Community Solutions for Nonresidential Solar Photovoltaics

Final Report | Report Number 24-20 | February 2024

NEW YORK STATE
NYSERDA
New York State Energy Research and Development Authority

NYSERDA's Promise to New Yorkers:

NYSERDA provides resources, expertise, and objective information so New Yorkers can make confident, informed energy decisions.

Our Vision:

New York is a global climate leader building a healthier future with thriving communities; homes and businesses powered by clean energy; and economic opportunities accessible to all New Yorkers.

Our Mission:

Advance clean energy innovation and investments to combat climate change, improving the health, resiliency, and prosperity of New Yorkers and delivering benefits equitably to all.

Community Solutions for Nonresidential Solar Photovoltaics

Final Report

Prepared for:

New York State Energy Research and Development Authority

Albany, NY

Prepared by:

The Nature Conservancy

Albany, NY

and

Evidn, LLC

Sea Girt, NJ

NYSERDA Report 24-20 NYSERDA Contract 154273 February 2024

Notice

This report was prepared by The Nature Conservancy New York and Evidn in the course of performing work contracted for and sponsored by the New York State Energy Research and Development Authority (hereafter "NYSERDA"). The opinions expressed in this report do not necessarily reflect those of NYSERDA or the State of New York, and reference to any specific product, service, process, or method does not constitute an implied or expressed recommendation or endorsement of it. Further, NYSERDA, the State of New York, and the contractor make no warranties or representations, expressed or implied, as to the fitness for particular purpose or merchantability of any product, apparatus, or service, or the usefulness, completeness, or accuracy of any processes, methods, or other information contained, described, disclosed, or referred to in this report. NYSERDA, the State of New York, and the contractor make no representation that the use of any product, apparatus, process, method, or other information will not infringe privately owned rights and will assume no liability for any loss, injury, or damage resulting from, or occurring in connection with, the use of information contained, described, disclosed, or referred to in this report.

NYSERDA makes every effort to provide accurate information about copyright owners and related matters in the reports we publish. Contractors are responsible for determining and satisfying copyright or other use restrictions regarding the content of reports that they write, in compliance with NYSERDA's policies and federal law. If you are the copyright owner and believe a NYSERDA report has not properly attributed your work to you or has used it without permission, please email print@nyserda.ny.gov.

Information contained in this document, such as web page addresses, are current at the time of publication.

Preferred Citation

New York State Energy Research and Development Authority (NYSERDA). 2023. "Community Solutions for Nonresidential Solar Photovoltaics." NYSERDA Report Number 24-20. Prepared by The Nature Conservancy, New York. Albany, NY. nyserda.ny.gov/publications

Abstract

Community support for nonresidential solar photovoltaic (PV) development is critical, and local opposition can slow or even halt projects. Residents and local officials in host communities are often concerned about the ways this new type of development will impact their lives, the local economy, and the character of their towns. NYS's Climate Action Council (CAC) has identified the need for strategies that support local community acceptance of nonresidential solar projects. However, there is a paucity of science-based evidence available about the societal impacts of greatest concern shared across host communities and the major drivers of support or opposition to solar PV development in New York State. Scholarly research shows that support for nonresidential solar PV projects depends on how development is framed and on the ability of projects to bring benefits that are valuable and meaningful to host communities. There is also evidence that community opposition to solar projects can stem from lack of control, fear of resulting changes to local character, lack of trust in the development process and players, and a lack of resources at the community level to effectively engage. Therefore, understanding host community perceptions and finding solar PV process design and management solutions that can build trust and maximize local ownership in project benefits is key to helping host communities, the State, and renewable energy developers negotiate and deliver successful projects. These process design and management solutions may include approaches and tools for community engagement and community-led analyses that enable bi-directional feedback between communities and decision-makers in project development. Developing and testing these solutions with host communities and other stakeholders will help to maximize public support.

Keywords

Community engagement, solar photovoltaic, climate change, stakeholder engagement, applied research, behavioral science, renewable energy development, New York, solar development, solar energy, scientific research, social science research

Acknowledgements

The Nature Conservancy would like to acknowledge and thank the New York State Energy Research and Development Authority (NYSERDA) for funding this project and the opportunity to conduct the research highlighted within this report. The Nature Conservancy would also like to acknowledge the time and input of all key partners and participants engaged throughout the analysis and co-design phases of the Solar Solutions project, especially our partners at the Cadmus Group for their facilitation and workshop design during Phase 1, and behavioral science firm Evidn for their behavioral science leadership during this project. We acknowledge the invaluable contributions of all the involved stakeholders in supporting this project and guiding its development and implementation. This project and final report would not have been possible without the insights of contributors from a wide array of industry and stakeholder organizations, including renewable energy industry professionals, policymakers, community interest groups, agricultural professionals, extension advisors, elected officials, and community liaisons.

Table of Contents

Notice ii
Preferred Citation ii
Abstract iii
Keywords iii
Acknowledgements iv
List of Figures vii
List of Tables vii
Acronyms and Abbreviations vii
Executive Summary ES-1
1 Introduction 1
1.1 Project Background 1
1.2 Project Overview and Limitations 2
1.2.1 Research Limitations 2
1.2.2 Phase 1, Literature Review 3
1.2.3 Phase 2, Community Research and Stakeholder Engagement 5
1.2.3.1 Engagement: Interviews 6
1.2.3.2 Engagement: Workshops 6

1.2.3.3 Engagement through Focus Groups 7
2 Community Transition Toolkit 9
2.1 Why Do Communities Need a Transition Toolkit? 9
2.2 How a Toolkit Can Help Communities Transition 9
2.2.1 How the Toolkit Was Developed 10
2.2.2 How to Use the Toolkit 11
2.3 Step 1: Defining a Community 11
2.3.1 Why Communities Matter 11
2.3.2 Steps to Defining a Community 12
2.3.2.1 Geographic Boundaries 12
2.3.2.2 Physical Landscape 13
2.3.2.3 Demographic Breakdown 13
2.3.2.4 Cultural Context 13
2.3.2.5 Stakeholder Groups 13
2.3.3 How to Use the Community Mapping Tool 14
2.4 Step 2: Identifying Needs and Priorities 16
2.4.1 Why Community Engagement Matters 16
2.4.1.1 Community Engagement Reveals Restraining Forces to Change 17
2.4.1.2 Community Engagement Builds Relationships with Community Advocates 17
2.4.2 Identifying Community Needs and Priorities 18
2.4.3 How to Use the Community Engagement Tool 18
2.4.3.1 Part A, Interview Guide 18
2.4.3.2 Part B, Restraining Force Analysis 21
2.4.3.3 Part C, Community Advocate Profiling 23
2.5 Step 3: Developing a Community-Led Transition Plan 24
2.5.1 The Benefits of Community-Owned and -Led Change 24
2.5.2 How to Create a Community Transition Plan 24
2.5.3 How to Use the Community Planning Tool 25
2.5.3.1 Stage 1, Coordinate 25
2.5.3.2 Stage 2, Commit 26
2.5.3.3 Stage 3, Build Capacity 27
2.5.3.4 Stage 4, Communicate 28
3 Solar Solutions Case Study 29
3.1 Background and Context 29
3.2 Key Takeaways 29

3.3 Purpose 29
3.4 Setting the Scene 30
3.5 Their Experiences 30
3.5.1 Information Is Not Enough to Change Behavior 30
3.5.2 Community Residents Want More Control 31
3.5.3 Experience Impacts Future Perceptions 31
3.5.4 Risk Tolerance and Decision-making Vary across Communities 32
3.5.5 Managing Expectations Is Crucial for Community Planning 32
3.6 Stakeholder Recommendations for Future Transitions 32
3.6.1 Preparation Is Essential to Successful Community Transition 33
3.6.2 Build a Sense of Collective Ownership through Communication 33
3.6.3 Create a Strong Messaging Framework 34
3.7 Summary 34
4 Communications Materials 35
4.1 Background and Context 35
4.2 This Guide 35
4.3 Design Principles 35
4.3.1 Personalize Information 35
4.3.2 Reduce Cognitive Load 35
4.3.3 Consider Message Framing 36
4.3.4 Create a Call to Action 36
4.3.5 Use Social Norms 36
4.4 Principles in Action 37
5 Conclusion and Recommendations 39
6 References 41
Appendix A. Solar Solutions Guidebook and Training Materials A-1
Appendix B. New York Solar Solutions Workshop B-1
Appendix C. Solar Solutions C-1
Endnotes EN-1

List of Figures

Figure 1. Factors Influencing Community Acceptance of Large-scale Solar Projects 4
Figure 2. Community Transition Toolkit 10
Figure 3. Five Dimensions for Defining a Community 12
Figure 4. Worked Example of a Community Narrative 16
Figure 5. Interview Question Template 20
Figure 6. Example of NY Solar Developers Event Flyer to Be Distributed on Farms and at Agricultural Industry Events 38

List of Tables

Table 1. Desktop Research Template 15
Table 2. Restraining Force Analysis Template 22
Table 3. Community Advocate Profiling Template 24

Acronyms and Abbreviations

CLCPA	Climate Leadership and Community Protection Act
DAC	disadvantaged community
GHG	greenhouse gas
GW	gigawatts
NGOs	nongovernmental organizations
NIMBY	Not in my back yard
NYSERDA	New York State Energy Research and Development Authority
ORES	Office of Renewable Energy Siting
PV	photovoltaics

Executive Summary

Climate change and the increasing demand for development of renewable energy generation to transition away from fossil fuel use requires communities to adopt new ways of living, thinking, and behaving. Despite broadscale public support for renewable energy, these projects, including nonresidential solar energy projects (solar installations that contribute to the wider energy grid of a community, rather than directly supplying solar energy to individual residences or buildings), can face strong local opposition. Stakeholders have found this to be the case in some Upstate New York communities, where much of the land-based renewable energy generation, transmission, and storage will need to be built to meet New York State's 2030 goals.

Seeking to better understand this challenge, the New York State Energy Research and Development Authority (NYSERDA) and the Nature Conservancy partnered with the Cadmus Group and behavioral science organization Evidn to better understand local challenges and identify solutions to overcome local opposition.

This report details the findings toward identifying and understanding the factors that shape community attitudes toward nonresidential solar photovoltaics (PV) solutions in Upstate New York. A multipronged approach was applied, including a comprehensive review of research and evidence and engaging with stakeholders across local communities and the State's renewable energy system. Throughout these interactions, several key themes emerged as well as recommendations from the various interviews (conducted in Phase 1), workshops (conducted in Phase 2), and focus groups (conducted in Phase 3) with stakeholders in the Upstate New York region.

This report offers findings and recommended tools and strategies designed to complement the State's proactive approach toward cultivating transparency and inclusivity of solar development decision-making with communities. To successfully achieve this in a timely manner, bringing communities along, listening and understanding their concerns and local needs, and addressing them in a way that allows community residents to be active participants in the development of these projects, not just a host community, is crucial.

Delays due to a perceived or validated lack of community engagement will result in increased project costs, a lack of trust by community members, and can potentially jeopardize the State's climate goals. A one-size-fits-all approach will not be successful, and as such, the tools provided through this report will help the State and other stakeholders better understand the individual needs of each community and its residents.

ES.1 Key Findings

Following are summarized highlights of key findings resulting from our research and stakeholder engagement interviews, workshops, and focus groups regarding nonresident solar photovoltaics (PV) development.

- **Information is not enough to change behavior.**
  Local town officials often feel underequipped to navigate proposed solar developments on their own and are unsure of where to get more support.
- **Community residents want to feel in more control**.
  Limited community experiences and understanding of solar technology can make prioritizing sources of community concern confusing for town officials.
- **Experiences can impact future perceptions**.
  Experiences with solar developers range greatly from town to town, and these variations can cause stakeholders to question the intentions and integrity of groups that might represent solar or clean energy projects.
- **Managing expectations is crucial for community planning**.
  An important consideration is how community leaders set realistic expectations for residents around what they can influence and how to best communicate their needs and priorities to developers and decision-makers.

Developing any renewable energy project, including nonresidential solar PV, is complex and multifaceted. The adoption of solar energy developments involves a host of views, perspectives, motivations, and barriers that can make or break the successful installation of such technology.

The outputs presented in this report are intended to provide a roadmap for how communities could be engaged, listened to, and involved to successfully transition to nonresidential solar PV, and renewable energy, more broadly. This is a critical process that requires coordination, capacity-building, commitment, and communication within communities and with developers. A system-level approach is ultimately needed to successfully maximize the benefits of renewable energy for communities.

1 Introduction

1.1 Project Background

Climate change poses a clear and imminent threat to communities throughout New York State and the world. In response, New York State is working to implement one of the most ambitious pathways to reduce greenhouse gas (GHG) emissions in the United States. Achieving the State's goal of 10 gigawatts (GW) of distributed solar energy by 2025 and 70% of the State's energy being supplied through renewable generation by 2030 requires rapid adoption of renewable energy technologies, including significant expansion of nonresidential solar photovoltaics (PV) installations.

Emerging public sentiment research indicates that most U.S. residents broadly support renewable energy. On a smaller scale, converting this support to the acceptance of specific projects in local communities remains a distinct challenge. Solar energy projects, in particular large-scale installations, can face public resistance from residents in communities where new solar projects are proposed. While instances of strong local opposition exist, these views and opinions are not universal; they typically vary as a function of stakeholder group, geographic location, and a range of other factors such as the political, regulatory, and sociocultural context in which people live.

Accepting and adopting solar solutions involve a host of opinions, perspectives, motivations, and barriers that can make-or-break the successful installation of such technology. Broadscale community support requires understanding the factors that shape community perspectives toward solar adoption, the concerns that local communities have about nonresidential solar developments, and what can be done to help communities capture any benefits available to them from proposed developments.

The Nature Conservancy in New York State engaged the Cadmus Group and behavior science firm Evidn to better understand the numerous factors that shape community opinions toward nonresidential solar PV solutions, what concerns residents have about nonresidential solar developments, and how the State and other stakeholders can increase local support for solar solutions and other renewable energy projects. The aim was to co-design strategies, including evidence-based tools, a toolkit, and resources, to support local officials to engage proactively with communities and successfully deploy solar solutions with the support of residents.[1]

The remainder of section 1 outlines the project and its limitations, as well as the foundational research that the project is based on; section 2 discusses the case study; section 3 presents the community toolkit; section 4 outlines communications materials; and section 5 concludes with recommendations.

1.2 Project Overview and Limitations

To better understand the primary factors that influence community acceptance toward nonresidential solar PV, the Nature Conservancy explored and implemented a multistep and multipronged methodology, which is described herein. Our approach begins with analyzing the research that currently exists and then focusing on integrating additional perspectives from community and stakeholder opinions through multiple formats.

The four major outputs in this report include:

1. **Solar Solutions case study:** This document brings together lessons learned from New York State communities in overcoming local concerns and enhancing the community benefits of nonresidential solar PV development.
2. **Community transition toolkit:** The toolkit provides the necessary strategies to support proactive community engagement to identify stakeholders and their needs and priorities for local solar development.
3. **Communications materials:** We provide a collection of behavioral science-based messaging principles to guide the development of communications materials to increase local understanding and acceptance of nonresidential solar PV.
4. **Recommendations:** These are the recommendations from NYSERDA and New York State that further accelerate the development of solar PV projects and community engagement.

1.2.1 Research Limitations

As described in Appendices A through C the questions we sought to answer and our methodology not only limited the pool of towns and cities that we considered, but, due to a confluence of factors, also represented challenges facing solar development in New York State. Furthermore, the town officials with whom we spoke had limited availability and expertise with this project and its focus. While our intent was to interview residents living in a disadvantaged community[2] (DAC), we were unsuccessful in finding community members living in an area that aligned with our methodology and who were able to spend time working with the project team. We also had limited information on DACs because the DAC definition and maps were formally accepted by New York State only at the end of the three-year project.

Although this research reveals important insights into how certain individuals in Upstate New York view solar, these results are limited in scope and do not represent a majority view in any town or city. Additional research and steps are needed for the State to meet its critical energy goals.

This project must be considered in the broader context of New York State, the political climate surrounding the energy transition, the history of racism including environmental racism, and cultural tensions, such as upstate versus downstate identity. These issues come to the fore in various ways, such as the perception of unfairness of individuals that have never been personally harmed by fossil fuel generation, in direct contrast to individuals who have died prematurely or manage disease due to fossil fuel exposure where they live or work. This latter group is not small; one in five deaths worldwide is due to fossil fuel pollution.[3]

Buonocore et al.'s (2021) recent research finds that New York State outranks all other states in premature deaths and related health costs from building pollution. In 2017, 1,940 deaths occurred as a result of building pollution; New York City residents are most harmed with 1,114 of these premature deaths. Additionally, New York State has an associated $21.7 billion in health-related costs from building fuel combustion.[4]

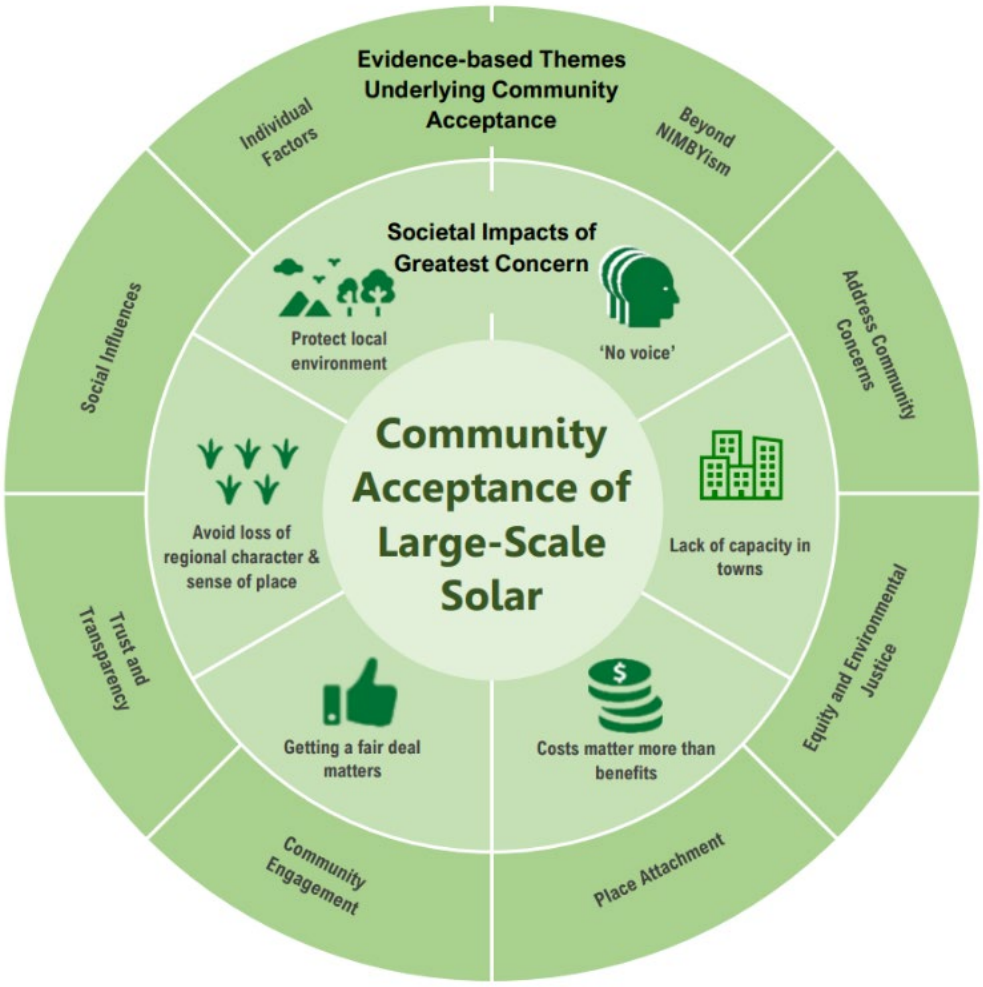
The development, generation, transmission, and storage of clean energy facilities do not have the same harmful effects (i.e., morbidity and mortality) that current oil and natural gas energy production have. While individuals do not always account for history or other people's experiences alongside their personal feelings, we must acknowledge that perceptions of unfairness in this project do not consider other perspectives or realities including the death and disease of millions of people, plants, and animals due to fossil fuel extraction and combustion. This report and its findings do not reflect the perspectives of those experiencing the ongoing harms from the burning of fossil fuels.

1.2.2 Phase 1, Literature Review

In Phase 1, Evidn analyzed existing research across the sustainability, energy, and social and behavioral science literature to understand New York State residents' perceptions of solar development and delineated the factors that impact community acceptance and adoption of solar solutions. Analysis of existing literature consisted of collating relevant research and case studies that highlight the social, economic, and cultural factors influencing communities' decision-making surrounding the adoption of solar developments. The literature review highlights key principles related to New York State residents' perceptions of solar developments that impact community acceptance and willingness to adopt large-scale

solar solutions and the analysis. These principles include building trust and transparency, engaging community members in project decision-making, and understanding the role of place attachment, social influence, and individual factors on community sentiment perceptions. Figure 1 summarizes the principles identified through this research, and Appendix A provides details. In total, 82 articles of evidence and research were considered to provide foundational evidence for later phases of the project. The societal impacts of greatest concern are briefly outlined in the bullets below.

Figure 1. Factors Influencing Community Acceptance of Large-scale Solar Projects



- **Protecting the existing environment:** Because solar projects can significantly alter local land use patterns, communities are concerned about the negative environmental impacts nonresidential solar can bring to their communities, including negative impacts on ecosystems, production of hazardous materials, and improper decommissioning and recycling procedures.

- **Avoiding loss of regional character and sense of place:** Impacts on agricultural land are a key concern for communities concerned about effects on farm financial viability, quality of agricultural land, changes to rural character, and fear of rural economic decline.
- **Getting a fair deal matters:** Communities want fair compensation and benefits as nonresidential solar hosts; they do not want to bear the burden of hosting solar projects while reaping minimal benefits.
- **Costs matter more than benefits:** Communities tend to care more about the loss due to short-term solar-related costs (i.e., visual impacts) rather than the long-term benefits, which can take years to experience.
- **Lack of capacity in towns:** Many communities hosting nonresidential solar projects are small, rural, and often lack adequate resources (i.e., staffing and funding) to navigate project processes.
- **No voice over local developments:** Local stakeholders and officials feel as though they have little control over solar development in their communities, and they want increased communication and collaboration with local developers.

1.2.3 Phase 2, Community Research and Stakeholder Engagement

Many organizations, networks, agencies, and individuals are involved in adopting solar energy technology throughout New York State. Each stakeholder has unique perspectives, experiences, and insights about the factors involved when adopting these technologies. Capturing these varied perspectives is instructive in building a nuanced understanding of the factors that impact the resistance to and adoption of renewable energy projects in communities.

This section reports on the analysis of data collected through multiple phases of the project that build on each other, incorporating community and stakeholder feedback and engagement, including individual interviews, workshops, and interactive focus groups as well as observational data collection by Evidn attending community forums and events. This project engaged 50 representatives from 41 organizations and groups ranging from community members to local and state representatives. These stakeholders spread across seven Upstate New York counties: Columbia, Erie, Genesee, Herkimer, Saratoga, Tompkins, Ulster, and Washington Counties.[5]

The Nature Conservancy, Cadmus, Evidn, and NYSERDA guided the stakeholder engagement process. Stakeholders were identified through a combination of the Nature Conservancy recommendations and ad-hoc referrals by community members and stakeholders. This project used a mixed-method (i.e., literature analysis, interviews, stakeholder workshops, focus groups) approach to stakeholder engagement to ensure timing and delivery modes were flexible and accommodated the diverse schedules and priorities of stakeholders in their region.

1.2.3.1 Engagement: Interviews

As we began to identify some of the societal impacts of greatest concern to community members when considering nonresidential solar PV installations, we conducted individual interviews in winter 2021–22 with approximately 30 Upstate New York stakeholders representing a cross-section of community members and industry representatives.[6] Interviews were scheduled for between 30 and 60 minutes, and were semistructured to ensure consistency across stakeholder groups while allowing for flexibility to discuss specific topics or themes of interest. The interview guide included questions to:

- Identify stakeholder background and role
- Uncover local concerns around nonresidential solar projects
- Distill driving and restraining forces to community acceptance of nonresidential solar PV projects
- Generate tactics to help drive community buy-in and enthusiasm for solar projects
- Identify other local groups engaged in energy development issues

Interviews were conducted through a mix of virtual (i.e., phone and video conference calls) and in-person meetings to provide flexibility for stakeholders.[7]

Highlights from this research describe societal impacts on local community members, including concerns about the lack of control around development decision-making, the potential unequal distribution of solar benefits, and negative impacts on local agriculture and the natural environment. See Appendix A for specific information from the interviews.

1.2.3.2 Engagement: Workshops

Building on findings from the interviews, the Cadmus Group worked closely with the Nature Conservancy to design and facilitate two 3-hour virtual workshops, Expanding Benefits and Building Community Support for Nonresidential Solar. Workshops convened key stakeholders including local government officials, nongovernmental organizations (NGOs) and not-for-profits, regional organizations, planning councils and commissions, consultants, and utilities and solar developers. A total of 23 participants attended the workshops on April 28, 2022, and May 3, 2022. Appendix B details information from the workshops.

Following are key themes and findings from the workshops that inform the final deliverables:

- Significant concern about local capacity constraints, including staff time and expertise

- Perception that local governments were not adequately resourced to confidently review technical proposals, engage with developers, design and lead community engagement processes, or ensure that the expressed concerns of their community were adequately addressed in these projects
- Perceived lack of trusted, credible, and neutral expertise readily available to answer questions
- Need for additional engagement tools and strategies to ensure communities are able to influence project design early in the design process
- Visual impact remains a top concern for communities, and community concerns increase as the size of the solar project increases
- Impacts on the wider agricultural economy are a top concern, which is greater than concerns over the viability of agriculture on any given property
- Lack of one-size-fits-all system design means that solar projects need to be developed in ways that reflect the uniqueness of each community, site, and so forth
- Inadequate current financial compensation mechanisms, including payment in lieu of taxes and community host payments (e.g., reduced electricity rates)

1.2.3.3 Engagement through Focus Groups

The final stakeholder engagement activity was a focus group Evidn facilitated with previously engaged stakeholders to collect feedback on the proposed Solar Solutions toolkit. The discussion themes resulting from this focus informed the development of the final toolkit (described in section 3). The focus group occurred on September 26, 2023, from 1:00p.m. to 2:30 p.m., via video conference for stakeholders' convenience, and 10 stakeholders attended, representing not-for-profit, extension, community, and industry groups. Appendix C has details on one focus group held September 2023.

Discussion themes from this focus group include:

- **Decision-making capacity and resources vary across communities:**
  Local towns vary in access to resources, knowledge capital, and infrastructure needed to effectively engage in proposed solar development decision-making, leaving some communities feeling overwhelmed and lost in the details of solar contracting, sometimes at the expense of integrating broader community needs and priorities into decision-making.
- **Engaging the right people at the right time is key to community buy-in:**
  Community opposition to solar development is complex and multifaceted. Obtaining buy-in for solar solutions requires incorporating numerous attitudes, perspectives, motivations, and barriers from stakeholders who are impacted by the installation of such technology. Identifying all potentially impacted stakeholders and engaging them early in the conversation can increase the effectiveness and efficiency of processes.

- **Leveraging local expertise can mitigate barriers to solar acceptance:**
  Variable community expertise and experience with solar can spread false or inaccurate information, which gives rise to attitudinal barriers that can negatively impact community engagement with solar industry groups. Identifying networks of trusted local experts can increase the accuracy of and receptivity to solar information and its deployment.
- **Managing expectations is crucial for community planning:**
  Solar development planning can heighten community members' desire for control over processes and outcomes. An important consideration is setting realistic expectations for residents around what they can influence and how to best communicate their needs and priorities to developers and decision-makers.
- **Engaging a third-party facilitator can be valuable:**
  Solar energy development is underpinned by community transition decision-making and behaviors. Many identified barriers to solar acceptance can be mitigated involving a third-party facilitator to document community needs and priorities, engage local influencers, and guide negotiations and planning among residents, developers, and municipalities to bolster community transition.

The research and stakeholder engagement from these first phases build on themselves to guide the outputs of this research highlighted in the following sections. Section 2 discusses the Case Study, section 3 presents the Community Toolkit, section 4 outlines communications materials, and section 5 concludes with recommendations.

2 Community Transition Toolkit

2.1 Why Do Communities Need a Transition Toolkit?

The changing climate and increased demand for renewable energy development in society is pressuring communities to adopt new ways of living, thinking, and behaving. The scale needed to meet New York State's energy transition goals will require a shift in the very fabric of communities from physical infrastructure to jobs and workforces. Fundamentally, our communities are in various stages of transition in tandem with the clean energy transformation.

2.2 How a Toolkit Can Help Communities Transition

The community benefits and virtues of a clean energy transition are real, including cleaner air, improved public health, economic development opportunities, and safer weather patterns. However, engagement with New York State communities through this project has confirmed that successfully navigating solar development decisions and processes at a local level is challenging.

Key challenges include:

- Insufficient local expertise and capacity to navigate administration processes and facilitate engagement with solar industry stakeholders
- Lack of awareness of existing information and available resources
- Limited opportunity to voice local concerns and engage in a transparent decision-making process with solar industry stakeholders

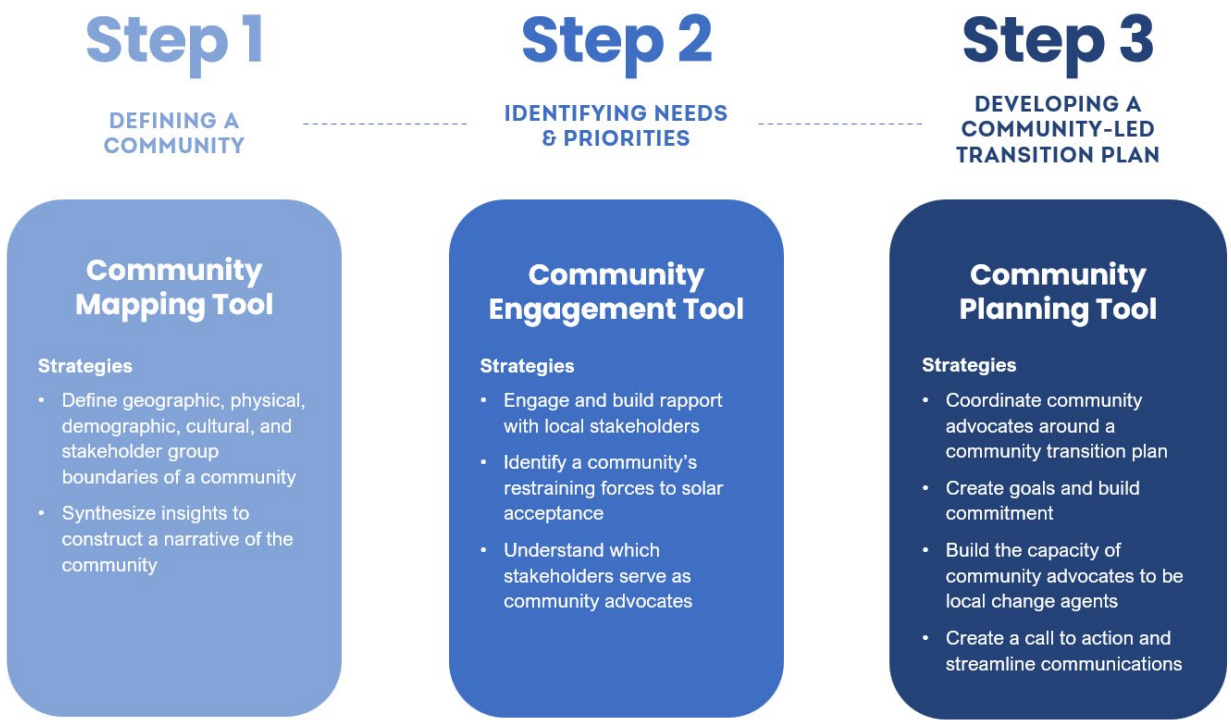
To help overcome these challenges, engaging with community residents to understand what is important to them and working with them to develop a strategy to ensure their concerns are heard is not only critical, but also very difficult.

We designed the Community Transition Toolkit to assist New York State communities to successfully support and adopt nonresidential solar PV projects. While content is framed around solar energy, the tools and strategies included in the toolkit have relevance for other projects, including renewable energy development, more broadly.

The toolkit comprises three steps geared toward understanding a community and providing a blueprint for effectively navigating solar development (Figure 2).

1. **Defining a community:**
   A community can take many forms and definitions. This step of the framework provides a mapping tool to help define the physical and social parameters of the community being considered for nonresidential solar PV development.
2. **Identifying needs and priorities:**
   Not all stakeholders have an equal say in decision-making on local solar developments. This step provides tools to engage with community advocates and identify what is important to communities to preserve and protect in the context of solar development.
3. **Developing a community-led transition plan:**
   Change that is locally owned and led has distinct benefits. This step provides a tool to assemble a solar transition plan tailored to the needs and stakeholders of a community to coordinate resources, build commitment, and lead change locally.

Figure 2. Community Transition Toolkit



2.2.1 How the Toolkit Was Developed

The Community Transition Toolkit is based on evidence collected in this project as well as previous research not related to this project. The tools assembled under each step of the toolkit draw on behavioral science theories and frameworks central to understanding human decision-making and behavior. Insights revealed through stakeholder and community engagement processes are specific to the experiences of stakeholders in New York State (see section 1.2 for methodological detail).

2.2.2 How to Use the Toolkit

The Community Transition Toolkit is designed to be a practical manual-style document. Each section provides instructions on how to use the toolkit templates. Examples of templates are provided along with worked examples, where appropriate. The templates can be found in Tables 1, 2, 3, and Figure 5.

The toolkit forms part of a system-level approach toward building community acceptance of nonresidential solar PV. To optimize the utility and effectiveness of the toolkit, certain conditions ideally should be in place:

- **Engage an independent facilitator:**
  The toolkit requires intensive information collection and relationship building, which take time and resources. Community leaders should consider engaging an independent facilitator that not only has the time to devote to the project, but also to ensure that the needs and priorities of the various stakeholders are heard and treated with respect and without bias.
- **Train and build skills of program coordinators:**
  Several government organizations have the necessary resources and experience to connect community officials with relevant programs and resources, providing much-needed guidance for navigating the benefits and costs of solar development. Examples include NYSERDA Clean Energy Communities Coordinators and Cornell Cooperative Extension Ag-Solar Working Group. Community leaders should consider how capacity can be built within groups to bolster the presence of support, assistance, and outreach skills in communities.
- **Enhance regional coordination:**
  Several state-level coalitions and networks routinely capture and share the perspectives of industry, government, and civic groups on solar development processes and structures. At a regional level, these stakeholder networks and forums are less developed and have less capacity, creating a gap in local knowledge. Enhancing the coordination of organizations and groups at the regional level will assist with toolkit rollout across communities.

2.3 Step 1: Defining a Community

2.3.1 Why Communities Matter

Early considerations when planning for solar development should not just encompass solar siting (i.e., assessing the physical characteristics of the planned site), but also assessing the stakeholders who may want or need to be engaged during the development process.

Solar development touches multiple segments of a community ranging from private landholders to municipal planning boards, all to varying degrees. Some stakeholders have more control and influence on land use decision-making than others, but with regard to shaping community acceptance toward solar development, a whole-of-community approach is beneficial. Understanding the parameters of who should be engaged during the planning process is crucial to identify what matters most to a community, how to ensure residents feel their concerns are being heard, and ultimately to build broadscale buy-in with solar development decision-making.

2.3.2 Steps to Defining a Community

Step 1 helps build understanding of the social and economic orientation of a community. The community mapping tool provides the process of defining the dimensions of a community, ensuring the full range of physical, cultural, and social characteristics that make a community unique are considered.

Five dimensions (Figure 3) should be considered when constructing a definition of a community:

1. Geographic boundaries
2. Physical landscape
3. Demographic breakdown
4. Cultural context
5. Stakeholder groups

Figure 3. Five Dimensions for Defining a Community

2.3.2.1 Geographic Boundaries

The geographic boundaries associated with a solar development need to be established first to provide scope on the variety of place-based characteristics and social structures that should guide community mapping across the other dimensions. Key questions to guide this search include:

- Which towns are involved by the site location?
- Does the site involve multiple towns and/or counties (i.e., is it on a boundary of a town/county)?

2.3.2.2 Physical Landscape

Research should be done on how the land is currently being used within the identified geographic boundaries and whether renewable energy zoning is planned. This will identify the types of landowners who live in the community and suggest areas or landmarks that the community might want to protect from development. Key questions to guide this search include:

- What is the breakdown of land-use types (e.g., agricultural, forest, urban)?
- What renewable energy and/or other infrastructure zoning are planned for the community?

2.3.2.3 Demographic Breakdown

Next, the social characteristics of the community should be mapped by collating demographic insights. This dimension can help to identify whether a community is considered a disadvantaged community with regard to benefiting from renewable energy transition. Key questions to guide this search include:

- What is the breakdown of sociodemographic variables?
- Does the community meet New York State's disadvantaged community[8] criteria?

2.3.2.4 Cultural Context

An important consideration when building a community map is developing an understanding of how historical and/or cultural factors contribute to a sense of place. Every community has residents with both shared and unique characteristics. Being aware of local events and/or artifacts of significance can help tailor the stakeholder engagement approach to build rapport with community members. Key questions to guide this search include:

- What are the local histories of the community?
- What is the community known for?
- What characteristics are unique to this community?

2.3.2.5 Stakeholder Groups

The final layer to a community map is understanding the range of individuals, stakeholder groups, and organizations that may want to be involved with solar development decision-making. This process is key to ensuring inclusion and building crucial buy-in with various members of the community to minimize disenfranchisement and resistance early in the process. Key questions to guide this search include:

- What kind of stakeholders are involved in solar development decision-making?
- Which specific groups and/or organizations exist in a community?

2.3.3 How to Use the Community Mapping Tool

Follow these steps to construct a community map:

1. **Review existing research** to gather available information and resources to detail the five dimensions of a community (Figure 3).
    - Table 1 provides an example of a useful template to summarize insights from your research. The research template is designed to be filled out sequentially from left to right. Here are some helpful links to get started:

      New York State's Disadvantaged Communities Map[9]
      DECinfo Locator Tool: https://gisservices.dec.ny.gov/gis/dil/
      DEC Environmental Resource Map: https://gisservices.dec.ny.gov/gis/erm/
      DEC Acreage Mapping Tool: https://gisservices.dec.ny.gov/eafmapper/
      DEC Nature Explorer Map: https://www.dec.ny.gov/natureexplorer/app/

2. **Construct a community narrative.**
    - Figure 4 provides an example of how a community definition can be constructed using research insights captured by the desktop research template, a template to guide research conducted using computers (Table 1).

Table 1. Desktop Research Template

Geographic Boundaries	Physical Landscape	Demographic Breakdown	Cultural Context	Stakeholder Groups	
				Stakeholder Category	Stakeholder Group
[Town name] [County] [Regional]	**Land-Use Types** [Examples include wetlands, forests, agriculture.]	**Socioeconomic** [Examples include population, average household income.]	**History** [Examples include historic events.]	**Federal/State Government Agencies** Government agencies designed to manage federal or state level portfolios and resources. [Examples include the Environmental Protection Agency (EPA) or New York State Energy Research and development Authority (NYSERDA).]	[Group name] [Group description]
Adjacent Municipalities [Town name] [Town name] [Town name]	**Urban Development** [Examples include residential and commercial lands.]	**Race** [Examples include racial and ethnic data.]	**Artifacts** [Include features the community is known for.]	**Local Government** Local governments have the authority to manage resources and regulations at the town level and are granted power by the State. [Examples include town supervisors, town zoning board, or town courts.]	[Group name] [Group description]
	Current Renewable Polices [Include current town regulations and/or moratoriums for renewable energy projects.]		**Resources** [Include any cultural resources or resources of significance.]	**Industry Stakeholders** Stakeholders that have technical expertise in renewable energy and participate in solar siting and development. [Examples include developers, laborers, engineers, and local utilities.]	[Group name] [Group description]
	Interconnection [Include town proximity to existing energy infrastructure.]			**Community Interest Groups** Civic stakeholders who are organized around advocating for community interests and efforts. [Examples include local watershed groups and land conservation associations.]	[Group name] [Group description]
	Infrastructure [Identify if any other infrastructure projects (i.e., transmission, water system, etc.) projects are proposed.]			**Residents** Individuals who reside either permanently or long-term in a community. [Examples include agricultural landholders and civic landowners.]	[Group name] [Group description]

Figure 4. Worked Example of a Community Narrative

Community Narrative

(Fictitious Worked Example)

New Town, NY, is a picturesque municipality, nestled in the hills of the southern Red Mountains of Upstate New York. As a small farming community, the local economy and culture are rooted in generations of agriculture. The community boasts 3,000 year-round residents; campers and recreationalists visit in the summer months to enjoy the beautiful Blue River for various activities, increasing the population to x,000. The town has a rich cultural history, being home to several Indigenous Nations historical sites that draw tourists all year-round. Most New Town, NY, residents are White, comprising 85% of the population; the average household income is approximately $40,000/annually. Because farming is a significant driver of the local economy, many residents are members of the New Town Farm Bureau, a group that promotes agricultural betterment in the community. New Town is governed by its local town board, which hosts meetings on the third Wednesday of each month at the town hall. The town also has access to county and regional resources, including Purple County Land and Water Conservation Association and the State Energy Cooperative. Because of its location on the Blue River, residents created the Blue River Watershed Coalition, a community interest group that advocates on behalf of the watershed and its welfare. New Town has been identified as a potential location for renewable energy projects due to its proximity to existing renewable energy infrastructure, including electricity grid interconnection points, and established local renewable energy regulations.

2.4 Step 2: Identifying Needs and Priorities

2.4.1 Why Community Engagement Matters

Community engagement is pivotal for understanding and meeting community needs, as well as for mitigating resistance to local solar development. Investing the time needed to meet with community members to demonstrate genuine interest to local needs and priorities helps build trust and gain early buy-in with the solar development process. Step 2 focuses on engaging with community members to build on insights collected in step 1 to identify what matters most to residents in the face of solar development and who should be involved in developing a community transition plan (step 3).

Two distinct processes need to take place via stakeholder engagement to meet step 2 objectives:

- **Identify restraining forces to community acceptance:** What are the community's prioritized concerns and challenges toward local solar development?
- **Build relationships with community advocates:** Which stakeholders have the trust and influence to drive positive change in a community?

2.4.1.1 Community Engagement Reveals Restraining Forces to Change

To identify what matters most to communities, we need to identify the concerns and/or challenges stakeholders have in general and specifically regarding local solar development. Key questions to ask include:

- What does the community struggle with the most?
- What does it want to preserve and/or protect the most?
- How are views toward solar development affected by these collective needs and priorities?

A popular framework identifying what factors are influencing a community's decision-making is Kurt Lewin's Force Field Theory (1951), which states that behavior is influenced by both driving and restraining forces. Driving forces move people toward change whereas restraining forces move people away from change. A status quo, or equilibrium, exists when these two forces are equal. To successfully change the status quo in a community, community members' restraining forces to change need to be removed, rather than increasing the salience of their driving forces to change.

For a community, identifying and understanding the most influential restraining forces to solar acceptance are crucial to build into the development of the community transition plan (step 3), to ensure strategies to reduce a community's restraining forces to change are prioritized.

2.4.1.2 Community Engagement Builds Relationships with Community Advocates

Community advocates can be conceptualized as local champions—they are members of a community who have the trust and influence to drive positive change across various social groups.

Decades of research exist on how much influence the social groups we identify with can have on our own thoughts, beliefs, and behaviors. This process takes place through the desire to align our behavior to the social norms of a group. Social norms serve as the unwritten rules of how to think and behave, which group leaders shape. The extent to which leaders can be identified and engaged within communities determines how perspectives and behaviors can be successfully shaped.

Step 3 is predicated on the ability to collect relevant insights in step 2 to understand how stakeholders can serve as community advocates and how to enlist them in coordinating a community response to local solar development.

2.4.2 Identifying Community Needs and Priorities

The community map developed in step 1 is the foundation for initially identifying whom to engage within the established parameters. Step 2 involves engaging with community members to build on insights collected through desktop-based research in step 1.

The community engagement tool provides strategies and techniques to effectively engage with community members, identify local restraining forces to change, and build relationships with community advocates.

The tool comprises the following sections:

- **Part A**, **Interview guide:** How to engage community stakeholders
- **Part B**, **Restraining force analysis:** How to identify restraining forces to change in a community
- **Part C**, **Community advocate profiling:** How to understand how community advocates drive positive change in a community

Outputs of Part A are central to deriving Part B and Part C outputs. In other words, stakeholder engagement will determine how comprehensive one's understanding is of the residents, their networks, and needs and priorities within a community.

2.4.3 How to Use the Community Engagement Tool

2.4.3.1 Part A, Interview Guide

The interview guide provides techniques for effective community outreach and engagement, and it helps determine the best approach for requesting an interview, conducting an interview, and following up after an interview with stakeholders who have been mapped in step 1.

For each planned engagement for step 2, follow these guidelines:

1. **Prepare; conduct background research:**
    - Identify the best contact person for each mapped stakeholder group.
    - Determine the best way to make contact.
    - Assess their backgrounds and roles to help create relevant interview questions.
2. **Outreach**
    - Personalize the outreach message to the stakeholders being contacted. How can the message be made personally relevant to their role in their organization?
    - Keep the initial contact brief. Ensure the basics are outlined by providing an introduction, the aim of the outreach, the ask, and potential options for meeting venues (in-person, phone call, videoconference, etc.).
    - Make it convenient for the stakeholders. Consider timing, location, and internet access when scheduling accessible and inclusive meetings.
3. **Engage**
    - Engage in active listening techniques. Be aware of nonverbal communication (e.g., what is your body language communicating?). Demonstrate active listening skills by nodding, paraphrasing, and summarizing the stakeholders' thoughts throughout.
    - Validate the perspectives and experiences of the stakeholders being interviewed.
    - Respect the stakeholders' time. Ensure the interviews begin on time (or if late, give as much notice as possible), and avoid running over time.
    - Ask the right kind of questions. Figure 5 provides a suggested interview question template to help structure these conversations.
4. **Follow-up**
    - Send follow-up notes. Thank stakeholders for their time and include any information promised during the interview (e.g., circulate a resource, share a link, request stakeholders' contact details).

Figure 5. Interview Question Template

Interview Question Template

Provided below is a suggested **interview question template** to help structure your conversations –

1. Welcome

Use their name (confirm pronunciation if unsure) and express your appreciation for their time.

2. Build Rapport

Use the first few minutes to build rapport with the interviewee by asking ice-breaking questions (e.g., How is your week going? Where are you based?).

3. Introductions

Make sure to introduce yourself briefly and ask the interviewee to provide an overview of their role and background.

4. Framing

Reiterate why you are conducting the interview and what you would like to discuss with them. Make sure to disclose any privacy or confidentiality considerations so the interviewee knows how their response is going to be used.

5. Question Themes

Consider shaping the conversation around two core question themes:

Restraining Forces

- What has been your experience / observation of concerns or challenges community members have towards non-residential solar PV?
- What do you think the community's perception towards solar is overall?
- What kind of skills and capacity does your community need to navigate solar development decision-making?

Stakeholders

- Which groups do you work / interact with?
- What kind of groups are typically implicated with solar decision-making in the community?
- Who has been outspoken about solar development in the community?
- Who do people listen to and place their trust in with community decision-making?

6. Close

Thank the interviewee for their time and ask whether they could suggest 1-2 other community members with whom you should conduct an interview.

2.4.3.2 Part B, Restraining Force Analysis

This section of the tool helps extract which restraining forces are contributing toward community resistance to nonresidential solar PV development.

Lewin's Force-Field Theory (1951) suggests that an understanding of restraining forces is the most important consideration when trying to change the status quo. Restraining forces reveal what is important to preserve and/or protect as a community in the face of solar development. The ability to identify what these issues are is crucial to generating step 2 insights and laying the foundation for step 3.

To help with this task, we have created an evidence-based list of key restraining forces that shed light on the reasons why specific residents might be resistant to local solar development. These restraining forces, derived from desktop-based research and community engagement conducted over the course of the project (see section 1.2), include:

- **No voice or control over local solar decision-making:**
  One of the most common concerns is the lack of control residents have over proposed developments in their communities. Feelings of having no voice contribute to a low sense of collective efficacy around navigating solar development.
- **Perceptions of solar deals as being unfair:**
  Some community members want compensation and additional benefits for having local solar development and facilities. Some residents are opposed to seeing facilities (i.e., mitigating potential costs is of greater concern than realizing the potential benefits of solar developments).
- **Towns lack capacity to engage in solar decision-making:**
  Solar development is a complex, multifaceted process, and local communities are often ill-equipped to commit the time and resources needed to align with the goals and vision of their community.
- **Risk to regional character and sense of place:**
  The potential impact that nonresidential solar development may have on agricultural lands is a key point of concern, which stems from the cultural and economic changes that solar developments could potentially have on farming communities and the fear of losing prime agricultural lands for nonfarming uses.
- **Threat to natural resource:**
  Environmental concerns associated with solar development cover a wide spectrum of issues, ranging from the negative impacts on recreational use of natural resources, to the potential hazardous impacts of toxic substances on the ecosystem. Ultimately, these represent preexisting and ongoing environmental tensions such as when efforts to mitigate climate change conflict with other environmental priorities.

- **Myths and misconceptions about solar energy:**
  Variability in community communication, expertise, and experience with solar development can create myths and misconceptions. The spread of misinformation gives rise to attitudinal barriers, which can negatively impact community engagement with solar industry groups.

Follow these steps to complete the restraining force analysis:

1. **Review collected stakeholder interview notes and synthesize insights.**
   - What concerns and/or challenges did interviewees raise?
   - What are the common themes regarding concerns and/or challenges?
2. **Group these insights via the restraining forces.**
   - How do these insight themes map onto the predefined list of restraining forces?
   - Use the restraining force analysis template (Table 2) to note which restraining forces are relevant to the analysis.
3. **Indicate which stakeholder category maps onto each restraining force.**
   - Use the restraining force analysis template to note the type of stakeholder (i.e., business owner, farmer, etc.) who raised concerns and/or the challenges that map onto the list of relevant restraining forces.
4. **Assign an impact score.**
   - Provide an assessment of how impactful each restraining force is on influencing the attitudes and behaviors of stakeholder categories.

Table 2. Restraining Force Analysis Template

Use the impact key of one, two or three dots to indicate the level of impact of each restraining force.

● Low impact ● ● Moderate impact ● ● ● High impact

Restraining Force	Federal & State Govt.	Local Govt.	Industry Stakeholders	Community Groups	Residents
1.					
2.					
3.					
4.					
5.					
6.					

2.4.3.3 Part C, Community Advocate Profiling

This section of the tool provides an understanding of the ways stakeholders can advocate for their community in the context of solar decision-making. This kind of information is typically revealed after engaging with members of the community, rather than purely through desktop-based research.

Community advocate profiling is a process undertaken to provide more clarity around how the mapped and engaged stakeholders can serve as community advocates. Community advocates can have multiple forms of influence within a community, from the kind of connections and relationships they possess to the way they facilitate the flow of information.

Following are five personality types typically found in communities who can be instrumental in advocating for their community's acceptance of solar. Each personality type comprises different motivational factors and behavior patterns.

1. **Connector:** This stakeholder operates as a spoke on a wheel in a community and is the central connection point to multiple stakeholder groups in the system. The Connector exerts influence through the number and quality of stakeholder relationships. Connectors are generally trusted and respected, and they are helpful in getting an initial overview of the community and bringing people together.
2. **Translator:** This stakeholder is a crucial intermediary between external solar-based stakeholders and the community. The Translator often occupies an on-the-ground extension-based or community coordinator role and is responsible for helping community members navigate local solar development decision-making via information, resources, and program support.
3. **Expert:** This stakeholder has expertise specific to solar siting and development. The Expert can offer communities up-to-date and accurate information about solar technology and developments. Respected for their knowledge, Experts are an important resource for community residents to be able to access.
4. **Decision-maker:** This stakeholder occupies a formal decision-making role in the community and exerts influence through position-based power. The Decision-maker is typically a public figure and has the responsibility of representing and advocating for the community's needs and priorities.
5. **Spokesperson:** A stakeholder who is informally recognized as representing a certain portion of the local population or community, this person synthetizes and reflects not only their own sentiments, but also those of other community members. The Spokesperson is generally outspoken and sees themselves as an important conduit to communicate local needs, priorities, and concerns. They typically participate in local discussion forums and events and are part of local community interest groups.

Following are the three steps to completing the community advocate profiling template (Table 3):

1. **Review compiled interview notes and synthesize insights for each stakeholder.**
    - How does this stakeholder describe themselves and their role in the interview?
    - How have other stakeholders described this stakeholder (if applicable)?
    - How does this stakeholder interact with other stakeholders in the system?
2. **Assign a community advocate personality type profile (or multiple profiles).**
    - Compare compiled notes to the listed personality profiles and assess whether one or more fit identified synthesized insights for each stakeholder.
3. **Provide a rationale.**
    - To help prepare for step 3, note how each stakeholder has the potential to serve as a community advocate.

Table 3. Community Advocate Profiling Template

Stakeholder Name	Stakeholder Category	Community Advocate Profile	Rationale
[What is the stakeholder's name?]	[Which stakeholder personality type do they belong to?]	[Which personality type(s) is/are relevant?]	[Why did you assign the personality type(s)?]

2.5 Step 3: Developing a Community-Led Transition Plan

2.5.1 The Benefits of Community-Owned and -Led Change

The growing demand for renewable energy development is creating rapid change in communities. The extent to which aspects of this transition process can be owned and led locally has important implications for a community's overall acceptance of local solar development. Step 3 provides the means to support communities' sense of collective efficacy around solar development decision-making.

2.5.2 How to Create a Community Transition Plan

Step 3 combines one's understanding of people and their needs and priorities to develop a plan for how a community can prepare for local solar development. The community planning tool provides a staged framework for creating the conditions to optimize the way a community works together.

The planning tool comprises four stages:

1. **Coordinate:** Create governance structures to rally and unite community advocates around local solar development decision-making.

2. **Commit:** Set goals and build commitment around actioning the renewable energy needs and priorities of a community.
3. **Build capacity:** Help community advocates build new skills and capacity to lead change in their community.
4. **Communicate:** Create a call to action around solar development for the community and leverage existing resources and information to enhance outreach and education.

2.5.3 How to Use the Community Planning Tool

The community planning tool is designed to be co-developed with the community of focus. Steps 1 and 2 of the Community Transition Toolkit provides several inputs needed to assemble the plan.

2.5.3.1 Stage 1, Coordinate

Stage 1 is geared toward creating organizing structures to rally and unite community advocates around local solar development decision-making. Use these tools to assist with coordination planning:

- Community map (step 1).
- Community advocate profiling (step 2).

Coordination Planning

Coordination planning is needed when local group-based structures are insufficient for hosting effective solar development engagements and/or decision-making processes. Bringing together local community advocates to ensure that the community's needs and priorities have a platform to be heard, that residents have access to information and resources, and that local perspectives, values, and expertise are integrated into solar siting and decision-making is crucial.

Answering the following questions will help to coordinate community focus:

1. **Do any coordination groups exist?** Use the developed community map (step 1) to establish whether any governance structures already exist within the community (e.g., town planning board). Assess whether existing structures could be enhanced or if a new structure should be created to host the community transition plan.
2. **Who should be recruited?** Use compiled community advocate profiling outputs (step 2) to identify which stakeholders should be invited to form a local coordination group. Consider having representation across multiple stakeholder and community advocate personality types.
3. **What should governance look like?** For the stakeholders being considered for recruiting, use the developed community advocate profiling outputs (step 2) to guide decision-making around the kind of governance structure that should be applied and the roles that are best suited for each stakeholder.

Evidence Base

- Highlighting buy-in from community advocates can help overcome preexisting attitudes and biases toward solar.
- Groups that community members identify with can be powerful change agents to solar acceptance.
- Working with in-group leaders is crucial for creating a change in social norms.
- Creating a sense of ownership and control is beneficial to ensure community stakeholders feel heard and involved in the process.

2.5.3.2 Stage 2, Commit

Stage 2 is built around setting goals and building commitment around prioritizing the renewable energy needs and priorities of a community. To assist with commitment planning use this tool:

- Restraining force analysis (step 2).

Commitment Planning

The solar transition goals set for a community should be focused around advocating local needs and priorities. The commitment-planning stage provides the opportunity to document what matters most to a community with regard to balancing the risks and benefits of solar development. Building commitment around meeting these goals (and implementing other components of the community transition plan) is crucial, especially when seeking and gaining commitment community advocates.

Answering these questions will help build commitment in a community:

1. **What goals should be set?** Refer to the restraining forces identified for the mapped stakeholder groups via the restraining force analysis (step 2). Consider the goals that can be set to reduce the influence of restraining forces on the decisions and behaviors of stakeholder groups in the community.
2. **How can commitment be built?** Consider how commitment devices can be implemented to gain buy-in from community advocates (e.g., drafting a behavioral commitment that requires members of the assembled coordination group to identify the actions they commit to doing to help implement aspects of the community transition plan).

Evidence Base

- Highlighting formal buy-in and commitment from leaders helps to overcome preexisting attitudes and biases toward solar.
- Identifying self-nominated actions and clear intentions for how stakeholders will contribute to the initiative promotes a sense of ownership and commitment.

- Engaging social comparisons and nudges can further enhance community stakeholders' motivation to commit.

2.5.3.3 Stage 3, Build Capacity

Stage 3 focuses building new skills and capabilities for community advocates to lead change locally in their community.

These tools can assist with capacity-building planning:

- Community advocate profiling (step 2).
- Interview question template (step 2).

Building Capacity

Building capacity is crucial for embedding new skills and practices in a community to better understand and overcome resistance toward local solar development. The focus of building capacity should be on providing community advocates with numerous behavioral science–based skills and tools to positively influence community members' perspectives and behaviors toward local solar development.

Answering these questions will help build capacity in a community:

1. **Who should participate?** Review the list of community advocates generated in step 2 to identify who should be prioritized and invited to capacity-building sessions. Consider grouping capacity-building participants together based on similar community advocate profiles.
2. **What skills should be enhanced?** Community members can benefit from skillsets ranging from coordination behaviors to strategies for enhancing engagement at community events and forums. Refer to responses gathered using the interview question template (step 2) to identify the kinds of skills and capacity stakeholders have flagged are needed in the community. Consider engaging a third party to co-design and deliver a capacity-building program tailored to these needs.

Evidence Base

- The effectiveness of community members' interpersonal skillset is a predictor of how they will influence other in-group members.
- Community advocates are seen as an in-group and can have a major influence on a community's response to solar development.

- Capacity-building is an effective behavioral change strategy that ensures new desired behaviors are embedded within a community.

2.5.3.4 Stage 4, Communicate

Stage 4 creates a call to action around solar development for the community and leverages existing resources and information to enhance outreach and education.

This tool can assist with communication planning:

- Community map (step 1).

Communication Planning

Solar expertise and experience in communities may be limited and this can make them uncertain about whom to go to for information and resources to navigate solar decision-making. Streamlining outreach resources and materials may help better inform and prepare communities for solar development.

Answering these questions will help to communicate within a community:

1. **What kind of resources are readily accessible?** Use the community map developed in step 1 to determine what existing resources community members have access to. Consider the kind of solar programs, policies, and support services that communities can access in their region.
2. **How can resources and materials be streamlined?** Consider working with the assembled coordination group to build a central information and resource repository for the community. The repository will be important for connecting community members with the appropriate individuals, programs, and information to assist with local solar development decision-making.

Evidence Base

- Adding a call to action is a common tactic to ensure success with behavior-change initiatives.
- Building collective action around a common goal is an effective behavior-change tool. This helps build positive outcome expectations by transferring benefits and risks from individuals to the collective.

3 Solar Solutions Case Study

3.1 Background and Context

Several communities in New York State already have direct experience with navigating renewable energy projects as proposed solar development begins to gain traction. While solar energy often receives widespread support in the abstract, this is not always the case when local developments are proposed.

Community members vary in their degree of acceptance of solar developments in New York State. Understanding community attitudes and responses to solar development can help stakeholders to improve community coordination, build capacity and confidence, and inform future community-led transitions.

3.2 Key Takeaways

1. **Preparation is essential to successful community transition.**
   Be prepared by investing in community information networks and creating local laws to support comprehensive transition to renewable energies.
2. **Build a sense of collective ownership through local communication.**
   Identify local expertise and coordinate tailored communications to increase collective ownership and community understanding of renewable energy developments.
3. **Frame solar development as a part of the climate solution and connect solar projects to local needs and values such as economic development, job creation, and increased public health.**
   Consider message framing to ensure that solar energy projects are framed appropriately as part of the solution to address local community economic development opportunities, energy security, increased public health benefits, and a local contribution to climate change—not only as a solution to climate change.

3.3 Purpose

This case study gathers experiences from analyzing four communities in Upstate New York that have recently navigated a solar development project. It offers insights around experiences of towns with solar developments, details what these communities thought could have been done to better support their transition, and shares what the communities learned about overcoming local concerns and building overall community transition readiness.

3.4 Setting the Scene

Evidn approached municipalities with the opportunity of allowing their experiences to be included in this case study with the goal of sharing collective experiences of New York State communities that have overcome barriers to local solar developments, as well as sharing strategies they recommend to other towns. The identities of participating towns have been removed to maintain confidentiality.

Towns included in this case study came from four New York State counties: Herkimer, Saratoga, Tompkins, and Washington. The average population across towns included in this case study was approximately 3,650 residents, with a median household income of approximately $42,000 annually. The average ethnic makeup of included communities was overwhelmingly White, with White residents comprising 96% of residents across the four towns. Common land-use practices across the communities include a heavy presence of agricultural lands, followed by residential and commercial lands.

3.5 Their Experiences

Evidn asked participating towns to reflect on their experiences with navigating nonresidential solar PV developments. Following are several themes that emerged and that explain the underlying perspectives, decisions, and behaviors of communities.

3.5.1 Information Is Not Enough to Change Behavior

Local town officials can sometimes feel that they may be underequipped to navigate proposed solar developments on their own and are unsure of where to get more support. While access to information and expertise is an important prerequisite to encourage adoption, this approach can have limited utility. Human behavior is not strictly objective and can be influenced by personal values, perspectives, social/personal norms, and other contextual factors. Effective information dissemination focuses on the needs of the target audience (i.e., local solar stakeholders) and is presented in a form that can be easily used and processed. Improved communications between stakeholder groups and tailored messaging allows for a more effective network and can assist in removing potential sources of misinformation.

> "There is a lot of overlap in the system and I'm not sure who to go to first." –Town official

3.5.2 Community Residents Want More Control

Limited community experiences and understanding of solar technology can make prioritizing sources of community concern confusing for town officials. Social cognitive theory suggests that learning occurs not only through experiencing the consequences of one's own actions, but also through direct observation and modeling of others. The theory indicates four important precursors to behavior change, as applied to acceptance of renewable energy projects:

1. **Self-efficacy:** Community members' sense of confidence that they can have more control of their actions and the associated outcomes.
2. **Collective efficacy:** Community stakeholders' belief in the ability of their community to work in a unified manner to achieve positive change.
3. **Goals and aspirations:** A community's short- and long-term goals determine what kind of conservation practices and community readiness activities are prioritized.
4. **Outcome expectations:** The specific outcome(s) communities anticipate from their behavior.

This theory may explain why, despite recommendations and incentives for change efforts, change remains a challenge for some communities. Without a sense of individual or group-level confidence (i.e., efficacy), individual stakeholders are unlikely to change their current feelings toward renewable energy projects. Likewise, without appropriate goals, incentives, and behavioral feedback, change is unlikely to be long-term or sustaining.

> "It's hard to know what concerns to address first; we try to cut through as much misinformation as possible." –Extension advisor

3.5.3 Experience Impacts Future Perceptions

Experiences with solar developers range greatly from town to town, and these variations can cause stakeholders to question the intentions and integrity of groups that might represent solar or clean energy projects. Humans rely on heuristics, which are automatic and cognitively effortless mental shortcuts, to facilitate decision-making and judgment formation. While these are typically helpful, they can also lead to cognitive biases and errors in judgement and decision-making. One of these is confirmation bias, prior beliefs that influence the likelihood that individuals will accept or reject reports of scientific studies. Individuals tend to accept facts that support their beliefs and reject those that contradict them. Variability in solar developer communications to interested landowners and area stakeholders, as well as delayed communication of project information to locals, can impact wide-scale project acceptance.

"Developers come into communities with not fleshed out projects and see a lot of opposition."
–Town planning board member

3.5.4 Risk Tolerance and Decision-making Vary across Communities

Loss aversion and risk tolerance are powerful influences on an individual's assessment of risk and adaptive decision-making. Communities that have greater levels of risk tolerance are more likely to be successful in proactively preparing for renewable energy projects. Local towns vary in access to resources, knowledge capital, and infrastructure needed to effectively engage in proposed solar development decision-making. This can leave some communities feeling overwhelmed and lost in the details of solar contracting, sometimes at the expense of integrating broader community needs and priorities into decision-making.

"I only have 15 hours a week to do this job and solar coming to town makes it feel like a full-time job." –Town supervisor

"Small towns don't have the right people to take on solar, and developers know that."
–Extension advisor

3.5.5 Managing Expectations Is Crucial for Community Planning

External events, including solar development planning, can heighten community members' desire for control over processes and outcomes. An important consideration is how community leaders set realistic expectations for residents around what they can influence and how to best communicate their needs and priorities to developers and decision-makers.

Research suggests that leadership influence is important in the diffusion of new renewable energy technology. Community stakeholders who are innovators or early adopters of new renewable technology or energy-use practices are more likely to be respected opinion leaders in their communities. Identity leadership theory suggests that leaders are chosen as the most "prototypical" member of their group, subsequently setting the agenda for how people should behave, defining new group norms and behaviors.

"We don't want to make it impossible for solar to come here; we just want to make sure we are protecting the future of our town." –Town supervisor

3.6 Stakeholder Recommendations for Future Transitions

After reflecting on their own specific experiences, participants were then asked what advice they would give to other towns that might be interested in clean energy projects. Below are three key recommendations to consider.

3.6.1 Preparation Is Essential to Successful Community Transition

Participating towns reported that they wished they had been more prepared when first approached by solar developers. Being proactive by organizing stakeholder groups, investing in renewable energy knowledge networks, and establishing local laws regarding renewable energy can help increase community confidence and capacity to undertake proposed solar developments. Town officials are continuing to brainstorm ways to address community concerns around proposed solar developments while also building capacity to transition to renewable energy sources.

> "Get your ducks in a row before the developers come. Get your laws on the books before you are playing catch-up." –Town planning board member

3.6.2 Build a Sense of Collective Ownership through Communication

Community leaders look for information but are often unsure of where to start. While myriad resources are available through New York State and other stakeholders, many town officials are overwhelmed by the volume of available information and do not know where to start or how to navigate those resources. A regional coordinator with deep knowledge and familiarity of the available resources would be helpful to town officials.

Identifying or building local expertise and coordinating targeted communication can increase community understanding of renewable energy developments. A sense of psychological ownership is the inference or feeling that a particular object or objective is one's own, and the objective is perceived as an extension of oneself. Collective psychological ownership can be evoked when individuals feel ownership in a project. Including input and involvement by community stakeholders will help communities feel proposed initiatives are co-designed and co-delivered, and that experience is a core component of successful programs. This ensures that initiatives have an approach that includes local involvement while being tailored to the unique interests and needs of subpopulations. This strategy also enables a broader reach and reduces barriers associated with staffing and resourcing constraints. Supporting communities to develop a sense of ownership over renewable energy projects is associated with increased stewardship and positive perspectives which, in turn, increases the likelihood of successful behavior change initiatives.

> "I would like more context on solar resources that are already out there to support our town." –Town supervisor

3.6.3 Create a Strong Messaging Framework

Communities need to frame solar development as part of the local economic development, energy security, and increased public health strategy, not solely a climate solution. They need to view renewable energy projects as way to help meet local needs and enhance community character. For instance, renewable energy projects can serve important functions in local economic development, job creation, and energy security in addition to being a local contribution to the larger climate change solution. Consider creating messaging to ensure the community communications are inclusive and provide a space for all stakeholders to share their thoughts on what local benefits renewable energy projects can bring to a community. Communities that take steps toward transitioning to safer and more reliable forms of energy, while also implementing other energy conservation practices, use the whole of community approach, creating more lasting change and building community-level confidence in the transition.

> "Renewables need to be complemented by a huge reduction in energy demand, but most people don't want to hear that." –Town supervisor

3.7 Summary

The effects of climate change, growing energy demands, and changing societal requirements have placed increased pressure on communities to adjust their decision-making and adopt new, more sustainable ways of living, thinking, and behaving. Strategies for communities to make these changes require coordinated efforts and although this case study focuses on nonresidential solar PV projects, community readiness for the clean energy transition goes beyond solar developments. The benefits and virtues of the clean energy transition can often be forgotten and proposed solar developments can evoke emotional responses from community members. The experiences of community transition included within this case study show that while community-level transition is a new experience for many towns, resilient and successful transitions can be achieved, and applying insights from other town experiences can build confidence and efficacy across New York State. The research and stakeholder engagement from these first phases build on themselves to guide the outputs of this research highlighted in the following sections.

4 Communications Materials

4.1 Background and Context

While most New Yorkers view solar and renewable energy sources positively, this support does not always translate into action once it becomes a potential reality in their own town. One of the greatest restraining forces to community acceptance of solar is limited opportunity for communities to "have their say." Communities have an opportunity to enhance the way solar energy development is communicated by ensuring messaging includes an understanding of people's needs, priorities, and motivations for being part of positive change initiatives.

4.2 This Guide

This document summarizes key principles of solar development-specific communications design and deployment, as well as demonstrates these strategies in use in a sample communication. These principles are not designed to be prescriptive but rather to provide easy-to-follow ideas for enhancing and facilitating communications within communities.

4.3 Design Principles

4.3.1 Personalize Information

Content that is personalized according to stakeholder groups and reader preferences can reduce reader fatigue and reduce cognitive load. Structure communications materials with the needs and priorities of the key audience in mind. Segmenting the key audience will demonstrate anticipating and meeting the different social group's needs and priorities. Doing so adds a personal touch, can foster trust, and can elicit a positive behavioral response. This principle can be implemented by simply addressing communications with the recipients' names and translating resources into the target audience's language of choice, as well as providing translation services at events.

4.3.2 Reduce Cognitive Load

Avoid overwhelming stakeholders with dense, hard-to-read information, which can lead to reader burnout and negatively affect comprehension. Simplifying the process of reading and making user-friendly materials is paramount. Furthermore, because our brains naturally form patterns and associations, similar content should be grouped together. Other ways to avoid visual clutter are to incorporate relevant photos, embrace negative space, and maintain consistent formatting for headings and subheadings rather than

using numerous font families and visual elements. Creating content in bilingual multiple forms (e.g., webinars, videos, letters, emails) increases accessibility and reach, and making the materials available prior to meetings allows people time to digest the content.

4.3.3 Consider Message Framing

Readers are greatly influenced by the way information is presented, and positive messaging is more powerful than negative messaging. Knowing your audience and, subsequently, framing data and information to make them more attractive to various stakeholder groups is important. For example, if the concept of climate change causes friction and does not resonate with the population, talking about "more frequent storms or droughts" might be more effective than talking about "climate change." The inclusion of other benefits, such as economic development and increased public health (i.e., cleaner air), should also be considered, as should framing the message as a solution, a fix for something the community cares about. Once the audience values are understood, all the benefits of solar energy development should be highlighted as a way to meet these goals and values.

4.3.4 Create a Call to Action

Important takeaways or areas of change could be supplemented with plans of action, or sample implementation plans to encourage the reader to overcome status quo bias. Consider integrating implementation intentions into the report, such as, "if situation X happens, then I will do Y," to improve goal attainment and modify habits and behaviors. Use positive emotions such as nostalgia or pride to take advantage of action bias (i.e., our desire to do something over nothing) to inspire the audience toward meaningful behavior change. Simple emotional messages are a valuable tool for effective communication because they easily cut across group identity barriers. Urgency is also a powerful emotion for driving action because people often act when they feel they may lose out or have something taken away. Incorporate action-oriented verbs such as "save" and "learn" and add a sense of urgency with words such as "now" and "today."

4.3.5 Use Social Norms

A key deciding factor in whether individuals will support solar development is whether they see it as something for like-minded individuals, not just for a specific group. Share stories of individuals who they identify with who have adopted solar to connect with new audiences and pique their interest. People

are bombarded with many pieces of information daily, so putting your message in terms of the human impacts of solar and how it tangibly benefits the community will be more memorable and effective. This could be a video testimonial from a local stakeholder highlighting their neighbors' involvement in solar or a success story from a similar town.

4.4 Principles in Action

An effective communications strategy for community outreach typically includes a range of distributed materials, such as overview brochures, event flyers, mailers, emails, press releases, and social media posts. With each form of outreach, be sure to:

- Keep the message concise and avoid confusing solar terminology
- Develop and incorporate a logo or symbol to help readers recall the project
- Emphasize and clearly state any deadlines, locations, times, or next steps
- Direct readers to the project website or other form of contact for more details

Using these principles, Figure 6 is a sample flyer for a workshop held by NY Solar Developers to discuss a potential solar development in a fictional town in New York State.

Figure 6. Example of New York Solar Developers Event Flyer to Be Distributed on Farms and at Agricultural Industry Events

This is an example of a flyer announcing an information session. The flyer is intended to be distributed to local farms and at agricultural industry events.

1 **Personalize Information.**

The flyer is addressed specifically to farmers and agricultural professionals of NY Town.

2 **Reduce Cognitive Load.**

The flyer has minimal text and a concise message. Workshop location, date, and time are all grouped together, and similar looking elements were chosen to highlight other workshop details.

3 **Consider Message Framing.**

There is a focus on positive messaging through the deliberate, simple wording of “Let’s talk about our community and renewables”. This relays the idea that this is an open forum and that no decisions have been made without consulting the community.

4 **Create a Call to Action.**

There are instructions on next steps, clear messaging urging residents to attend this informational event. This unifies the response across stakeholder groups and is a direct signal to have their voice be heard.

5 **Use Social Norms.**

Including in-group members such as John Smith appeals to this group because it shows that this event is for people like them.

5 Conclusion and Recommendations

This report details the findings to help identify and understand the factors that shape community attitudes toward nonresidential solar PV solutions throughout New York State.

We used a multipronged approach, including a comprehensive review of research and evidence, as well as engagement with stakeholders across local communities and New York State's renewable energy system. The main feature of the report is the Community Transition Toolkit, which combines evidence-based tools and strategies to define a community, identify stakeholder needs and priorities, and develop a community-led transition plan. Undertaking these processes is crucial for helping communities navigate the increasing pressures and requirements of local solar development.

This report also includes two supporting outputs: The Solar Solutions case study integrates insights from community meetings to share lessons learned and recommendations for overcoming local concerns toward solar development, and the communications materials highlight the way behavioral science design principles can be used to create accessible and effective solar outreach and communications materials.

The recommended tools and strategies highlighted herein are designed to complement New York State's proactive approach toward cultivating transparency and inclusivity for solar development decision-making with communities. To support the rollout of the Community Transition Toolkit, community leaders should consider the role independent groups play in helping to facilitate community engagement, build capacity in the network of on-the-ground program coordinators, and enhance regional coordination among government, industry, and community groups.

1. **Preparation is essential to successful community transition**.
   Community leaders prepare by investing in community information networks and creating local laws to support comprehensive transition to renewable energy.

2. **Risk tolerance and decision-making vary across communities**.
   Loss aversion and risk tolerance are powerful influences on individual's assessment of risk and adaptive decision-making. Communities with greater levels of risk tolerance are more likely to be successful in proactively preparing for renewable energy projects.

3. **Build a sense of collective ownership through local communication**.
   Identify local expertise and coordinate tailored communications to increase collective ownership and community understanding of renewable energy developments.

4. **Frame solar development as a multipronged solution for many issues.**
   Create messaging that enumerates all the benefits of solar development (e.g., economic development, energy security, increased public health benefits, local contributor to climate change), not just the climate solution

5. **Invest in training and skill-building for of program coordinators.**
   Several government organizations have the necessary resources to connect community officials with relevant programs and resources, providing much-needed guidance for navigating the benefits and costs of solar development. Community leaders should consider how capacity can be built within groups to bolster the presence of support, assistance, and outreach skills in communities.

6. **Enhance regional coordination.**
   Several state-level coalitions and networks capture and share industry, government, and civic perspectives on solar development processes and structures. At a regional level, these kind of stakeholder networks and forums are less developed and have less capacity, creating a gap in localized knowledge. Enhancing coordination among regional organizations and groups will assist with toolkit rollout across communities.

In conclusion, engaging with communities early in the process, listening and understanding their concerns and local needs, and addressing them in a way that allows community residents to be active participants in the development of these projects, not just a host community. This approach will be advantageous to the successful creation of a clean energy economy and reaching New York State's climate goals.

6 References

Bain, Paul G., Matthew J. Hornsey, Renata Bongiorno, and Carla Jeffries. “Promoting pro–environmental action in climate change deniers.” *Nature Climate Change* 2, no. 8 (2012): 600–603.

Bandura, A. “Social cognitive theory for personal and social change by enabling media.” In *Entertainment–Education and Social Change: History, Research, and Practice.* A. Singhai, M.J. Cody, E.M. Rogers, M. Sabido, L. Erlbaum (Eds.), 2004.

Bandura, Albert, and Richard H. Walters. *Social learning theory*, vol. 1. Englewood Cliffs, NJ: Prentice Hall, 1977.

Buonocore, Jonathan J., Parichehr Salimifard, Drew R. Michanowicz, and Joseph G Allen. “A decade of the U.S. energy mix transitioning away from coal: historical reconstruction of the reductions in the public health burden of energy.” *Environmental Research Letters* (2021): 16 054030.

Carlisle, Juliet E., David Solan, Stephanie L. Kane, and Jeffrey Joe. “Utility-scale solar and public attitudes toward siting: A critical examination of proximity.” *Land Use Policy* 58 (2016): 491–501.

Chandra, Shobhana, Sanjeev Verma, Weng Marc Lim, Satish Kumar, and Naveen Donthu. “Personalization in personalized marketing: Trends and ways forward.” *Psychology & Marketing* 39, no. 8 (2022): 1529–1562.

Charness, Gary, and Yan Chen. “Social identity, group behavior, and teams.” *Annual Review of Economics* 12 (2020): 691–713.

Cialdini, Robert B., and Ryan P. Jacobson. “Influences of social norms on climate change-related behaviors.” *Current Opinion in Behavioral Sciences* 42 (2021): 1–8.

Feinberg, Matthew, and Robb Willer. “Apocalypse soon? Dire messages reduce belief in global warming by contradicting just-world beliefs.” *Psychological Science* 22, no. 1 (2011): 34–38.

Feldman, Lauren, and P. Sol Hart. “Using political efficacy messages to increase climate activism: The mediating role of emotions.” *Science Communication* 38, no. 1 (2016): 99–127.

“Governor Hochul announces expanded NY-Sun program to achieve at least 10 gigawatts of solar energy by 2030.” September 20, 2021. governor.ny.gov/news/governor–hochul–announces–expanded–ny–sun–program–achieve–least–10–gigawatts–solar–energy–2030

Hardisty, David J., Eric J. Johnson, and Elke U. Weber. “A dirty word or a dirty world? Attribute framing, political affiliation, and query theory.” *Psychological Science* 21, no. 1 (2010): 86–92.

Haslam, S. Alexander, Stephen D. Reicher, and Katherine J. Reynolds. “Identity, influence, and change: Rediscovering John Turner’s vision for social psychology.” *British Journal of Social Psychology* 51, no. 2 (2012): 201–218.

Hogg, Michael A. “A social identity theory of leadership.” *Personality and Social Psychology Review* 5, no. 3 (2001): 184–200.

Kress, Laura, and Tatjana Aue. “The link between optimism bias and attention bias: A neurocognitive perspective.” *Neuroscience & Biobehavioral Reviews* 80 (2017): 688–702.

Kuhfuss, Laure, Raphaële Préget, Sophie Thoyer, Nick Hanley, Philippe Le Coent, and Mathieu Désolé. “Nudges, social norms, and permanence in agri-environmental schemes.” *Land Economics* 92, no. 4 (2016): 641–655.

Larson, E., C. Greig, J. Jenkins, E. Mayfield, A. Pascale, Chuan Zhang, J. Drossman, et al. “Net-zero America: Potential pathways.” *Infrastructure and Impacts, Final Report* (2021).

Lewin, Kurt. “Field theory in social science: Selected theoretical papers.” Dorwin Cartwright (Ed.). (1951).

Masson, Torsten, and Immo Fritsche. “Adherence to climate change-related ingroup norms: Do dimensions of group identification matter?” *European Journal of Social Psychology* 44, no. 5 (2014): 455–465.

Munasib, Abdul B.A., and Jeffrey L. Jordan. “The effect of social capital on the choice to use sustainable agricultural practices.” *Journal of Agricultural and Applied Economics* 43, no. 2 (2011): 213–227.

Nilson, R. S., and R.C. Stedman. “Are big and small solar separate things? The importance of scale in public support for solar energy development in upstate New York.” *Energy Research & Social Science* 86 (2022): 102449.

Nilson, R.S. and R.C. Stedman. “Reacting to the rural burden: Understanding opposition to utility-Scale solar development in Upstate New York.” *Rural Sociology* 88 (2023): 578–605. Doi.org/10.1111/ruso.12486

Nolan, Jessica M., P. Wesley Schultz, Robert B. Cialdini, Noah J. Goldstein, and Vladas Griskevicius. “Normative social influence is underdetected.” *Personality & Social Psychology Bulletin* 34, no. 7 (2008): 913–923.

O’Donoghue, Ted, and Matthew Rabin. “Doing it now or later.” *American Economic Review* 89, no. 1 (1999): 103–124.

Patt, Anthony, and Richard Zeckhauser. “Action bias and environmental decisions.” *Journal of Risk & Uncertainty* 21 (2000): 45–72.

Savolainen, Reijo. “Cognitive barriers to information seeking: A conceptual analysis.” *Journal of Information Science* 41, no. 5 (2015): 613–623.

Schwartz, Barry, and Andrew Ward. “Doing better but feeling worse: The paradox of choice.” *Positive Psychology in Practice* (2004): 86–104.

Tajfel, Henri, John C. Turner, William G. Austin, and Stephen Worchel. “An integrative theory of intergroup conflict.” *Organizational Identity: A Reader* 56, no. 65 (1979): 9780203505984–16.

Tversky, Amos, and Daniel Kahneman. “The framing of decisions and the psychology of choice.” *Science* 211, no. 4481 (1981): 453–458.

Appendix A. Solar Solutions Guidebook and Training Materials

Literature Review and Knowledge Analysis. Community Research Report 1

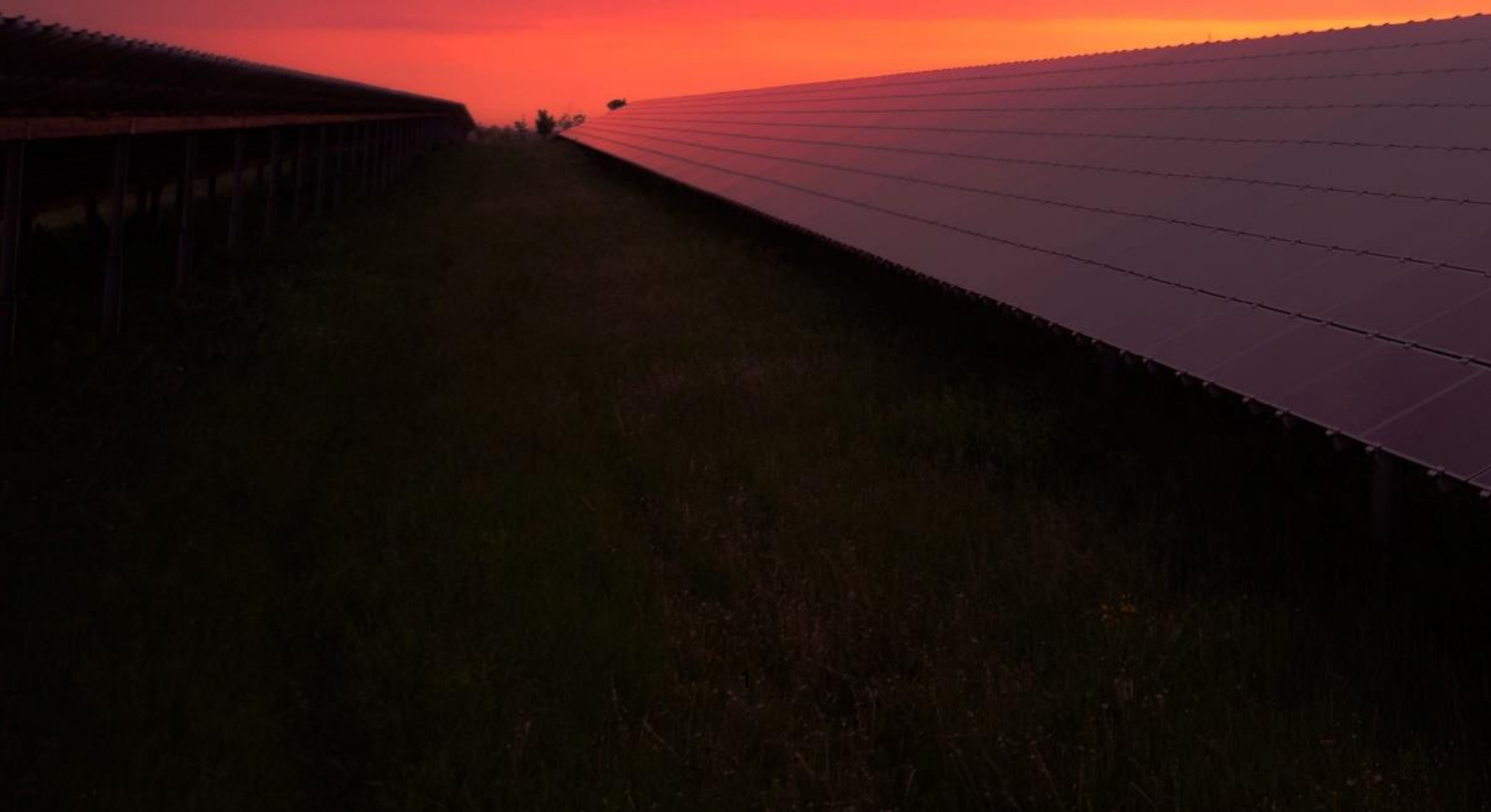
Evidn.

Solar Solutions
Guidebook & Training Materials

Literature Review and Knowledge Analysis
Community Research Report 1

Draft prepared for The Nature Conservancy

The Nature Conservancy



Document Information

Version	
Version no.	02
Author/s	T. McIntosh K. Haanterä J. Pickering
Checked	J. Pickering
Approved	J. Pickering
Distribution	
Issue date	9 March 2022
Issued to	The Nature Conservancy
Description	Solar Solutions Guidebook & Training Materials Literature Review and Knowledge Analysis Community Research Report 1
Contact	
Name	Evidn LLC
Contact person	John Pickering
Email	john@evidn.com

Contents

Executive Summary 4

Background & Context 6

Section One: Literature Review 7

Section Two: Community Research Report 22

Conclusion 39

Appendix 40

Executive Summary

New York is at the front line of the renewable energy transition.

The wide spread development of large scale solar is critical to achieving New York State's clean energy goals. Despite broad scale public support for renewable energy, non residential solar energy projects can face strong local opposition.

Seeking to better understand this challenge The New York State Energy Research and Development Authority and The Nature Conservancy has partnered with specialist behavioral science organization, Evidn. Evidn conducted an analysis to delineate the factors that shape community attitudes towards solar PV solutions, understand what concerns local communities have about non residential solar developments and what can be done to help maximize the benefits of proposed developments for communities.

This document is organized into two sections: the first section provides a literature review of the most relevant research and case studies relating to New York residents' perception of solar and the factors associated with community acceptance. The second section provides an overview of the societal impacts of greatest concern to New Yorkers when considering non residential solar PV installations. These impacts are derived from in depth interviews with almost 30 different stakeholders across New York State representing a broad cross section of community members.

The literature review highlights eight key principles related to New York residents' perceptions of solar that impact community acceptance and willingness to adopt large scale solar solutions and the analysis. These principles include building trust and transparency, engaging community members in project decision making and understanding the role of place attachment, social influence, and individual factors on community sentiment perceptions.

Data from the community research describes six societal impacts of concern for local communities including community concerns around the lack of control they have around development decision making, the potential inequal distribution of solar benefits and what impacts these projects will have on the local agriculture community and natural environment.

This report has identified a number of key opportunities to drive increased adoption and support of non residential solar PV developments, including building local community capacity, focusing on mitigating community concerns, and delivering benefits at the local level to increase project support.

These insights will ultimately be used in the development of a local handbook "Solar PV Design Solutions for Host Communities Handbook and accompanying training materials for local officials that provide clear project design options for non residential solar PV projects that address the top societal concerns shared by host communities and maximize local benefits.

A diagram summarizing the societal impacts of greatest concern to New York Residents and the underlying evidence that supports local community acceptance of non residential solar PV installations can be found on the following page.

Understanding Community Acceptance of Large-Scale Solar

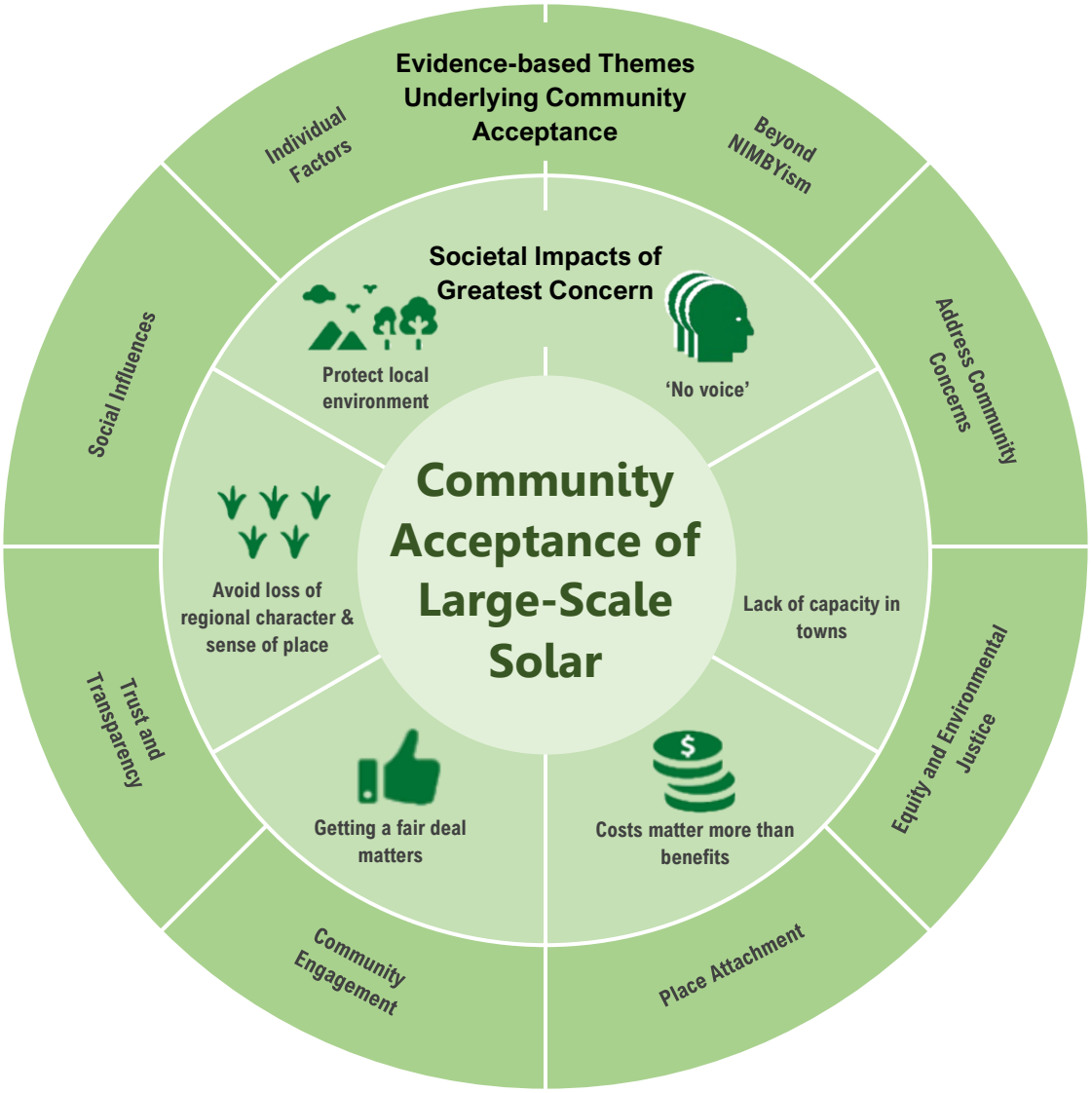


Figure 1: Factors influencing community acceptance of large-scale solar projects

Background & Context

Climate change poses a clear and imminent threat to the world. New York has risen to the challenge in response, outlining one of the most progressive and ambitions pathways to the reduction of emissions across America. Achieving the State's expanded goal of ten GW of distributed solar by 2025 and 70% of the state's energy being supplied through renewables by 2040 requires rapid adoption of renewable energy technologies, including significant expansion of non residential solar PV installations[1].

Although emerging public sentiment research indicate a majority of Americans support solar energy[2], converting this broad scale support to the acceptance of specific projects in local communities remains a distinct challenge. Put differently, broad scale support of solar energy does not necessarily translate to localized acceptability of solar farms. Solar energy projects, in particular large scale installations, can face strong public resistance from local communities who are asked to host these installations. Opposition to large scale solar is complex and multi faceted. The acceptance and adoption of solar solutions implicate a host of attitudes, perspectives, motivations, and barriers that can 'make or break' the successful installation of such technology.

Moreover, these attitudes and motivations are not universal; they typically vary as a function of stakeholder group, geographic location, and a range of other factors such as the political, regulatory, and sociocultural context in which people live. Studies have shown that any successful renewable energy transition must address the underlying social factors.[3]

As part of a broader body of work funded by the New York State Energy Research and Development Authority (NYSERDA), The Nature Conservancy (TNC) engaged behavioral science firm, Evidn, to understand the factors that shape community attitudes towards solar PV solutions, what concerns local communities have about non residential solar developments and what can be done to help maximize the benefits of proposed developments for communities.

This report presents findings from a literature review focused on understanding New Yorkers' perceptions towards non residential solar PV and an analysis of community research conducted across New York State communities. The approach to this report addresses a significant gap within much of the social science research to date: namely where studies are not conducted in areas where actual projects are proposed, underway or completed. Instead, studies present participants with hypothetical situations to explore factors related to community support. This method can result in hypothetical bias[4] and results from these studies should be interpreted with caution.

There are two sections to the report:

1. **Literature Review:** Section one focuses on understanding New Yorkers perceptions towards non residential solar PV. This review explores previous work by TNC to understand perception on these large scale solar projects. In addition to TNC's previous research, this review examines a cross section of research across the sustainability, energy, and social science literature to delineate eight key principles that impact community acceptance and willingness to adopt large scale solar solutions.
2. **Community Research Report:** Section two outlines six societal impacts of non residential solar PV of most concern. These societal impacts are derived through Evidn's engagements with stakeholders across New York. 29 representatives from 21 organizations and groups were engaged with across the project period. These insights center around people's thoughts, perspectives, and experiences towards non residential solar PV.

SECTION ONE

Literature Review

Literature Review

This section documents the outcomes of an analysis of research across the sustainability, energy, and social and behavioral science literature to understand New York residents' perceptions of solar development and delineate the factors that impact community acceptance and adoption of large-scale solar solutions. In total, 82 pieces of evidence were considered.

The analysis of literature synthesized 8 key evidence-based insights and themes that underly communities decision-making choices and behaviors in the context of the adoption of large-scale solar solutions.

Evidence-based Themes Underlying Community Acceptance & Adoption Behaviors

1. These Is Nuance Beyond NIMBYims
2. Addressing Community Concerns Can Matter More Than Benefits
3. Renewable Projects Should Address Equity and Environmental Justice
4. 'Place Attachment' is an Important Framework to Understand Community Sentiment
5. Engage with Local Communities from the Outset
6. Build Trust and Transparency
7. Social Factors Drive Acceptance and Adoption
8. Individual Factors Influence Community Acceptance

1

There Is Nuance Beyond NIMBYism

Key Considerations

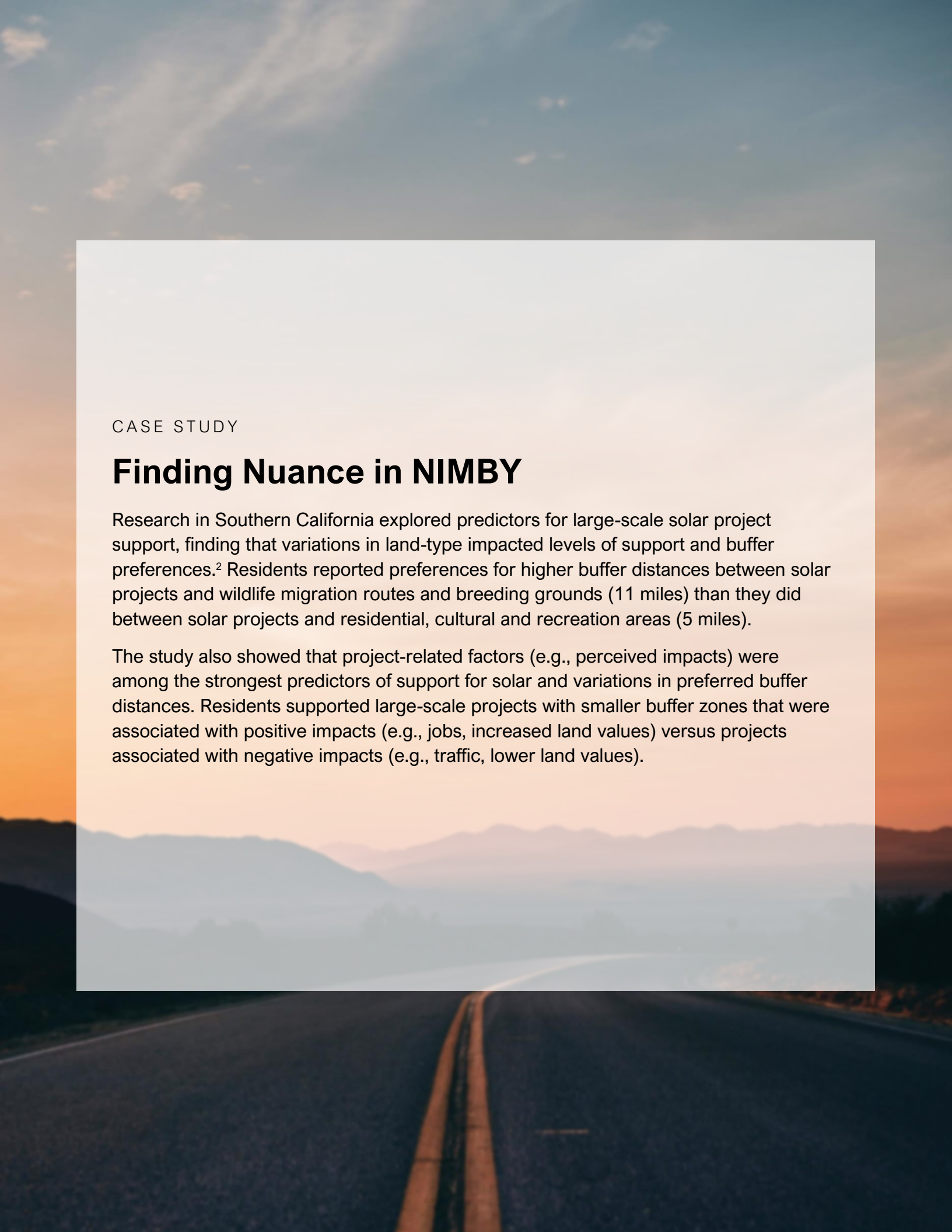
- NIMBYism does not adequately explain the complexity of factors that contribute to community opposition to large-scale solar projects
- Proximity to projects is one of many factors that influences support for large-scale solar projects
- Type of land-use for proposed projects is an important predictor of public perception and support for solar projects

The Not In My Backyard (NIMBY) phenomenon refers to the gap between popular public opinion and local acceptance, or the "national-local acceptance gap." Popular opinion in the U.S. for utility-scale solar energy is strong, however many communities are opposed to hosting such projects.[5] NIMBYism is commonly cited to explain local opposition to projects despite broad public support.

While there is much evidence demonstrating that factors such as visibility and proximity impact local opposition to these projects, as NIMBYism suggests, researchers caution that NIMBY is an overly simplified take on the matter. The explanation does not account for the nuances of each community's opposition to certain projects, and it is a loaded expression, often connotating negative sentiments of selfishness.[2]

Recent research proposes a more nuanced explanation that takes into account social-psychological factors such as direct experience, place attachment, environmental beliefs, in addition to contextual factors (e.g., technology type, scale, and incentives). Variations in proximity to certain land-uses, size, and scope of the project as well as the potential impacts of the project on local communities are factors that influence resident's support for proposed solar projects.[6]

A recent survey of 16,200 Americans concluded that local-based objections to energy infrastructure projects were not motivated by NIMBY attitudes (e.g., proximity).[7] The key implication of this finding, combined with the additional literature considered, is that perceptions of local environmental risk, risk orientation, concern about climate change are equally (or more) important than NIMBYism in terms of understanding community opposition to large-scale solar installations.



CASE STUDY

Finding Nuance in NIMBY

Research in Southern California explored predictors for large-scale solar project support, finding that variations in land-type impacted levels of support and buffer preferences.[2] Residents reported preferences for higher buffer distances between solar projects and wildlife migration routes and breeding grounds (11 miles) than they did between solar projects and residential, cultural and recreation areas (5 miles).

The study also showed that project-related factors (e.g., perceived impacts) were among the strongest predictors of support for solar and variations in preferred buffer distances. Residents supported large-scale projects with smaller buffer zones that were associated with positive impacts (e.g., jobs, increased land values) versus projects associated with negative impacts (e.g., traffic, lower land values).

2

Addressing Community Concerns Can Matter More Than Benefits

Key Considerations

- Solar developers need to collaborate with communities to address their concerns about proposed projects as well as promote the potential benefits
- Communities are concerned about the 'fairness' of siting decisions and the potential distribution of any costs, benefits and risks from large-scale solar developments

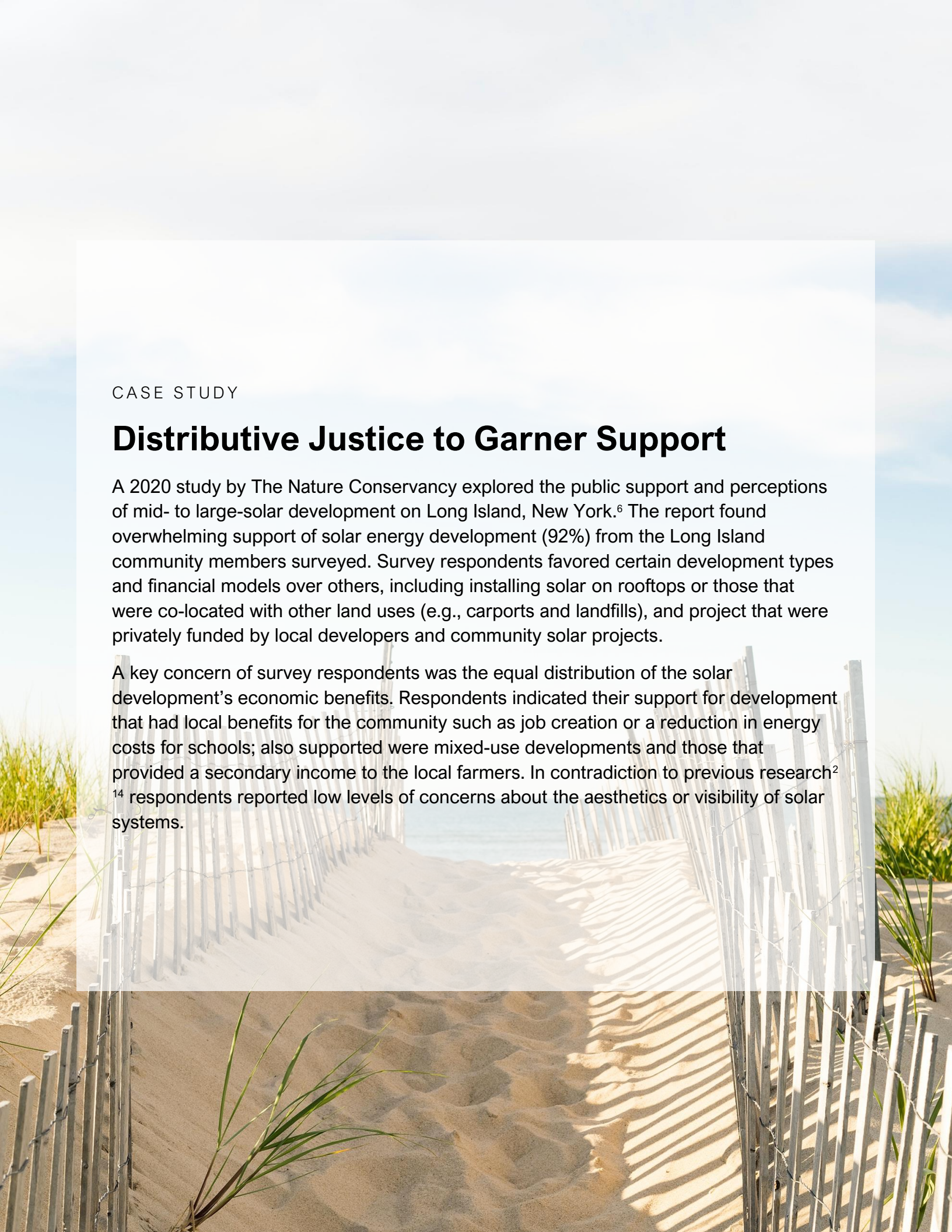
Large-scale solar development can produce a number of benefits, both for individuals and collectively (e.g., land leasing revenue for a farmer vs tax revenue generated for a municipality) and these benefits exist at both the local and non-local level (e.g., creation of jobs vs production of clean energy).[2] These benefits must be balanced against the potential costs or trade-offs faced by host communities.[8]

The behavioral science literature is replete with examples of how addressing barriers or 'restraining forces' to change are even more important than promoting benefits or 'driving forces' when it comes to modifying behavior.[9]

For residents in communities with proposed projects, construal-level theory – which describes the relationship between psychological distance and the extent to which a person's thinking is concrete or abstract[10] – suggests that the psychological closeness of these projects means factors such as the perceived risks and benefits are weighted more strongly when making judgement about proposed projects. Concerns about potential environmental impacts, project aesthetics, and loss of property values are weighted against potential benefits such as jobs or economic benefits.[8]

Other concerns that residents have relate to procedural and distributive justice, where local stakeholders evaluate potential projects by the perceived fairness of how a decision was made about project implementation (procedural justice) and the perceived fairness of the distribution of any costs, benefits or risks of the project (distributive justice).[11] For example, data from a recent survey by TNC shows that community members are concerned that utility companies may financially benefit without passing these benefits to consumers or that they might raise consumer rates to turn a profit.[6]

Projects that are perceived as more fair lead to increased levels of support whereas perceived injustices can negatively impact perceptions of local projects.[12] [13] Ensuring communities have a voice in the decision-making process can improve perceived fairness of proposed projects.[11]



CASE STUDY

Distributive Justice to Garner Support

A 2020 study by The Nature Conservancy explored the public support and perceptions of mid- to large-solar development on Long Island, New York.[6] The report found overwhelming support of solar energy development (92%) from the Long Island community members surveyed. Survey respondents favored certain development types and financial models over others, including installing solar on rooftops or those that were co-located with other land uses (e.g., carports and landfills), and project that were privately funded by local developers and community solar projects.

A key concern of survey respondents was the equal distribution of the solar development's economic benefits. Respondents indicated their support for development that had local benefits for the community such as job creation or a reduction in energy costs for schools; also supported were mixed-use developments and those that provided a secondary income to the local farmers. In contradiction to previous research[2] [14] respondents reported low levels of concerns about the aesthetics or visibility of solar systems.

3

Renewable Projects Should Address Equity and Environmental Justice Issues

Key Considerations

- New York's renewable energy transition represents an opportunity to address equity and environmental justice issues
- Addressing community concerns about equity and environmental justice issues requires deep and sustained engagement with the communities who will be impacted by these developments

Issues of procedural and distributive justice are closely tied to concerns about equity and environmental justice issues. Historically, communities of color, low-income earners and minorities with less political power have disproportionally felt the negative impact of energy production.[15] New York's renewable energy transition represents an opportunity to address some of these issues and ensure equitable economic distribution of solar energy benefits and costs.[16]

Distributional energy justice concerns may be mitigated by the access and inclusion of diverse community members in the decision-making process. This involves ensuring events related to the planning of these energy transitions are accessible to all parties involved.[16]

Non-residential solar projects can be designed with equity and environmental justice considerations in mind, and communication about development should highlight these key areas of concern through proper transparency, in order to engage public support for projects.

The 2017 Accelerating Large-Scale Wind and Solar Energy in New York Report by The Nature Conservancy, put forth seven recommendations to ensure environmental justice and equity issues are considered as New York transitions to clean energy.

RESEARCH ROUNDUP

Environmental Justice and Equity Considerations

The 2017 Accelerating Large-Scale Wind and Solar Energy in New York Report by The Nature Conservancy, included seven recommendations to ensure environmental justice and equity issues are considered as New York transitions to clean energy.[16] These seven recommendations should be strongly considered in the design and implementation of any community-based solar project

1. **Offer Benefits to Host Communities**

   Financial or in-kind, compensation should be developed with the host community agreement. The compensation should be determined through consultation and co-planning with the affected communities.

2. **Ensure Inclusion and Access to Energy Policy, Planning, and Siting Decisions**

   The main goal here is to ensure that any and all involved parties can make their opinion heard, so these public events should be scheduled at fully accessible hours, with community appropriate translation and interpretation services available. This process should be ongoing, throughout the energy transition process.

3. **Recruit Workers from Local Communities**

   In addition to hiring local labor to the extent possible, special consideration should be given to historically disadvantaged populations within local communities. Developers and planners can work with local training programs, Chambers of Commerce, and local businesses to access and prepare the local workforce.

4. **Invest in Training and Education**

   Local labor needs to be trained in the renewable energy sector. Unions, educational institutions, and workforce development initiatives must be supported in developing programs and opportunities for green job training.

5. **Support Environmental Justice Participation in Renewable Energy Policy, Siting Forums, and Processes**

   The participation and advocacy work that environmental justice and community equity groups contribute in the siting forums and planning processes needs to be financially supported.

6. **Involve Communities in Considering Renewable Projects on Brownfields in Low- and Moderate-Income Communities**

   When renewable energy projects are sited on brownfields, they may be more expensive and difficult to implement. However, this is an opportunity for land remediation in marginalized communities. Strategic incentives should be considered to promote the potential of renewable projects on brownfields.

7. **Support Minority and Women-Owned Businesses**

   Minority and women-owned businesses should be supported in accessing opportunities in the renewable energy sector.

4

‘Place Attachment’ is an Important Framework to Understand Community Sentiment

Key Considerations

- Place attachment is a key potential barrier in the acceptance of solar energy projects
- Careful evaluation of place-related meaning when considering large-scale solar development is essential to understand and respond to any potential disruption to place attachment
- Disruption can be reduced by taking an inclusive approach by involving community members to positively enhance their place-related values
- Local stakeholders are more likely to support large-scale solar if it provides benefits that provide value and align with community goals

‘Place attachment’ refers to the process of becoming attached to a specific environment. In this sense, an environment can refer to a park, a neighborhood, or a town. Place attachment relates to what environmental psychologists call place identity, which shapes deep aspects of identity such as values and beliefs.[2] Place-attachment serves as a useful alternative framework to NIMBYism to help understand host community responses to proposed renewable energy projects. It enables a community's unique relationship to local sites to drive the understanding of responses to proposed changes.[17]

When changes to the environment happen or are proposed, strong feelings of place attachment and place identity can manifest in feelings of disruption, or threat. This can lead to “place-protective” actions, which encompasses various attempts to stop, or reduce the impact of, a proposed change.

Threats to place attachment and identity underpin many of the specific concerns communities have about specific project design features, such as scale of project (e.g., the larger the scale, is often associated with a decline in acceptance[18]). Greater understanding of why local communities often feel threatened can help in designing approaches to mitigate these feelings.

Researchers’ emphasis the importance of understanding the socially constructed, symbolic elements of certain places and what impact specific developments might have on, not just the specific proposed development sites, but also on the local meaning and emotional attachment communities associate with the wider landscapes.[19]

While place attachment and identity can often be a source of resistance to change, a deeper understanding of the factors that feed into place attachment and identity can also be leveraged to optimize the planning of projects to ensure they fit with the goals and identity of a community. When this is successful, changes are perceived as “place enhancing.” Collaboration with communities is key for success in this approach and if done correctly, research suggest that individuals with high levels of place attachment are more willing to participate in pro-environmental, and pro-social behaviors.[17]

5

Engage with Local Communities from the Outset

Key Considerations

- To help people get on board with new ideas, give them options, control, and a voice
- Engagement and communication must involve listening to the public and being willing to engage in project design processes shaped by public input
- Keep local control and operation when developing community energy projects, in addition to keeping benefits local
- Opposition is highest in the planning phase - solar developers and local politicians need to talk to the community about what they want before a proposal is made

Communities value maintaining a sense of control and agency over their town and local developments. Large-scale solar developments can pose a potential threat to this sense of control and agency, especially in situations where state laws could overrule local laws (e.g., New York State Renewable Siting Law, 'Accelerated Renewable Energy Growth and Community Benefit Act'). People equate having choices with having control.[2]

The democratic deficit hypothesis within renewable energy refers to the idea that community groups and citizens are more likely to resist the local development of renewable energy when there lacks adequate public participation in the process.[20] By including local stakeholders and the general public in project planning, there tends to be less resistance to proposed projects.[21] This process is also critical in helping build community ownership of local developments.

A sense of psychological ownership is the inference or feeling that a particular object or objective is one's own,[22] and the objective is perceived as an extension of oneself.[23] Collective psychological ownership can be evoked when a group of people feel ownership towards an object.[24] Research indicates that supporting communities to develop a sense of ownership can lead to increased acceptance of solar projects.[25] [26]

The implementation of a participatory process and co-design approach is therefore crucial to capture community acceptance. A proactive approach, rather than reactionary planning to address community concerns, is recommended by a study that analyzed community reactions to proposed solar developments.[5] To foster proactive planning, local governments need more guidance throughout the planning process. Ideally, this guidance would allow communities to assess how solar developments can fit in their town before a developer proposes a project, and perhaps, lead to towns seeking out these projects.

6

Build Trust & Transparency

Key Considerations

- Transparent dialogues between all parties involved in project implementation can improve community's perceptions of large-scale solar
- Developers must balance a community desire to feed into the development process with being able to provide them with project specifics and clarity. Being transparent about both the potential benefits and the costs of project is critical in building and maintaining trust

It is well-documented that gaining a community's trust, through transparent dialogues between those involved with project implementation (project developers, government agencies, policy makers, and private landowners) can improve a community's perception of renewable energy projects. A systematic literature review found trust to be a determinant of public support for energy projects in communities.[14]

In a survey of Long Island residents 80% of survey respondents listed the reputation of the solar developer and local utilities as an important factor influencing their support.[6] Report recommendations included increasing transparency regarding financing, funding and utility motivations for supporting mid- large-scale solar through targeted outreach.

Locals face uncertainty with solar PV projects that can create significant resistance. Common concerns relate to taxation, government policy, local land use regulations and planning. The result is that communities ask for information, specifics, and certainty from developers as projects are proposed. This request for specifics presents a challenge for developers as they likely do not have concrete project plans and are yet to know what their economic obligation (e.g., community host agreements) to communities will be.

Not having enough details about projects can lead to mistrust from communities, however approaching communities with a fully formed plan can lead to concerns about insufficient community consultation. To community members, complete development plans can be perceived as if outside developers are proposing projects that are going to significantly impact their community without consulting them, feeding skepticism and mistrust.[16]

Developers are also key disseminators of potential benefits and impacts of proposed projects. It is critical that if there are potential negative impacts (e.g., environmental risk from solar infrastructure), that all risks are communicated clearly and in advance. Anticipatory consideration of potential objections and concerns is a critical consideration.

"Trust matters…[You want] the sense that [residents] are being involved in the process, that developers are making sound decisions and taking into consideration local sentiments and opinions, and perception and fears."

Environmental politics professor and researcher, Juliet Carlisle

7

Social Factors Drive Acceptance and Adoption

Key Considerations

- Group membership can have significant influence over whether individuals support solar PV
- Behavior is conducted within the context of others. Focusing on more than just individual attitudes towards the behavior by activating group norms and networks can help drive widespread solar acceptance
- Pro-solar ingroup norms will increase group-members' inclination to act in a pro-solar fashion
- To secure community buy-in, ensure the initiatives are owned and led by well-connected leaders in the community

Social identity theory is a collection of theories that highlight the important role that social groups play in our daily functioning. [27,28,29] Groups are a central facet of human existence – they provide us with a sense of security, meaning, and membership. Our groups and their leaders have a profound influence on our attitudes, behaviors, and beliefs, by defining how 'we' should behave.[30]

Social norms are the predominant behaviors, attitudes, beliefs, and codes of conduct of a group,[31] and they can exert enormous pressure on pro-environmental behaviors.[32] There are two main types of social norms, namely descriptive norms (describe how individuals should behave in a social group) and injunctive norms (describe the behaviors that are approved or disapproved of by a social group). Individuals are motivated to subscribe to these social norms because failure to do so risks derision or rejection from their groups.

A series of meta-analyses explored the link between identity and environmentalism.[33] The study found that belonging to a group can have a significant influence on pro-environmental outcomes. Affiliations, such as political group membership, are particularly influential in shaping attitudes and behavior. For example, a national study on US farming operations found that farms in Democratic states were more likely to have adopted some form of wind or solar energy generation on their property than in Republican states.[34]

Studies have shown that while solar energy receives more bipartisan support than some renewable energy technologies, Republicans are less likely than Democrats to support the construction of large-scale solar nearby.[14] Peer effects have been shown to be important factors in the adoption of residential solar installations where the presence of solar in communities plays a direct role in influencing wider adoption.

Within these groups leaders have a profound influence on the behaviors of their group members. Identity Leadership Theory[135] suggests that leaders are chosen as the most 'prototypical' member of their group, subsequently setting the agenda for how 'we' should behave and defining new group norms and behaviors. Ensuring key influencers are engaged in local developments helps to create a sense of trust and rapport from the local community. This also ensures that the development is designed to meet the needs and motivations of the local community.

[1] Identity leadership theory (ILT) explains how and why people come to be viewed as leaders. ILT suggests that leaders of groups aren't necessarily selected due to innate skillset or experience. Rather, they're seen as the most 'prototypical' member of their group.

8

Individual Factors Influence Community Acceptance

Key Considerations

- Individual factors should be considered when engaging with local communities
- People will filter information through pre-existing beliefs, attitudes and values when making decisions about non-residential solar projects
- Individual factors can explain some variability in local stakeholder's acceptance of large-scale solar projects across communities

Individual factors can explain some of the variability in local stakeholder's acceptance and adoption of large-scale solar. Below are five key categories of individual-level psychological factors.

1. **Awareness** refers to the knowledge, understanding, and beliefs that individuals have about large-scale solar and related issues. Knowledge about how solar technology works and its potential impacts can influence individual's perceptions and acceptance of solar technology.[11] Importantly, while knowledge is an important determinant in decision making, awareness alone is often not sufficient to drive action.[36]
2. **Attitudes** are the way that people think and feel about something. Attitudes towards solar installations are shaped by a number of different factors including demographic variables, past experience and feelings of personal responsibility.[14] For example, research has found that community support for development projects is increased when people have more experience with the technologies[6] or in areas that already host renewable energy projects.[5]

"A lot of folks have experienced predatory solar practices in a residential setting in the past that has left people with negative perceptions of solar generally."

Hudson Valley interviewee discussing community concerns about large scale solar

4. **Values** are consciously chosen criteria that provide social justification for an individual's choices and behaviors.[37] Values also represent desirable goals that individuals deem important and worthy and are strong determinants of behavior. Accordingly, values can influence pro-environmental support and behavior both positively and negatively. Research has found that belief in the seriousness of climate change was a predictor of support for large-scale solar projects.[14]

5. **Emotions and affect** are potent drivers of human behavior.[38] Affect is a positive or negative feeling towards an event or an object, and emotions refer to the adaptive reactions that occur when an event or an object is evaluated to be relevant to one's concerns. Subsequently, individuals' information processing and decision-making are largely influenced and guided by their affect and emotions. Results from a European study found that affect played an important role in forming people's attitudes towards large-scale solar, where the more positive the affect, the lower the levels of concern respondents had about the project implementation.[18]

6. **Cognitive biases** are shortcuts that allow individuals to filter and interpret information rapidly to make decisions, form judgments and solve problems. Mental shortcuts are automatic and cognitively effortless. While these shortcuts are typically helpful, they can lead to errors in judgement and decision-making, known as cognitive biases. There are several biases that may influence community members' decision-making about large-scale solar projects

EXAMPLES OF COGNITIVE BIASES

Loss Aversion is a powerful psychological barrier that pertains to the perception of losses and gains. Individuals weigh potential losses as greater than equivalent gains.[40] The development of large-scale solar projects comes at a cost to communities (e.g., loss of land or viewshed) and potential benefits are often uncertain and not guaranteed, this can be a serious barrier for local communities.

Confirmation bias refers to people's preference to select information that aligns with their pre-existing beliefs or ideas. On the other hand, disconfirmation bias refers to people's tendency to scrutinize information that contradicts their existing beliefs or ideas.[41] Both biases have the potential to impact people's willingness to change their attitudes and beliefs, even in light of compelling evidence to do so.

Status Quo Bias refers to people preferring to maintain the current state of affairs.[42] Even if people are aware of the potential benefits from proposed projects, they may still opt to maintain their current way of living due to perceived losses.

CASE STUDY

The Role of Knowledge

Knowledge is believed to play an important role in energy technology acceptance.[11] Knowledge, in this context, would refer to an accurate understanding of the risks, benefits, and impacts of solar development. Case studies on acceptance of other alternative energy show that perceived risks and benefits of a new technology are predictive of attitudes towards it. Understanding the outcomes of solar development is also crucial to fostering a sense of self efficacy, that is, the belief that your actions make an impact. This framework also, perhaps unsurprising, indicates that the less knowledge available to a community, the more important trust in those pitching new energy technologies becomes.

Although some studies have indicated that greater familiarity with an energy technology is associated with higher levels of community acceptance, more research is needed to understand its role across different types of energies, and host communities. Nonetheless, this is a point to consider, especially in light of a recent survey of 405 residential electric utility customers on Long Island finding that over half of respondents had little, or very little, knowledge of solar energy generation.[6]

SECTION TWO

Community Research Report

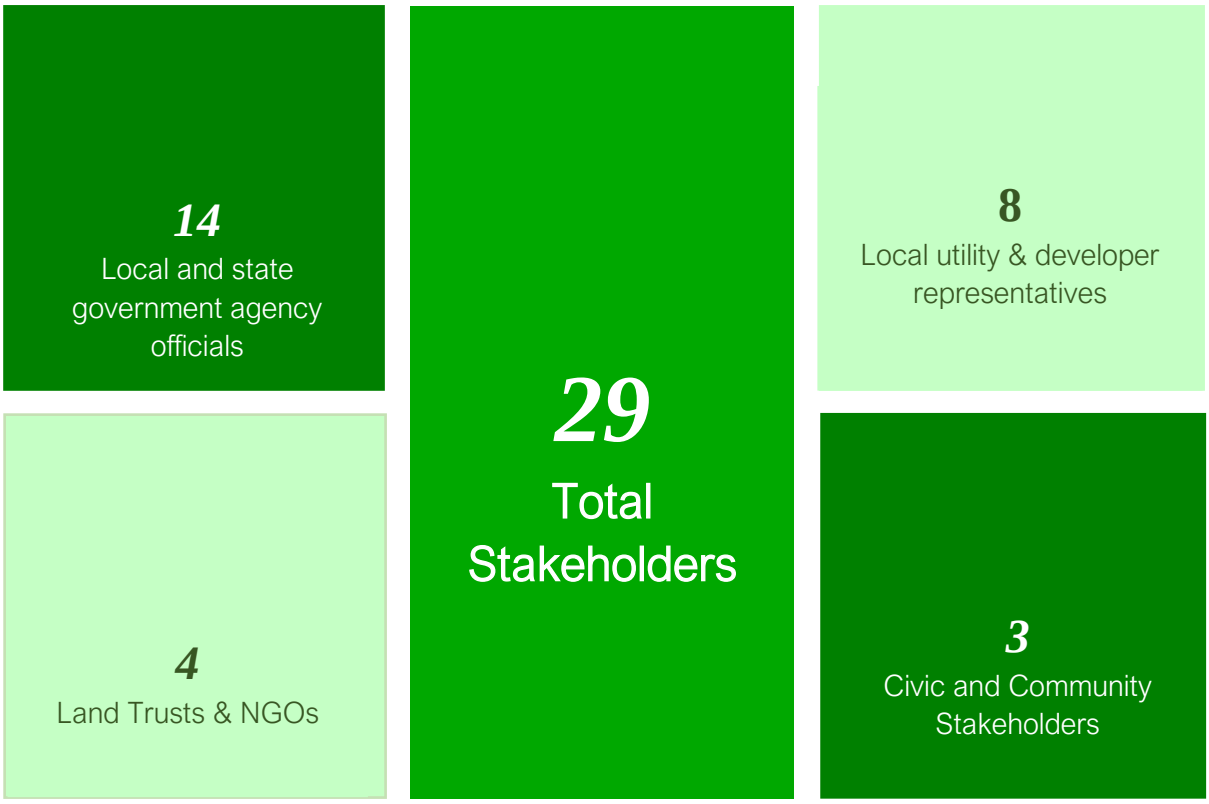
Overview

There are many different organizations, networks, agencies, and individuals that are implicated in the adoption of large-scale solar energy technology in New York State. Each of these agents have different perspectives, experiences and insights about the factors implicated in the adoption of these technologies. Capturing these diverse perspectives is key to building a holistic, population-level picture of the factors that impact the adoption of renewable energy projects in local communities.

This section reports on the analysis of data collected through the community research engagements. Stakeholder engagement methodology, community selection and interviews protocols are described below, followed by an analysis of the societal impacts of greatest concern for New York communities.

Stakeholder Engagement

Evidn engaged 29 representatives from 21 organizations and groups ranging from community members to local and state representatives. The infographic below provides a high-level breakdown of figures. Stakeholders who sat across multiple categories were assigned a primary category based on the perspective provided in interviews. A full list of organizations engaged with can be found in appendix 1.



Community Selection

A feature of this community research was to engage with a sub-set of New York's population across key stakeholder groups. Three New York State communities were initially selected to participate in the community research engagements. To ensure a thorough examination of the various drivers and barriers that exist to the adoption of the proposed solar solutions, community inclusion was predicated on prioritizing a combination of the following variables –

- Social and demographic factors (race, political status, and socioeconomic status)
- Geographic location (rural/urban vs upstate vs downstate)
- Local political and regulatory environment (town/county/municipality)
- Non-residential solar PV project pipeline (proposed, under development or completed)
- Non-residential solar PV community acceptance (support or opposition)

Following an analysis of 35 different communities against the outlined criteria and consultation with TNC and NYSERDA, the following three communities were selected -

1. **Easton, Washington County**: Easton is one of the first New York State communities to approve and commence installation of a large-scale solar project. Situated in the Capital Region this rural, moderately conservative community has a population of approx. 2,500 with a median household income of approx. $75,000. The largest Easton racial/ethnic groups are White (92%) followed by two ethic groups or more (3%) and Hispanic (4%).
2. **Batavia, Genesee County.** Batavia is in the Finger Lakes Region of New York. 7,000 residents live in this rural, moderately conservative community. The largest Batavia racial/ethnic groups are White (94%) followed by Asian (3%) and Black (2%). The town has no current large-scale renewable development but is working closely with local solar consultants and NYSERDA to develop policy in preparation for local solar developments. Batavia has a median household income level of approx. $65,000.
3. **Shawangunk, Ulster County:** Shawangunk is a community situated in the Mid-Hudson Valley Region. This downstate, liberal leaning town has a population of approx. 14,000 with a median household income of $80,000. The largest Shawangunk racial/ethnic groups are White (73%) followed by Hispanic (14%) and Black (8%). A 25MW solar project was proposed in the town but due to the community opposition was not developed.

Note: Perspectives from additional communities were included in the report as interviewees nominated additional contacts to participate in the project.

Engagement Procedure

Evidn's stakeholder engagement process was guided by The Nature Conservancy and NYSERDA. Stakeholders were identified through a mixture of (1) Evidn's stakeholder mapping process, (2) Solar Solutions project team recommendations, and (3) ad-hoc referrals by community members and stakeholders.

Evidn adopted a mixed method approach towards stakeholder engagements to ensure timing and delivery modes were flexible and accommodated the diverse schedules and priorities of stakeholders in the region. The primary modes of engagement included –

1. Individual interviews
2. Group discussions, and
3. Attending community forums and events.

Key methodological information pertaining to interviews is outlined below.

Engagement mode

The primary modes of engagement were individual interviews and group-based interviews via cell phone or virtual conference calls (e.g., Zoom). Due to the Covid-19 pandemic all engagements were virtual.

Format

Virtual interviews were scheduled for 30min – 1hr. All interviews followed a semi-structured format to ensure consistency across stakeholder groups while allowing for flexibility to discuss specific topics or themes of interest.

- Stakeholder background and role
- Understanding local concerns around non-residential solar projects
- Distilling driving and restraining forces to community acceptance of non-residential solar projects
- Exploring what can be done to help drive community buy-in and enthusiasm for solar projects
- Identifying other groups engaged in energy development issues locally

A list of interview questions can be found in appendix 2.

Societal Impacts of Greatest Concern

The interviews from each of the stakeholders were collated, corroborated and distilled into a set of overarching societal impact themes.

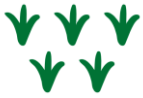
This section of the report outlines the six societal impacts of non-residential solar PV of most concern to have emerged through Evidn's engagements with stakeholders across New York. These insights center around people's thoughts, perspectives, and experiences towards around non-residential solar PV.

The six key concepts to emerge through conversations with stakeholders are:

'No voice' over local developments

Getting a fair deal matters

Lack of capacity in towns



Avoid loss of regional character and sense of place

Costs tend to matter more than benefits

Protect the existing environment

"To get buy-in, you need to involve the town in the decision-making process. Ask them, who wants this? Give them the information they need to make an informed decision. Make sure they know what questions to ask, and that they have the resources, attorneys, and consultants.

Only then you can start exploring what benefits solar can bring to their community."

1

Communities feel that they have 'no voice' or control over local developments

One of the most common concerns, and a significant barrier to community acceptance of non-residential solar PV development, is the lack of control local stakeholders and officials report they feel about proposed developments in their communities.

"These solar projects are being shoved down the throats of local communities and they don t feel they have any control.

Local Community Group Member

Throughout the interviews, stakeholders reported that they felt there is generally inadequate community outreach and participation about the siting and development of large-scale solar projects. They highlighted their frustrations about the impact the New York State Renewable Siting Law, 'Accelerated Renewable Energy Growth and Community Benefit Act' or '94C,' has on their ability to make decisions and have agency over developments proposed in their communities.

"These bigger projects fall under a new law, 94C, which takes away their control. [Communities] are angry they can't say no.

Solar Consultant

The literature has shown that stronger community opposition occurs in situations where communities do not feel like they have been properly consulted. One stakeholder explained that the lack of communication and opportunity to provide early input into these projects had long-lasting negative impacts on the way the project was viewed, the relationship with the developer and the level of trust they had in them.

"We need to find a way to put some level of decisions making back in the hands of local officials"

Solar Community Group Member

In interviews, local stakeholders said they desired better communication and collaboration with local developers and groups who are proposing projects. The strongest negative response to local solar projects often came from interviewees who reported low levels of trust in developers stating that they were not transparent enough about potential projects.

"Forcing people to react is a bad thing, without community participation they feel they have to defend themselves [against these projects] and you can't recover the relationship after that.

Mid-Hudson community organization stakeholder

"We need to have community input and control. The key to getting our project to work was building trust and dialogue.

Solar Working Group Member

2

Towns lack capacity to respond effectively to large-scale solar developments

Large-scale solar development is a complex, multi-faceted process and local communities engaging in these processes have to commit extensive time and resources to ensure that developments are aligned with the goals and vision of their community.[8]

"Being approached about these large scale development put lots of communities in reaction mode, they implement moratoriums on development because they are not comfortable.

Mid-Hudson Community Organization Member

As a clean energy coordinator, while it is not specifically part of the program, communities were coming to me and asking for help in understanding and navigating these projects"

Clean Energy Community Coordinator

Give them facts rather than fear.

Community Group Member

"They don t like to admit it, but often we see a lot of fear in communities trying to navigate these complex large scale projects.

Regional Agency Stakeholder

To attempt to maximize the benefits of these projects and minimize the costs, towns faced with developments will often start a process of updating zoning and other development and land-use regulations. This typically includes updates to a community's local comprehensive plan to regulate large-scale solar development locally.

In addition to the capacity that is required to effectively navigate updating local regulations, communities must also respond to, and negotiate with, local developers to set payment in lieu of taxes (PILOT) amounts and host community agreements.

This presents a serious challenge for many of the communities asked to host towns in New York as they are often small, rural towns with limited resources (e.g., funding, staffing), and have little to no prior experience with non-residential solar projects. These processes typically require support from specific professional services (e.g., attorneys, consultants) to navigate the process which can be costly, time-consuming, and confusing.

Interviewees from communities with large-scale renewable projects under development reported that they had challenges accessing the right resources and information throughout the process, highlighting that they did not know who they could turn to or what information to trust when it came to accessing information that they could utilize and understand.

Stakeholders highlighted resourcing equity issues stating that despite best efforts to ensure equitable access to services, communities that have the most capacity still come out ahead.

Communities struggle to figure out who to turn to, it d be great to see NYSERDA put together a list of trusted contractors that have been vetted for large scale solar. It would give communities a starting place."

Clean Energy Community Coordinator

While there are many high-quality educational tools and materials developed by the state and energy focused groups, and organizations who have the resources to help communities navigate these complex processes, the challenge lies in providing communities with access at the right time and to the right people.

Where resources are available and utilized by towns (e.g., model town solar law), interviewees reported that, while useful, they often lack specificity of detail (e.g., model laws did not include decommissioning solar information) or are not set up to adequately service unique elements of their towns.

We need more support from the state, they should realize that we are a small town

Local Community Member

"Towns are under resourced; they fear that they will get swindled by developer and don t want to risk missing out on providing benefits to their communities.

Community Group Member

3

Communities tend to focus more on the potential costs of large-scale solar development than they do the benefits.

In discussions with community members and local officials, interviewees repeatedly focused on the potential costs of the large-scale developments on their local communities. How these costs would be addressed or potentially mitigated was of greater concern than the potential benefits that these projects could bring to their community.

Many of the benefits of solar developments are in the medium to long-term (e.g., mitigating climate change) and are of collective benefit, whereas the costs typically playout immediately, are on-going (e.g., site development, impacts on viewsheds), and can be personal. The differentiation between long-term benefits and short-term costs is tantamount to loss aversion. As described in the literature review, loss aversion is the tendency for individuals to weigh potential losses as greater than equivalent gains and is a significant barrier to community acceptance and adoption of these projects. Hearing the community reflect the empirical literature was not surprising in this instance.

Messaging to drive community buy in to these projects can't be just about helping the state [achieve its energy goals] or creating more jobs, it needs to be local and address local community concerns.

Land Trust Stakeholder

"The scale of these projects is just out of wack with the towns they're being proposed in.

Local Official

"We re losing greenspace, how can we make up for greenspace?

Local Resident

When asked whether contributing to the collective benefit by producing clean energy was a motivator for their local community, most respondents indicated was not enough to shift perspectives or motivate behavior change when balanced against the potential costs of proposed projects.

Across the range of stakeholders interviews the concerns raised about the potential costs of large-scale developments include:

1. **Impact on viewsheds**. Large-scale solar projects require significant plots of land, which can drastically change local viewsheds depending on project location (e.g., through the siting of projects on previously undeveloped land). They can also be an eyesore for nearby residents (e.g., visibility or glare). This is a serious concern for residents, especially in small, rural towns where the natural landscapes and lack of development is a key reason why individual live or visit those geographical areas.
2. **Impact on property values.** Stakeholders expressed concerns about the impact proposed projects would have on homeowners and their property values. They wanted impacts on views to be minimized for nearby residents

“Residents are always asking me about how this will impact [redacted] don t actually know.

Solar Consultant

“Solar technology is ever changing. We wanted to be able to stagger the development so we could install new technology as it became available.

Local Community Member

“Why are we investing in putting so much of this technology in the ground when it might be obsolete in a couple of years.

Local Official

(e.g., scenic screening around developments) and compensation for any property value loss. It is important to note that further investigation is needed to better understand the likely impact of large-scale solar developments on property values as findings so far are mixed. Current data suggests that any impacts, positive or negative, are likely going to be limited to a relatively small number of nearby homes.[43] [44]

3. **Impact on local industry**. Interviewees reported a range of concerns about the unknown impact local developments would have on local industry (e.g., agriculture, tourism). For example, agriculture is one of the largest industries in regional town and stakeholders are concerned about not only the cultural and economic changes solar developments will have on farming communities, but the flow-on effects for associated towns where these business support local economies.

4. **Solar energy technology advancements**. Interviewees indicated a reasonable degree of concern that current solar technology will soon be outdated, and much more advanced and effective technology will become available. The implication is “why bother” erecting a 30-year installation on technology that might soon be outdated. This concern was not the most prolific of stated concerns, but it emerged regularly enough to warrant inclusion in this report. Other industries also face obsolescence of technology as advances are made. Research shows that industries can prepare for this situation by having a transition or replacement strategy in place.[45] Importantly, considerations underlying these strategies should extend beyond economic costs, and consider environmental impacts of infrastructure and equipment over their entire life cycle. [46]When these factors are considered, upgrades are not necessarily made as soon as they are available (i.e., as technology improves) as the environmental cost is higher than the reward.

4

Local stakeholders are concerned about potential unequal distribution of solar benefits

In interviews stakeholders highlighted that they wanted to ensure their community received fair compensation and benefits for hosting solar developments. Interviewees expressed the importance of ensuring these benefits were received at the local level. They also identified knowledge gaps in relation to understanding and negotiating with developers and other parties for these benefits.

Why should we be responsible for paying for other people's problems? These projects benefit folks down there [in New York City] more than they benefit us and we re the ones paying the price.

Local Working Group Member

"Reps for solar developers are like used car salesman, they push you hard to make a decision, so they can meet deadline.

Local Official

None of us are directly benefiting from the project."

Community member whose neighbor hosts a large-scale solar project

People want cheap energy, but they don t want to see a solar farm.

Local Official

Communities don t feel like they can trust developers.

Community Organization Member

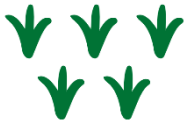
These findings complement studies from the literature which found that concerns around procedural and distributive justice were front of mind for communities where solar energy projects are proposed and developed. Communities were opposed to projects where they felt like they were being asked to shoulder the burden of costs of these projects with inadequate benefits.

Local officials in charge of negotiating with developers about PILOT payment and community host agreements reported challenges in understanding what they could and should be asking for from developers. These data are supported by findings by a recent TNC report[16] which identified that current taxation policy for renewable energy projects is not well understood and that the process to negotiate a projects tax liability and arrange mitigation payment through PILOT agreements was confusing. This confusion creates financial uncertainty for municipalities that rely on property tax revenue to fund schools and other critical services, and for developers as they negotiate with inexperienced counterparts in municipalities around their operating costs.

Stakeholders also identified that host community benefits need to be multi-faceted and offer a variety of incentives that could be tailored to suit the specific needs and characteristics of towns. For some towns this meant more walking trails and access to the outdoors, for others this meant scholarships provided to local schools. Whatever the benefit was, the key was ensuring that the community had the opportunity to be engaged and have their say on what they wanted to happen in their town.

5

Solar farms will impact the sense of 'place,' regional identity and prosperity



The impact that large-scale, non-residential solar development will have agricultural lands is a key point of concern among community members and local government officials interviewed. Studies from our literature review also found that this was one of the most often raised issues in the realm of solar development's impact on land use.[5] The concerns stem from cultural and economic changes solar developments will have on farming communities as solar developments compete for the same land that would otherwise be used for agriculture. Interviewees concerns were clustered across the following four concerns -

1. Impact on the Farm Financial Viability

These communities don t want to see farmland go away; they are scared it will be eaten by solar.

Solar Consultant

Among farmers, the financial impact of solar developments largely depends on their land tenure. Farmers who own their land and lease it to solar developers benefit from an additional source of steady income. This is especially important for farmers who operate on thin margins, with variable returns year to year. For farmers who own their property, solar is an opportunity to earn additional income, and strengthens the long-term viability of their operation.

As more farmland is leased to solar developers, there is however, less available to rent. Farmers who rent land are reporting higher rates, and issues of land scarcity. This means they may have to pay more to rent their land, and / or travel further to get to it. This is especially problematic for new, and beginning farmers, and historically underserved farmers as it is one more barrier to their success in the industry.[47]

It was gut wrenching. A complete shock.

Community member describes her reaction to solar developments next to her property

2. Change in Rural Character

Members of rural communities, both farmers and non-farmers, view large-scale solar developments as a threat to the rural character of their towns. The agricultural viewsheds of open fields, livestock grazing, and wooded areas are tied to deep sentiments of cultural value. Large-scale solar developments that disrupt these viewsheds evoked strong emotions tied to the loss of heritage. These findings are in line with research on place attachment and represent a significant barrier to the adoption and acceptance of these projects.

[Farming] may not define the economy, but it defines the character of the town.

Local Community Organization Member

3. Impact on Agricultural Land Quality

The potential state of agricultural land at the end of a solar lease is a source of distress for rural communities. Central to these concerns is

uncertainty about the process of decommissioning solar panels. To ensure that the land has the potential to be returned to agricultural use, above and below ground infrastructure will need to be removed when the contract is over. There are concerns to the quality of the clean-up effort as well as potential contamination of the land with any harmful material used in solar panels and supporting infrastructure.

How can we ensure accountability in decommissioning?

Community Member

Some advocates of solar development explain that the quality of the soil may be improved by the end of a solar contract, depending on how it is managed. After having rested for many years, or having been properly managed with livestock, there is the potential to replenish soil fertility.

Most of these solar projects are going in on solar land. Now we will have energy but not food.

Local Official

4. Fear of Rural Economic Decline

The literature review revealed concerns of cascading negative effects on rural economies and local food production as a result reduced agricultural land in use. As solar development replaces some agricultural activity, there is the potential of reduced capacity to grow food locally and the decline in secondary agricultural markets which are important to rural economies. This includes the business of seed providers and veterinary services.[47]

"What you are really dealing with is change.

State Official

There is also evidence of perceived negative views on the idea of economies transitioning from "farming economies" to "energy economies."[5]

CASE STUDY

Strategies to Address Concerns Within the Agricultural Community

American Farmland Trust (AFT): Smart Solar Siting [47]

AFT has developed a model framework with guiding principle to ensure solar energy can coexist with farming activities. Below are three broad strategies outlined in their report.

1. Avoiding Development on Prime Agricultural Land

Development on prime agricultural land should be avoided if possible. Blacktop, brownfields, and marginal land should be prioritized and incentivized as sites to develop large-scale solar projects.

2. Encourage Dual Use of Land Through Agrivoltaics

With proper planning, agricultural activities and solar projects can occur simultaneously. This dual use of space is called agrivoltaics. This planning strategy can be a “win-win” for those interested in maintaining agricultural activities while also developing solar projects, reducing feelings of loss associated with farming heritage.

3. More Research to Support Optimal Solar Development and Planning

Much of the resistance to large-scale solar development comes from the uncertainty associated with these projects. More research is needed to thoroughly address issues that remain unclear, such as the impact of decommissioning, or agrivoltaics best management practices.

These strategies sit alongside a rating system in which **mitigation fees** for solar developers' impact on agricultural activity can be applied. The fees could be augmented, or reduced, depending on the extent to which the project avoided prime agricultural land (established through soil ranking), and encouraged the dual use of space through agrivoltaics. The goal of this framework is to incentivize developers to avoid development on prime agricultural land, something that most stakeholders generally agree should be avoided.

Proposed use of the funds raised through mitigation fees are activities that advance farmland protection and farm viability in host communities.

6

To what extent will solar cause more harm than good to the environment?

Due to their scale, the development of large, non-residential solar projects presents significant changes to local land use patterns. Various environmental concerns relating to these changes have been raised. These concerns cover a wide spectrum of issues, ranging from the negative impacts on recreational use of natural resources, to the potential hazardous impacts of toxic substances on the ecosystem. Ultimately, these represent what has been coined “green-on-green" tension: when efforts to mitigate climate change conflict with other environmental priorities[48]. Interviewees concerns were clustered across the following three concerns -

The loss of wetlands and tree cover is a big concern for these communities.

Mid-Hudson Community Organization Member

We were worried about losing green space and wanted to know how we could make up some green space.

Local Resident

We re already noticing changes in the coyote population and how we hear them.

Community member explaining the impacts of nearby solar development

1. Ecosystem Impacts

The size of non-residential projects is significant, spurring concerns about their impact on wildlife and ecosystems among different environmental protection groups, recreational hunters, and other stakeholders. Due to the site-specific context of local wildlife and ecosystems, the impacts these projects may have are highly context dependent. To build large-scale solar projects, typically vegetation is cleared, soil is graded, and areas are fenced off. There are legitimate concerns of habitat loss and fragmentation resulting from these activities.

Wildlife may lose the ecosystems that sustain them, and the obstruction of wildlife corridors or migratory pathways could prevent the movement of certain species.[49] The impact solar panels may have on bird populations specifically has also garnered a lot of attention. Some bird populations suffer from mortality due to collisions with the panels and solar flux burning / stinging. Strategic siting, and design, can help mitigate these issues.[50]

Proponents of solar development have cited that with proper planning, negative impacts associated with large-scale solar projects can be mitigated. Furthermore, there can even be some positive ecosystem services for the proximate area, if designed correctly, and dependent on what the area was used for previously.[51] For example, the habitat underneath solar panels can host different flowering species, and the partially to fully shaded environment from the panels can delay blooming, therefore prolonging floral abundance and positively impacting late-season pollinators.[52]

2. Hazardous Materials

Stakeholders have expressed serious concern about the potential of toxic pollutants making their way into their environmental resources (soils and water), and ultimately posing a hazard to the health and safety of their community. Per-and polyfluoroalkyl substances (PFAS) make up a large portion of concerns. PFAS are a class of chemicals with water repellant properties that make them useful as a coating for certain products. Their potential hazard is substantial as they persist in the environment, and are subject to bioaccumulation, known as "forever chemicals." Exposure can lead to a host of negative health issues.

Research indicates that PFAS is not typically used in solar panel production[53]. Nevertheless, there is significant uncertainty within potential host communities, and conflicting information. What some communities would like is guarantee that no PFAS is used by developers in their community[54].

There are a lot of myths out there, we are often asked about potential contamination in local water ways and have to reassure people about the risks

State Official

PFAS compounds are not the only hazardous materials causing anxiety. Lead and cadmium are sometimes found in solar panels[55]. In the event of solar panels getting damaged in a natural event, some have voiced concerns about potential leaching of these materials into their environment[56].

Are they hazardous? How are they disposed of? No one really knows because we haven't gotten there yet.

Local Resident

3. Decommissioning & Recycling

In part because of hazardous materials in PV systems, the decommissioning of solar projects and recycling of the panels has become a contentious issue. There are concerns around the quality of the decommissioning, and the accountability that will be put on developers to restore the land back to its original state before the solar project was installed. Concerns range from trust in a developer to keep their promise of decommissioning, to questions about mitigating soil compaction, or to what depth into the soil clean-up be enforced.

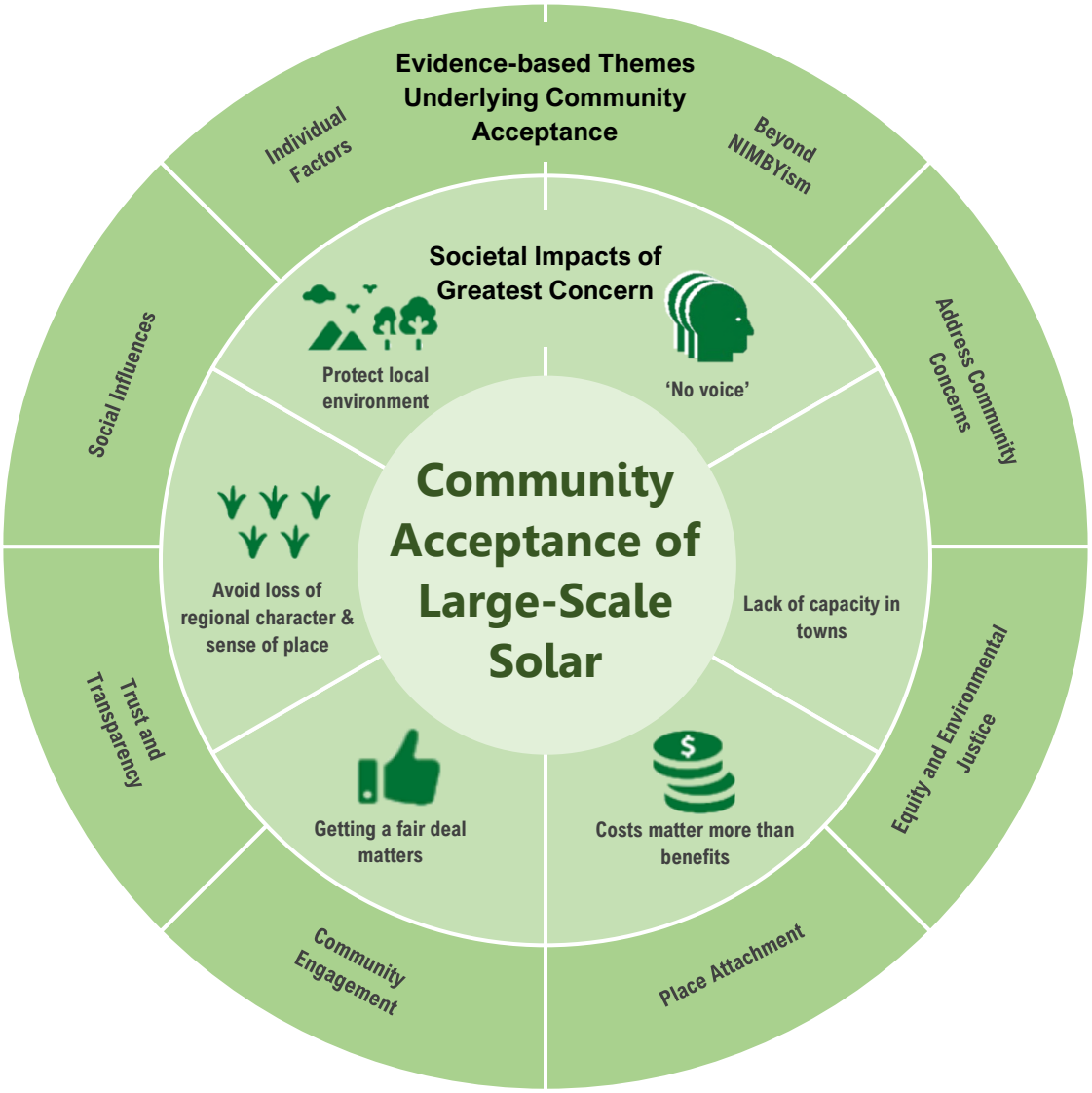
Stakeholders often had negative perceptions about recycling the material used in PV panels and the generation of toxic waste. They raised the issues of hazardous materials in PV systems and challenges in an efficient recycling system as solar panels are comprised of many different materials and not easily taken apart. As the industry develops further, more standardized recycling and decommissioning systems are expected to develop.[57]

You need to educate yourself, because you don t want to allow something that 20 years from now, will cause a problem for my family who will still be living here

Local Official

Putting it all together: Understanding Community Acceptance of Large-Scale Solar

The following diagram summarizes the societal impacts of greatest concern to New York Residents and the underlying evidence that supports local community acceptance of non-residential solar PV installations. Community acceptance, as depicted in the inner circle, is shaped by a complex system of factors. The second ring outlines the societal impacts of greatest concern to residents and the third ring describes the evidence-based themes that impact community acceptance and adoption of large-scale solar solutions. The holistic social and behavioral system must be considered for successful large-scale solar development to occur.



Conclusion

The wide spread development of large scale solar is critical to achieving New York State's clean energy goals. The potential for lack of support, or acceptance, of these proposed projects among host communities is a significant barrier to achieving these goals.

This report outlines key considerations relating to the factors that shape community attitudes towards solar PV solutions, what concerns local communities have about non residential solar developments and what can be done to help maximize the benefits of proposed developments for communities.

This report has identified a number of key opportunities to drive increased adoption and support of non residential solar PV developments, including building local community capacity, focusing on mitigating community concerns, and delivering benefits at the local level to increase project support.

The opportunity for New York to help led the way, not just in the United States but globally, with transitioning to renewables is immense. The challenges associated with this transition are also immense. The opportunity is to intertwine an understanding of the major social and behavioral factors that can impede or enable progress to be made. This report is an important step in outlining some of these key considerations as we move towards assembling a comprehensive handbook to guide future solar installations in the state of New York.

Appendix 1

List of different organizations & groups engaged through community research

1. Capital District Regional Planning Commission
2. Columbia Land Conservancy
3. Clean Energy Communities
4. ConEdison
5. EDF Renewables
6. Basilica Hudson
7. Genesee Finger Lakes Regional Planning Council
8. Hudson Valley Regional Council
9. National Grid
10. NYSERDA
11. Orange and Rockland Utilities
12. Mid-Hudson Regional Economic Development Council
13. Capital Regional Economic Development Council
14. Scenic Hudson
15. The Nature Conservancy
16. Town of Ballston
17. Town of Batavia
18. Town of Easton
19. Town of Shawangunk
20. Wendel Companies
21. Wallkill Valley Land Trust, Inc.

Appendix 2

Interview Questions

1. To start, can you tell me a little bit about your role locally, how long you have lived and/or worked in [town], and what it's like to be part of this community?

2. Can you tell us a little bit about the main social and environmental issues that your community currently faces? Has your community experienced any climate impacts?

3. What impact do you think the development of a non-residential solar project locally would have on you personally and/or your local community?

4. What are some concerns that you have, or others have expressed to you, about non-residential solar projects?

5. What do you see as the major barriers to community acceptance of non-residential solar projects (observed or experienced)?

6. What do you see as the major drivers to community acceptance of non-residential solar projects (observed or experienced)?

7. In an ideal scenario, what benefits would your community receive from non-residential solar projects?

8. Given these barriers and potential benefits, what do you think could help drive community buy-in and enthusiasm for solar projects?

9. What other groups (civic groups, non-profits, government agencies/departments, universities, etc.) have you worked with or interacted with on energy development issues? Who seems to be the most vocal (in support or opposition) on the issue?

References

[1] New York State Press Release. September 20, 2021. https://www.governor.ny.gov/news/governor-hochul-announces-expanded-ny-sun-program-achieve-least-10-gigawatts-solar-energy-2030

2 Carlisle, J. E., Solan, D., Kane, S. L., & Joe, J. (2016). Utility-scale solar and public attitudes toward siting: A critical examination of proximity. Land Use Policy, 58, 491-501.

3 E. Larson, C. Greig, J. Jenkins, E. Mayfield, A. Pascale, C. Zhang, J. Drossman, R. Williams, S. Pacala, R. Socolow, EJ Baik, R. Birdsey, R. Duke, R. Jones, B. Haley, E. Leslie, K. Paustian, and A. Swan, Net-Zero America: Potential Pathways, Infrastructure, and Impacts, Final report, Princeton University, Princeton,NJ, 29 October 2021

4 Loomis, J. (2011). What's to know about hypothetical bias in stated preference valuation studies?. Journal of Economic Surveys, 25(2), 363-370.

5 Uebelhor, E., Hintz, O., Mills, S. B., & Randall, A. (2021). Utility-scale solar in the Great Lakes: Analyzing community reactions to solar developments. Sustainability, 13(4), 1677. https://doi.org/10.3390/su13041677

6 Schelly, C., Prehoda, E., Price, J., Delach, A., & Thapaliya, R. (2020). Ratepayer Perspectives on Mid- to Large-Scale Solar Development on Long Island, NY: Lessons for Reducing Siting Conflict through Supported Development Types. Energies, 13(21).

7 Konisky, D. M., Ansolabehere, S., & Carley, S. (2020). Proximity, NIMBYism, and public support for energy infrastructure. Public Opinion Quarterly, 84(2), 391-418.

8 Solar@Scale (2021) A Local Government Guidebook for Improving Large-Scale Solar Development Outcomes Report

9 Lewin, K. (1951). Field theory in social science. Harper.

10 Trope, Y., & Liberman, N. (2010). Construal-level theory of psychological distance. Psychological review, 117(2), 440.

11 Huijts, N. M., Molin, E. J., & Steg, L. (2012). Psychological factors influencing sustainable energy technology acceptance: A review-based comprehensive framework. Renewable and sustainable energy reviews, 16(1), 525-531.

12 Tabi, A., & Wüstenhagen, R. (2017). Keep it local and fish-friendly: Social acceptance of hydropower projects in Switzerland. Renewable and Sustainable Energy Reviews, 68, 763-773.

13 Gross, C. (2007). Community perspectives of wind energy in Australia: The application of a justice and community fairness framework to increase social acceptance. Energy policy, 35(5), 2727-2736.

14 Carlisle, J. E., Kane, S. L., Solan, D., Bowman, M., & Joe, J. C. (2015). Public attitudes regarding large-scale solar energy development in the US. Renewable and Sustainable Energy Reviews, 48, 835-847.

15 Wilson, A., Patterson, J., Fink, K., Wasserman, K., Starbuck, A., Sartor, A., ... & Fleming, J. (2011). Coal blooded: putting profits before people. NAACP: Baltimore,

16 The Nature Conservancy (2017). Accelerating Large-Scale Wind and Solar Energy in New York. Report

17 Mjahed Hammami, S., & Abdulrahman Al Moosa, H. (2021). Place attachment in land use changes: A phenomenological investigation in residents' lived experiences with a renewable energy project deployment. Sustainability, 13(16), 8856. https://doi.org/10.3390/su13168856

18 Cousse, J. (2021). Still in love with solar energy? Installation size, affect, and the social acceptance of renewable energy technologies. Renewable and Sustainable Energy Reviews, 145, 111107.

19 Van Veelen, B., & Haggett, C. (2017). Uncommon ground: The role of different place attachments in explaining community renewable energy projects. Sociologia Ruralis, 57, 533-554.

20 Frate, C. A., & Brannstrom, C. (2017). Stakeholder subjectivities regarding barriers and drivers to the introduction of utility-scale solar photovoltaic power in Brazil. Energy Policy, 111, 346-352.

21 Mulvaney, D. (2017). Identifying the roots of Green Civil War over utility-scale solar energy projects on public lands across the American Southwest. Journal of Land Use Science, 12(6), 493-515.

22 Pierce, J. L., Kostova, T., & Dirks, K. T. (2001). Toward a theory of psychological ownership in organizations. Academy of Management Review, 26(2), 298-310. https://doi-org.ezproxy.library.uq.edu.au/10.2307/259124

23 Belk, R. W. (1988). Possessions and the extended self. Journal of Consumer Research, 15(2), 139-168. https://www.jstor.org/stable/2489522

24 Pierce, J. L., & Jussila, I. (2010). Collective psychological ownership within the work and organizational context: Construct introduction and elaboration. Journal of Organizational Behavior, 31(6), 810-834. https://www.jstor.org/stable/41683948

25 Vuichard, P., Stauch, A., & Wüstenhagen, R. (2021). Keep it local and low-key: Social acceptance of alpine solar power projects. Renewable and Sustainable Energy Reviews, 138, 110516.

26 Warren, C. R., & McFadyen, M. (2010). Does community ownership affect public attitudes to wind energy? A case study from south-west Scotland. Land Use Policy, 27(2), 204-213. https://doi.org/10.1016/j.landusepol.2008.12.010

27 Turner, J. C. (1975). Social comparison and social identity: Some prospects for intergroup behaviour. European Journal of Social Psychology, 5, 5-34.

28 Tajfel, H., & Turner, J. C., Austin, W. G., & Worchel, S. (1979). An integrative theory of intergroup conflict. Organizational identity, 55(65).

29 Haslam, S. A., Reicher, S. D., & Reynolds, K. J., (2012). Identity, influence, and change: Rediscovering John Turner's vision for social psychology. British Journal of Social Psychology, 5, 201-218.

30 Hogg, M. A. (2001). A Social Identity Theory of Leadership. Personality and Social Psychology Review, 5(3), 184-200.

31 Cialdini, R. B., & Jacobson, R. P. (2021). Influences of social norms on climate change-related behaviors. Current Opinion in Behavioral Sciences, 42, 1-8. https://doi.org/10.1016/j.cobeha.2021.01.005

32 Farrow, K., Grolleau, G., & Ibanez, L. (2017). Social norms and pro-environmental behavior: A speakhttps://doi.org/10.1016/j.ecolecon.2017.04.017

33 Vesely, S., Masson, T., Chokrai, P., Becker, A. M., Fritsche, I., Klöckner, C. A., ... & Panno, A. (2021). Climate change action as a project of identity: Eight meta-analyses. Global Environmental Change, 70, 102322.

34 Borchers, Xiarchos, I., & Beckman, J. (2014). Determinants of wind and solar energy system adoption by U.S. farms: A multilevel modeling approach. Energy Policy, 69, 106–115. https://doi.org/10.1016/j.enpol.2014.02.014

35 Hogg, M. A. (2001). A social identity theory of leadership. Personality and social psychology review, 5(3), 184-200

36 Bamberg, S., & Möser, G. (2007). Twenty years after Hines, Hungerford, and Tomera: A new meta-analysis of psycho-social determinants of pro-environmental behaviour. Journal of environmental psychology, 27(1), 14-25. https://doi.org/10.1016/j.jenvp.2006.12.002

37 Rokeach, M. (1973). The nature of human values. Free press.

38 Brosch, T. (2021). Affect and emotions as drivers of climate change perception and action: a review. Current Opinion in Behavioral Sciences, 42, 15-21. https://doi.org/10.1016/j.cobeha.2021.02.001

39 Gardner, G. T., & Stern, P. C. (2008). The short list: The most effective actions US households can take to curb climate change. Environment: science and policy for sustainable development, 50(5), 12-25. https://doi.org/10.3200/ENVT.50.5.12-25

40 Kahneman, D., Knetsch, J., & Thaler, R. (1991). Anomalies: The endowment effect, loss aversion, and status quo bias. The Journal of Economic Perspectives, 5(1), 193-206. https://doi.org/10.10257/jep.5.1.193

41 Kress, L., & Aue, T. (2017). The link between optimism bias and attention bias: A neurocognitive perspective. Neuroscience and Biobehavioural Reviews, 80, 688-702. https://doi.org/10.1016/j.neubiorev.2017.07.016

42 Samuelson, W., & Zeckhauser, R. (1988). Status quo bias in decision making. Journal of Risk and Uncertainty, 1(1), 7-59. https://doi.org/10.1007/BF00055564

43 Guar, Vasundhara, and Corey Lang. 2020. Property Value Impacts of Commercial-Scale Solar Energy in Massachusetts and Rhode Island. Kingston, R.I.: University of Rhode Island

44 Al-Hamoodah, Leila, Kevita Koppa, Eugenie Schieve, D. Cale Reeves, Ben Hoen, Joachim Seel, and Varin Rai. 2018. "An Exploration of Property-Value Impacts Near Utility-Scale Solar Installations." Austin, Tex.: University of Texas at Austin

45 Mellal, M. A. (2020). Obsolescence – a review of the literature. Technology in Society, 63, 101347. https://doi.org/10.1016/j.techsoc.2020.101347

46 Sloan, T. W. (2011). Green renewal: Incorporating environmental factors in equipment replacement decisions under technological change. Journal of Cleaner Production, 19(2-3), 173–186. https://doi.org/10.1016/j.jclepro.2010.08.017

47 Levy, S., Ruiz-Ramón, M., & Winter, E. (2022). Smart Solar Siting on Farmland: Achieving Climate Goals while Strengthening the Future for Farming in New York. Saratoga Springs, NY: American Farmland Trust.

48 Roddis, P., Roelich, K., Tran, K., Carver, S., Dallimer, M., & Ziv, G. (2020). What shapes community acceptance of large-scale solar farms? A case study of the UK's first 'nationally significant' solar farm. Solar Energy, 209, 235–244. https://doi.org/10.1016/j.solener.2020.08.065

49 Hernandez, R. R., Easter, S. B., Murphy-Mariscal, M. L., Maestre, F. T., Tavassoli, M., Allen, E. B., Barrows, C. W., Belnap, J., Ochoa-Hueso, R., Ravi, S., & Allen, M. F. (2014). Environmental impacts of utility-scale solar energy. Renewable and Sustainable Energy Reviews, 29, 766–779. https://doi.org/10.1016/j.rser.2013.08.041

50 Walston, L. J., Rollins, K. E., LaGory, K. E., Smith, K. P., & Meyers, S. A. (2016). A preliminary assessment of avian mortality at utility-scale solar energy facilities in the United States. Renewable Energy, 92, 405–414. https://doi.org/10.1016/j.renene.2016.02.041

51 Randle-Boggis, R. J., White, P. C. L., Cruz, J., Parker, G., Montag, H., Scurlock, J. M. O., & Armstrong, A. (2020). Realising co-benefits for natural capital and ecosystem services from solar parks: A co-developed, evidence-based approach. Renewable and Sustainable Energy Reviews, 125, 109775. https://doi.org/10.1016/j.rser.2020.109775

52 Graham, M., Ates, S., Melathopoulos, A. P., Moldenke, A. R., DeBano, S. J., Best, L. R., & Higgins, C. W. (2021). Partial shading by solar panels delays bloom, increases floral abundance during the late-season for pollinators in a dryland, agrivoltaic ecosystem. Scientific Reports, 11(1). https://doi.org/10.1038/s41598-021-86756-4

53 Anctil, Annick. (2020). Facts about solar panels: PFAS contamination. Michigan State University.

54 Saving Greene. (2021). PFAS and other compounds in solar panels, wiring, and coatings. Concerned Citizens for Sensible Solar.

55 United States Environmental Protection Agency. Solar Panel Recycling. Retrieved from https://www.epa.gov/hw/solar-panel-recycling

56 Shellenberger, Michael. (2018, May 23). If Solar Panels Are So Clean, Why Do They Produce So Much Toxic Waste? Forbes.

57 United States Environmental Protection Agency. (n.d.). Solar Panel Recycling. Retrieved from https://www.epa.gov/hw/solar-panel-recycling

Appendix B. New York Solar Solutions Workshop

Expanding Benefits and Building Community Support for Nonresidential Solar

New York Solar Solutions Workshop

EXPANDING BENEFITS AND BUILDING COMMUNITY SUPPORT FOR NON-RESIDENTIAL SOLAR

WELCOME

Echo Cartwright

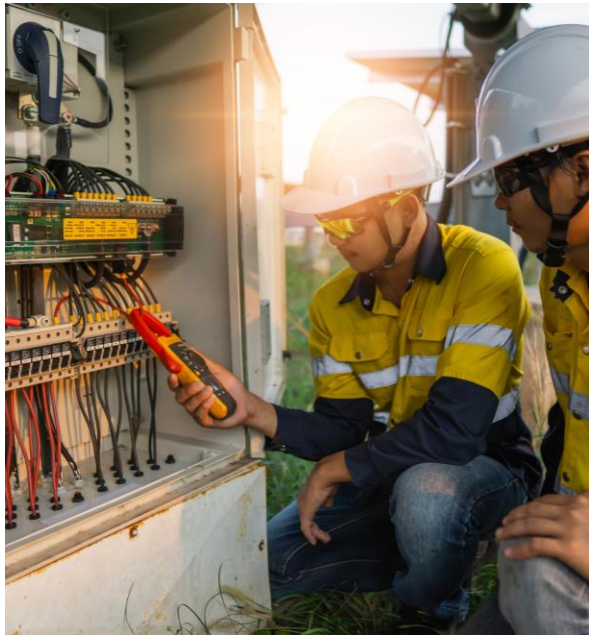
The Nature Conservancy

New York Director of Climate Mitigation

Diane Bertok

NYS Energy Research and Development Authority (NYSERDA)

Project Manager



JOBS

HEALTH

SAFETY

The Nature Conservancy and Clean Energy

- Mission: conserve the lands and waters on which all life depends
- Global warming is a grave threat
- A bright future requires rapid buildout of clean energy technologies that:
  - Protect critical wildlife habitat
  - Addresses local needs
- Low carbon, low impact
- Develop tools, resources, and reports on low-impact development and community involvement

NEW YORK CLIMATE ACT

Climate Leadership and Community Protection Act establishes the following goals and actions:

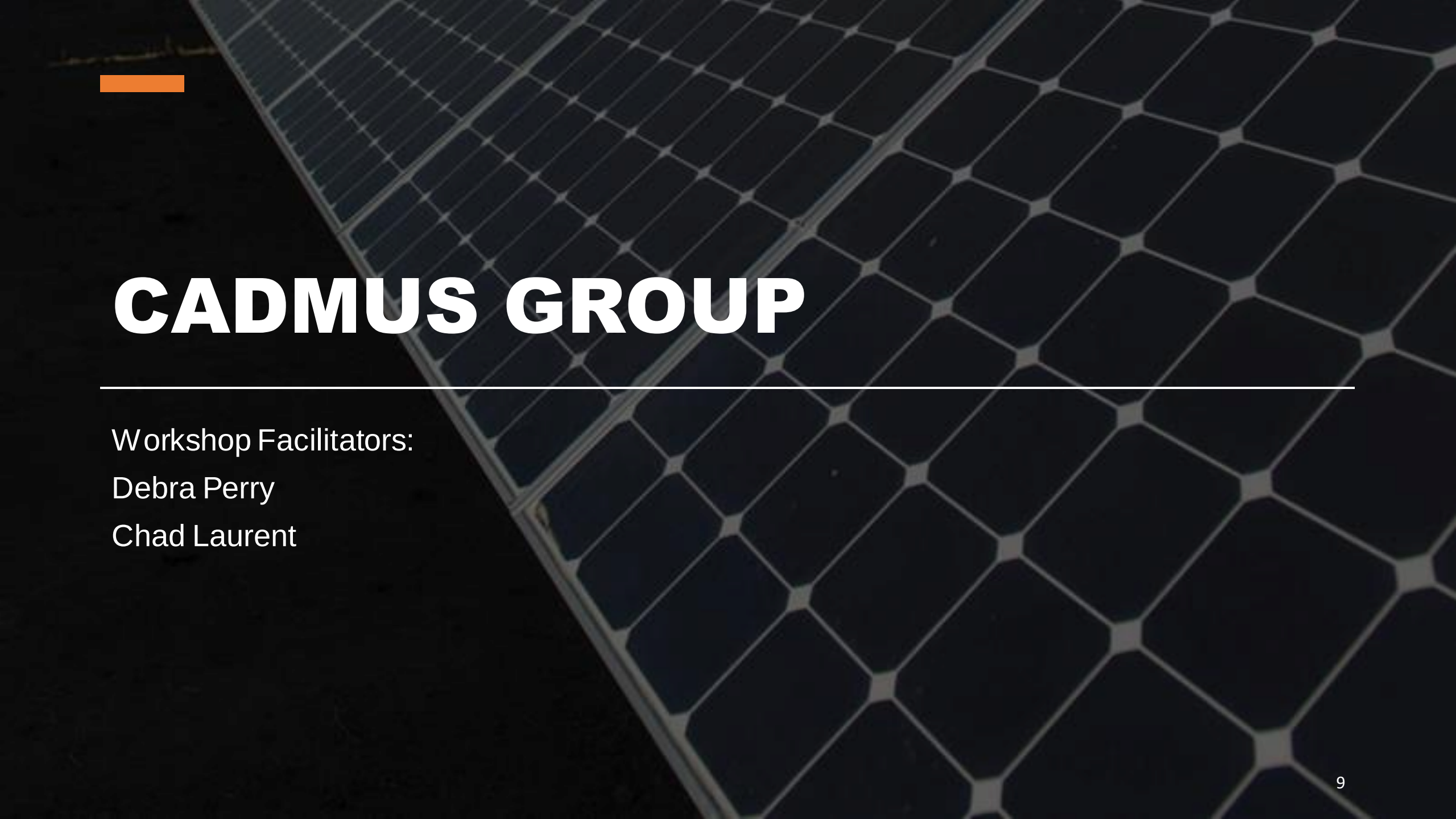
- By 2030: reduce statewide emissions 40 percent
- By 2050: net zero emissions statewide

- By 2030: 70 percent renewable energy
- By 2030: 10 GW of distributed solar energy
- By 2040: 100 percent zero-emission electricity

- Climate Action Council – draft scoping plan to meet goals
- Climate Justice Working Group – draft criteria for disadvantaged community definition
- Public comment period open now. Visit climate.ny.gov.

SOLAR SOLUTIONS

- Key question: what do your communities want to see in local solar projects?
- Process: collaborate with communities, developers, policymakers, community leaders – 1:1 conversations and workshops
- Result: solar solutions **handbook** for decisionmakers and developers that outlines what's important to communities
- Why: communities and local leaders are essential to meeting New York's goals and creating a safer future for our children and grandchildren.



CADMUS GROUP

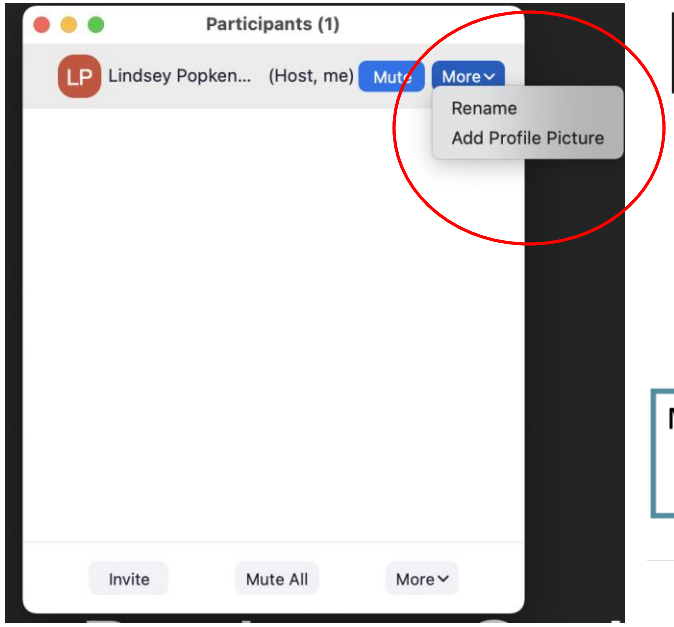
Workshop Facilitators:

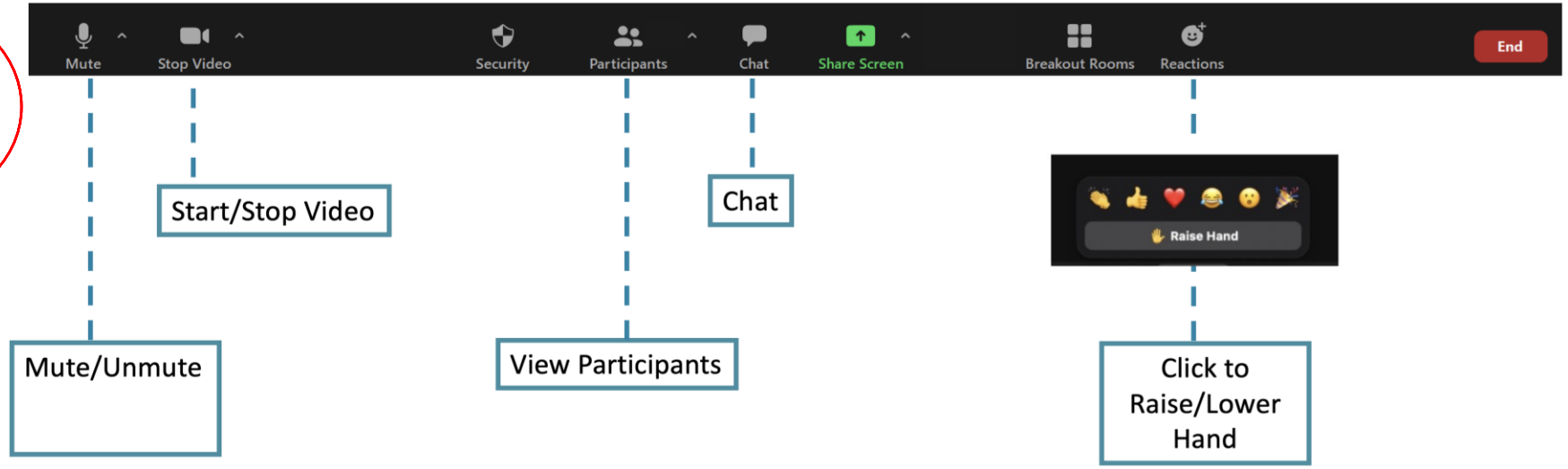
Debra Perry

Chad Laurent

ZOOM TECHNOLOGY REVIEW

Please check that your name is displayed correctly. Thank you!





NOTE: Recording in progress

QUICK POLL

Please answer on the pop-up screen:

Have you had experience with non-residential solar projects? (Yes/No)

Are you currently engaged in local solar development decisions? (Yes/No)

Workshop Goals

Share information and experiences on non-residential solar development in New York.

Discuss how non-residential solar projects can reflect community values and help meet local needs.

Expand and refine a suite of ideas and solutions based on what communities want to see in solar projects.

Goal is <u>not</u> to design or consider specific projects.

AGENDA

Presentation: Overview of Solar Landscape and Community Input

Small Group Discussion: Community Values and Local Solar Development

Break

Presentation**:** Tools, Techniques, and State Resources

Small Group Discussion: Local Needs for Community Goals

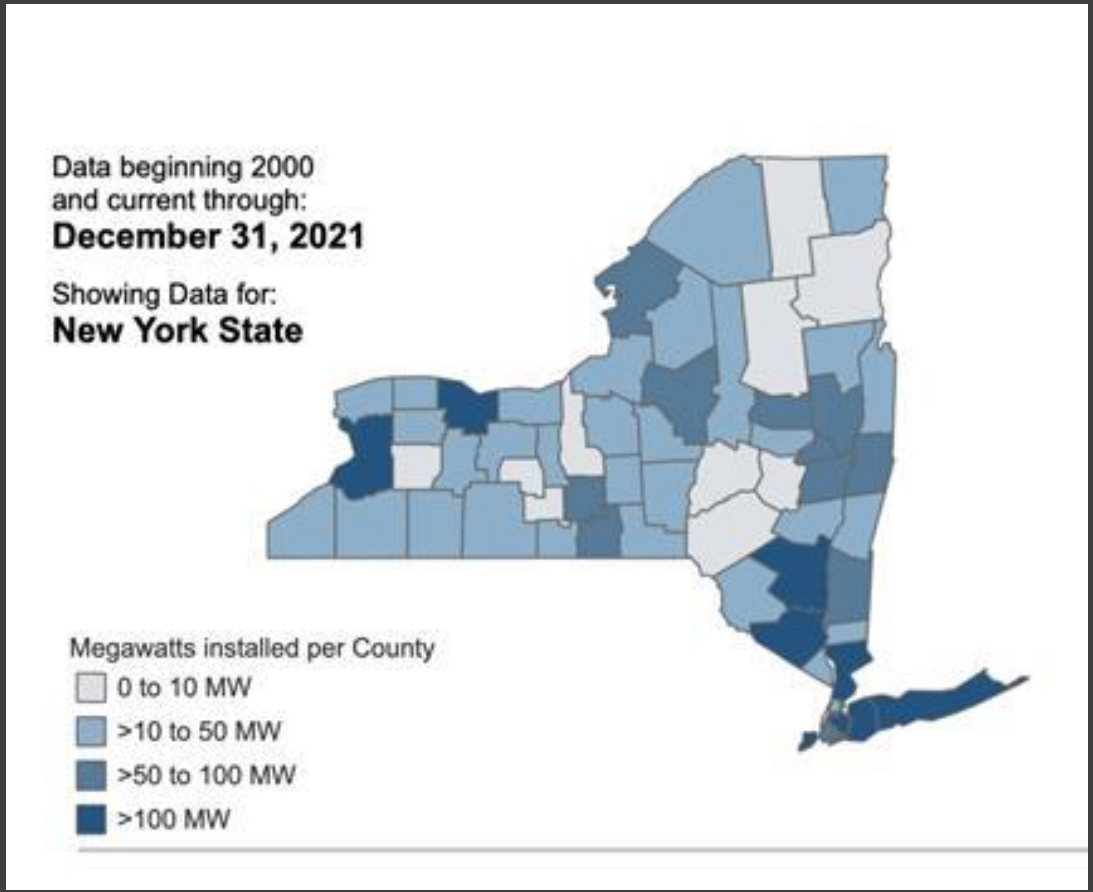
Wrap-up

Next Steps

DISCUSSION GUIDELINES

- Please speak openly and honestly
- Listen carefully and respectfully to each person
- Ask questions
- Keep comments brief and stay focused on task
- If you have already spoken, please give others the opportunity to speak before you go again
- Explore differences respectfully and look for common ground

Overview of Solar Landscape and Community Input



Installed solar capacity (as of Dec 2021)

Source: NYSERDA, based on NYS DPS and NYISO interconnection data

FUTURE NEEDS

New York has **3.6 GW** of installed solar capacity today and will need at least **10x** that to meet the **2050** goals.

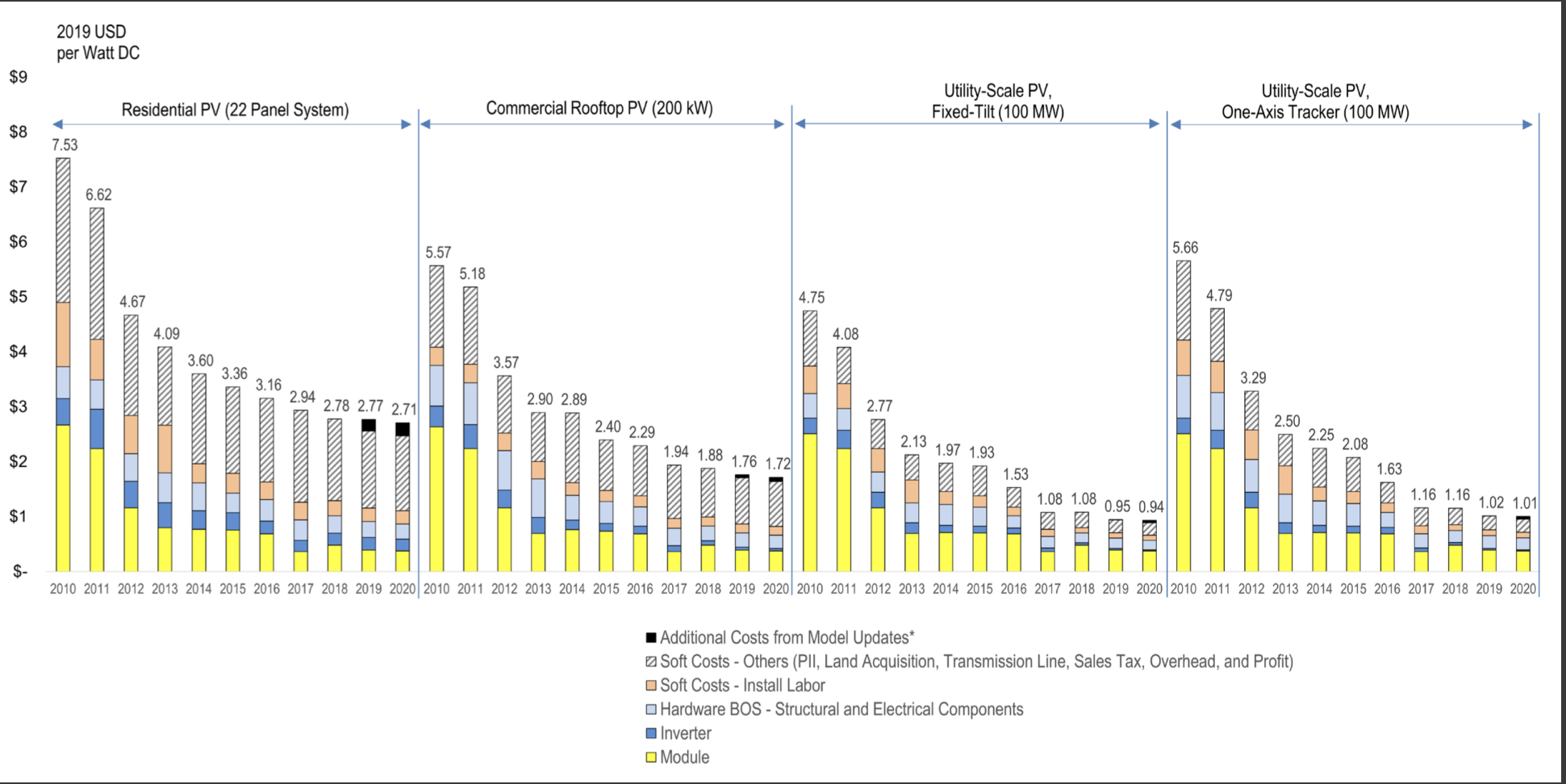
STATE CLEAN ENERGY POLICIES & PROGRAMS

Related policies and programs are driving clean energy investment in the State, including:

- Accelerated Renewable Energy Growth and Community Benefit Act
  - Build Ready
  - Office of Renewable Energy Siting (ORES)
  - Power Grid Study and Investment Program
- Clean Energy Standard
  - Large-Scale Renewables
- Clean Energy Fund
  - NY-Sun
- And more…

Learn more: **nyserda.ny.gov** and **ores.ny.gov**.

LOWER COSTS GROW MARKET



Source: NREL U.S. Solar Photovoltaic System Cost Benchmark: Q1 2020 (NREL.GOV)

PROJECT REQUIREMENTS

- Unshaded space
- Grid connection
- Lease agreement with landowner(s)
- Community support
- Financing
- Permits
  - Under 25 MW: SEQRA, local zoning
  - 20-25 MW: Article 10 (optional)
  - Over 25 MW: Office of Renewable Energy Siting (ORES)
- Program Requirements (i.e., Build Ready)
- Coordination across multiple sites

EVIDN

Project researchers:
Toneya McIntosh
John Pickering

SNAPSHOT: COMMUNITY CONVERSATIONS

Understanding community needs, values, and concerns about non-residential solar development

Who was involved?

- Local Officials and Community Members across upstate NY
- State Representatives
- Regional Economic Development Council Representatives
- Local Utilities & Developers
- Land Trusts & NGOs
- Solar Consultants

KEY FINDINGS

- Communities want to be involved
- Communities have a strong sense of place and pride in farming
- Communities care about environmental protection

COMMUNITY INVOLVEMENT

Communities care about being actively involved in shaping local developments.

They want to have input on how projects are implemented and shape how local benefits are designed and delivered.

Local stakeholders asked for access to resources and information to better understand the development process and engage more effectively with developers.

“To get buy-in, you need to involve the town in the decision-making process…

Make sure they know what questions to ask and that they have the resources.”

– NGO Representative

SENSE OF PLACE FARMING PRIDE

New Yorkers are deeply connected to their communities and want local developments to contribute to a town's sense of place and integrate with local goals and community identity.

Supporting the rural character of towns and ensuring the viability of local farms and businesses was especially important.

“[Farming] may not define the economy, but it defines the character of the town.”

– Regional Council Representative

CONSERVATION

New York communities care deeply about the local environment. They support projects that minimize ecosystem impacts and provide clear information about potential risks and how they will be minimized.

Local stakeholders were particularly interested in understanding long-term plans and impact for proposed developments (i.e., decommissioning).

“We have a beautiful regional character here. There is a strong sense of the natural landscape, lots of interest in open space protection.

Nature is an important part of tourism and our town. Reducing the impacts on wildlife is important to us.”

– NYS Town Official

Questions
Comments
Discussion

SMALL GROUP DISCUSSION #1

VALUES & VISION

What is most important to your community related to solar development?

How and when does it feel most constructive to engage with solar developers and other stakeholders?

What opportunities do you see to influence how solar projects are developed in your community?

Do you have a vision of how non-residential solar projects can be integrated into your community?

10 MINUTE BREAK

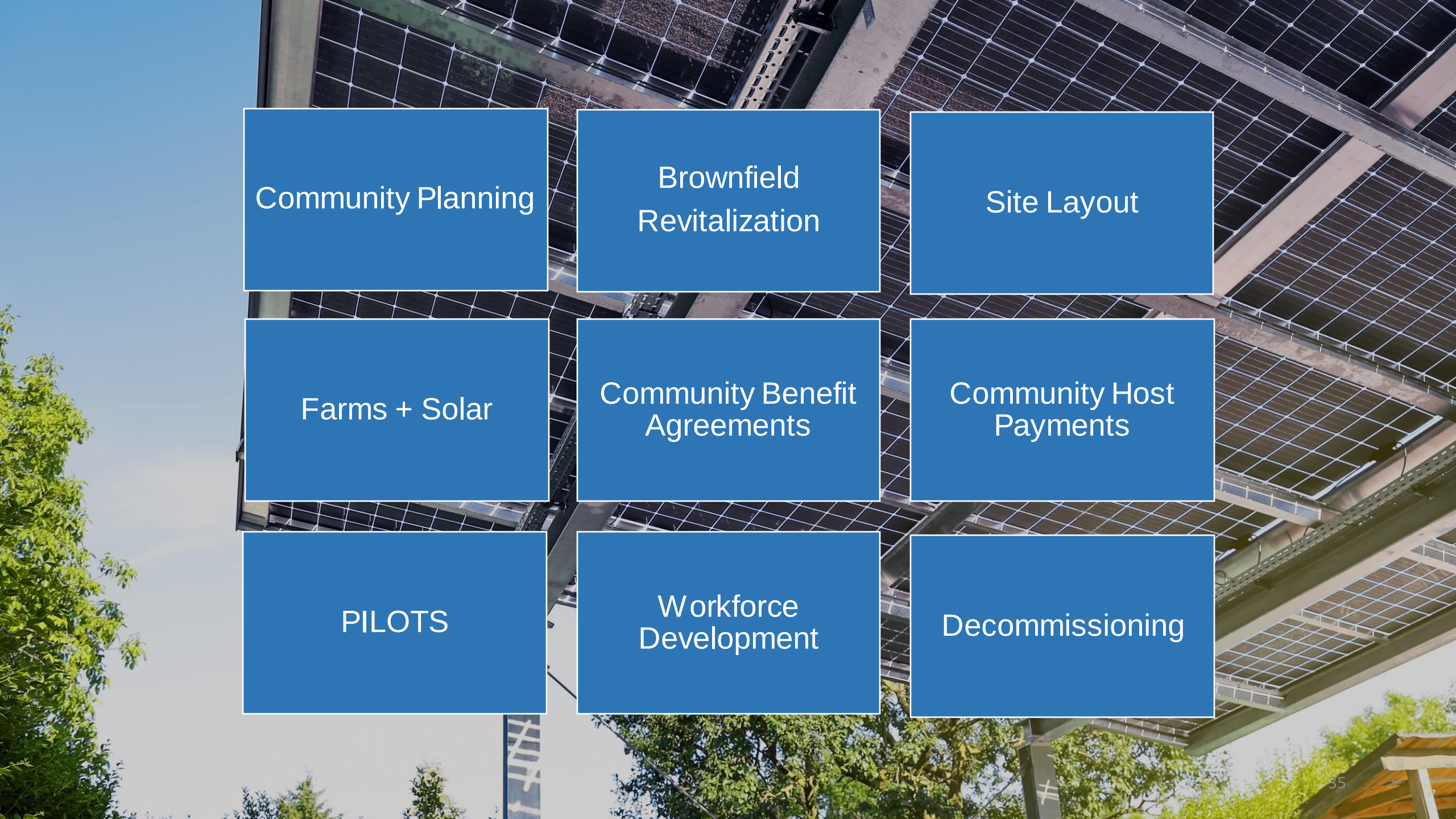
QUICK HIGHLIGHTS

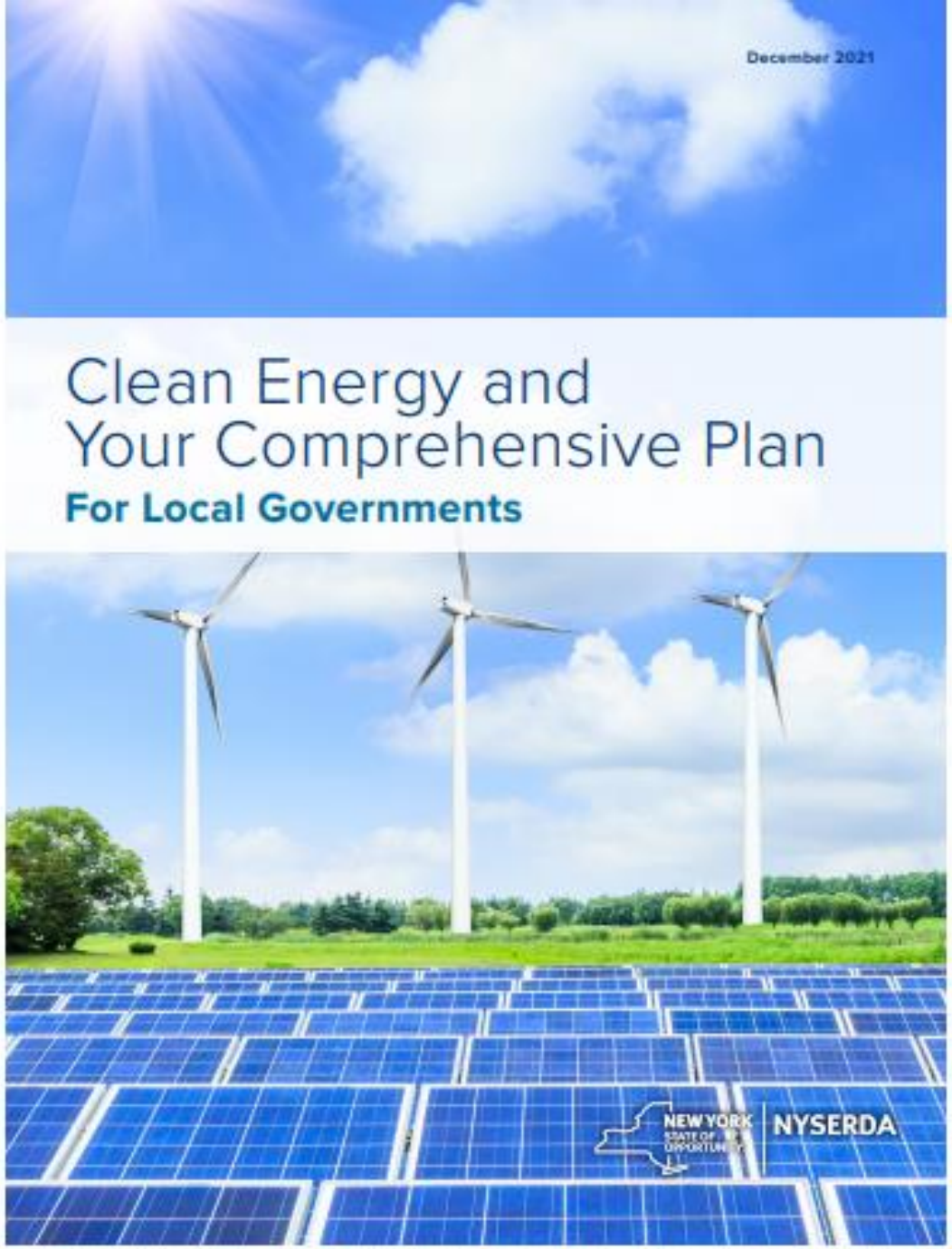
What was most interesting or intriguing to you?

Did anything surprise you?

What are you most excited to discuss further?

Tools and Techniques to Advance Community Goals


Community Planning
Brownfield Revitalization
Site Layout
Farms + Solar
Community Benefit Agreements
Community Host Payments
PILOTS
Workforce Development
Decommissioning



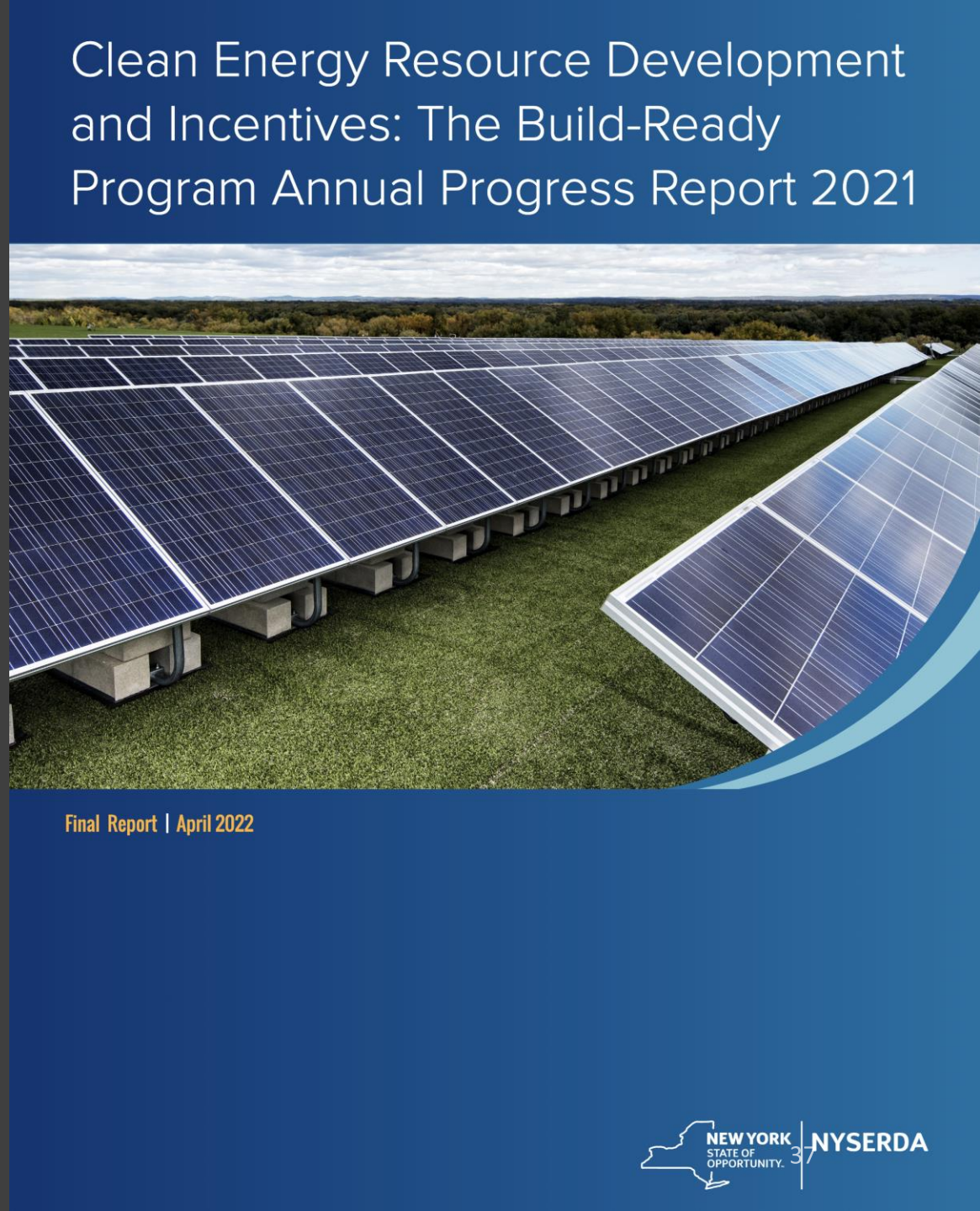
COMMUNITY PLANNING

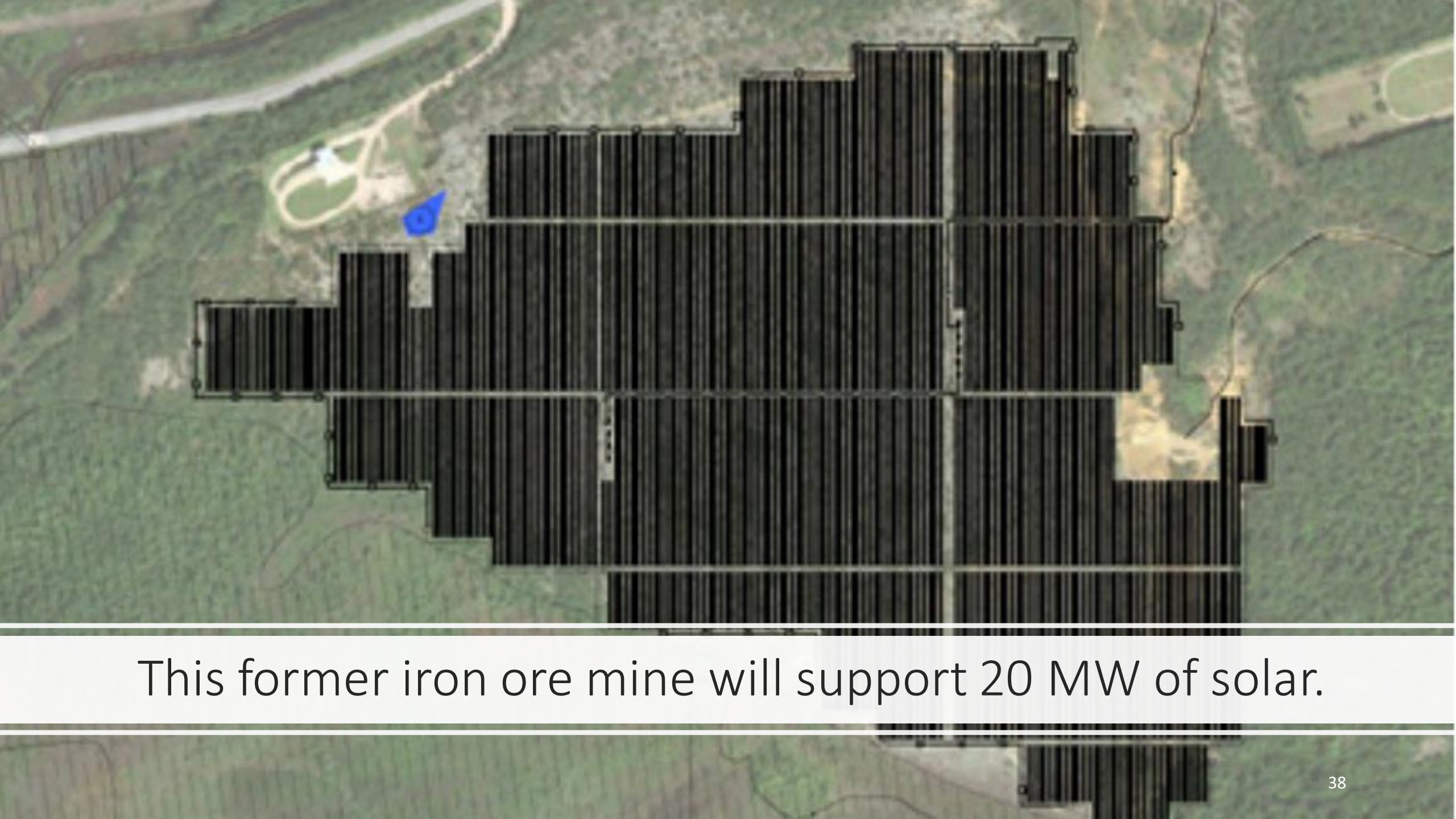
- Through local plans, communities can set renewable energy goals along with land use, economic development, and conservation goals.
- Plans can identify desirable areas for solar, including underutilized lands, municipal properties, etc.
- Through NY-Sun, local governments receive free technical assistance on solar zoning, permitting, property taxes, procurement, and more.
- Communities with proposed projects being reviewed by ORES can access intervenor funds to support local involvement.

BROWNFIELD REVITALIZATION

Solar arrays can be installed on unused or contaminated sites.

NYSERDA's Build Ready Program identifies locations and provides support and technical assistance to develop solar projects.





This former iron ore mine will support 20 MW of solar.

SITE LAYOUT

Site planning and landscaping shapes the visual layout, options include:

- Strategic planting of native vegetation
- Decorative fencing with minimum height requirements
- Placement beside highways and on underutilized spaces, brownfields, and decommissioned landfills

FARMS + SOLAR

Integrating solar arrays on farms strengthens the viability of local farms, generates clean power, and benefits wildlife:

- Many crops grow under solar panels
- Shaded crops attract bees, butterflies, and other pollinators
- Vegetation cools solar panels
- Animals graze and manage site vegetation

COMMUNITY BENEFIT AGREEMENTS

Communities work with developers to identify local needs and design benefits, such as:

- Permanent, local jobs
- Workforce training
- Community amenities (park, greenway, playground)
- Economic development (commerce center, road repairs)
- Education resources (new laptops for students)

WORKFORCE DEVELOPMENT

New York has several job training and placement programs, including support for veterans, youth, workers with disabilities or other barriers to employment, including:

- Clean Energy Intern Program
- Climate Justice Fellows
- On-the-Job Training Program

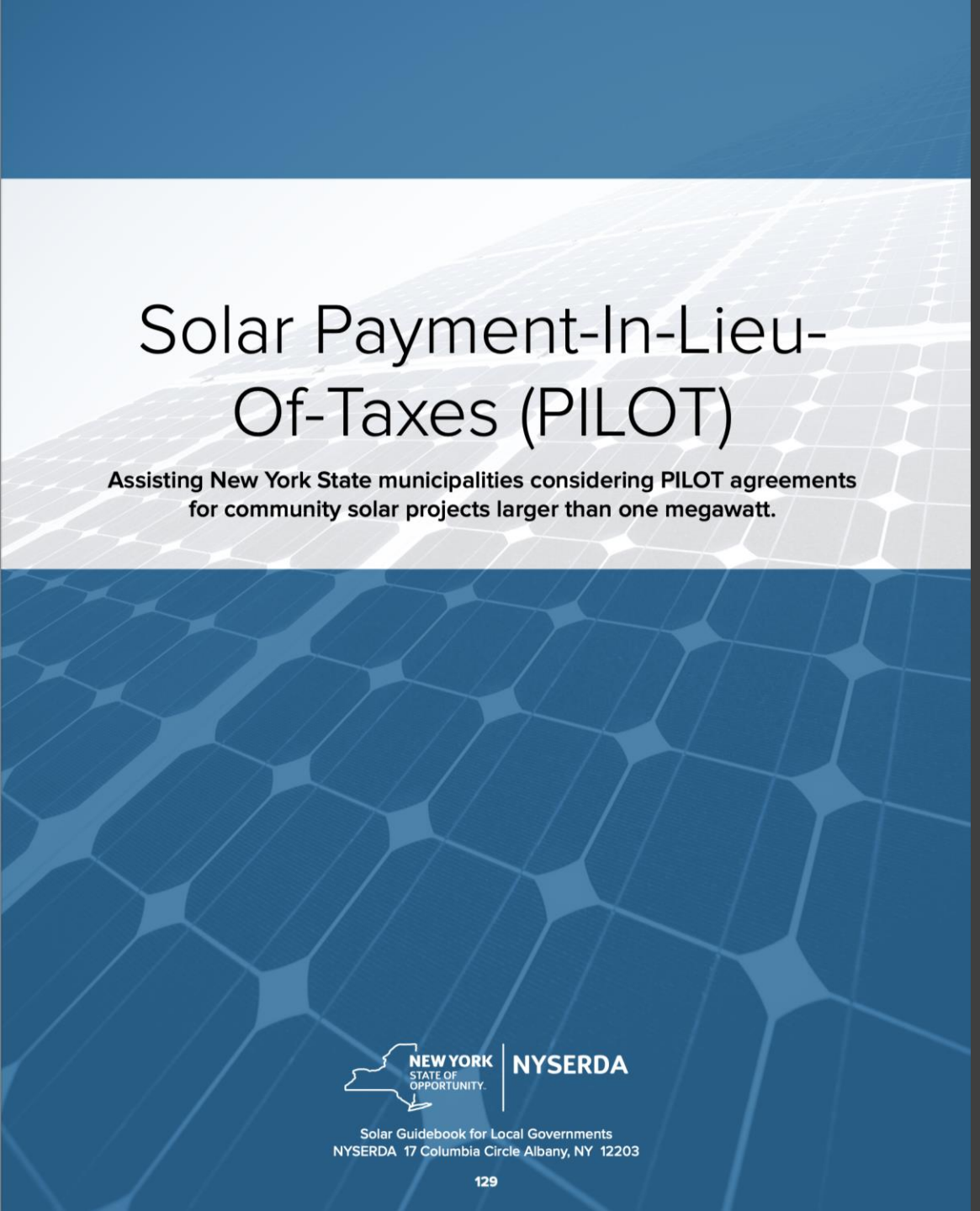
Median wages for solar jobs range from $20 an hour (entry) to $38 an hour (experienced).

Learn more: **nyserda.ny.gov**.

COMMUNITY HOST PAYMENTS

Residential electricity customers in host communities receive an annual credit on their utility bills for 10 years on each utility-scale project.

The project owner pays an annual fee of $500 per MW for solar projects, which is divided up equally among residential customers.



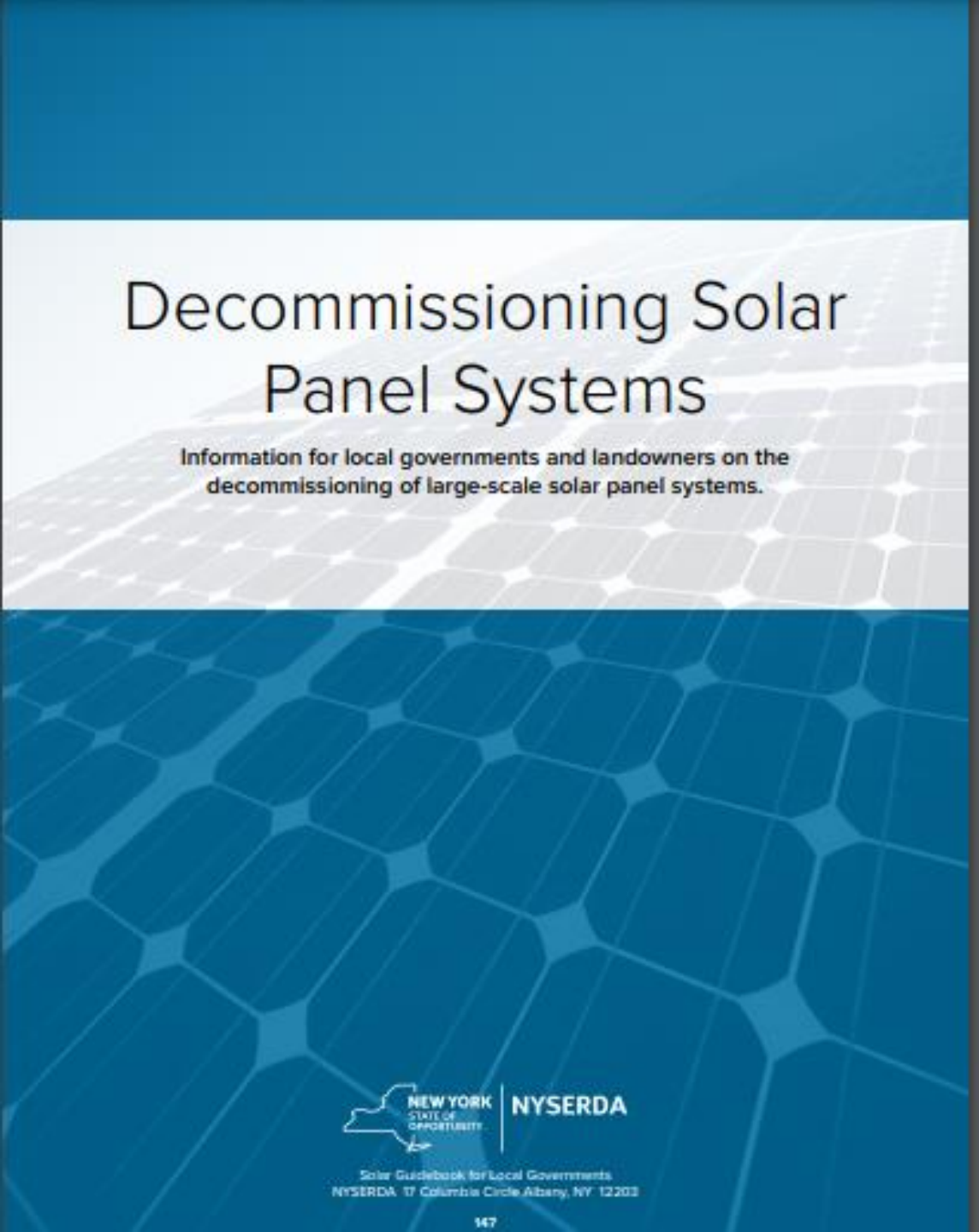
Payment-In-Lieu-of-Taxes (PILOTS)

Renewable energy projects pay tax district services, such as water, sewer, and fire, but have a 15-year exemption on property taxes.

PILOTs are typically negotiated in place of taxes to provide revenue to local taxing authorities.

Revenues are split among the town, county, and school district.

The PILOT is negotiated through the county's Industrial Development Authority (IDA).



DECOMMISSIONING

A Decommissioning Plan is created during the planning phase that includes:

- Removal of all infrastructure and the remediation of soil and vegetation to return parcel to its original state
- Expected timeline for execution
- Cost estimate detailing projected cost
- If not decommissioned, the municipality may remove the system, restore the property, and impose a lien

SMALL GROUP DISCUSSION #2

GROUP DISCUSSION

GROUP DISCUSSION

To move ideas we've discuss today into action, what does your community need?

What organizations are trusted sources of information and can further support communities?

WRAP UP

NEXT STEPS

Next week: Workshops

Monday: 10am-1pm

Tuesday: 9am-12pm

Summer: Focus groups

Winter: Handbook released

Summer 2023: Training materials


The Nature Conservancy
THANK YOU!
Learn more: nature.org/NewYork
Contact us: nysolarsolutions@tnc.org

Appendix C. Solar Solutions

Summary of Focus Group Discussion Themes—September 26, 2023

Solar Solutions

Summary of Focus Group Discussion Themes

Background & Context

Evidn has been engaged by NYSERDA and TNC (NY) to understand community perceptions towards acceptance of non-residential solar PV and develop a toolkit of strategies to help communities navigate the transition to non-residential solar. The Solar Solutions focus group was held on September 26, 2023 from 1:00pm-2:30 pm EDT to collect feedback on the proposed solar solutions toolkit. The focus group was attended by ten stakeholders in total representing not-for-profit, extension, community, and industry groups. Summarized below are several discussion themes that emerged during the focus group.

Discussion Themes

Decision-making capacity and resourcing varies across communities

Local towns can vary in access to resources, knowledge capital, and infrastructure needed to effectively engage in proposed solar development decision-making. This can leave some communities feeling overwhelmed and lost in the nuts and bolts of solar contracting, sometimes at the expense of integrating broader community needs and priorities into decision-making.

Engaging the right people at the right time is key to building community buy-in

Community opposition to solar development is complex and multi-faceted. ‘Buy-in’ of solar solutions implicates a host of attitudes, perspectives, motivations, and barriers of stakeholders who are impacted by the installation of such technology. Identifying stakeholders in a community who are implicated in proposed solar project development decision-making, and engaging them early in the conversation, can increase the effectiveness and efficiency of processes.

Leveraging local expertise can mitigate barriers to solar acceptance

Variability in community expertise and experience with solar can create the conditions for myths and misconceptions. The spread of misinformation gives rise to attitudinal barriers, which can negatively impact community engagement with solar industry groups. Identifying networks of trusted local experts in communities can increase the accuracy of and receptivity to solar information and its deployment.

Expectation management is crucial for community planning

Solar development planning can heighten community members’ desire for control over processes and outcomes. An important consideration is how to set realistic expectations for residents around what they can influence and how to best communicate their needs and priorities to developers and decision-makers.

Third-party facilitation can be a valuable tool for communities

Solar energy development is underpinned by community transition decision-making and behaviors. Many identified barriers to solar acceptance could be mitigated by the involvement of a third-party facilitator to document community needs and priorities, engage local ‘influencers’, and guide negotiations and planning between residents, developers, and municipalities to bolster community transition.

For more information, please contact –

- *Echo Cartwright – The Nature Conservancy, Director of Climate Mitigation* *echo.cartwright@tnc.org*
- *Dr. Elizabeth Smith – The Nature Conservancy, Lead Scientist* *elizabeth.smith@tnc.org*
- *Katri Haanterä – Evidn, Senior Behavioral Scientist* *katri@evidn.com*

Endnotes

[1] When conducting this research, the Solar Solutions team intentionally focused on communities in the Upstate New York area and did not include communities within the New York City or Long Island areas. In addition, nonresidential solar projects were limited to project scope size of 10–20 MW and did not include projects subject to the newly created 94-c permitting process through the Office of Renewable Energy Siting (ORES).

[2] See New York State's Disadvantaged Communities (DAC) Criteria at https://www.nyserda.ny.gov/ny/Disadvantaged-Communities

[3] Vohra, K., Vodonos, A., Schwartz, J., Marais, E. et al. (2021). Global mortality from outdoor fine particle pollution generated by fossil fuel combustion. Environmental Research, 195, 110754. https://doi.org/10.1016/j.envres.2021.110754

[4] The authors note these figures do not include costs from lost workdays, emergency room visits, or asthma attacks, and they are likely an underestimate.

[5] Note: All feedback related to the interviews, workshop and focus groups have been anonymized and aggregated to protect participant confidentiality.

[6] Appendix A details the methodology on the way interview subjects were identified.

[7] The initial stage of this project began as the COVID-19 pandemic emerged, which required all initial stakeholder meetings to be conducted in a virtual setting.

[8] See New York State's Disadvantaged Communities (DAC) Criteria at https://www.nyserda.ny.gov/ny/Disadvantaged-Communities

[9] See New York State's Disadvantaged Communities (DAC) Criteria at https://www.nyserda.ny.gov/ny/Disadvantaged-Communities

NYSERDA, a public benefit corporation, offers objective information and analysis, innovative programs, technical expertise, and support to help New Yorkers increase energy efficiency, save money, use renewable energy, and reduce reliance on fossil fuels. NYSERDA professionals work to protect the environment and create clean-energy jobs. NYSERDA has been developing partnerships to advance innovative energy solutions in New York State since 1975.

To learn more about NYSERDA's programs and funding opportunities, visit nyserda.ny.gov or follow us on X, Facebook, YouTube, or Instagram.

New York State Energy Research and Development Authority

17 Columbia Circle
Albany, NY 12203-6399

toll free: 866-NYSERDA
local: 518-862-1090
fax: 518-862-1091

info@nyserda.ny.gov
nyserda.ny.gov

State of New York
Kathy Hochul, Governor

New York State Energy Research and Development Authority
Richard L. Kauffman, Chair | Doreen M. Harris, President and CEO