

# PV Considerer Survey Delivery

## Summary

The PV Considerer survey was fielded to single-family homeowners who had seriously considered PV but had not installed it at the time of the survey, and provides a basis for understanding the decision process for solar, especially how and why households move along, pause, or drop out of interest in buying or leasing solar.

This document describes the survey process for the Considerer survey, covering instrument development, sampling, fielding, and the creation of a final data set for analysis. It also gives a brief summary of basic household and respondent characteristics of the Considerer survey sample, by state, as revealed in this data.

## Project Overview

Three different household-level surveys were fielded for this project: one for households who had installed PV on their current home or had signed a contract to do so (the Adopter survey), one for households that had seriously considered PV but had not installed it (the Considerer survey), and one for the general population who did not have PV on their current home (the General Population survey or GPS).

By collecting similar data from three fairly different “statuses” with respect to adoption, the surveys provide a basis for understanding how those who do not have rooftop PV differ from those who have, for how and why people do (or don’t) transition from not having to having rooftop PV on their home, and for understanding the characteristics and viewpoints of households who have scarcely, or not at all, entered the “PV consideration” track. All three surveys covered single-family owner-occupied households in each of the four target states used in the project -- Arizona, California, New Jersey, and New York – allowing a comparative approach to understanding how the factors that affect PV adoption vary by geography and policy conditions.

## Instrument Development

The Considerer survey targeted a specialized subset of “non-adopters”: households who had considered installing solar but had not installed solar panels on their current home.

The Considerer survey was designed to allow the research team to probe more deeply into the decision process for solar, especially as to how and why households move along, pause, or drop out of interest in buying or leasing solar. For example, did the respondent learn something from an installer that dissuaded them from adopting solar, or were there other stumbling blocks and doubts? To what extent are the characteristics of Considerers different from those of PV adopters or from the general population who had not considered solar? The survey was developed to be readily compared to responses from the Adopter survey, to the extent relevant. As discussed below, this was a difficult sample to collect. To our knowledge, few if any other research projects have targeted this group, and the results are thus particularly valuable.

Survey instrument development drew from existing PV adoption survey instruments, PV adoption literature, and research team experience, as well as from past work on household interest in energy efficiency, environmental attitudes, purchasing tendencies, and related knowledge. Early interviews and discussions with installers and others in the PV industry were also taken into consideration.

The three surveys together were developed to support major goals and requirements of the project, including:

- (a) Developing agent-based models of solar adoption with particular attention to social networks;
- (b) Strengthening general knowledge about: opinions on, and concerns and experience with, residential rooftop PV, along with socio-demographic, economic, and technical data, and related information on environmental and energy use attitudes, purchasing practices, social networks, and other psychological and social aspects with respect to adoption and consideration status. This approach thus supplies more information on how people figure into PV adoption, versus studies that focus primarily on technical and/or economic characteristics;
- (c) Characterizing population segments and mapping these segments to interest and non-interest in solar and to solar adoption and non-adoption, especially in a way that can be compared across states and to other SEEDS research on solar adoption.

## Survey Content

In addition to basic tracking and administrative data, the following types of data were collected:

- Geographic location (zip code)
- What prompted the household to look into solar panels, and how long they had been thinking about solar?
- Motivation and criteria for adoption (e.g., “adding to your home’s market value”)
- Social networks: who else they knew who had solar panels and what influence they thought this had on their decision
- How many installation companies the household had talked to, and how they connected with them
- Timing: approximate dates for first talking to an installer
- Difficulties faced (e.g. “finding a trustworthy and competent installer”)
- Concerns about installation (e.g., “taking on debt or signing a lease”)
- Electricity costs
- Respondent “innovativeness”
- A “Value- Belief-Norm”-style battery of questions<sup>1</sup> (see Stern et al. 1999), covering attitudes and opinions about environment, energy use, and climate change, and general purchasing habits
- Technical details of the house, including year house was built, living area, efficiency improvements made, and presence of air conditioning, swimming pool, plug-in hybrid vehicle, or electric vehicle

---

<sup>1</sup> Summarized in Stern, P.C., Dietz, T., Abel, T.D., Guagnano, G.A. and Kalof, L., 1999. A value-belief-norm theory of support for social movements: The case of environmentalism. *Human ecology review*, 6(2), p.81-97.

- Political leanings and affiliation
- Respondent details (e.g., male versus female, age, education, whether they are retired) and household details (e.g., number of adults and number of children, income, financial situation)
- Open-ended comments, as volunteered by the respondent

## Deployment

Table 1 summarizes the sampling and fielding results for the Considerer survey by state. A total of 588 surveys passing quality checks were completed, spanning December 2014 to April 2015.

**Table 1. Response summary for the Considerer homeowner surveys.**

Recruitment Source	When Fielded	Response Rate Estimate	Responses Passing Data Quality Checks				
			AZ	CA	NJ	NY	Total
Lead Generators, Installers	Dec 2014 to April 2015	1.4%	13	90	9	40	152
Panelists	March 2015	Not applicable	100	97	98	141	436
<b>Grand Total</b>			<b>113</b>	<b>187</b>	<b>107</b>	<b>181</b>	<b>588</b>

The research team took a good deal of care to obtain samples that were as useful as possible, but the nature of the target populations and the resources available precluded obtaining a formally “representative” sample, as explained below. The sampling and fielding of the survey was complex, since the population was fairly specialized and the sample difficult to locate. Two principal methods were used to obtain Considerer survey sample lists. First, we reached out to installers who had been interviewed for the project and asked if they were willing to share lists of contact information for households with whom they had discussed PV installation but had not closed a deal. In exchange, willing installers were offered a market report and a list of “win-back” leads.<sup>2</sup> Many contacts were obtained but response rates were low –about 1-2 percent, despite applying methods to increase response, including offering incentives. Furthermore, the samples provided by the installers were primarily focused in California, and the nature of the sample selection (from a relatively small number of installers) risked that the sample was biased relative to the overall population of “Considerer” households.<sup>3</sup> Thus, a commercial panel method was used to supplement installer-provided leads, again applying screening questions for homeownership and to establish status regarding whether they had considered rooftop PV for their current home.<sup>4</sup> The screening process for Considerers allowed respondents to switch

<sup>2</sup> See also the Installer memo for further information on general recruitment of installers and sample list negotiations, which also pertains to contact lists obtained for the Adopter survey.

<sup>3</sup> Response rates for the Adopter survey were much higher than for the Considerer survey, but still fairly low, which is commonly the case for using email invitations to an online survey.

<sup>4</sup> To complete the Considerer survey, the commercial panel respondent had to meet all three of the following criteria: (1) a “No” answer to “Do you have solar panels that generate electricity at your home”; (2) a “Yes” answer to “Have you or someone in your household talked with a solar installer while considering solar panels for your current home”, and (3) a “Yes” answer to “Were you personally involved in considering solar panels for your home”? If the first two criteria were met and the third was not, the respondent was asked to exit the survey and pass the link along to a household member who had been personally involved in the decision, if possible. The second screening question was asked somewhat differently to contacts received from installers: “Has your

over to the Adopter survey instrument as appropriate, and vice versa for those initially entering in the Adopter survey. A minimum of 100 surveys were obtained for each state, with over 180 for California and New York. Median survey complete time was 18 minutes for the Considerer Survey.

## Data Cleaning and Recoding

The raw data set resulting from fielding the Considerer survey was cleaned and recoded. Of 618 total survey responses, 30 responses were removed on the basis of quality checks. Table 1 above excludes these surveys from the count, for a total of 588 surveys passing quality checks.

Additional cleaning and recoding steps were applied to the data set, in particular:

- Converting open-end numerical responses into numerical values
- Creating derived variables based on response data, e.g. a Boolean variable for “have kids” based on response for the number of children, or combining parallel questions across branches.

## Public Data File Preparation

A final step was completed to support the public release of the Considerer dataset while protecting respondent confidentiality. This step involved:

- Matching variable names and response codes in this survey to those in the other two surveys where possible to facilitate combined analysis across the three surveys
- Withholding open-ended text responses and several other variables
- Top coding, bottom coding, and general recoding of several variables to protect confidentiality.

No full responses were removed from the dataset in this step, so the response numbers in Table 1 apply to the public release dataset. Basic quality checks were performed to ensure that overall sample statistics were not compromised by this processing.

## Basic Comparison of Sample Characteristics

Table 2 summarizes central tendencies of some basic individual and household characteristics for the Considerer survey samples, by state. Fewer than half of respondents in each state were 55 years old or older, sometimes retired (about one out of three in Arizona, and more infrequently elsewhere), well-educated (usually with a 4-year degree), and fairly well off as viewed by annual income, except for Arizona (where the high level of retirement presumably relates to annual income).

---

household considered solar panels for your current home, for example whether it is feasible and makes sense for you, or talking with a solar installer?” Over 97% of the final Considerer respondents said that they had talked to an installer.

**Table 2. Central tendencies of basic household and respondent characteristics of Considerer Survey samples, by state.**

	Considerers Survey			
	AZ	CA	NJ	NY
Respondent: % female	46	36	53	48
Respondent: % 55 or older	40	43	31	30
Household: % reporting income of \$100,000/year or more	25	45	42	40
Respondent: % retired	31	21	11	18
Respondent: % holding 4-year degree or higher	51	65	50	66
Households: Summer electricity bill				
% with bills \$100/month or more	81	78	88	73
% with bills \$150/month or more	64	61	72	56
Households: Winter electricity bill				
% with bills \$100/month or more	61	75	79	84
% with bills \$150/month or more	32	48	58	60