SUPPLEMENTAL INFORMATION

Public perceptions and information gaps in solar energy in Texas

Varun Rai*1,2 and Ariane L Beck1

1 LBJ School of Public Affairs, The University of Texas at Austin, Austin, Texas, 78712
2 Mechanical Engineering Department, The University of Texas at Austin, Austin, Texas, 78712

*Corresponding author. E-mail: raivarun@utexas.edu

1. Choice and construction of variables

1.1 Subjective and Personal Norms

As discussed in the main text, multiple survey questions were used to construct index variables for some of the constructs. Subjective norms and personal norms used a single question, which is not uncommon in the case of a singular observable behavior, such as installing solar. For subjective norms, the question asked was, “If I install a solar system on my roof, people who are important to me would approve.” This captures both the behavior (installing solar) and the motivation to comply, by specifying people who are “important” (Gardner & Abraham 2010; Bamberg et al. 2003). Table SI-1 lists the two questions asked regarding personal norms; however, the high correlation (r = 0.93) between the two indicates that there is no new information provided by including both. Thus, as with subjective norms, we included only one question: “Regardless of what others think, I think installing a solar system is a good thing to do.”

1.2 Descriptive norms

Measuring descriptive norms presents a unique challenge when the observable behavior, e.g., a solar installation, has a very low penetration rate. Knowing that there are very few solar installations in the area of interest (1 of 522 respondents in our survey), the descriptive norm questions in our survey (see below) capture the perception of others’ attitudes toward solar and what others would like to do regarding solar. Asking about the perception of others desired behavior toward solar has elements of an injunctive norm (i.e., the perception of which behaviors are approved by others) but differs in that we are not asking about the approval of others. In other words, peers expressing interest in solar or the aspiration to install solar could influence solar adoption in a similar way to others actually installing solar.
1.3 Perceived behavioral control

Perceived behavioral control (PBC) for installing solar could potentially include a number of contributing factors, such as perceptions of affordability and suitability of physical factors (e.g., roof area, tree cover, irradiation). The high initial cost of solar has emerged in the literature as a dominant factor in solar adoption and decision-making (Faiers & Neame 2006; Rai & Sigrin 2013). The physical factors, on the other hand, are site specific and can vary considerably across sites. Thus, we focused on the affordability factor of PBC for the TPB models, due both to its being a more universal factor in solar decision-making and an accessible target for policy intervention. Focusing on affordability for PBC also allows for better models as demographic variables can be controlled, whereas unknown, site-specific variables are not readily measured in a survey and thus cannot be reliably controlled for in models. We also note that third party options (TPO) like no-money-down leases could significantly impact perceptions of affordability.

In our analysis incentive awareness was explored as a moderating factor on attitude and PBC (Hypothesis 7, main text), due to its prevalence as a policy tool for driving residential solar demand. Both attitude and PBC, however, were measured more generally using potential savings and perceived affordability, which would include any factors related to cost and benefit of which respondents were aware of. Thus to the extent TPO options impact perceptions of affordability and the respondents were aware of those options, we believe that those perceptions would be reflected in our measures of PBC.

2. Survey questions

|                    | Mean | SD  |
|--------------------|------|-----|
| **Attitude (α = 0.74)** |      |     |
| I think a solar energy installation would save me money. | 5.42 | 1.81 |
| I think a solar energy installation would increase the value of my home. | 5.34 | 1.79 |
| I think rooftop solar installations are ugly. | 4.27 | 2.08 |
| Solar energy is good for the environment. | 6.20 | 1.38 |
| **Subjective Norms** |      |     |
| If I install a solar system on my roof, people who are important to me would approve. | 5.28 | 1.70 |
| **Descriptive Norms (α = 0.83)** |      |     |
| Solar energy is a topic of interest in my neighborhood. | 2.81 | 1.68 |
| People who are important to me would like to install a solar system. | 3.93 | 1.93 |
| People who are important to me think solar energy is important. | 4.51 | 1.89 |
**Personal Norm** \((\alpha = 0.96)\)
Regardless of what others think, I think installing a solar system is a good thing to do.  
Regardless of what others think, I think installing a solar system is a smart thing to do.

**Perceived Behavioral Control**
A solar system is affordable for my household.

**Environmental Concern** \((\alpha = 0.92)\)
In general, I am concerned about environmental issues.
I am concerned about air pollution.

**Intention**
How likely is it that you will call a solar installer for a quote?  
Are you considering installing a solar system on your house? \((n=520)\)
- Already installed solar: 0% (1)
- Yes, I'm currently considering: 14% (71)
- No, I'm not considering: 54% (283)
- Previously considered, but decided not to install: 10% (52)
- Other: 22% (113)

**Behavior**
Have you ever called a solar installer for quote? \((n=480)\)
- Yes %(#)   No %(#)
  - 6% (27)   94% (453)

Chronbach’s alpha given for multiple question constructs.

### 3. Demographic summary statistics
The 522 completed responses were approximately geographically distributed to the proportions of the city populations, with 47% in Corpus Christi, 26% in Abilene, and 27% in San Angelo (Table SI-2). Male and female respondents were represented 49% and 51%, respectively. The age of the sample has a mean of 52.7 years (sd = 14 years). This is similar to the mean age of 52 (sd = 11.4 years) for solar adopters in Texas from a prior survey that focused on north and central regions of Texas (Rai & McAndrews 2012). Nearly 60% of respondents have a bachelor’s degree or higher. In prior research, 80% of solar adopters in Texas had a bachelor’s degree or higher (Rai & McAndrews 2012). The US Census reports 26.3% of Texans overall have a bachelor’s degree or higher, placing our respondent sample between the overall population and solar adopters on educational attainment.
This survey targeted single-family homes only. When asked if they owned their home, just over 85% (150) of those who chose to respond to this question (n = 173) owned their home.\(^1\) The mean home size is 1870 square feet (median = 1700 sq.ft.). For the solar adopters in Texas surveyed in Rai & McAndrews (2012) the mean home size is 2,740 square feet. The median home value of respondents is $133,000, whereas the median for Texas is $128,000, and the median for solar owners in Texas is $260,000. The median household income of respondents is between $50,000 to $75,000. For solar adopters in Texas, the median household income is between $85,000 - $115,000, whereas the median household income for Texas overall is $51,563. The respondents for this study differ from the solar adopters in Texas in having smaller homes, lower incomes, and a lower average educational attainment. On the other hand, and by design (see main text Section 3.3), the respondent sample is similar to the average Texas household on key socio-economic demographics, except education. On education they rank above average for the general population of Texas (26.3% with bachelor’s degree or higher). Education is typically associated with better information and higher awareness (Rogers 2003). Accordingly, to the extent that we identify information and awareness gaps in this study (see main text), we believe that those gaps would be even more significant for the underlying population from which our sample is drawn.

\(*1\) Home ownership has the potential to impact perceived behavioral control related to a solar installation, since those that do not own their home usually do not have the option to install. A t test showed no significant difference in PBC between homeowners and renters, p = 0.61.

### Table SI-2. Demographic and house-related variable summary statistics.

| Variable                  | n  | % Responses |
|---------------------------|----|-------------|
| Location                  | 522|             |
| Abilene                   |    | 26%         |
| Corpus Christi            |    | 47%         |
| San Angelo                |    | 27%         |
| Gender                    | 485|             |
| Male                      |    | 49%         |
| Female                    |    | 51%         |
| Age (mean, years)         | 480| 52.7        |
| Home size (median, SF)    | 486| 1700        |
| Home value (median, $)    | 439| $133,000    |
| Education                 | 494|             |
| Less than high school degree | | 1%        |
| High school degree or equivalent (e.g., GED) | | 7%        |
| Some college but no degree | | 25%       |
| Associate degree          | | 9%         |
| Bachelor degree           | | 32%        |
| Graduate degree           | | 19%        |
| Doctorate                 | | 7%         |
| Income                    | 472|             |
| Income Range                      | Percentage |
|----------------------------------|------------|
| Less than $25,000                | 9%         |
| $25,000 to $34,999               | 13%        |
| $35,000 to $49,999               | 16%        |
| $50,000 to $74,999               | 25%        |
| $75,000 to $99,999               | 15%        |
| $100,000 to $149,999             | 16%        |
| $150,000 to $199,999             | 5%         |
| $200,000 or more                 | 3%         |

4. References

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