaborate with their team "extremely well" or "very well," and that their experience at the workshops enhanced collaboration and coordination back at home. Qualitative feedback included:

- "This was one of the best opportunities to collaborate with groups working on similar initiatives that I have been a part of."
- "My teammate and I came up with a very concrete plan of action that emerged as a 'lightbulb' moment—something we should work on now so that our target trainee audience will be adequately prepared for continued/advanced training 6-12 months down the line."
- "The workshop helped me crystallize some ideas that had been 'simmering' previously. An indirect benefit is that I learned a lot of information/ideas that I believe will be very helpful and informative for my colleagues at my office who are involved in other (non-Solar Market Pathways) projects."

Each annual workshop offered a technical clinic designed to help the teams think strategically about their projects. The first year's clinic focused on program design and established a strong theory of change, the second year on communications, and the third year on strategic planning for implementation beyond the grant period.

Box 2. **Peer Learning Workshop Impacts**

The final peer learning workshop in 2017 focused on maintaining momentum beyond the award period, sharing Solar Market Pathways lessons learned work to a broader audience, and inspiring replication of best practices. Awardees developed strategies to maximize the positive impact of their Solar Market Pathways projects and identified how, as a network, we could leverage the full power of the Solar Market Pathways community to achieve greater impact. For example, the Cook County team reported, "These strategy opportunities away from the day-to-day and in the context of this intensive thinking are extremely helpful and they gave us a few new goals to implement in these last months," including creating a communication and dissemination plan, and establishing a network of local leaders to advance community solar.

The annual workshops connected Solar Market Pathways awardees to national experts in ways that had tangible benefits for their projects. It allowed awardees to vet and improve tools and resources for use in their markets. For example, connections made with Energy Sage and the Center for Sustainable Energy were instrumental in facilitating a new online solar matchmaking forum for multifamily solar in California; GTM Research provided peer review and feedback on Cook County's community solar valuation tool; and Wasatch Solar Project was able to tap into rate design and

economics expertise with Synapse Economics to inform state solar valuation discussions.

The national coordinator team also offered webinars to the awardees on topics identified as common challenges across the group. Topics covered stakeholder engagement, communications and storytelling, battery and fire safety, and shared solar model rules. All webinars were recorded and shared with the network for future reference.

FOSTERING PRODUCTIVE PEER CONNECTIONS

A productive peer learning network creates meaningful connections among participants and across teams; facilitates the transfer of information, ideas, and resources; helps reduce redundancy and “leapfrogs” participants over pitfalls; and results in shared learning and products. Through a combination of virtual and in-person peer networking services, ISC was able to create a highly effective peer learning network that achieved these outcomes.

The first step in establishing a successful peer learning network was a needs-wants assessment process, which we conducted in the spring of 2015. This process helped identify the essential needs of the awardees and informed the set of networking tools and services the national coordinator team would provide the projects. As a result of this process, ISC affirmed the need to build an online networking platform, to hold regular quarterly all-awardee calls, and to establish smaller affinity groups. This set of practices established opportunities to learn and connect across the whole Solar Market Pathways program while also enabling more topic-specific learning.

Informed by the findings of the needs-wants assessment, ISC established three affinity groups to help connect projects working on similar issues. The national coordinator team led the groups based on shared topical areas across awardees: 1) Resilient Solar, 2) Community Solar, and 3) Solar for Colleges and Universities. The affinity groups provided a forum for Solar Market Pathways awardees and their partners to discuss common challenges, share potential solutions, and exchange results and lessons learned. The groups met virtually and in-person at the annual workshops. The topics

they addressed became the foundation for much of the dissemination and replication work intended to amplify the awardees' accomplishments.

The Solar Market Pathways Basecamp site provided a platform that enabled awardees to share insights from their work, identify common challenges, and brainstorm solutions. This online peer networking platform was instrumental in delivering outcomes for the network by providing a central location where all project teams could communicate with each other. Through the life of the project, over 250 members made nearly 800 posts, asking questions and sharing project deliverables, helpful resources, event announcements, and other information between quarterly check-in calls and annual in-person meetings.

Box 3. Peer Learning Examples

The connections built through the network fostered collaboration between the awardees. Sustainable CUNY worked together with the City and County of San Francisco to adapt the solarresilient.org critical loads calculator so it would work on the NY Solar Roadmap website. This saved Sustainable CUNY the time and effort of creating a new calculator from scratch. The calculator now works to calculate critical equipment sizing for solar+storage on critical infrastructure in both San Francisco and New York.
The Smart Electric Power Association's community solar consumer preferences and program design research informed Dominion Energy Virginia's utility strategy by providing examples of successful utility-run community solar programs from across the country and insight into what consumers are looking for when contemplating participating in a community solar program.
Council of Independent Colleges in Virginia utilized Midwest Renewable Energy Association's models of student engagement, including lesson plans and curriculum as well as hands-on training projects at annual faculty and staff workshops, designed to build the capacity of the member colleges to engage students in solar energy education.
As awardees were working to overcome challenges to their solar efforts, the peer learning network provided a unique opportunity for the teams to problem-solve and leverage lessons learned from one another. For example, Cook County, Smart Electric Power Association, Community Solar Value Project, and Dominion Energy Virginia collaborated with IREC and ISC to provide feedback on an initial community solar value matrix to help identify possible areas of alignment as they were working on this shared aspect of community solar within their respective scopes of work. The resulting collaborative effort helped all of these teams as they proceeded to develop community solar tools in their respective projects.

As an additional role, DOE asked ISC to support the National Community Solar Partnership from 2015-2016, helping to leverage the momentum in the public and private sector to expand solar access to new markets and convene relevant stakeholders to assess market barriers and catalyze deployment in low- and moderate-income communities.

ISC supported a national kick-off event in November 2015, convening 100 people in Washington D.C. and four regional National Community Solar Partnership workshops held in Denver, Atlanta, Boston, and Minneapolis. ISC helped to plan, implement, and staff each event, including agenda design and delivery, speaker identification and coordination, and overall logistical support for nearly 500 registrants combined.

Overall feedback was positive at all events and exemplified the connections built through peer learning and a national forum:

- “Truly appreciated the diversity of topics and speakers brought together.”
- “A tremendous opportunity to network and learn.”
- “I think the conference was run extremely well—the right people were in the rooms and the quality of the presentations was excellent.”

As a result of National Community Solar Partnership work, ISC’s developed six case studies that featured innovative community solar projects accomplished by partners, which further advanced the goals of the partnership.

STRATEGIC DISSEMINATION AND REPLICATION

The work emerging from the Solar Market Pathways program was timely and relevant to numerous national and regional audiences working to overcome solar barriers and build market solutions. ISC worked to identify, contextualize, synthesize, and document best practices to produce knowledge products that translate the experiences of the awardees into actionable and replicable resources to inform and inspire communities across the U.S. These best practices and lessons learned on creating and implementing effective solar plans and strategies were shared through the Solar Market Pathways biweekly newsletter, the Solar Market Pathways website, blogs, articles, conference presentations, webinars, videos, and toolkits.

We showcased Solar Market Pathways awardee products through channels most relevant to our target audiences. In order to deploy limited resources toward creating high-caliber knowledge products and strategically promoting replication, the national coordinator team relied heavily on existing mechanisms to share the information we generated. This included working through our extensive networks of communities and other solar stakeholders—such as emergency management professionals, local government practitioners, nonprofit organizations, community-based organizations, and affordable housing agencies. As part of the dissemination plan, ISC worked throughout the duration of the project to connect awardees with outreach opportunities and identify

appropriate communities within the solar industry, including members of the National Community Solar Partnership, that would benefit from the lessons of the awardees.

ISC sent biweekly email newsletters to all awardees and their partners to share action items for the learning network, information about solar industry events and other learning opportunities, Solar Market Pathways-created resources, and external relevant resources. Over the course of the program, ISC sent 81 newsletters and the subscriber list grew to 348. Open and click rates remained roughly double the industry standard throughout the life of the project.

The national coordinator team leveraged our networks to ensure Solar Market Pathways awardees and innovations were featured in a number of prominent forums throughout the duration of their projects, from conferences (Table 1) to publications (Table 2) and webinars (Table 3).

Table 1. Conferences

TITLE	DATE
SXSW eco	10/5/15-10/7/2015
Renewable Energy Vermont	10/8/15-10/9/15
Minnesota Solar Energy Industries Association Gateway to Solar Conference	11/13/15-11/14/15
SOLAR 2016	7/11/16-7/13/16
Intersolar	7/12/16-7/13/16
National Association of Regulatory Utility Commissioners Fall Meeting	11/13/16-11/16/16
Second Nature Climate Leadership Summit	2/12/17-2/15/17
Turning Data into Action: Advancing Your Clean Energy Strategy	4/3/17-4/4/17
National Adaptation Forum	5/8/17-5/10/17
Association for the Advancement of Sustainability in Higher Education Conference	10/15/17-10/17/17
Solar Power Midwest	10/19/17-10/20/17
Urban Sustainability Directors Network Annual Meeting	10/20/17-10/25/17

National League of Cities Summit	11/17/17
Colorado Public Utilities Commission Meeting	1/30/18
Solar Power Mountain West	3/12/18-3/14/18

Table 2. Publications

TITLE	DATE
Blog: Celebrating Solar at ISC (ISC)	Feb 2015
Blog: Community Solar Heating Up (ISC)	Sept 2016
Case study series: National Community Solar Partnership Innovative Projects	Dec 2016
Blog: Working with Higher Ed to Advance Solar (ISC)	Feb 2017
Blog: Three New Ways to Make Solar a Reality (ISC)	March 2017
Blog: Consumer Advocates Perspectives on Solar (IREC)	June 2017
Report: Community Solar Stakeholder Impacts in Cook County, Illinois (NREL)	Aug 2017
Publication: Options for PACE Financing Alternatives (Ballard Spahr)	July 2017
Case Study: Cook County Case Study (IREC)	Sept 2017
Publication: Community Solar Checklist (IREC)	Nov 2017
Blog: How do you know if the price is right for community solar programs? (RAP)	Nov 2017
Blog: New tools for solar (contractor Ben Paulos)	Dec 2017
Blog: Energy Resilience in NY & SF (contractor Ben Paulos)	Dec 2017
Blog: Forecasting for Distributed Energy Resources (IREC)	Feb 2018

Article: New Tools Make Solar Development Easier (contractor Ben Paulos)	Feb 2018
Article: Community Storage - What is it? Where is it? How does it work? (IREC)	March 2018
Publication: Resilient Solar Powering and Empowering Communities (ISC)	March 2018
Video: City and Community Approaches to Resilient Solar	June 2018

Table 3. Webinars

NAME	DATE	ATTENDEES	RECORDING VIEWS
Creating a Stakeholder Engagement Process with Implementation in Mind	2/25/15	30	54
Tools You Can Use for Community Solar	12/15/16	73	52
Perspectives on Solar Consumer and Community Advocates	5/24/17	22	74
New Tools to Accelerate Solar Deployment	10/30/17	32	99
Opening Doors to Community Solar: insights from Cook County, IL & other local governments	11/9/17	83	55
Connecting the Community Solar Market	1/25/18	83	78
Powering and Empowering Communities with Resilient Solar	3/5/18	48	75

ISC developed and maintains solarmarketpathways.org, the Solar Market Pathways website that serves as a curated website and public dissemination platform. The website features the best tools and resources developed through Solar Market

Pathways, as well as top resources from others in the field. It shares case studies that carefully document each project's three-year journey—lessons learned, key takeaways, and tools to help others replicate these successes in their own communities. It also hosts six toolkits that contribute to the advancement of solar nationally by spotlighting the best available tools and resources, including many Solar Market Pathways-created products, in the following areas:

- Building resilience with solar+storage
- Catalyzing community solar
- Expanding engagement and participation
- Working with utilities
- Increasing higher education investment potential
- Growing nascent markets

The website has been collectively viewed by 7,801 unique users for a total of 30,438 page views (Table 4).

Table 4. Solar Market Pathways Website Activity Log

RESOURCE TYPE	NAME	UNIQUE VIEWS
Toolkit Views		
	Catalyzing Community Solar	2,081
	Expanding Engagement and Participation	899
	Increasing Higher Education Investment Potential	823
	Working with Utilities	743
	Building Resilience with Solar+Storage	290
	Growing Nascent Markets	107
Project Views		
	Cook County Department of Environmental Control	631
	City University of New York	536
	Dominion Energy Virginia	487
	Vermont Energy Investment Corporation	460
	City and County of San Francisco	420
	Center for Sustainable Energy	400
	Midwest Renewable Energy Association	371
	Ecolibrium3	338
	Smart Electric Power Alliance	321
	Council of Independent Colleges in Virginia	310
	Community Solar Value Project	309
	Salt Lake City/Wasatch Solar Project	277
	CivicPACE	243
	Northeast Solar Energy Market Coalition	203

The Solar Market Pathways program set out to create successful, replicable plans and approaches that would increase the viability and deployment of solar energy by making solar more affordable and accessible for everyone in the U.S. To succeed in this goal, ISC and our partners identified the need to have a targeted and strategic approach to replication. Working closely with DOE, we developed a replication strategy in 2017 that focused on three specific replication opportunities emerging from Solar Market Pathways: community-scale deployment planning for resilient solar, Cook County's

community solar approach, and CICV's collaboration model. Appendix 2 describes the replication strategy and the results of each associated activity.

Box 4. Community-Scale Deployment Planning for Resilient Solar Replication Activity Example

Combining the tools and promising practices emerging from San Francisco, Salt Lake City, New York City, and Duluth, ISC sought to provide resources to at least 20 communities and to deeply engage with at least two communities to develop their implementation strategy, improve local permitting, and support market development. ISC selected two cities to receive one-on-one replication support.
Boulder, Colorado was most interested in replicating the Sustainable CUNY permitting and interconnection guide. They knew that several storage projects in their community had been abandoned because the process was unclear and they felt that a key to opening up the storage market was to clarify the process for potential project owners and developers. ISC, in partnership with Clean Energy Group, met with stakeholders in Boulder to closely review the permitting guide and created a template for them to follow. With our support, they developed their own guide, made public in June 2018. The work to develop the guide revealed a fairly straightforward process and helped stakeholders identify remaining gaps that warrant further work. Boulder is considering hosting a workshop or webinar for other Colorado communities that might also be interested in replicating the guide.
The **City of Baltimore** was interested in replicating promising practices in project development in their resiliency hub program. This program is working to implement solar+storage on five community facilities as part of a larger effort to support vulnerable communities during disasters. ISC and Clean Energy Group spent two days in Baltimore sharing experiences, tools, and resources from Solar Market Pathways projects, including two presentations to city staff (one with emergency management entities and one with the staff at resiliency hub sites). We provided additional information on permitting storage at the request of the city fire department lieutenant. There was strong interest in using the solaresilient.org sizing tool developed by San Francisco and in the case studies developed by Sustainable CUNY.

Challenges and Lessons Learned

Over the three and a half years serving as the Solar Market Pathways national coordinator, we encountered challenges and developed lessons learned related to the design of the program and our role.

The 14 Solar Market Pathways projects are not an obvious or natural cohort. They represent a wide variety of approaches working on different challenges, at different scales, and in different geographies. Although these disparities among the project goals allowed for increased awardee exposure to a range of solar deployment approaches, the program as a whole had a broad goal, rather than being focused on a goal such as breaking down barriers to city-utility collaboration or new customer acquisition models. While we saw consistent participation in the peer learning network and had success in disseminating project innovations, a more focused goal could further enhance opportunities for peer learning and to lift up best practices. This diverse group of projects also made it challenging to draw one program-wide conclusion, since many projects had different experiences.

We saw success in replicating key approaches of some of the awardees, but see opportunity to amplify this work by building replication activities into all awardee work plans and budgets. We also learned that replicating elements of projects in real time is challenging. With project implementation still underway, teams were unavailable to focus significantly on replication. Many of the replication activities will likely unfold beyond the award period, therefore we are unable to fully track the impacts. In a future iteration of a similar program, funding a national coordinator for additional time after the awardees completed projects could further disseminate and replicate the efforts of the program.

Throughout the project period the awardee teams participated in peer learning activities, however not all awardees had factored this into their work plan and budget. Setting clearer expectations about peer learning and dissemination and ensuring sufficient budget in each project for these efforts could strengthen future efforts for peer learning.

Conclusions

Thanks to a strong peer learning network, we received consistent feedback over the life of the project about the enormous value of forming a learning network across this set of very diverse projects and organizations.

Using a combination of peer learning approaches, ISC facilitated deep and meaningful learning opportunities on particular topics and challenges, while also creating space to find unexpected commonalities. This resulted in stronger individual projects and a stronger collective suite of projects working toward a common goal of reducing soft costs and accelerating the solar market. This kind of exchange also ensured the efficient use of DOE funds—avoiding duplication of effort and enabling awardees to build on and adapt what their fellow awardees had created. There are numerous examples of this—CUNY adapting San Francisco's solarresilient.org calculator, Council of Independent Colleges in Virginia using Midwest Renewable Energy Association's models of student engagement, and Dominion Energy Virginia drawing from Smart Electric Power Alliance's community solar research to inform their strategy.

> *"Having a national coordinator made all of the projects stronger and certainly made the CICV project stronger...having a coordinating role really contributes to sharing of information and it only benefits future iterations of these types of programs to have someone there to ensure projects talking together and sharing."*
>
> - Lora Toothman, Council of Independent Colleges in Virginia

> *"The national coordinator helped to get more national attention on things happening in Utah and in other projects that were surprising to people by packaging materials teams were working on and getting us out on the national stage."*
>
> - Kate Bowman, Wasatch Solar Project

> *"The peer learning network helped move our project forward and provided much needed access to national experts. The connections made were key to the final deliverables."*
>
> - Deborah Stone, Cook County

ISC's work to create a shared and strategic dissemination and replication plan that spanned Solar Market Pathways projects was also fundamental to deepening and broadening the program's impact. Creating resources—including webinars, videos, publications, and presentations—that spanned projects and offered multiple experiences and perspectives brought greater credibility to the work and allowed the program to more effectively inform and influence the field.

A strong peer learning network enables projects to leapfrog past known pitfalls and challenges and facilitate faster uptake of solutions and tools. It creates a crowd-sourced solution toolbox for solar challenges and ideally facilitates more standardized approaches.

The most significant legacy of the Solar Market Pathways learning network will be ongoing peer connections and future collaborations built through the program. For example, Council of Independent Colleges in Virginia is looking to further adapting student engagement models from Duluth and Midwest Renewable Energy Association, Cook County is seeking a commitment from Solar Market Pathways projects to participate in their efforts to connect their local network to people across the country working to further community solar, and many of the awardees seek to utilize this network to help disseminate future project successes and market advances.

Budget and Schedule

The total project budget was $2,271,233 with federal funds accounting for $1,960,104 and cost share of $311,129. All funds have been spent. The project was divided into three budget periods: calendar years 2015 and 2016, and the final period spanning 2017 through June 30, 2018.

The most significant budget spending slip occurred early in the first year of the project when Rocky Mountain Institute (RMI) made the decision that, as an organization, they no longer had the capacity to be on the national coordinator team. ISC worked quickly to find a new partner (IREC) and technical provider (NREL), but the program did fall slightly behind in spending during this transitional period.

This award was modified eight times throughout the course of this project. Significant modifications to the budget included:

- Budget Modification #001 (July 2015): Due to changes at RMI, the organization requested to exit the project. As a result, ISC proposed to replace RMI with IREC.
- Budget Modification #002 (March 2016): Obligated an additional $87,259 for ISC's support of the National Community Solar Partnership.
- Budget Modification #006 (July 2017): Shifted funds from ISC staff to contractual support to provide more targeted assistance to partners.
- Budget Modification #007 (October 2017): Extended the performance period through June 2018.

Path Forward

ISC is pursuing work to further build out and expand on the work undertaken through Solar Market Pathways. Our commitment to this pursuit is being codified in an organization-wide strategic direction plan, currently in draft form and expected to be adopted by our board in fall 2018. Our path forward will include:

Deepen the engagement of low-income communities in solar and the clean energy economy. ISC is continuing to grow our Partnership for Resilient Communities program that, since 2016, has been working with low-income communities and communities of color to build their capacity to shape and lead the implementation of resilience work in their communities. A cornerstone of the project is solar energy project implementation and workforce development, with projects in Baltimore, Milwaukee, and Kansas City demonstrating the value of this approach. In the coming years, we anticipate adding new partners and projects and continuing to support solar access, workforce training, and community leadership through this successful program model.

Explore opportunities for regional collaboration on clean energy. ISC has been supporting climate action in U.S. metropolitan regions for nearly a decade. Our work has shown us that regional collaboration is fundamental to accelerating climate action, efficiently deploying resources, and bringing solutions to scale. With funding from The Kresge Foundation, ISC has been working to advance regional collaboration for climate action in the U.S. by working with the Metropolitan Mayors Caucus (MMC) in the greater Chicago region to build their capacity to take action on the MMC's climate mitigation goals. Focusing on the issues of accountability and tracking, ISC is developing a tailored report detailing opportunities and challenges, potential tools and platforms, and recommendations for regional greenhouse gas reporting to meet MMC's goals and to provide peer learning opportunities through connections with other regional collaboratives.

Continue to support resilient solar implementation in cities and communities and strengthen connections to emergency management. The Solar Market Pathways projects led by Sustainable CUNY, the City and County of San Francisco, Wasatch Solar Project, and Ecolibrium3 developed a strong set of tools and models on how resilient solar can improve emergency preparedness operations and strengthen community resilience. As part of our replication efforts, ISC was able to identify more than a dozen locations interested in implementing similar programs, including Houston and Southeast Florida, locations where ISC is currently working. We will continue to connect these communities to relevant resources and will seek opportunities to provide them further support and assistance.

Expand options for cities to support clean energy financing. ISC is currently working on an assessment of the potential for urban-scale green banks and similar clean energy financing mechanisms. This work is funded by the Blackstone Ranch Foundation and done in partnership with the Coalition for Green Capital and Sustainable Capital Advisors. We know cities are more interested than ever before in

accelerating the transition to clean energy and that financing is a key barrier. This collaborative assessment will articulate the clean energy financing opportunities available through urban green banks. This research will help inform city-level policymakers, philanthropy, and relevant nonprofits. We anticipate completing this assessment by the end of 2018 and will define next steps based on our findings.

Foster peer learning and bring best practices to scale. For more than a decade, ISC has worked to support peer learning and the transfer of best practices and lessons learned among urban sustainability professionals across the U.S., serving more than 700 communities and 3,000 sustainability practitioners. Through innovative peer learning platforms, strategic place-based engagements, and deep partnerships, ISC continues to be a valued and respected resource for cities and urban communities.

References

Grantmakers for Effective Organizations and NYU's Robert F. Wagner Graduate School of Public Service. "Learn and Let Learn: Supporting Learning Communities for Innovation and Impact."

Solar Tribune. "*Innovations Spur Era of Rapidly Declining Solar Costs."* *https://solartribune.com/residential-solar-cost-trends/.*

U.S. Department of Energy. "Soft Costs." https://www.energy.gov/eere/solar/soft-costs

U.S. Department of Energy. 2016. "The SunShot Initiative: Making Solar Energy Affordable for All Americans" https://www.energy.gov/sites/prod/files/2016/06/f32/SunShot-factsheet-6-10_final-508.pdf

U.S. Department of Energy. 2017. "2020 Utility-Scale Solar Goal Achieved." https://www.energy.gov/eere/solar/articles/2020-utility-scale-solar-goal-achieved

Appendices

1. Technical Assistance Summary
2. Replication Activities

Appendix 1. Technical Assistance Summary

AWARDEE	REQUEST DATE	REQUEST & RESPONSE SUMMARY	PROVIDER
Community Solar Value Project	**6/15/2015**	Advice on analytic methodology for expressing the net value of a solar + DR + storage strategy.	NREL
Council of Independent Colleges in Virginia	**6/22/2015**	Memo providing assessment of proposed regulatory incentives in Virginia outlining the benefits and drawbacks for CICV colleges.	RAP
Council of Independent Colleges in Virginia	**6/22/2015**	Memo providing analysis of the impact of rate design in Virginia on the CICV project.	RAP
San Francisco	**8/18/2015**	Advice on implementing the critical load sizing tool and access to existing data on building loads in different U.S. climates.	NREL
Wasatch Solar Project	**10/13/2015**	Memo providing information about best practices for interconnection standards and review of Utah's standards to incorporate into the 10-Year Solar Deployment Plan.	IREC
Ecolibrium3 & Midwest Renewable Energy Association	**12/2/2015**	Build out of a value-added solar map of Duluth utilizing GIS footprint data for the city based on supplied LIDAR data.	University of Minnesota Geospatial Analysis Center and the Great Plains Institute
Center for Sustainable Energy	**1/5/2016**	Memo identifying and comparing best practices from virtual net metering and shared solar programs in other states to inform project efforts.	NREL
Northeast Solar Energy Market Coalition	**1/26/2016**	Memo outlining interconnection procedures and practices that compare among utilities and inventorying the specifics of these features for the main utilities operating in the states covered by the coalition.	Pullman & Comley

Cook County	**3/9/2016**	Review of community solar costing spreadsheet and memo providing community solar benefits and value data including quantification of local grid benefits, developer benefits, and community benefits.	NREL
San Francisco	**7/19/16**	Running ReOpt model on the financial pro formas developed for installing solar+storage in San Francisco.	NREL
Cook County	**8/9/16**	Work sessions and analysis to identify methodology for assigning value to community solar stakeholders in a deregulated market.	NREL
Sustainable CUNY	**10/9/16**	Creation of open-source application programming interface to enable the NY Solar Map calculator to access San Francisco's online load sizing tool.	Future Web Studio
Midwest Renewable Energy Association	**10/10/16**	Visualization of PV finance models for universities and foundations built into an online public platform.	Sustainable Capital Advisors
CivicPACE	**12/1/16**	Memo providing legal assistance on PACE for nonprofits, including guidance on potential approaches to issuing bonds.	Ballard Spahr
Community Solar Value Project	**12/5/16**	Assistance planning and presenting at two technical utility workshops on community solar+demand response and storage.	ISC and RAP
Wasatch Solar Project	**12/14/16**	Leadership on three technical workshops for municipal utilities in Utah regarding the grid impacts of solar and integration; solar valuation and cost benefit analysis; and rate design and alternatives to net metering.	RAP
Ecolibrium3	**7/10/17**	Enhancements to the existing solar map to add ground-mounted solar PV assessment capability, additional information layers to increase the map's ability to realize client acquisition costs for rooftop solar and the available community solar capacity within Duluth.	University of Minnesota Geospatial Analysis Center
Midwest Renewable Energy Association	**11/10/17**	Course resources and video presentations, including legal and regulatory considerations for institutions developing PV facilities.	NREL

Council of Independent Colleges in Virginia	**11/27/17**	Calculation of cost savings associated with collaborative procurement and power purchase agreements.	NREL

Appendix 2. Replication Activities

COMMUNITY-SCALE DEPLOYMENT PLANNING FOR RESILIENT SOLAR Combining the tools and promising practices emerging from San Francisco, Salt Lake City, New York City, and Duluth, ISC sought to provide resources to at least 20 communities and to deeply engage with at least two communities to develop their implementation strategy, improve local permitting, and support market development. Target audiences: municipal emergency management staff, municipal sustainability/energy staff, and nonprofit organizations focused on climate adaptation and resilience	
ACTIVITY #	**DESCRIPTION OF ACTIVITY**
Activity 1	**Resilient Solar Toolkit**: ISC developed a toolkit on resilient solar, which packages best practices from Solar Market Pathways projects and the field. This toolkit, hosted on the Solar Market Pathways website, has been disseminated via conferences, events, newsletters, and word of mouth. We disseminated the toolkit and best practices from the Solar Market Pathways projects to target audiences (local government energy and emergency departments, NGOs working on resilience and climate adaptation, etc.) via: ● *Resilient Solar: Powering and Empowering Communities*, a publication released this quarter ● Articles in RAP, ISC, and American Society of Adaptation Professionals newsletters ● A panel at the National Adaptation Forum featuring resilient solar promising practices from Sustainable CUNY, San Francisco, and Ecolibrium3
Activity 2	**Workshop:** ISC conducted a half-day workshop for interested communities as part of the National Adaptation Forum on May 4, 2017. ISC worked with NREL, Sustainable CUNY, San Francisco, and Ecolibrium3 to offer an agenda aimed at helping local leaders learn how their communities can use solar to support community resilience through Solar Market Pathways examples. Twenty-two people attended the workshop.
Activity 3	**Targeted Replication Support:** ISC selected two cities to receive one-on-one replication support. In partnership with the Clean Energy Group (CEG), we developed a list of potential cities and solicited their interest in working with us on replication. After screening these cities, we selected two:

	● Boulder, CO: Boulder was most interested in replicating the Sustainable CUNY permitting and interconnection guide. They knew that several storage projects in their community had been abandoned because the process was unclear and felt that a key to opening up the storage market was to clarify the process for potential project owners and developers. We met with stakeholders in Boulder to closely review the permitting guide and created a template for them to follow. With our support, they developed their own guide, made public in June 2018. The process of developing the guide revealed a fairly straightforward process and helped stakeholders identify remaining gaps that warrant further work. Boulder is considering hosting a workshop or webinar for other Colorado communities that might also be interested in replicating the guide. ● Baltimore, MD: The City of Baltimore was interested in replicating promising practices in project development in their resiliency hub program. This program is working to implement solar+storage on five community facilities as part of a larger effort to support vulnerable communities during disasters. ISC and CEG spent two days in Baltimore sharing experiences, tools, and resources from Solar Market Pathways projects, including two presentations to city staff (one with emergency management entities and one with the staff at resiliency hub sites). We provided additional information on permitting storage at the request of the city fire department lieutenant. There was strong interest in using the solaresilient.org sizing tool developed by San Francisco and in the case studies developed by Sustainable CUNY.

REPLICATION AREA: COOK COUNTY'S COMMUNITY SOLAR APPROACH

The national coordinator team sought to support the replication of the Cook County tools to advance community solar. Given the new legislation supporting community solar in Illinois and the significant momentum and interest among the communities surrounding Cook County, we focused our efforts there. The following replication activities sought to increase the resources and capacity of local organizations to move potential projects through planning and implementation.

Target audiences: municipal sustainability/energy staff and nonprofit organizations focused on community solar in illinois

ACTIVITY #	DESCRIPTION OF ACTIVITY
Activity 4	**Case Study:** IREC developed a detailed case study outlining the process, tools, approaches, and findings of the Cook County project.
Activity 5	**Replication Package:** IREC created a curated resource list which served as a step-by-step replication tool for any local government or organization in

	Illinois seeking to adopt, deploy, or support community solar. Available here: http://solarmarketpathways.org/cook-county-replication-package/
Activity 6	**Replication Events:** ISC and IREC coordinated several events designed to share the Cook County story with broader audiences beyond their immediate network of partners. These events included: ● National Community Solar Partnership Working Group Call (April 2016) - Cook County Community Solar Business Case Tool presented by Vito Greco (Elevate Energy) ● National Community Solar Partnership Convening (June 2016) - Cook County project presented by Vito Greco to approximately 100 attendees ● Cook County's Wrap-Up Event (September 2017) - case study distributed to approximately 100 attendees ● Opening Doors to Community Solar: Insights from Cook County, IL and Other Local Governments Webinar (November 2017) - panelists from Cook County and local government representatives shared key considerations for site owners, municipalities, and other stakeholders interested in community solar, either as participants or through the development of a community solar project on their own land or building; 181 registrants and 89 attendees ● Community Solar Workshop at Solar Power Midwest (October 2017) - IREC developed, organized, and moderated a workshop with a panel featuring Deborah Stone (Cook County), Vito Greco, and Emily McGavisk (West Monroe Partners) that focused on the Cook County project, the pilot site process, and the resources they developed; 50 people attended and IREC disseminated 50 additional copies of the Cook County case study ● Connecting the Community Solar Market Webinar (January 2018) - Cook County community solar project overview presented by Deborah Stone to 82 attendees out of 132 registrants
Activity 7	**Targeted Replication Support:** IREC held additional follow-up conversations with certain organizations to determine how communities in the area could use the tools and resources created by Cook County. IREC communicated with the following individuals and organizations as part of this effort: ● Chad Kruse (Illinois Environmental Protection Agency) ● Toba Pearlman (National Resources Defense Council) ● Jon Sullivan (Microgrid Energy) ● Peter Hardt (Hardt Electric) ● Ray Bell (Faith in Place - nonprofit that works with houses of worship on environmental issues) ● Juliana Pino (Little Village Environmental Justice Organization) ● MeLena Hessell and Bradley Klein (Environmental Law and Policy Center)

	● Margaret Hansbrough (City of Chicago) ● The Metropolitan Mayors' Caucus
REPLICATION AREA 3: COUNCIL OF INDEPENDENT COLLEGES IN VIRGINIA'S COLLABORATIVE PROCUREMENT MODEL The national coordinator team supported replication of the joint procurement approach undertaken by the CICV. ISC and RAP sought to provide college associations and campus networks with the tools and resources to jointly procure solar, and to deeply engage with at least two of these organizations to develop procurement plans for large-scale installations (<1MW). Target audiences: associations of colleges and universities and college and university sustainability/energy program managers	
ACTIVITY #	**DESCRIPTION OF ACTIVITY**
Activity 8	**Replication Package:** ISC created a package of replication resources for interested colleges and universities and other associations, including: ● CICV collaborative procurement request for proposals (RFP) and lessons learned documents ● An evaluation and summary of resources that would be needed to complete a collaborative procurement (including exploring how to fund project leader and technical consultant positions) ● A questionnaire an association could use to assess interest among colleges and universities in replicating an approach similar to CICV's ● We also helped to develop a replication webpage on the CICV website to host all replication materials and resources to help interested associations learn from and replicate the CICV approach.
Activity 9	**Replication Events:** RAP and ISC promoted CICV's collaborative procurement approach through national events and videos: ● Second Nature Presidential Climate Leadership Summit (February 2017) - conference session to promote and build interest in the replication area with approximately 40 attendees; the CICV project fact sheet was distributed to approximately 200 attendees ● AASHE Conference (October 2017) - multiple conference sessions featuring the CICV approach with approximately 70 attendees; a replication poster featuring ways colleges could replicate this approach available for viewing by the approximately 2,000 sustainability leaders from colleges and universities ● CICV Collaborative Procurement RFP Webinar and Video for the Colleges & Universities Affinity Group (January 2016) - collaborative procurement RFP process and lessons learned presented by Tyler Espinoza (Optony) 79 views

Activity 10	**Targeted Replication Support:** Through events, outreach, and phone calls, ISC and RAP solicited interest from associations of colleges, individual campuses and institutions, and associations of energy stakeholders beyond higher education. ISC and RAP selected two groups for replication work after they expressed interest in pursuing support at the Second Nature Climate Leadership Summit panel: the Pennsylvania Environmental Resource Consortium and the Atlanta Regional Council for Higher Education, represented by Agnes Scott College. RAP and ISC held a series of calls to advise each group and share the CICV experience and resources. For each group, RAP and ISC produced a document for comparing solar policies in Virginia to policies in Pennsylvania and Georgia and analyzing how policy differences could influence the practicality of replicating the CICV collaborative approach. In speaking with the groups in Georgia and Pennsylvania, we realized that we needed to be able to better estimate and articulate the cost savings achieved by CICV to help the groups make the case to their associations for a collaborative approach. We provided CICV with technical assistance (via NREL) to complete this analysis and will shared the results with these groups, as well as more widely as part of the CICV story. There is strong interest from stakeholders to continue to learn about this approach and possibly adapt CICV's process to meet their needs. While the Georgia and Pennsylvania colleges groups have not yet decided on the approach they will take, feedback from both was very positive and in each case we were able to influence and inform their strategy.