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Understanding what motivates households to adopt solar

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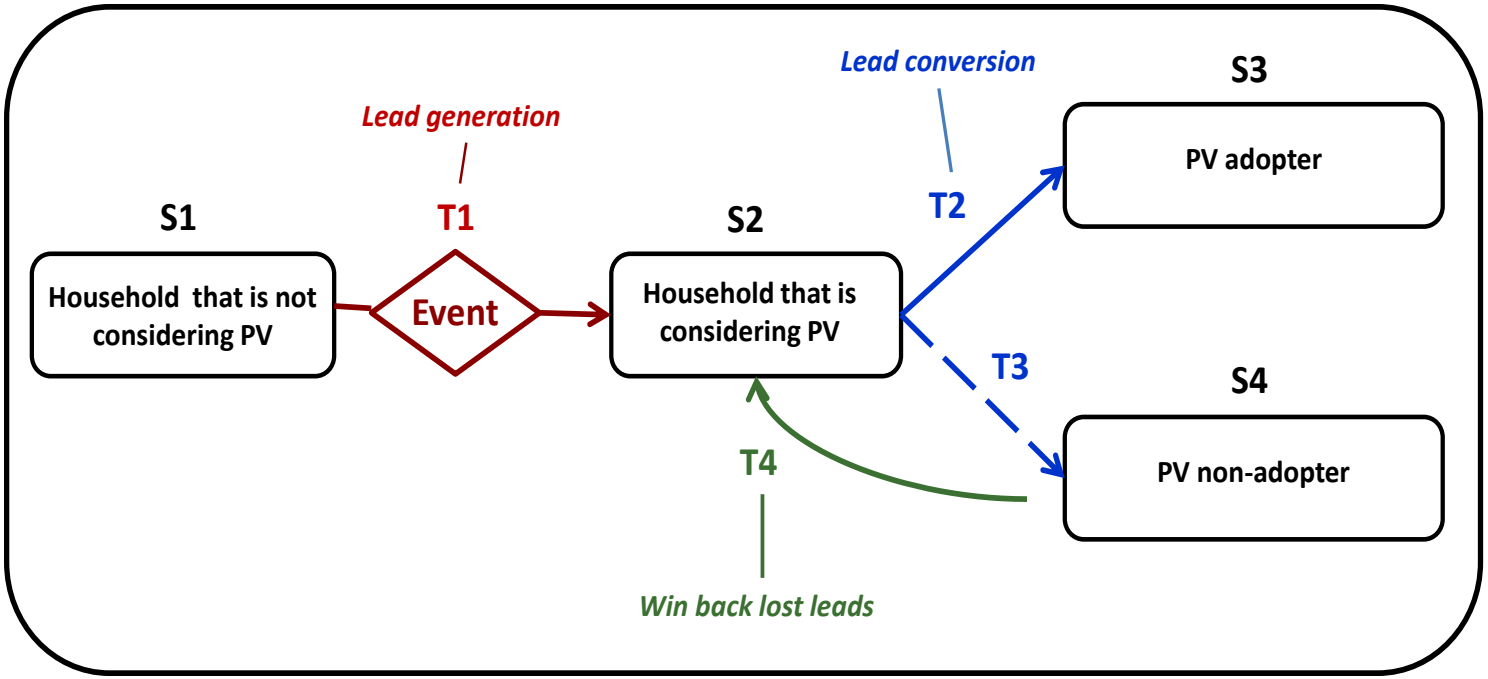
How do households think about solar?

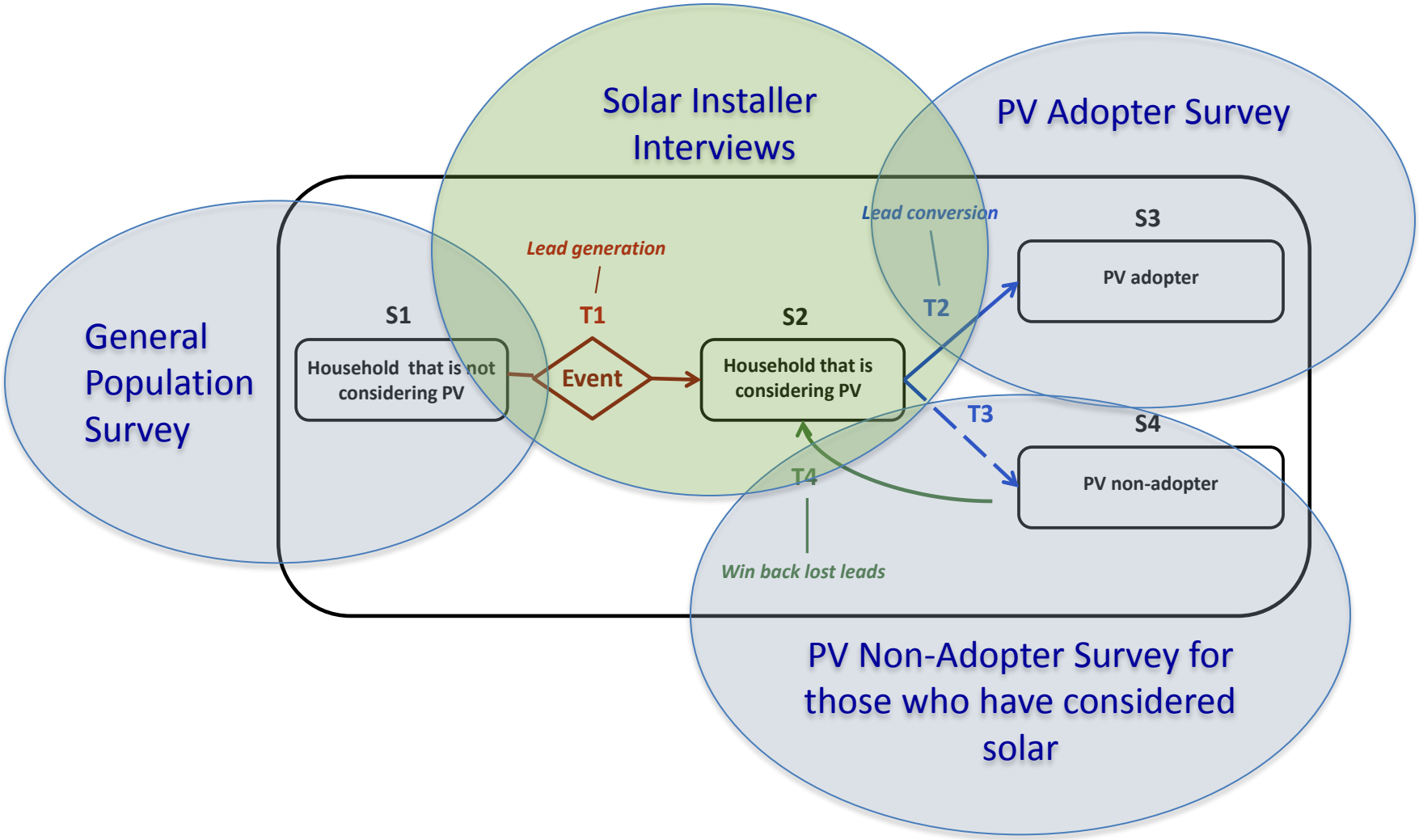
The decision to adopt solar includes several steps…



How can we accelerate diffusion?

1. *Collect new data from various populations in the decision making process*
2. *Develop predictive diffusion models to test and refine hypotheses*
3. *Run controlled market pilots to demonstrate new methods for increasing solar demand*

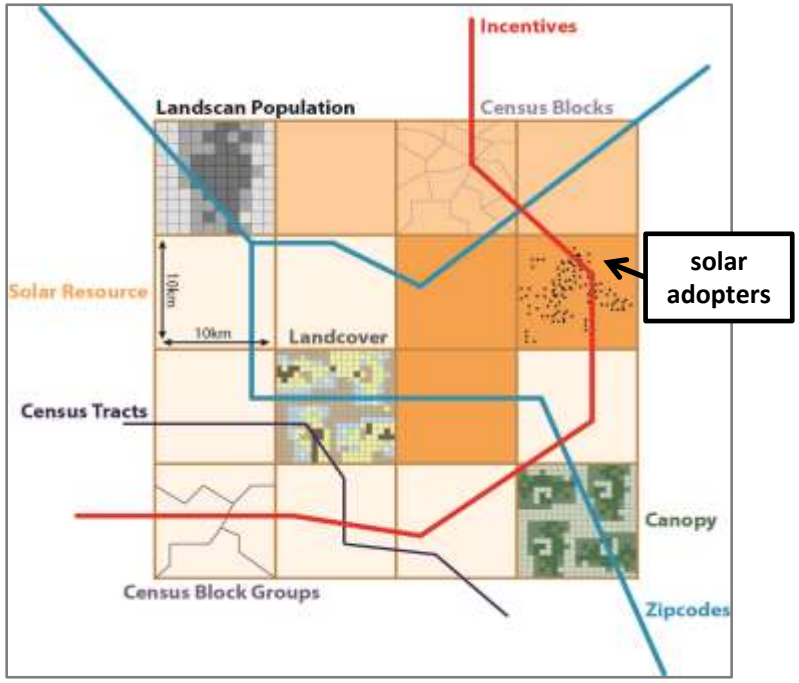
1. Data – Collecting new household-level information



- **Data collected in four regions— *NY, NJ, so. CA and AZ* —to measure general versus regional motivations/barriers**
- **Combine with additional data (census, ACS, vehicle ownership, etc.)**

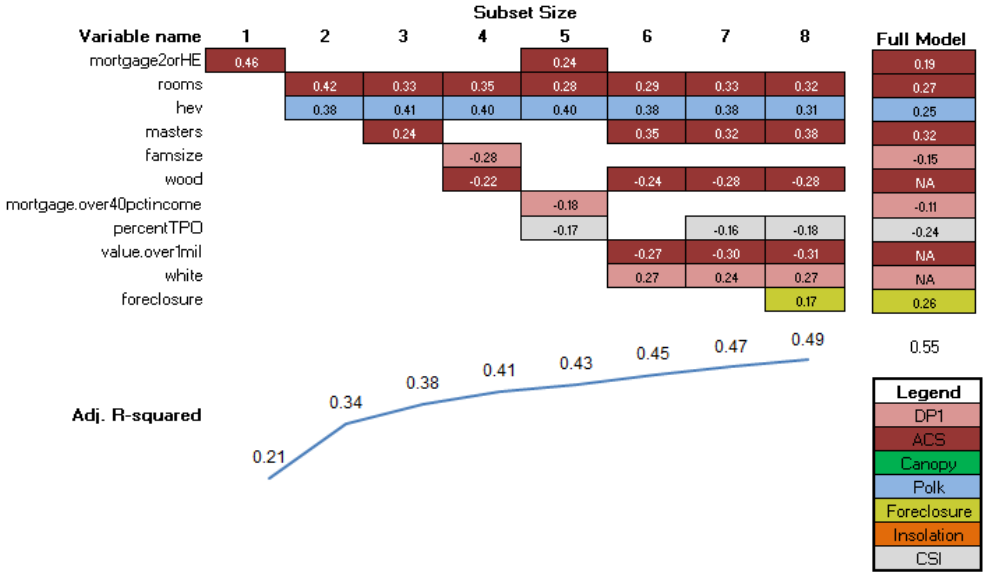
1. Data – Combining survey responses with other data sources

Geospatial data sources



- Historical PV adoption
- Solar Economics
- Demographics
- Housing stock information
- Vehicle ownership
- Shading proxies

Assess which types of data are most predictive of solar adoption



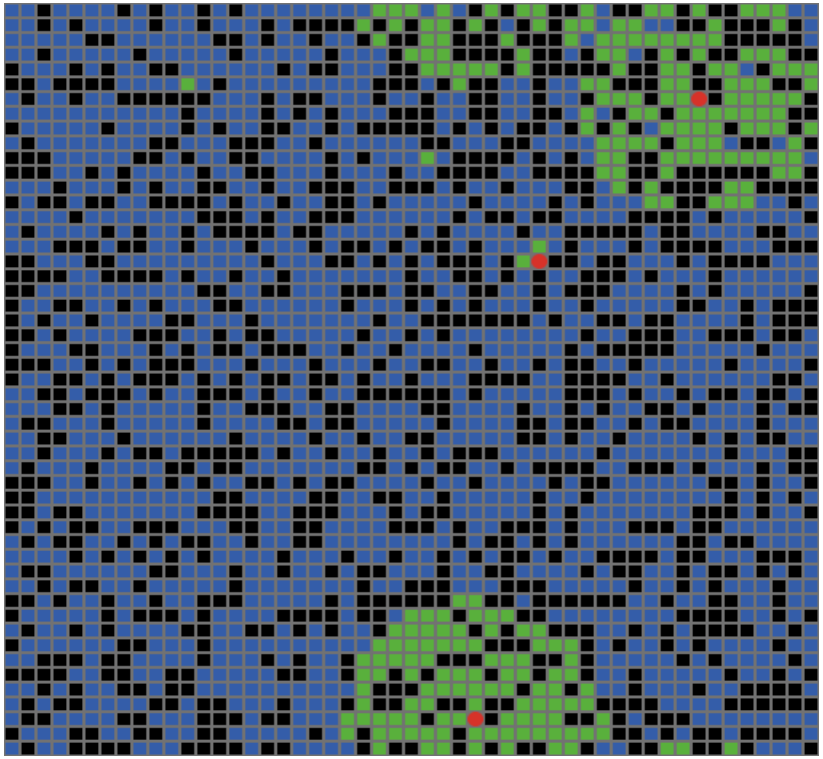
Source: Davidson et al. 2014

- Identify population characteristics that are most predictive of solar adoption
- Characterize how these are similar or different across study regions
- Use data to constrain diffusion models

2. Modeling Solar Adoption

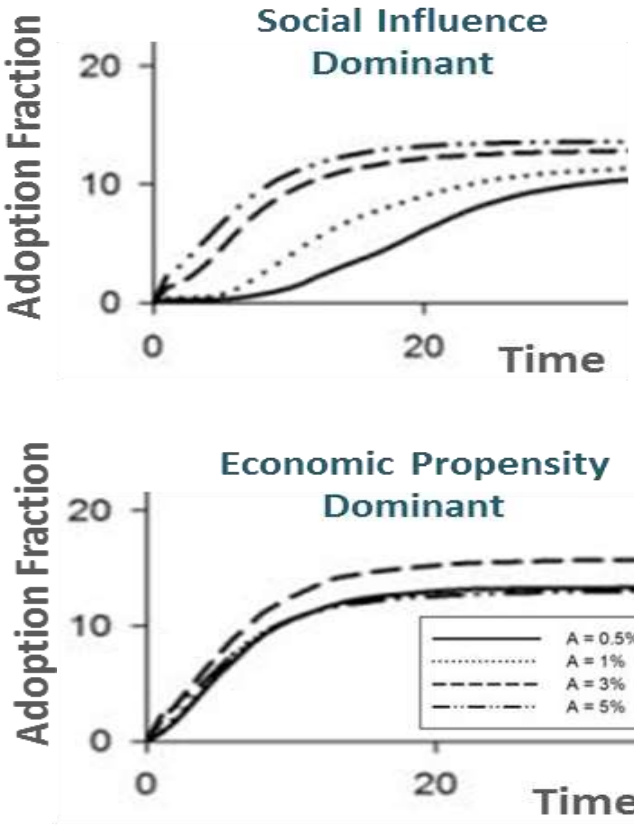
Exploratory ABM simulations

[3 installers, 0.5% starting adoption, indirect social influence only]



- *=> Installers*
- *=> PV adopters*
- *=> Non-adopters who may adopt*
- *=> Non-adopters who won't adopt*

Exploratory ABM simulations

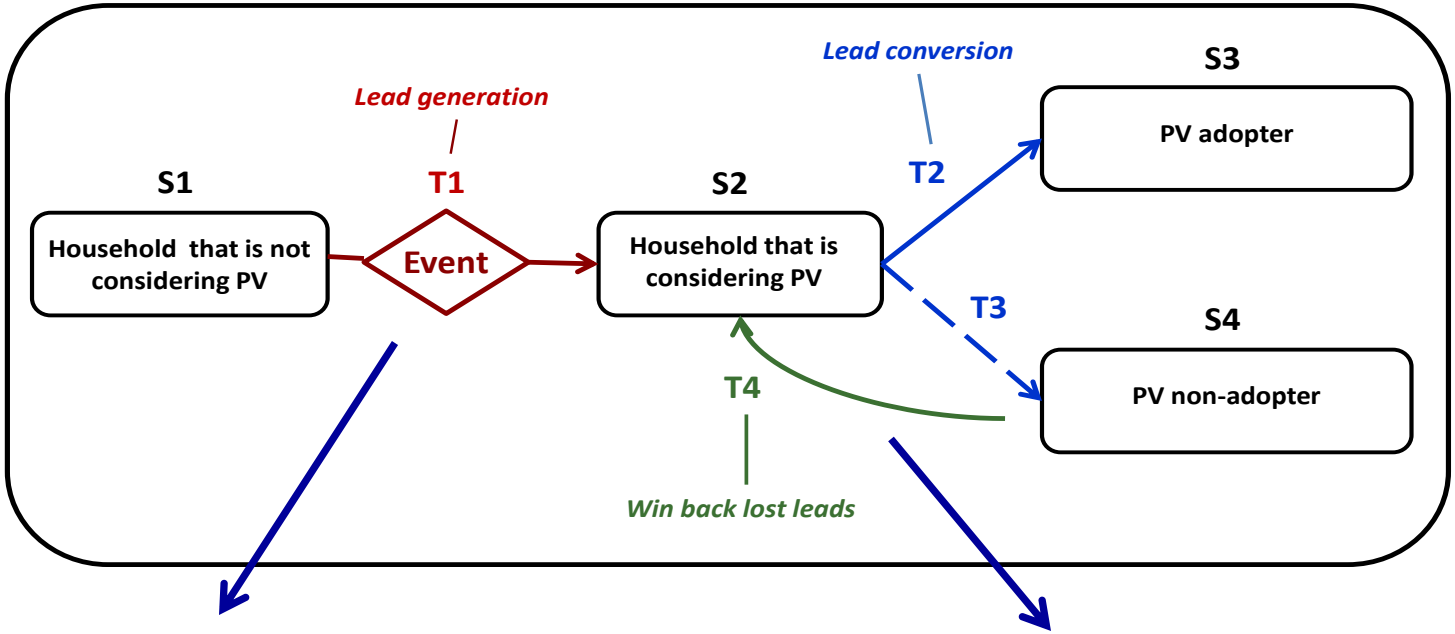


A represents the initial adoption %

- **Behavior modeled to include economics, indirect and direct social influence**
- **Decision to adopt represented by a logit function**
- **Used to identify 'types' of customer behavior**

3. Pilots – designing market pilots

Based on conversations with installers, there are strong opportunities to market run pilots in T1 and T4 transitions



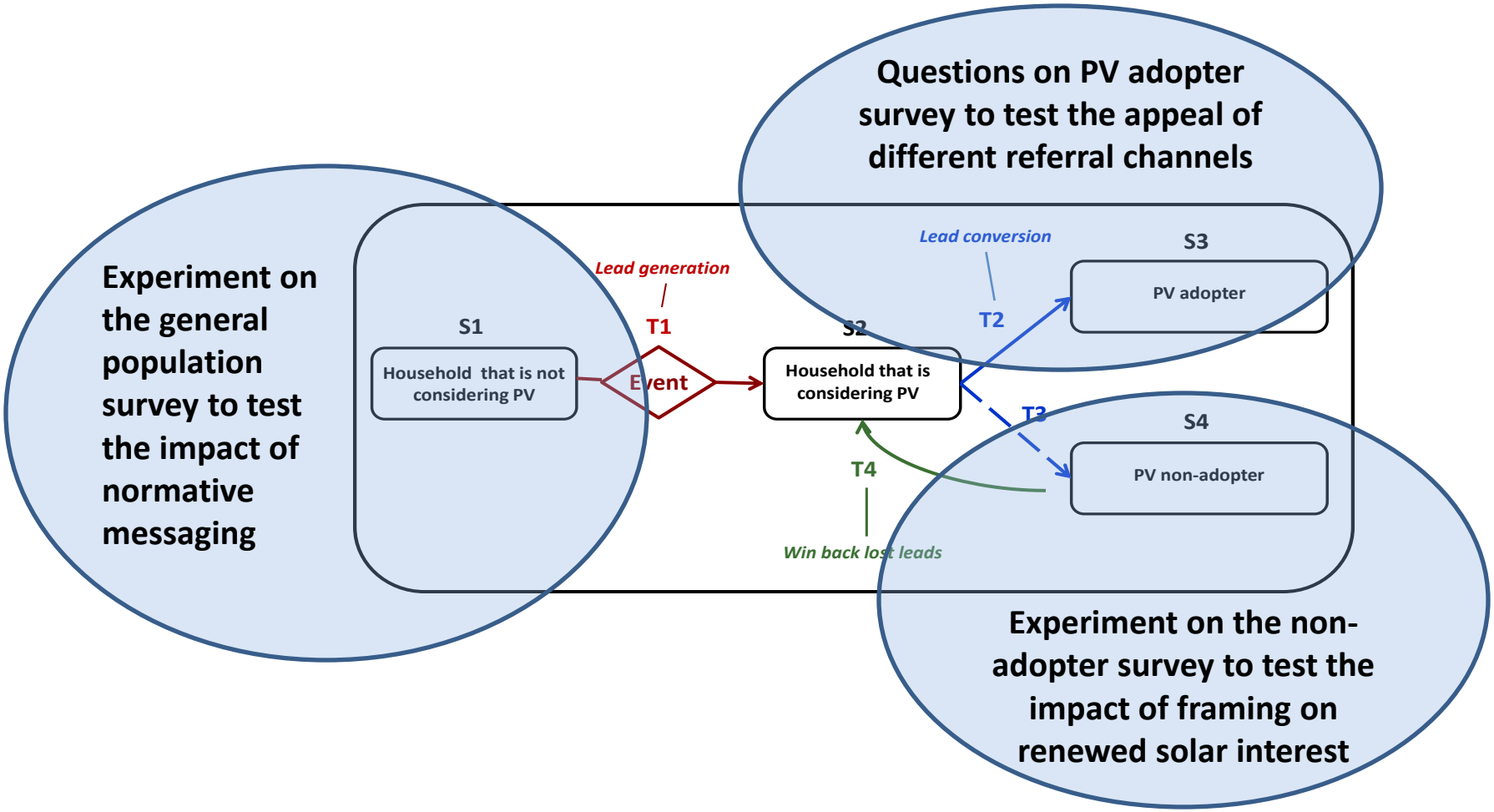
Word of mouth referrals

- Referrals typically pitched during the solar installation, uncommon after six months
- Customers more likely to provide referrals if the methods reduce individual investment or cost (time, social, etc.)

Win back lost leads

- Fewer than 10% of leads converted to sales
- Leads typically treated as 'lost' after a short amount of time
- Explore the impact of framing solar benefits on rekindled interest in solar

3. Collecting data to inform pilots



- Data collected from pre-pilot experiments and survey questions will be used to design market pilots
- Measuring differences between responses on surveys v. action in markets

3. Market information - free Market Report

Sample Market Report (free.study@nrel.gov), automated knitR

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PV Market Report – Acme Solar LLC

This report has been created to assist you in benchmarking your company's performance against the broader solar market in *California*. The values below were generated by statistically analyzing the survey responses of your PV customers and comparing them to the responses from all other partnering PV installation companies in *California*. To maintain confidentiality we are not able to the names of the other partnering PV installation companies or provide you with responses from individual consumers.

1. What customers are saying about your company

Leads in the solar industry are driven by referrals—and referrals come from happy customers! The section below shows the how the loyalty of your customers compares to the market as a whole using three metrics: Net Promotion Score (NPS), Lead-to-Sale Conversion, and willingness of customers to be contacted again

	Your Company				Rest of Market			
	2012	2013	2014	All Years	2012	2013	2014	All Years
Net Promoter Score (NPS)[1]	7.1	7.3	7.8	7.4	6.2	6.1	6.3	6.2
Lead-to-Sale conversion	4%	6%	8%	6%	5%	5%	6%	5%
Lost sales willing to be contacted again	5%	8%	25%	10%	5%	2%	35%	20%

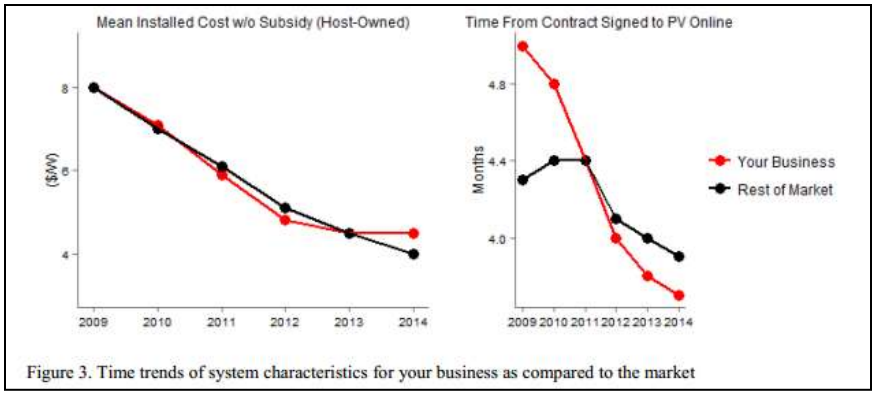


Figure 3. Time trends of system characteristics for your business as compared to the market

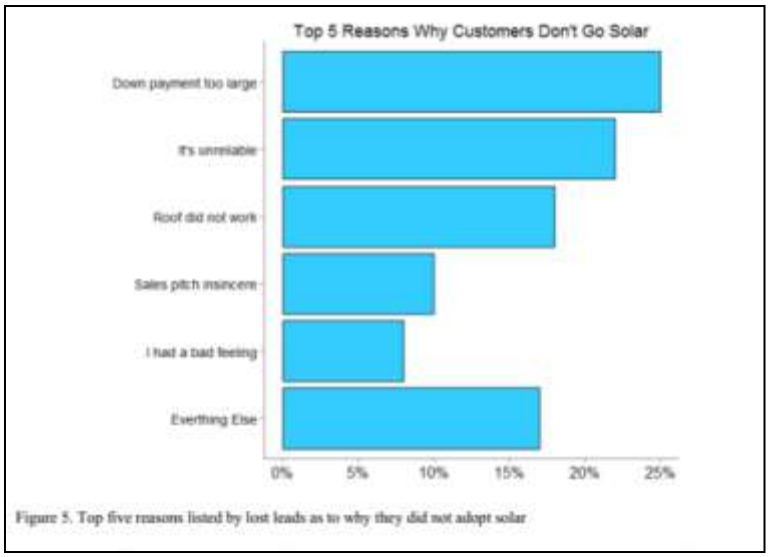


Figure 5. Top five reasons listed by lost leads as to why they did not adopt solar

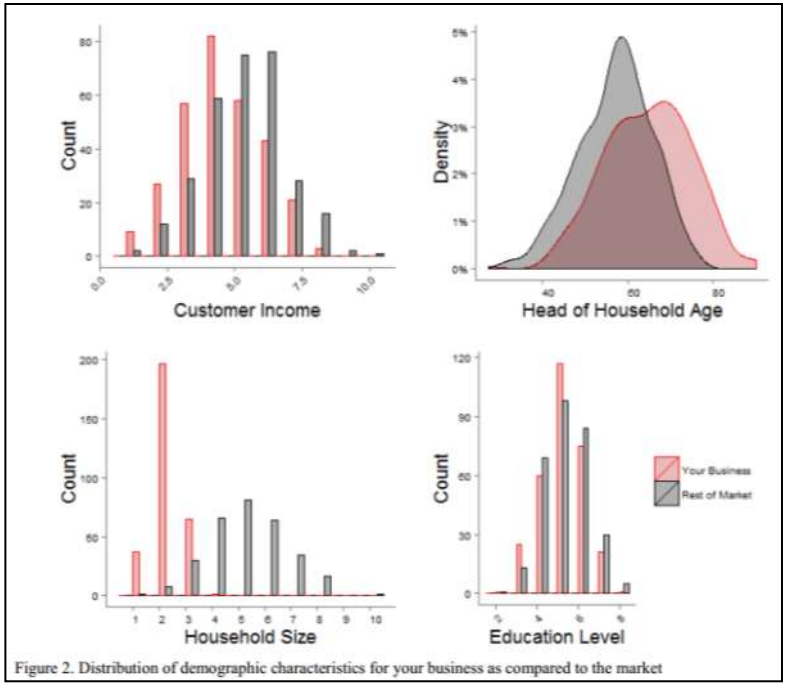
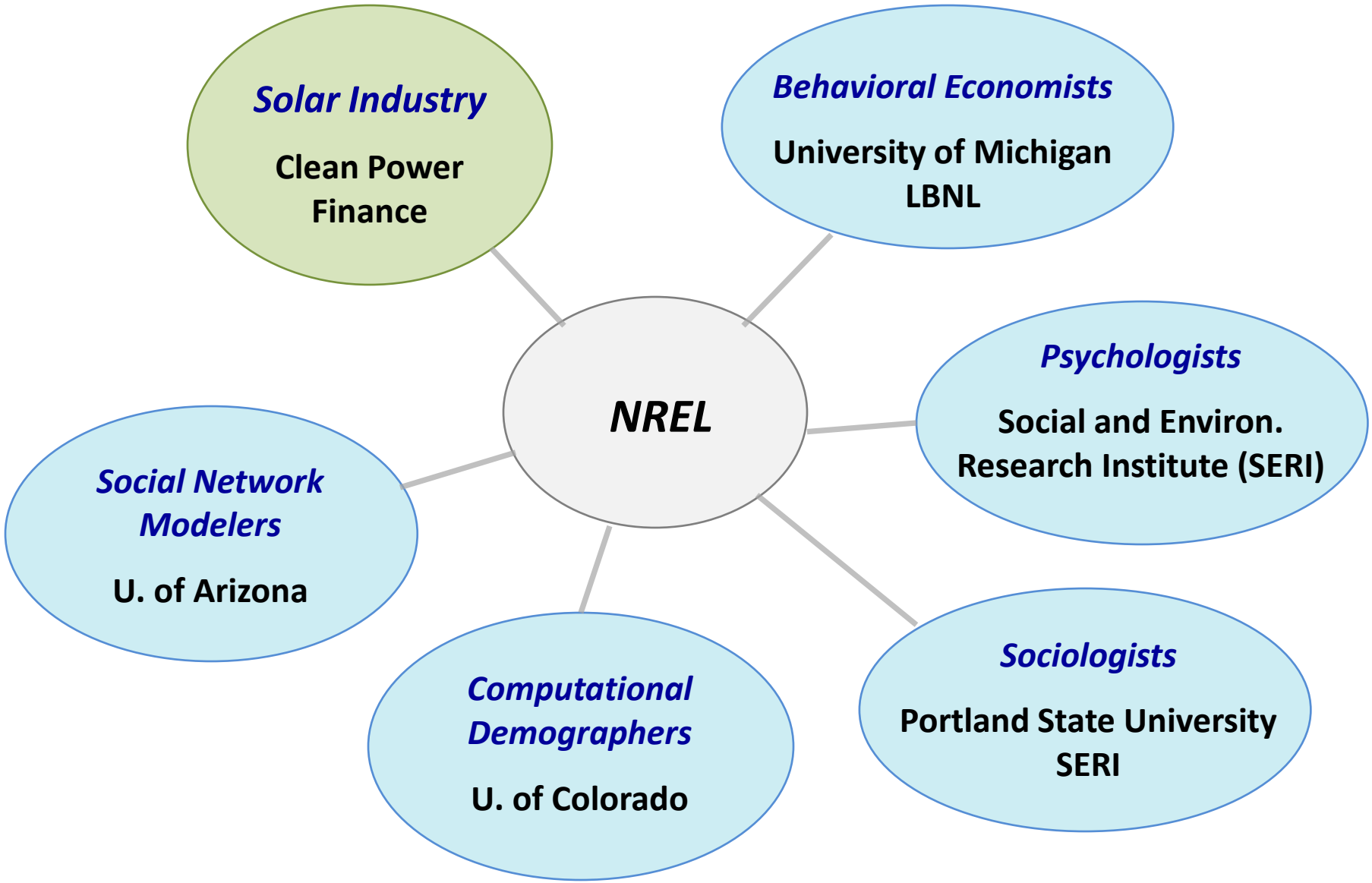


Figure 2. Distribution of demographic characteristics for your business as compared to the market

Diverse SEEDS Research Team



Benefits of Public / private partnerships

Benefits to the public sector and academics:

- Household-level information is hard to come by, particularly for large samples
- Industry experts are absolutely critical for understanding household behavior
- Ability to run large market pilots by finding 'win-win' scenarios; sample population and scale.

Benefits to the private sector:

- Bring robust methods for collecting and analyzing data
- Link to decades of literature on customer behavior (behavioral econ, psychology, sociology, simulation, etc.)
- Implement robust, anonymized market experiments
- Partner with third-party researchers that aren't trying to sell you anything

Find out more

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Study website:
www.nrel.gov/seeds