SOLARIZE YOUR COMMUNITY

An Evidence-Based Guide for Accelerating the Adoption of Residential Solar

Project Partners

U.S. Department of Energy Sunshot Initiative
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The U.S. Department of Energy SunShot Initiative is a national effort to drive down the cost of solar electricity and support solar adoption. SunShot aims to make solar energy a low cost electricity source for all Americans through research and development efforts in collaboration with public and private partners. Learn more at energy.gov/sunshot.

The Connecticut Green Bank was established by the Governor and Connecticut's General Assembly on July 1, 2011 through Public Act 11-80 as a quasi-public agency that supersedes the former Connecticut Clean Energy Fund. As the nation's first state "Green Bank", the Connecticut Green Bank leverages public and private funds to accelerate the growth of green energy in Connecticut.

SmartPower is the nation's leading non-profit marketing firm dedicated to promoting energy efficiency and renewable energy and has extensive experience with hundreds of community-based energy campaigns and Solarize projects across the country. SmartPower provides participating communities with technical assistance, campaign strategizing and outreach, and media planning.

The Yale Center for Business and the Environment joins two world-renowned graduate schools—the Yale School of Management and the Yale School of Forestry & Environmental Studies—with a network of internal and external leaders working at the interface of business and the environment. We catalyze research and cultivate partnerships that advance business solutions to global environmental problems.

+ 20 Solarize installation companies and 58 towns

About the Partnership

What motivates people to install rooftop solar panels? Which incentives can rapidly boost the adoption of this technology? Which programs are persistently effective, and which are most easily scaled?

Supported by a grant from the U.S. Department of Energy a multidisciplinary set of partners came together to test these questions by examining the uptake of solar through the Solarize CT program. Out of this collaboration, we have produced a guidebook for community and business leaders, active citizens and policymakers detailing the most effective strategies for accelerating the adoption of residential solar.

The Yale School of Forestry and Environmental Studies and **Duke University**, in collaboration with the **CT Green Bank** and **SmartPower**, conducted a series of rigorous controlled field trials to better understand the adoption of residential solar.

The Yale Center for Business and the Environment coordinated the partnership and worked with a team of students to facilitate the research, assist with the data analysis and create this guidebook.

The Connecticut Green Bank, a state-level institution devoted to expanding the region's clean energy sources, accelerated consumer financing options by developing risk-reduction mechanisms in partnership with local lending and capital partners.

SmartPower, a social marketing firm, provided insight and support for Solarize CT, creating high impact on-the-ground community campaigns.

About Solarize

Solarize is a community based program that leverages social interaction to promote the adoption of solar through a group pricing scheme. Solarize campaigns are designed to leverage peers and social networks to spur solar adoption.

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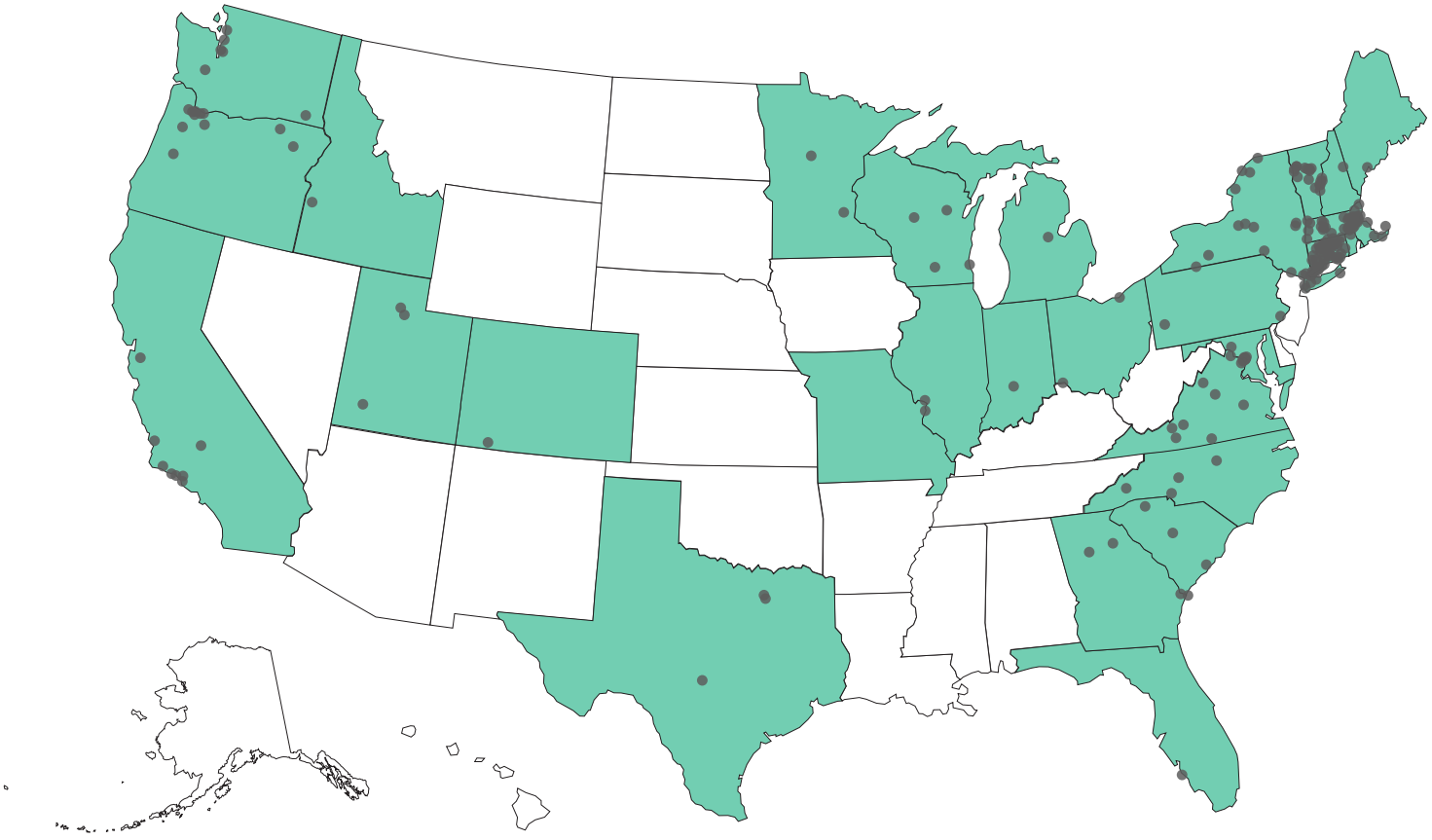
TABLE OF CONTENTS

Solarize: A National Movement, Rigorously Tested in Connecticut



This map illustrates the communities that organized Solarize campaigns across the U.S from 2009–2016.[1]

1 Ryan Cook, Meister Consultants Group

Foreword

The national energy economy is undergoing a massive transition. Solar recently became the cheapest source of new electricity generation while other renewable technologies are quickly becoming cost-competitive with traditional fossil-fuel sources; energy infrastructure from the twentieth century is in need of replacement; and states are considering capital-intensive infrastructure projects with an eye to the future—both of regulation and competitiveness.

Distributed, residential solar installations will no doubt be integral to this future.

The following guidebook is based on the promising outcome of a research project focusing on a set of campaigns called Solarize CT, launched across the state of Connecticut from Fall 2013 to Spring 2016. The Solarize campaign, which was designed to increase the adoption of solar energy, ran in 58 towns statewide. The results were striking: **in just three years, the number of homes with solar grew from about 800 to over 12,500**. Solarize played a central role in this expansion.

Solarize CT was rolled out in five distinct phases, allowing for research on different variants of the campaign, with small tweaks to the campaign in each phase. These variants allowed researchers from Yale and Duke Universities to determine the factors that most directly influenced household solar adoption—from the best messaging to ideal campaign lengths to optimized use of social networks. The researchers also examined the behavioral underpinnings of consumer decision-making: why do people decide to install solar panels? What hinders this decision, and what can make the decision more likely? Though Solarize is a national effort with a demonstrated record of success in the town's where it is implemented—the idea was first launched in Portland, OR in 2009—**Solarize CT represents the first large-scale experiment of its kind to rigorously examine specific catalysts of solar adoption.**

For those looking to foster a local solar market, the pages that follow offer explicit guidance that is firmly rooted in research findings. The lessons learned in Connecticut can be applied to streamline policy, design compelling business strategies, and galvanize community-led programs for organic solar growth. This guide offers insight into ***what* to do when fostering a local solar market and *why* to do it**. It is organized into four main sections:

1. Capitalizing on social networks to drive adoption
2. The business case for a solar campaign
3. How a campaign like this benefits communities and local governments
4. The essential components of a successful campaign

Also included is a two-page "how-to" for designing and implementing a campaign with links to templates and resources. For any person or institution interested in how to increase rates of solar adoption, this guidebook will help set and achieve those goals.

Executive Summary

SolarizeCT, which began in 2009, is designed to increase the installation of residential solar systems through local campaigns. The results have been stunning. In a three-year Connecticut campaign (2012–2015), the number of homes with solar grew from about 800 to over 12,500. Research findings based on the campaign—the first of their kind—indicate that the success of Solarize rests on a few key components.

The diffusion of awareness, or spreading of knowledge, about solar through social networks is a surprisingly powerful lever for boosting adoption. For instance, over a six-month period, the presence of one solar rooftop project increased the average number of installations within a half-mile radius by nearly 50 percent.[2] This peer influence effect is even stronger if the panels are visible from the street.[3] Thus, increasing the visibility of solar is clearly an important facet of any solar marketing campaign.

Recognizing that—social networks have a strong influence on decisions to install solar—Solarize campaigns are specifically designed to focus and amplify this peer effect: Solarize makes installations visible; it convenes events where people talk about solar (and watch it being installed); and it supports an energetic, local, and organic marketing campaign.

The findings on the research from Solarize CT also made evident the importance of recruiting the right volunteers ("solar ambassadors") and involving a range of stakeholders. Effective solar ambassadors—people who are respected in the community and passionate about not just the environment, but Solarize specifically—are critical to a successful campaign; towns with strong volunteer leadership demonstrate consistently higher adoption rates.[4]

Beyond these ambassadors, a coalition of support that includes local and state officials, and vetted installers, legitimizes a Solarize campaign in the eyes of customers. Especially because Solarize is a grassroots approach to increasing solar adoption, having trusted sources in positions of leadership who not only support the program, but actually take part in it, makes a difference.[5]

But why should leadership—why should anyone—take part in a Solarize campaign? Besides the environmental benefit, these campaigns generate tremendous benefits for businesses and local economies. On the business side, Solarize CT resulted in a statewide "20–20 rule." Most campaigns ran for roughly 20 weeks and reduced the average cost of solar by 20 percent. This resulted in **more than three times**[6] the number of rooftop installations in participating communities.

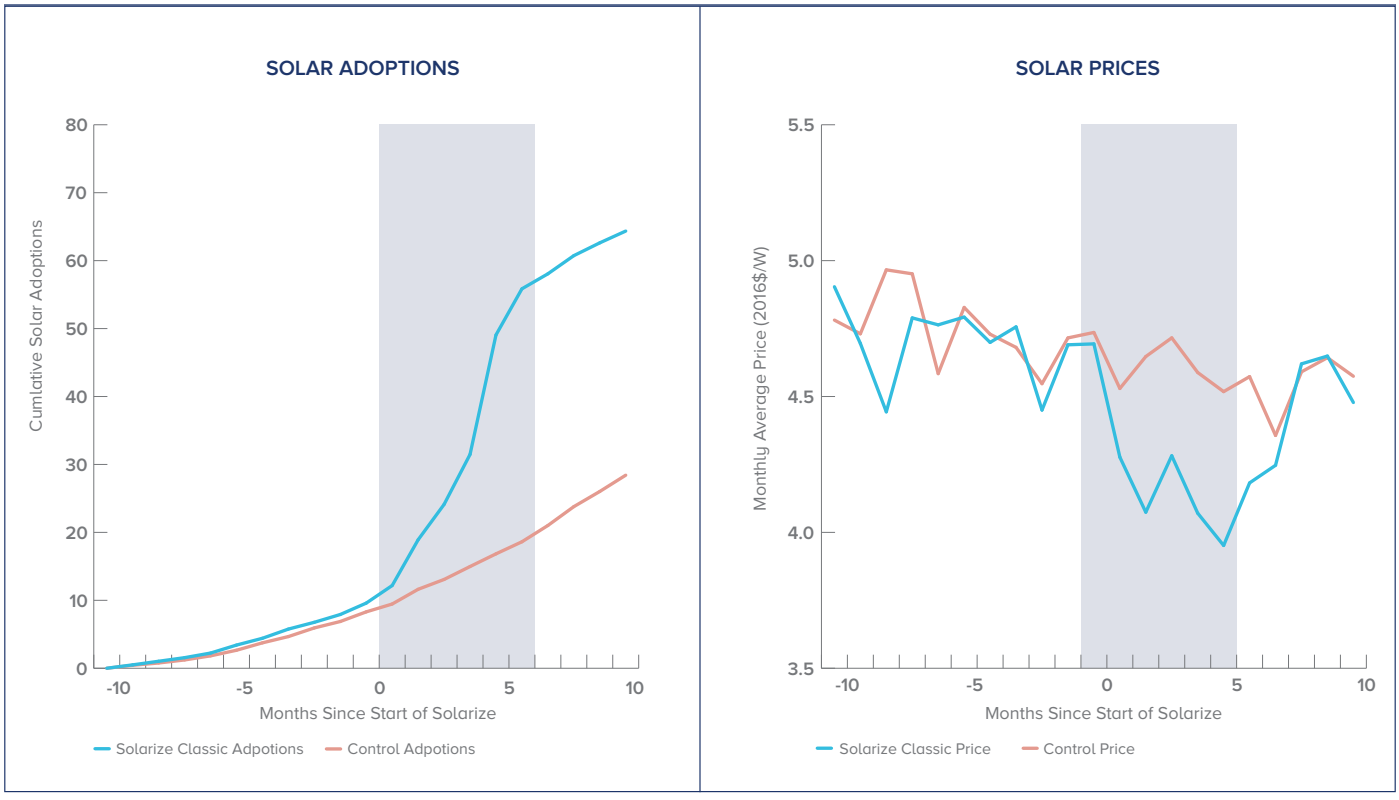
2 Graziano and Gillingham (2015), https://academic.oup.com/joeg/article/15/4/815/2412599/Spatial-patterns-of-solar-photovoltaic-system

3 Bollinger and Gillingham (2012), http://pubsonline.informs.org/doi/pdf/10.1287/mksc.1120.0727

4 Kraft-Todd, Gordon, David Rand, Bryan Bollinger, Kenneth Gillingham – "Environmental Actions Speak Louder than Words" Yale University Working Paper

5 Bollinger and Gillingham (2017) Social Learning and Solar Photovoltaic Adoption: Evidence from a Field Experiment. Yale University Working Paper

6 Ibid.



Solarize CT led to a "tipping point" within a few months of launching the campaign. Residential solar adoption significantly increased while prices significantly decreased during the campaign.

Bollinger, Gillingham, and Lamp (2017) "Tipping Points and Solar Photovoltaic Adoption," Yale University Working Paper

For local economies, Solarize creates jobs, bolsters the local solar industry, and streamlines permitting processes by establishing a pipeline of installations with similar characteristics. More broadly, Solarize campaigns overseen by a cross-sectoral coalition create a strong foundation for a robust clean energy market that no single actor could achieve in isolation. **In other words, Solarize has the potential to be a launching point for a much larger investment in the transition to a renewable energy infrastructure.**

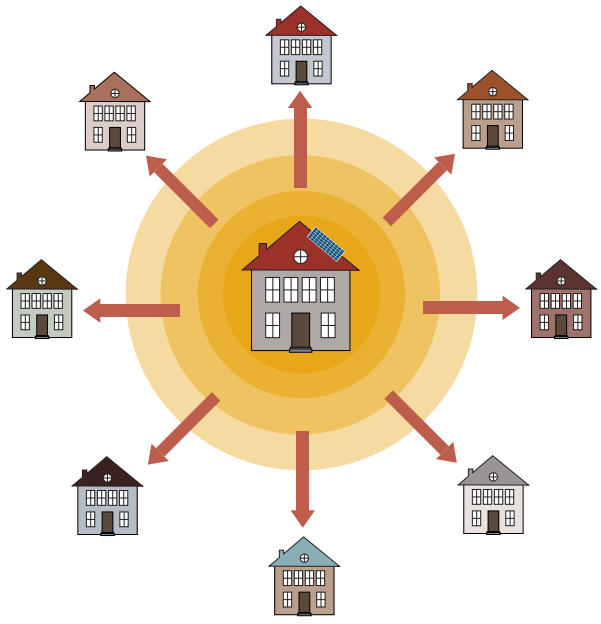
Given these benefits, it's fortunate that designing and implementing a campaign is straightforward and built around three fundamentals:

1. Educate the consumer
2. Find points of motivation
3. Convert interest into a decision to install solar.

This guidebook clearly maps the process for any town, or individual, interested in solarizing their community.

Solar is Contagious. Capitalize on This.

Community social networks are a powerful force for driving solar adoption. Recognizing and using these 'peer effects' accelerates individual decisions to go solar.



SHINE A SPOTLIGHT ON SOLAR: THE DIFFUSION EFFECT

One of the central factors determining whether a given house installed solar was the actions and influence of peers. **Over a six-month period, the presence of one solar rooftop project increased the average number of installations within a half-mile radius by nearly 50 percent.**[7] This peer influence effect is stronger if the panels are visible from the street. This is why installers often attempt to raise the visibility of installations with signs that call out the panels.[8]

Recognizing that social networks have a strong influence on decisions to install solar, Solarize campaigns are specifically designed to amplify social interactions about solar. Under normal circumstances, social interaction on issues of solar energy would occur passively and randomly. Solarize campaigns work in part because they create a forum that concentrates conversation and interaction.

RECRUIT SOLAR ENTHUSIASTS TO SPREAD THE WORD

Community-led marketing leverages a small group of passionate volunteers—Solarize CT dubbed them "solar ambassadors"—to spearhead outreach activities and to organize other volunteers who can canvass and host events. Recruiting the right solar ambassadors is critical to the success of a campaign; towns in Connecticut with strong volunteer leadership demonstrated consistently higher adoption rates.

One of the most powerful predictors of an effective ambassador is that he or she takes part in the Solarize campaign by signing up for an installation. This action proved far more telling of successful ambassadorship than other environmental behaviors like composting, owning a hybrid vehicle, or having double-paned windows. (This is consistent with the well-known notion that "actions speak louder than words.") Surveys and interviews also found that ambassadors who conceptualized

7 Graziano and Gillingham (2015), https://academic.oup.com/joeg/article/15/4/815/2412599/Spatial-patterns-of-solar-photovoltaic-system

8 Bollinger, B, Gillingham, K, Kirkpatrick J, and Sexton, S.—"Visibility and Social Influence" Duke University Working Paper

WHAT DO SOLAR AMBASSADORS DO?

As locally trusted sources, solar ambassadors advance word-of-mouth recommendations for solar PV on three fronts:

- **EDUCATE:** They raise awareness and answer questions about the benefits of solar PV.
- **MARKET:** They organize community events, canvass neighbors and friends to sign up for solar, and publicize the Solarize program through various media.
- **CONNECT:** They act as a liaison between the homeowner and installer.

their role as part of a job rather than as ancillary volunteer work were more persuasive.[9]

Solar tours and live installations serve two ends at once: they facilitate exposure to solar installations among peers, and they offer basic information about the process and benefits of going solar.

Solar tours allow people to meet current owners, see the panels and inverters, and hear first-hand about the owner's experience. In Solarize CT, current owners often showed visitors years of extremely low electric bills along with monitoring systems demonstrating historic and live production numbers. These events feed the curiosity of potential customers, help build trust in solar technology, and make the prospect of renewable electricity visible. They also allow prospective customers to absorb the experiences of others before taking the leap personally.

Live installation events are exactly what they sound like: a chance to watch the installation of solar panels. These require a homeowner who has signed up for panels, lives in a visible location, and is willing to host an event such as a barbeque on his or her lawn. The event gives interested residents an opportunity to watch the raising and attachment of solar panels to the roof. Installation events also provide a great opportunity for press, especially in areas where there is not a lot of solar. Installers on roofs with a party down on the ground makes a great photo op for newspapers and TV. Both the homeowners *and* installer are then on-hand to answer questions about solar and the installation process.

GET CREATIVE WHEN CONNECTING WITH THE COMMUNITY

The more visible a campaign is, the more successful it will likely be. As one town leader in Connecticut put it, "be everywhere in the community." Every town event and town meeting is an opportunity to promote solar—at the Lions Club, farmers' markets, and the library, to name just a few.

In West Hartford, Connecticut, besides posting flyers and tabling at various events, solar ambassadors brought solar to life with distinctive outreach efforts. The first event was a float in a neighborhood parade escorted by

WHAT DOES A LIVE INSTALLATION EVENT LOOK LIKE?

In short, whatever you want it to look like.

For a live installation in the shoreline community of East Lyme, Encon Solar had a full-scale clambake. People were able to watch the panels go up and enjoy fresh clams and corn.

In West Hartford, C-TEC Solar had a barbeque with balloons drawing people to the event. Homeowner Mickey Toro (who is the president of C-TEC) even gave people rides in his Tesla. The corner location of his house attracted a lot of people simply out for a stroll; a number of folks signed up for site visits on the spot.

9 Kraft-Todd, Gordon, David Rand, Bryan Bollinger, Kenneth Gillingham— "Environmental Actions Speak Louder than Words" Yale University Working Paper

marching ambassadors wearing sun hats and carrying signs. Runners also participated in a winter "mitten run" wearing Solarize t-shirts. PTA members got the schools involved with a video of students singing "Here Comes the Sun" interspersed with a rooftop tour of the school's solar installation. West Hartford has many neighborhood associations; members of these associations conducted outreach through blogs and email groups. Toward the end of the campaign, ambassadors got together to make phone calls reminding people about the approaching deadline and asking them if they had any questions concerning solar.

COMBINING THESE APPROACHES FOR SUCCESS: DEFINING A SOLARIZE CAMPAIGN

Solarize campaigns are locally organized community outreach efforts aimed at getting a critical mass of homes to "go solar" together in a limited amount of time, typically a few months.

The campaigns leverage group-purchasing power: customers can purchase solar systems in bulk for significantly less money than the typical market rate through the creation of a steady stream of purchases and installations.

A classic Solarize model combines four key strategies—town-supported outreach and education, pre-selected solar installers from competitive bidding, discount pricing, and a limited time period—and typically unfolds in four basic stages:

STAGE 1

Well in advance of the campaign launch, Campaign organizers reach out to several local solar installation companies and invite them to participate in an RFP process to be the solar installer(s) for the campaign. The Campaign organizers and three selected volunteers from the community conduct a thorough review and interview process based on selection criteria. These criteria can include quality, experience, and locally specific requirements, such as 'Made in America' hardware. The Campaign organizers and the three-person community volunteers choose the designated installer for the Solarize CT campaign.

STAGE 2

Interested community members are recruited to volunteer their time telling friends and neighbors about the program. Prior to the campaign launch they plan the outreach and media strategy to get the word out about the Solarize campaign. Over the course of the campaign, these solar ambassadors spearhead outreach activities and organize other volunteers to canvass and host events.

STAGE 3

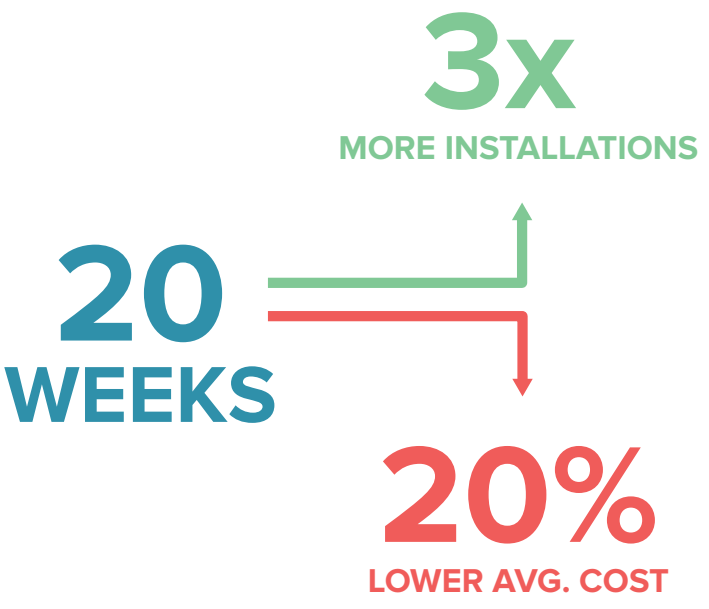
Town champions, distinct from solar ambassadors and typically from the First Selectman's/Mayor's office and/or a Clean Energy Task Force, come together with local or state-level partners, as well as with the chosen installer and solar ambassadors, to launch an intensive community outreach campaign.

STAGE 4

With the support of solar ambassadors, the designated installer follows up with members of the community who express an interest in solar, offering a tiered discount pricing structure whereby the more customers that sign up to install solar during the 20 weeks of the campaign, the cheaper the price per watt for everyone.

A Striking Business Case

Using a tight timeline and bulk discounts can result in dramatic outcomes.



THE 20–20 RULE

Most Solarize CT campaigns ran for roughly 20 weeks. Over this period, they reduced the average cost of residential solar by 20–30 percent. The campaigns **more than tripled** the number of installations in each community and significantly expanded the size of the market (one out of five households that signed a contract through Solarize had never before considered installing panels[10]).

Thus, the 20–20 rule—a 20 week campaign, a 20 percent cost reduction for customers resulting in more than three times the number of installations. This is a compelling benchmark for the solar installation business.

WIDE-RANGING BENEFITS FOR SOLAR INSTALLERS

Beyond the increase in sales and market-size—20–100 new contracts over the course of the campaign— installers saw a number of benefits from Solarize. For instance, Solarize programs introduced benefits of scale and reputation to smaller firms that are typically reserved for larger, name-brand companies.

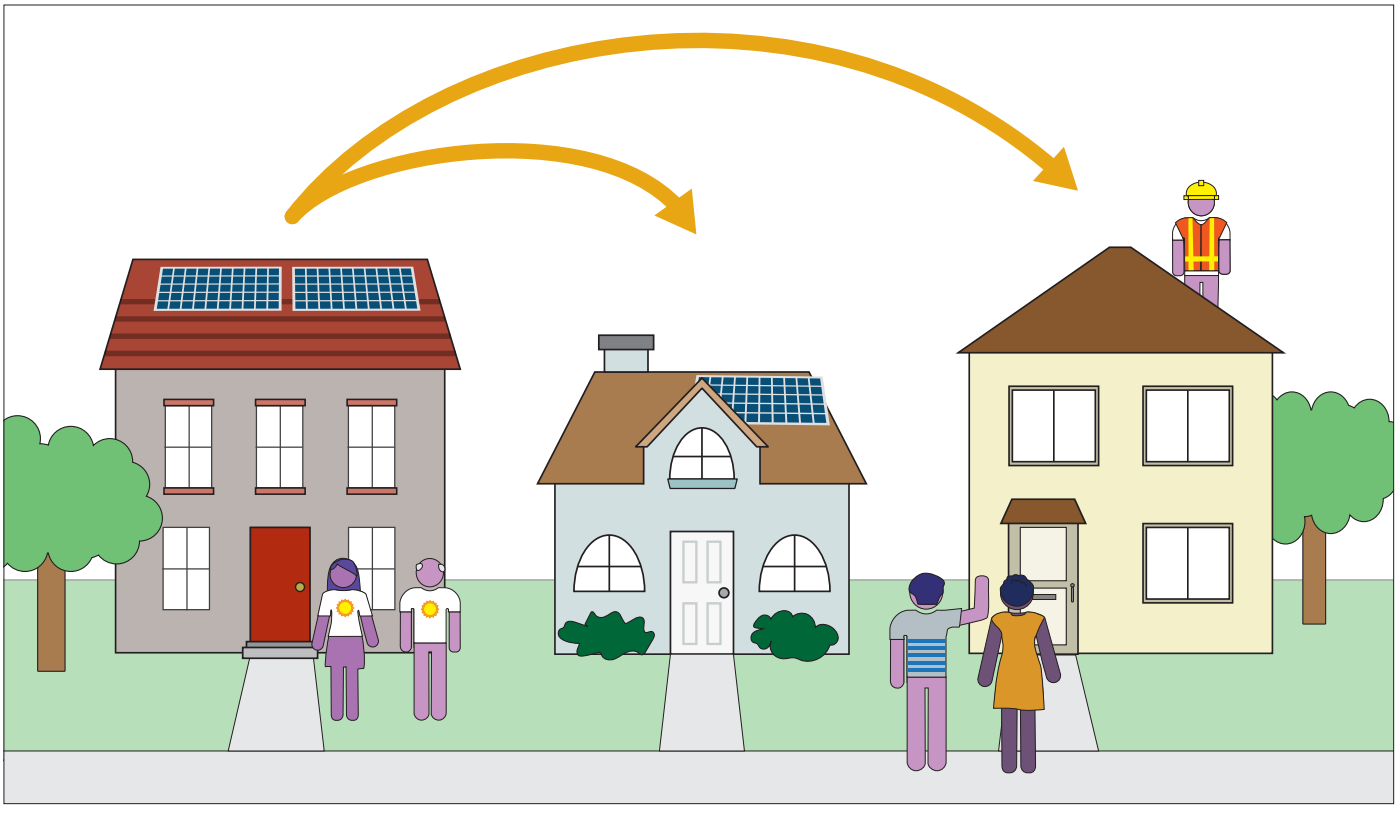
Participating solar installers also reported that Solarize CT significantly lowered customer acquisition costs through:

- Greater awareness of solar among customers
- Increased brand recognition of Solarize
- Reduced marketing spend
- Geographic concentration of customers (reducing travel time)
- Higher lead volumes
- Higher close rates
- Shorter time to sale

These are valuable benefits, considering that costs unrelated to solar hardware made up 55 percent of a system's price tag in the U.S. in 2015.

As a result of the volume of signed contracts, all installers reported growth in their business. To meet demand, many hired additional employees. After the Solarize CT campaigns ended, several installers continued offering discounted pricing to customers who signed-up after

10 Bollinger and Gillingham (2017) Social Learning and Solar Photovoltaic Adoption: Evidence from a Field Experiment. Yale University Working Paper



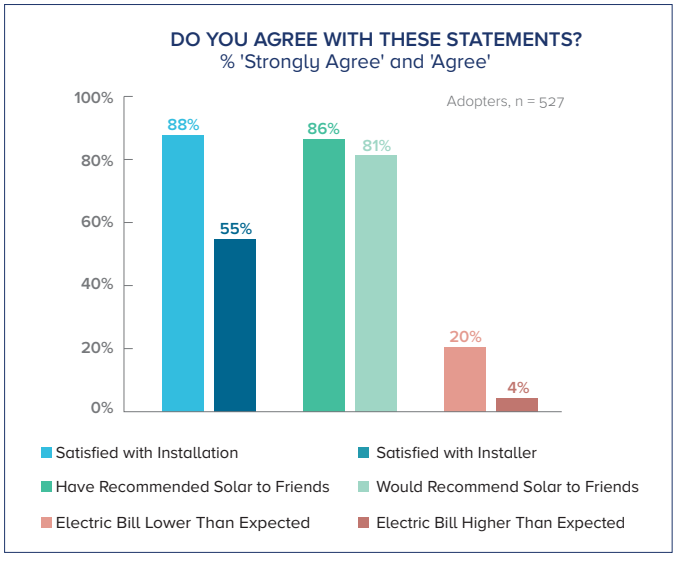
the deadline. The majority of installers reported that there were persistent benefits of participating in Solarize as customers contacted them even after the campaign was over.

In some instances, such rapid growth also created challenges. Where solar adopters reported reasons for being unsatisfied, they felt that problems stemmed from the installation company having insufficient bandwidth to handle the spike in demand. But as the section below describes, customer satisfaction generally remained high.

CUSTOMERS ARE OVERWHELMINGLY HAPPY WITH THE RESULTS

Customers in the research survey data from the Solarize CT program provided mostly positive feedback. Almost 90 percent were very satisfied with their installations, and more than 80 percent would recommend (or have already recommended) solar to others. Overall, the program provided accurate information about costs: only 2 percent of households said that their electricity bill was higher than expected after the installation. Reasons that solar adopters reported being unsatisfied included lack of responsiveness, missed deadlines, and inadequate training for technicians.

Of course, it goes almost without saying that the selection of a reliable installer, who is prepared for a large increase in business, is of fundamental importance to campaign success and future adoptions.



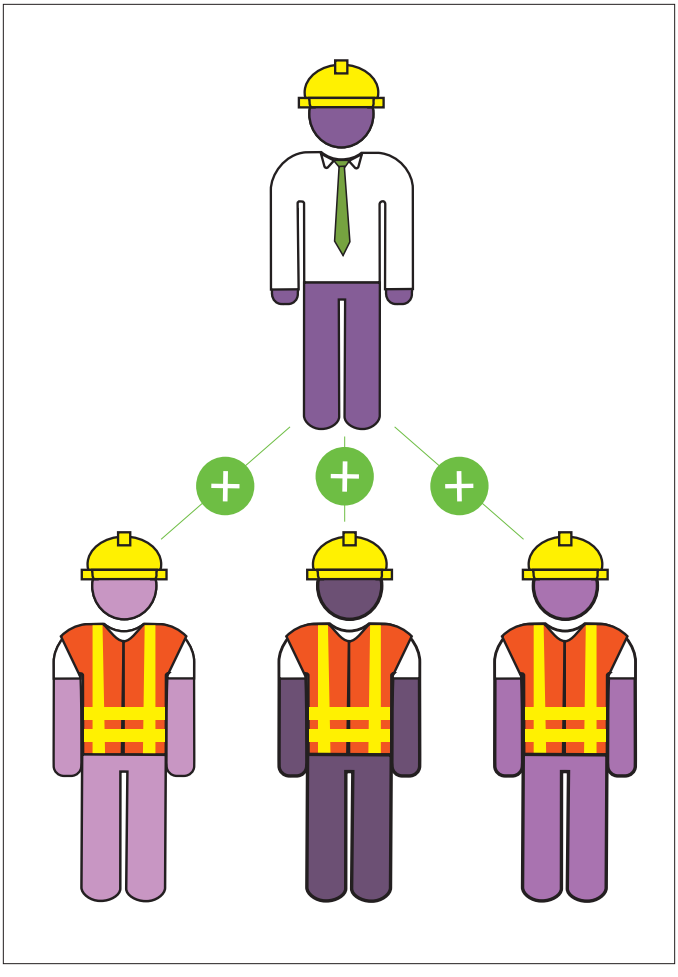
The Tremendous Benefit to Local Communities

From a stronger local economy to streamlined policy, running a Solarize campaign offers communities an array of social benefits beyond simply more solar panels.

SUPPORTING JOB GROWTH AND WORKFORCE INVESTMENT

Solarize campaigns strengthen consumer demand and spur job growth within the solar industry. Nearly every installer that took part in Solarize CT hired new employees for a variety of positions, like electricians and sales representatives. One solar installer even created a standing Community Solar division in its company, dedicating resources to develop and participate in community solar programs.

Given the difficulty of filling so many new positions so quickly—a relative dearth of qualified employees existed in Connecticut—the state created jobs training programs and recruitment fairs.



A PATH TO EFFICIENT MARKETS AND STREAMLINED POLICY

Solarize CT convened groups from across sectors to support the campaign. This broad coalition of organizations and community leaders—from a quasi-public financing agency to a nonprofit clean energy marketing firm—created a foundation for a sustainable clean energy market that no single actor could have achieved in isolation.

A SHARED SENSE OF COMMUNITY PURPOSE

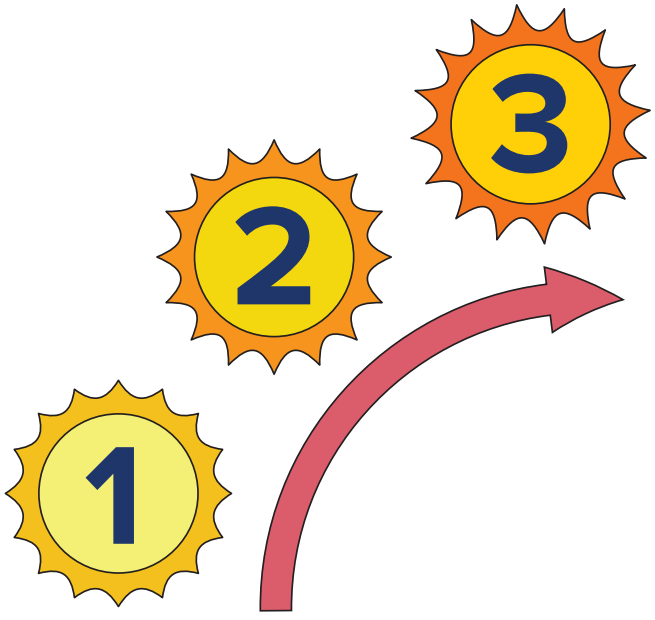
Having the support of town leadership on community-based campaigns is paramount in building legitimacy for the campaigns, and serves to bring leadership and citizens together toward a shared sense of purpose. The Town of Portland was lucky to have First Selectwoman Susan Bransfield as one of its solar ambassadors. Bransfield was very involved in the installer review and selection process and very supportive of the Clean Energy Task Force's efforts. She even opened up her own home for a solar open house, where she talked about her personal experience going solar. Having her to lead by example increased social proof, one of the strongest motivations for human behavior. Especially since Solarize is a grassroots approach to increasing solar adoption, having trusted sources in positions of leadership who not only support the program, but actually take the recommended action, makes a difference.

Solarize campaigns, through the quick deployment of a large amount of solar, also help to establish uniform processes and build trust among communities. Creating a pipeline of installations with similar characteristics streamlines permitting, economic development, and job growth for governments.

In short, this combined policy and market mechanism to promote solar deployment not only benefits suppliers and customers, but it also can accelerate the growth and maturity of a statewide renewables market.

Three Critical Elements of a Successful Campaign

A well-designed campaign comprises three basic steps: first, raise awareness. Second, understand and tap into customer motivation. Third, convert motivation to action.



EDUCATION: GETTING THE CUSTOMER GOOD INFORMATION

The first step is getting the word out—educating town residents about both the campaign underway and the value of solar. In Solarize CT, local print newspapers were the single most important source for learning about the campaign. Other effective avenues were workshops, town events, and town websites; interestingly, social media was the least effective method for spreading the word.

Prominent visual displays like banners and yard signs also kept the campaign front-of-mind among residents. In towns where local regulations restricted public signage the lack of a constant visual reminder damaged the success of the campaign.

Outside of specific channels for marketing, four basic principles appear to drive household awareness of solar:

1. **Community networks** are the backbone of success, not just because they help to spread the word but also because they increase trust in the technology. Parent-teacher organizations (PTOs), clubs, civic groups, libraries, and churches are all great convening points to build community connections. Hosting events like those described above—solar tours and live installations—serves the same end.

2. Campaigns are most effective if **tailored** to the specific characteristics of the community. For instance, analysis of the Solarize CT campaign found that younger groups were most sensitive to price, which meant that the discount offered through Solarize attracted them to installations. Pricing mattered less and less moving up age brackets; older segments of the population were, instead, more persuaded by the trustworthiness provided by town sponsorship and vetted installers. (While solar ambassadors from the Connecticut campaign stressed that a “perfect pitch” should be tailored to the specific audience, they said that every communication should highlight the urgency of the campaign and the credibility earned through official support.)

3. Helping homeowners get their **technical questions** answered is as important as initially gaining their attention. Solarize workshops, usually held

at the launch of a campaign, and then periodically throughout the campaign, are simple ways to answer residents' technical questions.

4. Coalition towns i.e towns that partner on Solarize campaigns to increase capacity and potential adopters perform well, suggesting that a **friendly competition between towns can motivate** customers and/or campaign organizers.

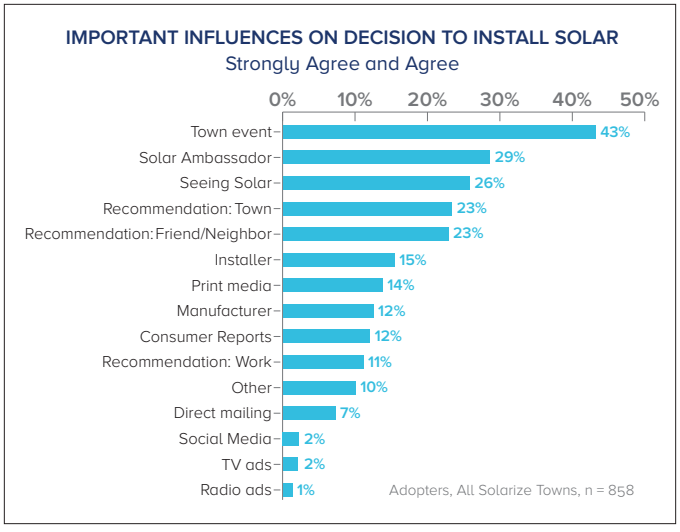
MOTIVATION: MOVING NEW CUSTOMERS TOWARD SOLAR ADOPTION

Customer education is a necessary first step, but some information is more motivating than other information in a campaign.

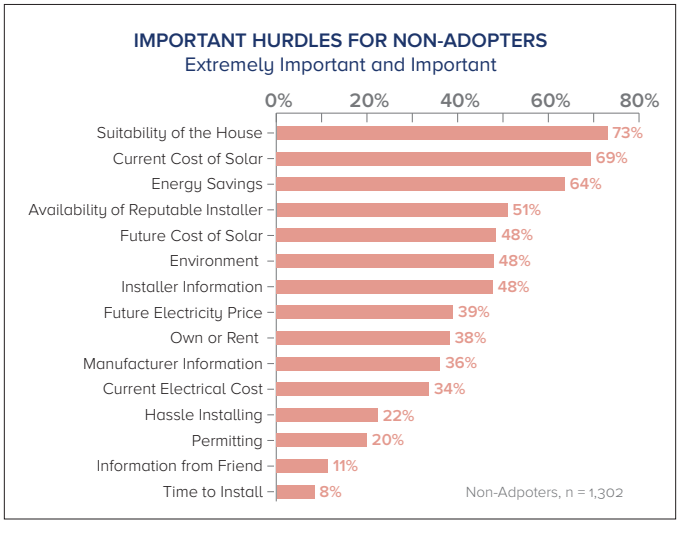
Start with the economics of going solar. Communicating the discount provided through Solarize—a tiered pricing model in which more money is saved when more people sign up—plus the prospect of saving money on energy bills. From there, once you have a better feel for the customer, introduce complementary reasons for going solar. Solar ambassadors—the locals spearheading a campaign—should think creatively about this facet of communication; it's better to avoid leaning exclusively on arguments like "it saves you money" or "it's good for the environment."

For example, in Simsbury, Connecticut, ambassadors found customers who were not simply motivated by the return on investment of solar. Some saw solar as a way to give back to the rising generation of their grandchildren. Others, frustrated with the local electric utility in the wake of power outages cause by Hurricane Sandy, were persuaded by ambassadors who framed solar as a way of gaining independence from the utility. A diversity of messages around the value of solar serves a campaign well.

Support from trusted actors, like local government and high-profile citizens or elected officials, also helps motivate people to install solar. Municipal leaders who dedicate themselves to the success of local campaigns (through sponsorship of promotional materials, town-led events, personal outreach, etc.) legitimize the campaign as a program that residents can have faith in. Solar installers were especially appreciative of this third-party credibility.



In thinking about what motivates people to adopt solar, it's important to also consider specific hurdles to adoption. In the Solarize CT campaign, 75 percent of non-adopters mentioned unsuitability of their house as a reason for not going solar, and nearly 70 percent highlighted the current cost of solar as a barrier. While siting issues are difficult to overcome, innovative financing options, such as power purchase agreements, play a



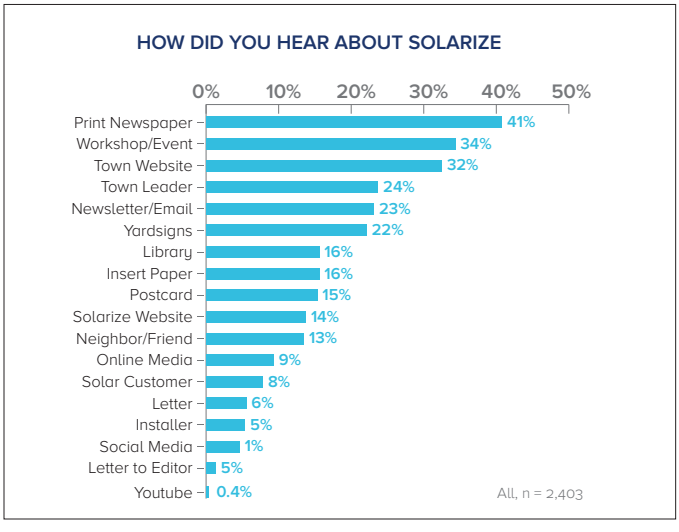
critical role in unlocking solar for households. Leaders of a Solarize campaign should map these hurdles in planning and preempt them in execution.

ACTION: CONVERTING INTEREST INTO INSTALLATIONS

Finally, two components of a campaign are especially useful for turning prospective buyers into paying customers.

First, the urgency of the campaign, with its strict (generally 20 week) deadline, is a particularly powerful force for motivating action. The majority of sign-ups in Connecticut occurred in the last several weeks of the campaign. In fact, knowing that the campaign end-date motivated customers to take action, installers were able to time their investment of resources at this stage of the campaign. (Notably, campaigns with end-dates close to the winter holidays and poor weather faced challenges with converting community outreach activities into customer sign-ups.)

Second, social diffusion—the combined influence of peers talking about and installing solar—has a marked effect on citizens' final decision to install solar. Create as many opportunities as possible for people to meet and talk about solar; highlight installations as they go up.



STARTING THE SOLARIZE CAMPAIGN RIGHT

How a town or city introduces its community to Solarize helps set the campaign tone. Solarize CT was careful to schedule launch events that matched the sponsor community, asking towns to find a venue that would attract people and seat at least 100.

Every launch had elements in common: introductions by the Energy Committee Chair, a welcome by the Chief Elected Official, a presentation by SmartPower and CT Green Bank, and a presentation by the solar installer, who detailed a number of practicalities, from "how solar works" to "how to pay for a system." But each event also had its own charm and culture; they took place in historic buildings, school cafeterias, grange halls, town halls, and libraries. Easton/Redding/Trumbull held their launch on Sunday afternoon—full brunch included—because commuters came home from work too late to attend evening meetings. Westport launched its campaign at a local environmental center with wine and cheese.

MARKETING AND COMMUNICATION

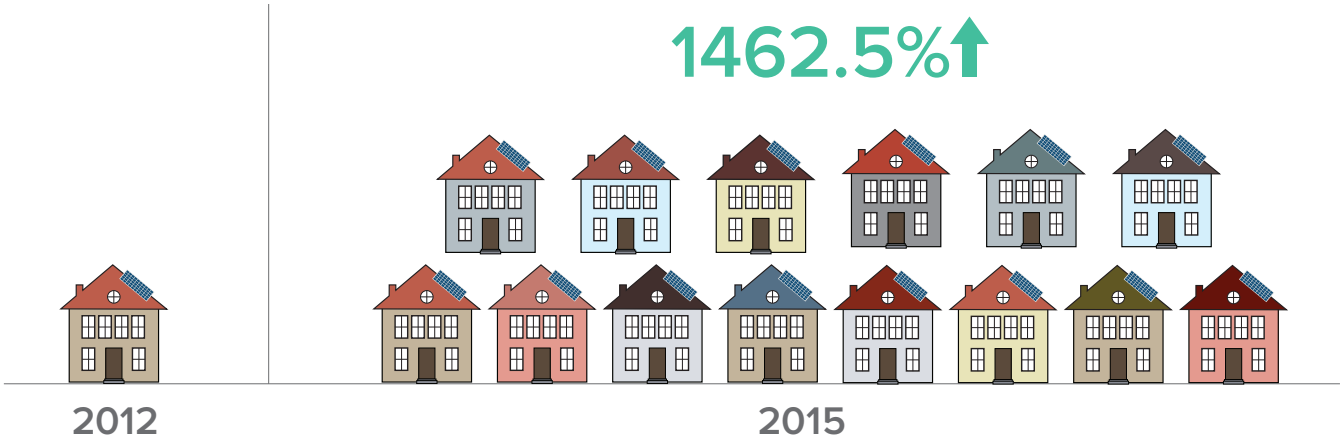
Constant communication is key, and marketing strategies should integrate both local media and live events. A few examples of outlets for advertising the campaign: town newsletters, the town website, local newspapers, workshops, town events, and local meeting groups. Prominent visual displays, such as banners and yard signs, are especially helpful to keep the campaign front-of-mind. In the Solarize Connecticut campaign, the six most effective methods for reaching community members, in order, were: print newspapers, workshops/events, the town website, the town leader, a newsletter/email, and yard signs.

BUILD A COALITION OF STAKEHOLDERS

For the Solarize CT campaign, organizations from the public, private, and nonprofit sectors were all involved. These broad partnering efforts created a rich ecosystem around a renewable energy market. Presented below are the core stakeholders for the campaigns in Connecticut, with a short summary of their roles.

- State agency: lends support and legitimacy to a campaign; accelerates consumer-financing options alongside local lending partners.
- Town leadership: provides legitimacy and raises awareness
- Solar ambassadors: locally trusted sources who advanced word-of-mouth recommendations, recruit volunteers, and organize/host informational events
- Installer: connects with consumers, follow-up on leads, installs solar systems
- Marketing firm: if budgeting permits, a marketing firm can help spread the word

The Path Forward



In Connecticut, solar installations increased dramatically from 2012–2015

Solarize campaigns have the potential to dramatically increase the adoption rate of rooftop solar photovoltaic systems. Connecticut's experience demonstrates a radical effect: in just three years, the number of homes with solar grew from about 800 to over 12,500, with Solarize responsible for about 20 percent of this growth. Campaigns leverage existing social networks and provide a wide range of benefits:

- Reduced energy bills for consumers
- Streamlined permitting, economic development, and job growth for governments
- Cohesion around a single campaign for communities
- New customers, increased sales, and business expansion for solar installers
- A reduction in greenhouse gas emissions through the replacement of fossil fuel energy sources with renewables

More broadly, the coalition of organizations supporting a Solarize campaign create a strong foundation for a robust clean energy market that no single actor could achieve in isolation.

As such, these campaigns are more than a simple behavioral or marketing innovation for capitalizing on the power of social networks. Rather, Solarize serves as an innovation with the potential to induce widespread progress around renewable energy. As the price of renewables continues to drop, and the profile of renewables continues to rise, consumers will be more predisposed to consider solar as a valuable energy option.

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Appendix A – Experimental Design of Solarize CT

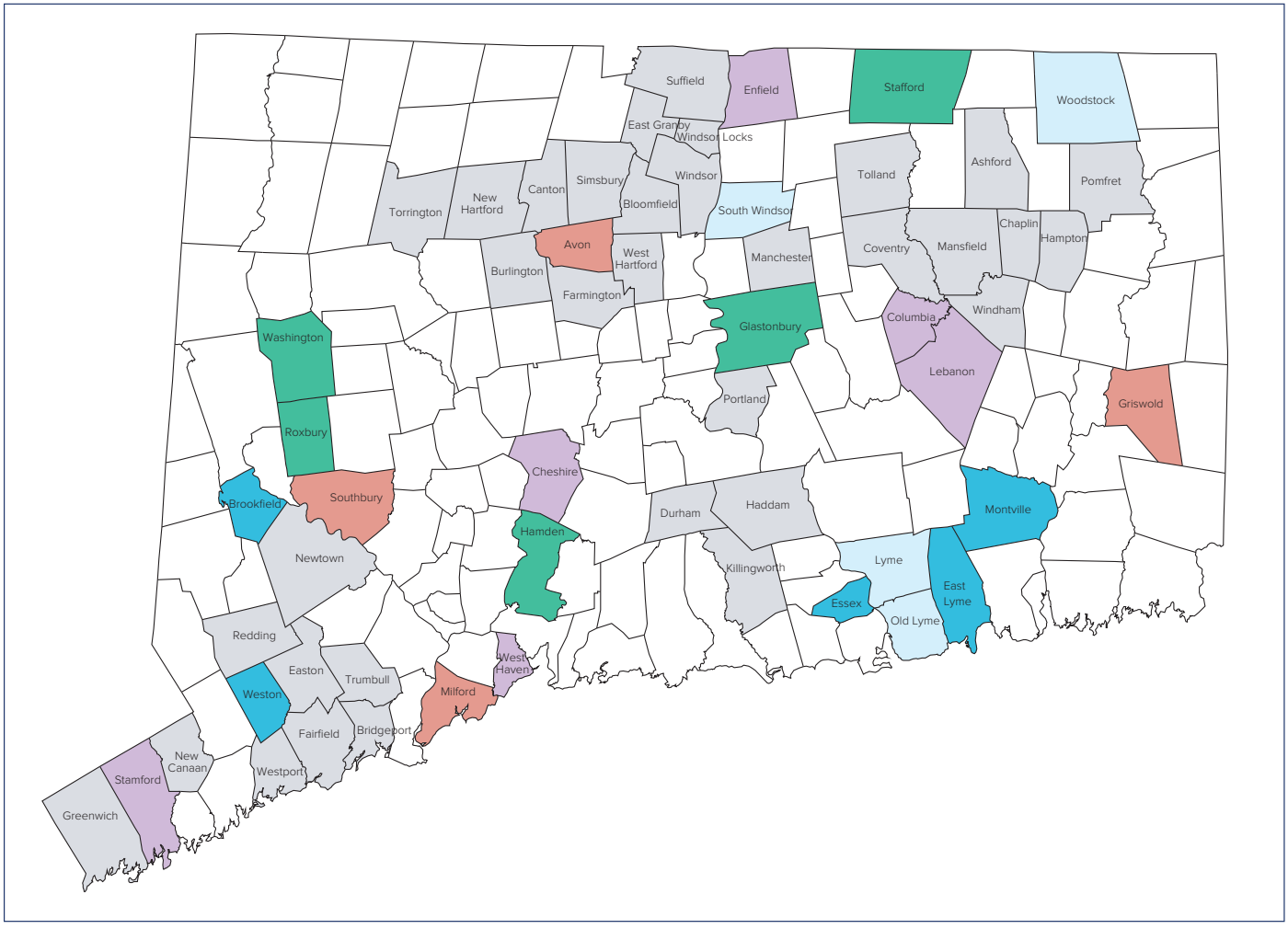
Solarize campaigns share central tenets of community-based outreach, a clear end-date, discount pricing, and some number of pre-determined installer(s) or price options. Our research tested five variations on the "Classic" model, which is described below. By adjusting a single campaign variable at a time, researchers from Yale and Duke Universities were able to capture the direct value of single aspects of the campaign. How important, for instance, is the 20-week campaign length? Might that be shortened without sacrificing effectiveness?

The table and figure across offer, respectively, a snapshot of each model and where it was implemented across the state.

The table on page 22, for each variation, offers a thorough summary, its benefits and potential considerations if implementing.

VARIATIONS OF SOLARIZE CT

MODEL	TOWN MOTIVATION	LENGTH OF CAMPAIGN	PRICING OFFER	# INSTALLERS	QUOTE COMPARISON
Classic	Competitive Application	20 Weeks	Tiered	1	N/A
Select	Selected At Random	20 Weeks	Tiered	1	N/A
Express	Competitive Application	10-12 Weeks	Tiered	1	N/A
Prime	Competitive Application	20 Weeks	One Low Price	1	N/A
Choice	Competitive Application	20 Weeks	Tiered	2-3	In-Person
Online	Competitive Application	20 Weeks	N/A	5+	Online Platform



MODEL	HOW IT WORKS	BENEFITS	CONSIDERATIONS
Classic[11]	• 20 Weeks • Tiered Pricing • One Installer	• 20 weeks allowed communities time to plan and execute their campaigns • Single installer simplified choice for customers and simplified coordination for campaign organizers • Tiered pricing encouraged a peer-to-peer effect with customers striving to reach the highest tier • Proven model nationwide	• With a single selected Solarize installer, residents did not have a choice of installation company if they wanted to take advantage of the Solarize discount • Smaller installers needed to expand capacity quickly to meet higher demand
Express[12]	• 12 Weeks • Tiered Pricing • One Installer	• Suggestive evidence that Express was more effective per week, but less effective in aggregate (neither difference is statistically significant). Theoretically, Express campaigns could save implementation costs. (This was not the result of Solarize CT) • Word of mouth played a much smaller role in leading people to adopt	• Express did not deliver the expected cost savings: SmartPower and CT Green Bank had to increase their administrative support and increase their investment in coordination efforts to meet the earlier deadline • Towns needed to invest in up-front planning to make marketing effective during the short campaign • All installers who participated in an Express program reported that the timeframe was too short
Choice[13]	• Multiple Installers • One Low Price	• Compared to Classic, Choice towns were more successful in terms of the percentage increase in total number of installations. Several installers competing for business appeared to play a key role in this uptake dynamic • Solarize Choice towns had the lowest prices – the average system price in Choice towns was 2.65$/W compared to 2.72$/W in Round 3 Classic towns • Choice experienced sustained price discounts post-campaign • Customers felt confident that they were getting a good price with participation of multiple installers • Strong growth rates were observed post-campaign, suggesting that the campaign brought installers in touch with more residents	• Installers and Solar Ambassadors reported that choice created confusion for some customers • More coordination effort was required • Installers highlighted the need for strong guidelines to execute effectively. A number of installers reported poor customer experience, lost leads due to overwhelming or conflicting information, and increased cost of customer acquisition

MODEL	HOW IT WORKS	BENEFITS	CONSIDERATIONS
Select[14]	• Towns Selected At Random To Join	• Allowed residents to experience the benefits of a Solarize campaign even if their towns did not have the time or resources to commit to the application process • For some towns, the "you've been chosen" message was motivating as a special opportunity • Results show that Solarize can still be effective in randomly selected municipalities	• Whilst still effective, results show a lower effect when municipalities do not opt-in on their own; level of interest/ resources may be lower
Prime[15]	• One Low Price • Single Installer	• Simplified the decision-making process for residents: one installer and one price • Word-of-mouth from community members declined in effectiveness but was offset by other word-of-mouth channels (friends, coworkers, etc.)	• Limited homeowners' choice to a single installer • Without the pressure of tiered pricing, with discounts contingent on numbers signed up, residents may have been less inclined to encourage others in their towns to install with them
Online[16]	• Compare Quotes Online • Multiple Installers	• Gave residents more choice and provided them with easily accessible information to make decisions • Customers were able to easily compare quotes with apples-to-apples assumptions • Residents were able to utilize the assistance of an online solar coach to help guide them in their decision • Competition among installers reduced prices—a reduction that persisted even after the campaign ended	• More limited installer visibility and engagement • With many participating installers, it was reported that some customers felt an overload of information; onus on customer to compare installer quotes • Potential technical barriers associated with user access of online platform for customers who are not very tech-savvy

11 Gillingham and Bollinger (2017) "Social Learning and Solar Photovoltaic Adoption: Evidence from a Field Experiment," Yale University Working Paper
12 Bollinger, Gillingham, and Tsvetanov (2016) http://environment.yale.edu/gillingham/BollingerGillinghamTsvetanov_SalesDurationGroupBuys.pdf
13 Bollinger, Gillingham, and Lamp (2017) "Long Run Effects of Competition on Solar Photovoltaic Demand and Pricing," Yale University Working Paper
14 Gillingham and Bollinger (2017) "Social Learning and Solar Photovoltaic Adoption: Evidence from a Field Experiment," Yale University Working Paper
15 Bollinger, Gillingham, and Tsvetanov (2016) - http://environment.yale.edu/gillingham/BollingerGillinghamTsvetanov_SalesDurationGroupBuys.pdf
16 Bollinger, Gillingham, and Lamp (2017) "Long Run Effects of Competition on Solar Photovoltaic Demand and Pricing," Yale University Working Paper

Appendix B – Financing Residential Solar Installations

Though the mix of reasons for participating in Solarize varied across demographics, the discount pricing consistently proved to be the predominant motivation. In fact, nearly 70 percent of respondents highlighted the current cost of solar as a barrier to adoption.

Innovative financing options, such as power purchase agreements, therefore have a critical role to play in unlocking solar for households.

In Connecticut, the CT Green Bank, a state-level institution devoted to expanding the region's clean energy sources, lent its support to the Solarize program in three basic ways:

1. The Bank oversaw the Request for Proposal process among solar installers, vetting all of the applicants and establishing quality controls. This formal "stamp of approval" gave homeowners confidence in local suppliers.

2. The Bank contracted with the clean energy marketing organization SmartPower to raise the profile of solar across the state.

3. Most importantly, the Bank accelerated consumer financing options by developing risk-reduction mechanisms in partnership with local lending and capital partners.

The existence of the CT Green Bank has prompted private-sector investment in clean energy infrastructure at a scale that may otherwise have been impossible. States pursuing Solarize should consider in what capacity they can help homeowners overcome the barrier of cost.

MOST IMPORTANT REASON FOR PARTICIPATING BY INCOME

NOTES