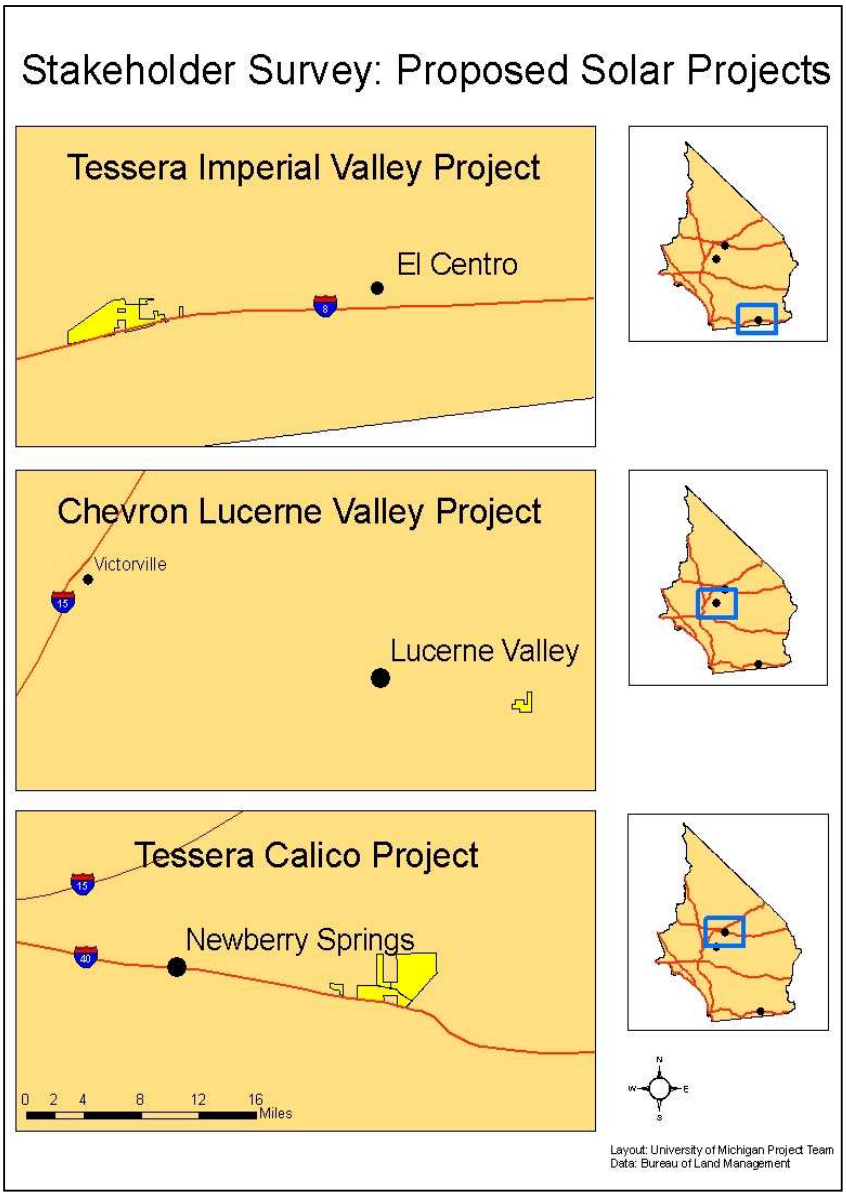
CHAPTER 9 | COMMUNITY ATTITUDES

Prior to this study, little research had been done to assess local communities' attitudes regarding utility-scale solar energy development. Yet, the interests, opinions, and concerns of desert residents are both important and highly relevant because these individuals and communities will be directly affected by the development of multiple, utility-scale solar facilities in the California desert. They will experience many of the positive and negative impacts of development, and their support or opposition could influence the approval or denial of these projects.[i] Because these communities have the potential to exert exceptional influence, it is important to consider the degree to which communities support or oppose solar development, reasons behind those opinions, the level of understanding of the technology and its impact, and the level of participation in the decision-making process. Answering these questions allows decision makers to both consider barriers and drivers to achieving objectives and to plan around them.



Map 9.1 Location of Proposed Solar Facilities and the Surveyed Communities.

The importance of public opinion and public involvement in natural resource management is well recognized. A reflection of the need to involve "stakeholders" in land management decisions can be seen in NEPA, which requires that federal agencies hold public scoping meetings and public comment periods

for major federal actions. Decisions made without adequate participation of affected groups often results in disputes, stymied decision-making, and costly administrative and judicial reviews.[ii]

Using a case study like Nevada Solar One to analyze past impacts in tandem with additional research to predict future impacts offers valuable insight into how utility-scale solar development might, from a socioeconomic perspective, positively or negatively affect nearby communities. These methods, however, do not take into account the thoughts and concerns of residents of communities prior to construction. Moreover, our research extends beyond socioeconomic impacts, and we believe that public opinion of such developments is based on much more than jobs and housing. As described in our methods section, we therefore set out to complement our socioeconomic research with a stakeholder survey of those communities modeled, Lucerne Valley and El Centro, as well as Newberry Springs (Map 9.1). Our survey was intended to provide insight into stakeholder opinions and actions, information that might be used by both government agencies and private developers to consider how to best engage, inform and potentially influence stakeholders.

STAKEHOLDER SURVEY

Altogether, 5,079 surveys were mailed to the three communities described in our methods section: 2,000 were sent to El Centro, 1,910 were sent to Lucerne Valley, and 1,169 were sent to Newberry Springs (of which 559 were identified as absentee owners). Of the 5,079 surveys sent, 577 hard copies and 47 online versions of the survey were returned, representing a 12.3 percent overall response rate. With an aggregate sample size of 624 respondents out of a total population of 43,600, our study has a confidence level of 95 percent and a margin of error of roughly 4 percent (Table 9.1).

Table 9.1 Stakeholder Survey Response Rate by Community. Newberry Springs includes residents &absentee respondents.

Community	Population	Surveys Sent	Returned	Response Rate	Percent Total
El Centro	44,259	2,000	150	7.5 percent	24.0 percent
Lucerne Valley	7,500	1,919	180	9.4 percent	28.8 percent
Newberry Springs	2,895	1,169	294	25.1 percent	47.1 percent
Totals	43,600	5,079	624	12.3 percent	100.0 percent

In terms of age, the majority of respondents were older than 40, with 44 percent reporting to be between the ages of 40 and 60 and 46 percent reporting to be older than 60 (Figure 9.1). These results are surprising, since the median age in El Centro is 30 and the median in Lucerne Valley and Newberry Springs is 40.[iii] This might indicate that older residents pay more attention to the issue, though it might also suggest that they are more likely to respond to surveys in general.

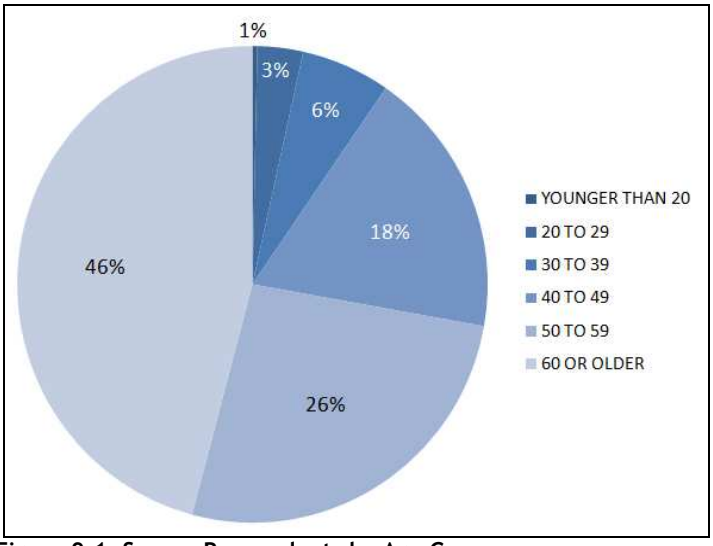


Figure 9.1: Survey Respondents by Age Group.

ATTITUDES TOWARD UTILITY-SCALE SOLAR DEVELOPMENT

In aggregate, respondents generally favored utility-scale solar development, with a mean rank of 5.4 on a scale of 7, with nearly half of all respondents across the three communities marking 7 or "very supportive" of solar development (Figure 9.2). The distribution was clearly skewed toward extreme support, bottoming out at mild opposition, and trending back upward toward extreme opposition.

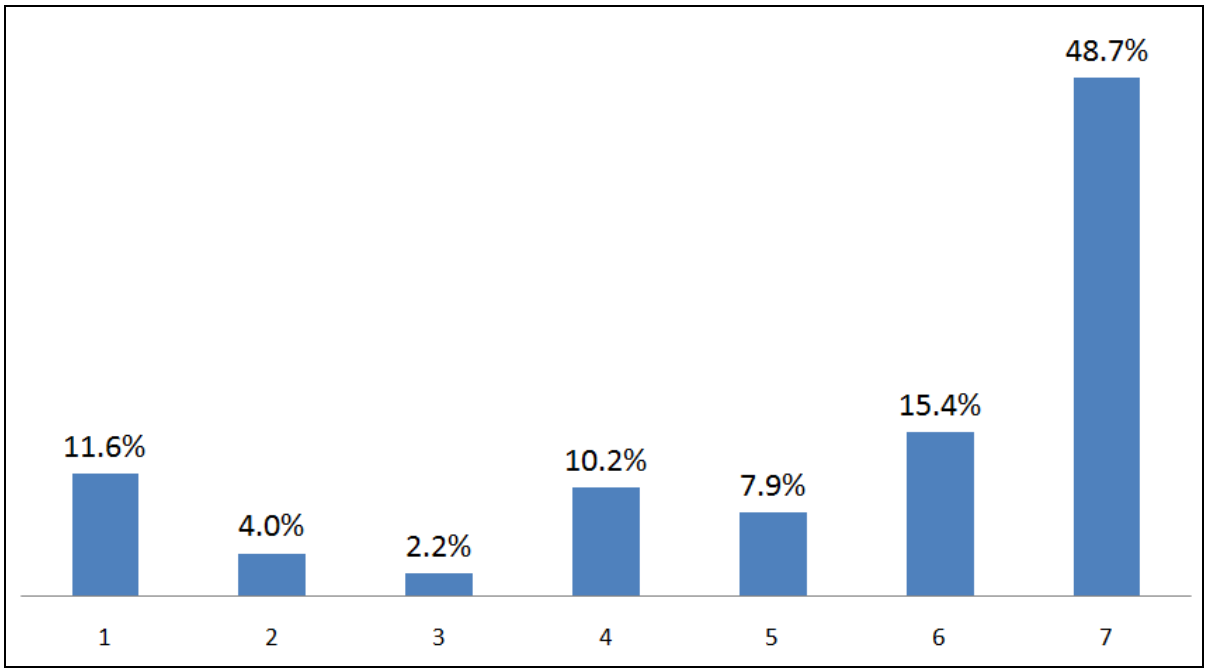


Figure 9.2Aggregate Distribution of Attitudes Toward Solar, with 7 being favorable. Percentages are percent of total respondents who circled that score. The number of respondents totaled 624.

Geographically, the three communities showed similar results, although Lucerne Valley residents reported slightly more opposition to and less support for solar, roughly 3.5 percentage points greater than the overall mean and nine percentage points less than the overall mean, respectively (Figure 9.3). Reasons for this do not appear to be related to differences in age, residence time, or education levels across the respondents. In fact, distribution in age, residence time, and education level was generally flatter for Lucerne Valley than for the other two communities, where age and residence time trended in different directions. Lucerne Valley was in the middle. Likewise, community economic indicators did not distinguish Lucerne Valley from the other two communities. For example, at 27 percent, El Centro has a much higher rate of unemployment than do the other two communities, at five percent, respectively.[iv] Participation in the process, however, did vary slightly: 19.4 percent of respondents from Lucerne Valley claim to have participated in BLM public comment opportunities, compared to 12.7 percent for El Centro and 17.8 percent for Newberry Springs. Absentee ownership appeared to play no role. As such, residents of Newberry Springs and El Centro appear to be more aligned in public opinion than residents of Lucerne Valley. A deeper dive into why Lucerne Valley appears to exhibit slightly less support for utility-scale solar, such as handling of the process, could be a useful follow up to our survey.

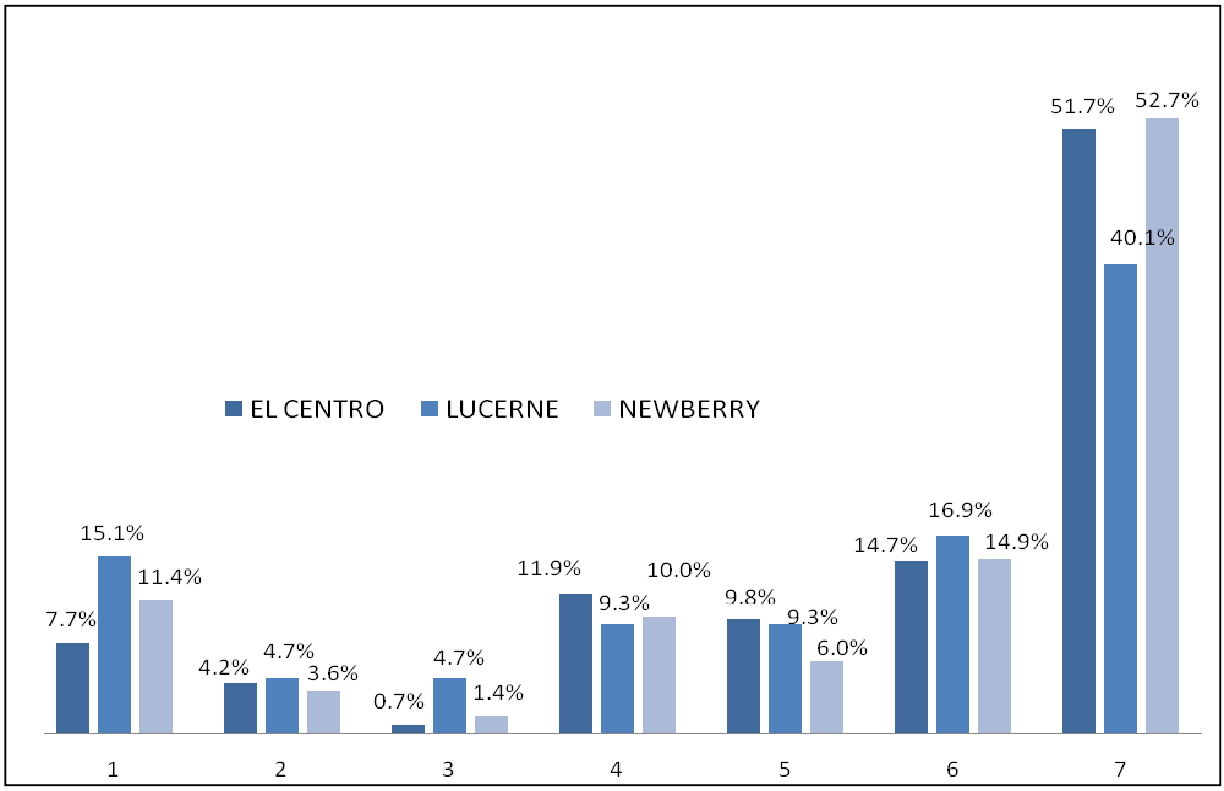


Figure 9.3 Distribution of Attitudes toward Solar by Community, with 7 being favorable. Percentages are in terms of share from each community.

It is not clear whether age is a significant differentiator in terms of overall opinion. Respondents less than 40 years old exhibited slightly less extreme opposition to solar, at 5.4 percent ranking support atone versus 12.3 percent for the other two age groups. That said, only 9.6 percent of respondents reported to be less than 40 years old — 58 in total — and may not accurately represent that demographic. Additionally, those who had lived in their respective community for a shorter period of time tended to report slightly more support for solar than those who had lived in the region for more than 10 or 20 years, 48 percent and 41 percent, respectively. However, the distribution is generally the same.

The one demographic category in which support appeared to be more divergent from group to group was education level. Interestingly, the more educated people were, the less they tended to support solar and the more they tended to oppose it, as measured by mean response. In addition, those with higher education claimed to be more familiar with various solar technologies than those with less education (Figure 9.4). This trend had a significance level of 0.05 and a p value of 0.048, as calculated using a chi square test in Table 9.2.

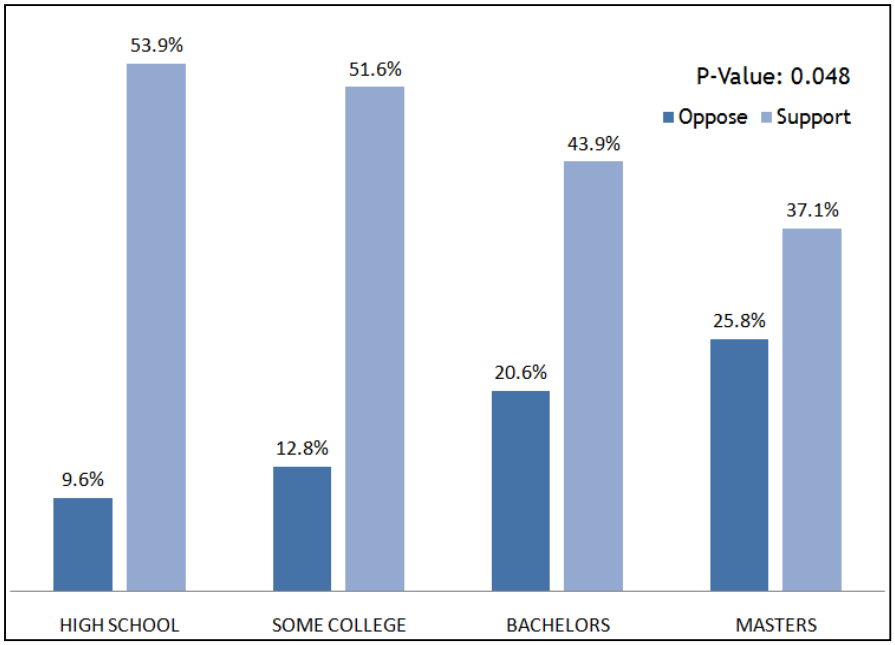


Figure 9.4 Percent of Education Group that Opposes and Supports Solar.

There might be several reasons for this trend. For instance, those who have higher levels of education might know more about the negative impact solar could have on plant and animal habitats than those who do not, and might therefore be more apt to oppose development. In fact, those with more higher education did, on average, have a greater concern for loss of habitat, and a qualitative analysis of open-ended questions suggest that those with more higher education are concerned about local plant and animal habitats, as well as viewsheds. But a pattern of greater or less concern from one education category to another was not discernable in the mean response, and tests did not return statistically significant results. Reasons behind this trend are therefore speculative.

Table 9.2 Chi Squared Test to Determine Statistical Significance Between Education and Opinion of Solar.

Chi Squared Test for Independence | Education Level and Attitude toward Solar					
Observed					
	High School	Some College	Bachelors	Masters	Total
Oppose Solar	10	27	16	16	69
Support Solar	64	133	47	36	280
Total	74	160	63	52	349
Expected					
Oppose Solar	14.63037249	31.63323782	12.45558739	10.28080229	69
Support Solar	59.36962751	128.3667622	50.54441261	41.71919771	280
Total	74	160	63	52	349
Chi Squared					
Oppose Solar	1.465468458	0.678618257	1.008612467	3.181582671	6.334281854
Support Solar	0.361133299	0.167230928	0.248550929	0.784032873	1.560948028
Total	1.826601757	0.845849185	1.257163397	3.965615544	7.895229882
p-value					0.04823

Negative and Positive Impacts

We asked respondents to rank, on a 5-point scale, the likelihood of various potential impacts of utility-scale solar development (Figure 9.5, Table 9.3). The outcomes that respondents thought were most likely to occur were positive in nature and consistent with their overall support for solar: more construction jobs (4.16 out of 5), more energy available to them (4.10 out of 5), and more post-construction jobs (4.04 out of 5). Respondents also placed the most value on these outcomes, rather than on other potential outcomes.

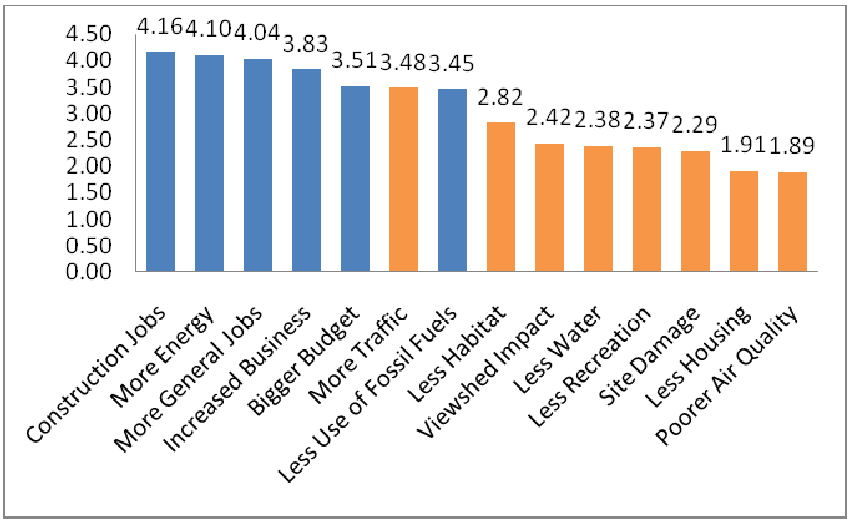


Figure 9.5Issues most and least likely, were of greatest and least concern, and were of most and least value. Negative outcomes are colored in orange.

Respondents in Lucerne Valley, where residents appear to be generally less supportive of solar development, tended to fall slightly below the mean on these three categories. In other words, they reported to be less convinced that these outcomes will happen. On the other hand, residents of Lucerne Valley also did not report to believe that negative impacts are more likely to happen than did residents in Newberry Springs or El Centro.

Table 9.3 Distribution of Overall Mean Response on a 5-ponit Scale of Likelihood of Outcomes of Solar Development.

What Issues Rise to the Top?		
Question Type	Highest Ranked	Second Highest Ranked
Most Likely to Occur	More Construction Jobs	More Energy for Community
Least Likely to Occur	Poorer Air Quality	Decrease In Housing
Least Certainty About	Negative Impact On Water	Increased Town Budget
Greatest Cause of Concern	Negative Impact On Water	Decreased Natural Habitat
Greatest Potential Value	More Energy For Towns	More Post-Construction Jobs
Most Valuable Additional Info	Water Use Estimates	Job Creation Estimates

Aggregated across all three communities, respondents tended to report that less housing (1.91) and poorer air quality (1.89) were least likely to happen. On the other hand, water rose to the top of concerns across all three communities, registering an average of 3.2 on a 5 scale. Interestingly, more than 14 percent of respondents reported to not know if water would be affected, the potential outcome with the greatest share of respondents who could not commit to an opinion about its likelihood of occurring. Therefore, while many are unsure about the impact of solar on water resources, they appear to be somewhat concerned about it. Concern over water, as well as a desire for jobs, fit the socioeconomic and geographic realities of these desert communities, where water is scarce and the unemployment is high — more than 27 percent in El Centro.[v]

GROUPED SAMPLE RESULTS

A series of two-sample t-tests allowed us to determine the issues for which the two groups' opinions were statistically different, the degree of those differences, and the directional orientation of each group with respect to the median (Table 9.4). In our analysis, statistical significance was determined by the two-tailed p-value. Degree of difference was measured by difference between the two mean values. Orientation was measured by where the mean response fell with respect to the median option, in other words, greater than or less than three on our 5-point scale. For instance, mean responses below three for the third question — "How likely do you think the following outcomes will be if a utility-scale solar facility is constructed near your town?" — denotes "not likely to happen." In this example, a zero would indicate "will not happen" and a three would indicate "equally to happen as not to happen."

Across every category, those who were classified as supporters of solar believe that the positive outcomes are more likely to happen than do those who oppose solar, and vice versa. The most divisive issue was water, where opponents believe utility-scale solar might lead to less water (3.15) and supporters believe it is far less likely (2.01). Water was followed by viewshed impact, where opponents believe that the scenery might be impacted (3.15) and supporters believe it is far less likely (2.04). Less housing was the only outcome option that did not show statistical significance in opinion between

Table 9.4Two-Sample t-Tests Between Respondents Who Favor and Respondents Who Oppose Solar.

Two Sample t-Test Results						
	Supporters		Opponents			
	Likelihood	Value	Likelihood	Value	Differential*	P-Value*
Construction Jobs	4.45	4.41	3.51	3.54	-0.87	2.42×10^{8}
General Jobs	4.33	4.41	3.30	3.61	-0.80	3.29×10^{7}
Less Fossil Fuel Use	3.59	3.89	2.87	3.32	-0.57	5.74×10^{4}
Bigger Budget	3.61	3.95	3.14	3.29	-0.65	3.06×10^{5}
Increased Business	4.07	4.34	3.31	3.47	-0.86	1.39×10^{8}
More Energy	4.34	4.59	3.44	3.67	-0.93	1.07×10^{9}
	Supporters		Opponents			
	Likelihood	Concern	Likelihood	Concern	Differential	P-Value
Less Housing	1.81	1.63	1.97	1.85	0.22	0.0956
Less Habitat	2.42	2.68	3.35	3.64	0.96	1.45×10^{8}
Poorer Air Quality	1.56	2.53	2.45	3.38	0.85	2.18×10^{6}
Less Recreation	1.95	2.16	3.05	3.25	1.09	1.08×10^{9}
Less Water	2.01	2.89	3.15	3.79	0.89	2.75×10^{7}
More Traffic	3.31	2.25	3.75	3.15	0.90	6.56×10^{8}
Site Damage	1.92	2.37	2.82	3.46	1.09	9.3×10^{10}
Viewshed Impact	2.05	2.12	3.14	3.31	1.18	1.1×10^{10}

Reported p-values and differentials in this table are a function of the value and concern columns. Differential is value or concern mean response from supporters support minus those of opponents.

the two groups. The questions that followed asked respondents to rate their degree of concern for and degree of value placed on potential outcomes: supporters were far less concerned about the potential negative outcomes and place more value on the potential positive impacts. In terms of greatest concern, the biggest differential was viewshed impact, where opponents consider it somewhat concerning (3.30) and supporters of solar were less concerned (2.12). However, the issue of greatest concern to opponents remained water (3.78). In terms of value, supporters and opponents disagreed most on the value of more energy to their communities. Neither group, however, reported to find little value in any of the potentially positive impacts — all mean responses were greater than three.

Given these results, it seems as if opponents of solar differ the most from supporters in their concern over water resources. Habitat and viewshed appear to be close behind. For their part, supporters seem to value the potential increase in the availability of energy, more jobs, and greater commercial activity. Given that all mean responses to issues of concern fall below 3, supporters appear to be generally optimistic whereas opponents tend to be more cynical of the positive outcomes.

Analysis of Open-Ended Questions

We asked two open-ended questions: “What do you think are the positive impacts of these facilities?” and “What do you think are the negative impacts of these facilities?” Out of 624 responses, 27 left these questions blank. The remaining respondents offered views ranging from a few words to entire paragraphs. To make use of this data, we went through these responses and gave each unique word or

phrase a code, and then counted the frequency of the appearance of the word or phrase as a way to validate close-ended responses and to capture sentiment missing in our questions (Table 9.5).

Table 9.5 Top 20 Words and Phrases Identified in Stakeholder Survey. Shaded words are negative in nature.

Word or Phrase	Count
Renewable or clean energy	286
More jobs	236
Reduced or no pollution	125
Cheaper electricity	122
Viewshed impact or loss of scenery	86
Supports solar tech development	74
Better land use	73
Reduced conventional fuel use	65
Damage to habitat or desert	64
More electricity	53
Increase property values	48
Harm to animals and plants	44
Income for community or business	43
Taxpayer burden or higher costs	42
Need more information	41
Low environmental impact	40
None or do not believe in any	39
Water shortage or threat to water	39
Energy independence	34
Paves way for other technologies	34

Consistent with respondents' overall positive outlook on utility-scale solar in their communities, the words that appeared most were "clean energy" (286), "jobs" (236), "reduced pollution" (125), and "cheaper electricity" (122). Yet, "viewshed impact" and "unsightly" ranked fifth (84), and "destruction of desert" and "damage to desert" ranked eighth (66). We also found that most of these phrases and words were also met with a contrarian viewpoint: some people said that these facilities would not produce much energy, unemployment might go up, or utility bills might increase. In addition, these views were often qualified. For example, several people wrote that these facilities would provide jobs, but that these jobs would not be given to locals. (A few expressed anger over immigration.) Another group believed that electricity would be cheaper, but not for their local community, and that the utilities would benefit.

Mistrust

These less positive views were part of a larger theme of mistrust, described in the following section. Mistrust was one of several themes that arose out of both the keyword count and the open-ended

observations, but was not specifically tested for in our close-ended questions. Interestingly, these negative views did not necessarily mean the respondent was against solar, as ranked support associated with these comments ranged from one to seven. One respondent from Lucerne Valley, who indicated a 1 in opposition to solar, wrote, "[I do] not see any [benefits to solar development], I see only a corporate scam." A respondent from Newberry Springs, who indicated mild opposition of 3, wrote, "Sounds like another corporate rip-off of public land. We have a solar plant just west of our town, in the town of Yermo. Take a look at that town and tell me if there has been any economic improvements." On the other hand, an extreme supporter from Newberry Springs wrote, "I have very low regard for the BLM and their handling of our desert and find anything they have to say a waste of time." Another extreme supporter expressed similar sentiment: "BLM has effectively stopped progress on the Newberry facility with its unrealistic regulations, such as not allowing water to be applied on the soil in order to move drilling and construction equipment on to the site."

The general sentiment of these respondents appeared to be that of either not trusting the process in general or believing their land was being used without their regard. A Lucerne Valley supporter wrote that the "BLM has kept this under the table." Another supporter wrote "[I] have not received any info as to the degree of benefits by allowing this solar plant to go forward, or even its exact proposed location." These comments shed light on the high rate of respondents who said they have not participated because they were unaware of opportunities to participate. The belief may be that the information about participation opportunities is intentionally hidden rather than just poorly communicated.

Environmentalists were also a target of mistrust. One supporter from Lucerne Valley wrote, "Environmentalists are insensitive to the needs of the people who live here, and private companies [are running] a financial scam to benefit only a few manipulators of the system." Another supporter from Newberry Springs wrote, "Environmentalists are mean spirited and think their good intentions make everything okay, [but] the locals are the ones who actually know the land and what will work or not." A resident of El Centro referenced global warming as "a big lie."

Taxpayer Burden

Another theme that emerged was taxpayer burden or overall cost to the community. In 42 surveys, "higher taxes" was observed. While this represents only 6.7 percent of our sample, the idea that individuals and households would carry a higher tax burden was not expected. We did test for increased community budgets through taxes paid by private companies, but not for citizens. An opponent of solar from Lucerne Valley contends that "solar energy plants quadruple energy costs when compared to coal fired or nuclear power generation." A respondent from El Centro agrees that jobs will be created, "but most hiring is done out of area." Inconsistency was found in other issues: energy bills

will either go down or up, unemployment will either decrease or increase, and property values will either rise or fall, depending on the individual and his or her view.

In contrast, some believed they could benefit from solar development. One supporter from Newberry Springs wrote, "I have started classes at Barstow College to hopefully get a job at the plant or to help put the plant in operation." Another supporter from El Centro wrote, "Maybe my five acres would be of use, I'm unemployed right now." One respondent from Newberry Springs wanted to profit: "Open the grid, make it public, let me plug in and profit."

Rift over Land Use

The most disagreement appeared to be with regard to land use. Quite a few respondents said that the land is unproductive, and that solar energy development would be one way to extract value. "There is an over-supply of empty land in Lucerne Valley," wrote one supporter. "Any development in this area would be a positive improvement." Another supporter from Newberry Springs wrote, "It is a perfect use for land that, except for the sunshine, has very little else going for it." Similar sentiment was expressed by a supporter from Newberry Springs, writing that "[this would be a good] use of land in areas [that are] otherwise not useful."

In contrast, a number of other respondents expressed great concern over the potential negative outcomes. "The desert is very fragile: once [the] surface is disturbed, it takes many years to recover, if at all," wrote one moderate supporter from Newberry Springs. "Any development must be sensitive to the desert habitat, particularly the desert tortoise." A supporter from Newberry Springs cited air quality, expressing concerns over the "possible dust bowl effect caused by removing plants and top soil." A Newberry Springs supporter wrote: "Using BLM lands for solar projects destroys the natural environment for endangered species in the high desert areas." In fact, that is related to another theme that emerged: outside parties taking and using land that belongs to the local communities.

These views on land use represented a small sampling of the conflicting comments on land use. In addition, some supported distributed generation, while others pitched their views on nuclear development in the region. From the standpoint of qualitative observation, land use was the issue which residents seemed to disagree over most.

STAKEHOLDER PERCEPTIONS AND STUDY FINDINGS

We then explored how community attitudes relate to the ecological and socioeconomic impacts predicted in other segments of our study. We found that, in some cases, public perception was aligned with what we determined to be a likely outcome, and in others, public perception was misguided and

should be addressed through modified messaging and message distribution, as well as additional community outreach tactics through those channels preferred by community stakeholders, as discussed later in this chapter. Table 9.6 summarizes these relationships.

Table 9.6. Public Perception of Potential Impacts from Solar Facilities and Their Likelihood of Happening.

Impact Category	Public Perception	Study Findings
Technological		
Energy Availability	Likely and Valuable	Likely but Value Uncertain
Water Quantity	Most Concerned	Cause for Concern
Ecological		
Water Quality	Most Concerned	Cause for Concern
Habitat Damage	Somewhat Likely	Probable
Air Quality	Not Likely	Possible
Spatial		
Viewshed	Less Concerned	Probable
Socioeconomic		
Construction Jobs	Likely and Valuable	Not Likely
Operation Jobs	Likely and Valuable	Not Likely
Town Budget	Likely and Valuable	Not Likely

Technological

We asked respondents how likely they thought "increased energy availability/reliability for California residents" would be if a utility-scale solar facility were constructed near their town. Based on the survey responses received, greater availability of energy was seen as both highly likely (4.10 on a 5-point scale) and valuable (4.31 on a 5-point scale). In fact, energy was seen as the most valuable of all the potential positive outcomes listed in the survey. This stakeholder perception is aligned with probable outcomes, since the development of these facilities will have some impact on the availability of energy in California. Even if only 13 out of the 54 projects currently being reviewed by the CEC and BLM were developed, they would provide an additional 13 million MWh of electricity annually, enough to power more than 1.1 million U.S. homes, given that the average U.S. home uses 11,040 kWh per year.[vi] Electricity from solar facilities will then be fed into the grid and sent wherever there is demand.

However, respondents interpreted the question as an increase in availability of electricity to their community, or a lower cost of electricity, which is unlikely. This potential misconception demonstrates the need for additional education at the public meetings regarding how and where the new electricity will be utilized.

Ecological

We also gauged the degree of concern over "decreased quantity or quality of water in streams, springs, and wells," an issue which respondents cited as their greatest concern (3.20 on a 5-point scale). It was

also the issue that the most respondents — 14 percent — expressed uncertainty about the likelihood of happening. Given the importance of water in this region as well as respondents' uncertainty about the impacts of these facilities, it is not surprising that respondents also indicated that they would find more information about water usage of these facilities useful (4.36).

Our analysis has indicated that the communities' concerns as well as their uncertainty about water are reasonable. Utility-scale solar energy facilities, similar to other industrial operations, have substantial water needs. In an effort to combat the potentially irreversible draw down of desert aquifers, the CEC has issued guidance to developers that dry cooled systems should be utilized and that wet cooled systems are extremely unlikely to be allowed by the agency. It would be useful to communicate this measure to desert residents. However, all technology types will require some water for panel or mirror washing, though water sources vary on a project-by-project basis. A compounding factor to this issue is the complexity of aquifers and hydrologic systems in our study area, making predictions about the impacts to regional water levels difficult. Additionally, site engineering and surface water diversions could alter water infiltration and flow to natural streams and springs, while water quality could be compromised if chemicals used for vegetation control end up as runoff into the surrounding ecosystem. Again, given the results of our survey, we believe it would be in the BLM's best interest to develop information campaigns around water use estimates and conservation measures.

At 3.04 out of 5, "Decreased Wildlife and Plant Habitat" was ranked second on the list of concerns for our respondents. However, they scored the likelihood of this happening lower, at 2.82. With a variance of 2.21, it was also an issue that residents disagreed about, more so relative to other issues. These scores suggest that, while desert residents are unsure about whether habitat loss or disturbance will occur as a result of solar development, local communities should examine these potential consequences in more detail. As our ecological impact analyses suggest, the public may currently be underestimating the potential for habitat loss following facility construction. Perimeter fencing will effectively eliminate habitat for species unable to penetrate the barrier, while grading and vegetation removal may destroy habitat within the site for birds or smaller species that still may be able to access the area despite fencing. Given the level of concern regarding these impacts, our survey analysis suggests education about the likelihood of potential impacts to wildlife and plant habitat may be of value to local residents.

The survey results also indicate that respondents believe decreased air quality is a relatively unlikely impact of solar development (1.89 on a 5-point scale). This public perception, however, may represent an underestimation of this potential, or a lack of understanding about how air quality may be affected by facility construction in our study area. The site engineering associated with development, especially grading and vegetation removal, has a high potential for dust emission. These processes will disturb soil

structure and stability, releasing dust into the atmosphere. Large dust emissions could also occur if dust-sequestering biological soil crusts are on the facility site and are crushed during construction. Additionally, activities that result in drier soil surfaces may lead to increased dust; this may include vegetation removal, soil compaction that reduces water infiltration, and groundwater pumping that diminishes streams, springs and seeps. Given the high potential for dust emission as a result of solar development, air quality may be reduced for residents living in close proximity to, or downwind of a facility — especially during the construction phase. As discussed earlier, dust can travel great distances, so impacts to air quality should be considered for residents in a broad geographic area.

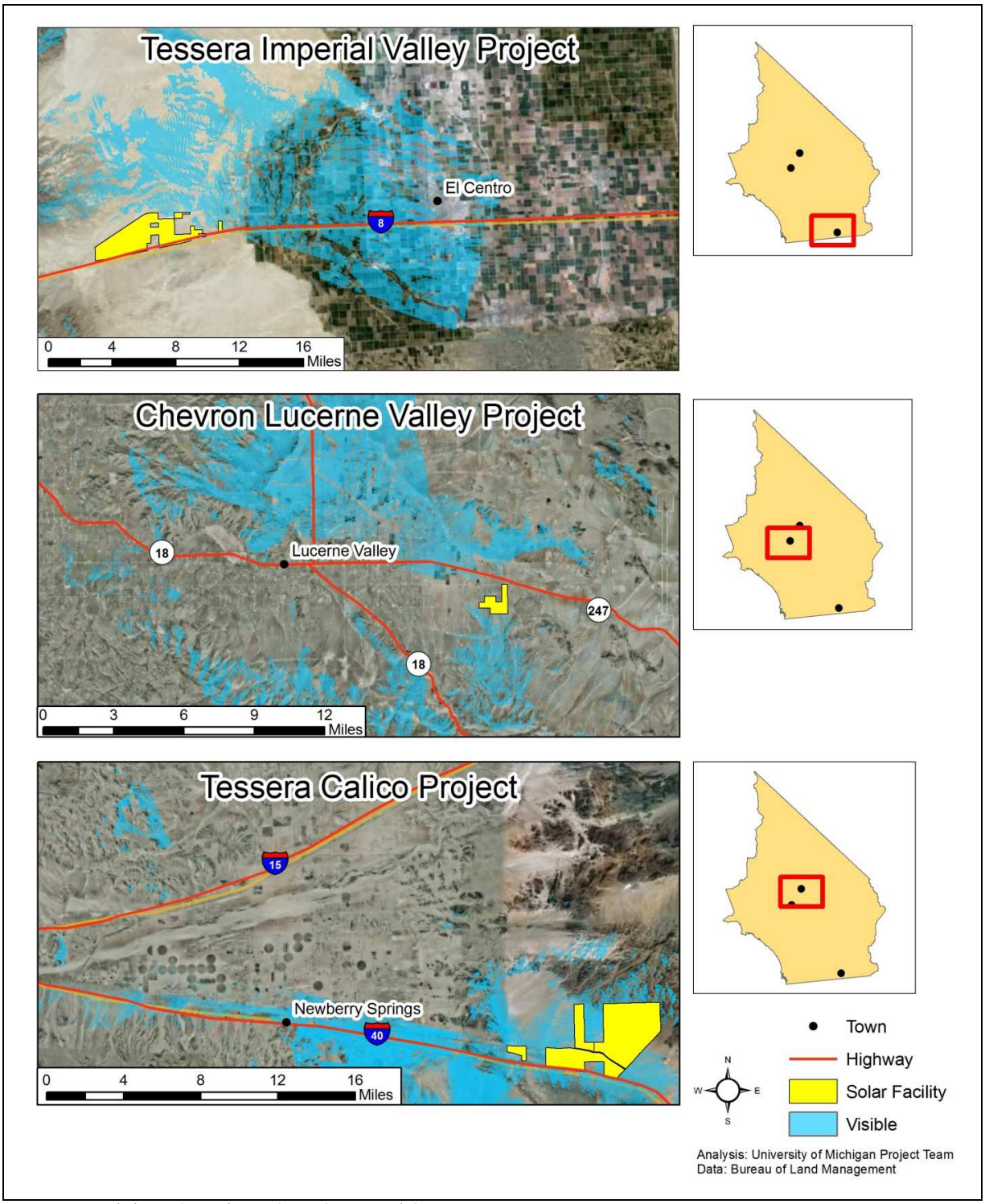
Spatial

The impact to the viewshed was the fifth most cited negative consequence of solar development in our open-ended response keyword analysis. However, respondents rated "decreased quality of vistas from your town" as the outcome they were least concerned about with an average rating of 2.5 out of 5. This discrepancy might be best explained by the nature of the open-ended responses; half of those who cited viewshed impact suggested that it would have an impact on the view but that it was not something that might bother them. A related sentiment observed in the open-response questions was that of the desert being "barren" or "otherwise useless." That said, the variance of the closed-ended response was 2.27, indicating that there is quite a bit of disagreement between respondents, where responses were grouped at extremes. While concern over an altered viewshed varies, a closer look at the likely visual impacts indicates that residents are likely to be affected by the proposed facilities, both in many parts of the communities and along primary highways leading in and out of town. This being the case, it might be useful for the BLM to mock up what the visual impact will be from ground level to allow residents to either temper their concern or reevaluate their indifference. We have created an example of such a map (Map 9.2).

Socioeconomic

Respondents ranked increased employment opportunities during facility construction and operation as both highly likely and quite valuable. Unfortunately, this optimistic outlook may prove unfounded. Although facility construction will create hundreds of temporary jobs, the labor pool in the California desert includes thousands of individuals; residents will face stiff competition for these positions. Once in operation, each facility will require relatively few full-time employees: of 14 proposed facilities reviewed in this study, 10 expected to create fewer than 100 permanent positions each, whereas the other four could create more. While a handful of respondents indicated skepticism about job creation for their communities, many more expressed hope.

Respondents also believe that it is likely that solar development in the California desert will have a positive impact on local municipal budgets. However, facilities sited on federal land will have few direct local fiscal impacts; all lease payments will go to the U.S. Treasury. Given that federal land is



Map 9.2. Visibility of Facilities from Surveyed Communities.

property tax exempt, facilities on public land will probably not result in increased local property tax revenue, unless payments in lieu of taxes are made. Facilities sited on both public and private land may have local fiscal benefits; for example, these private landowners will benefit directly from lease payments. Furthermore, infrastructure on private land that is unrelated to energy production, such as office buildings, may be assessed property tax, thereby benefiting the local unit of government. Some of these misunderstandings are related to a lack of understanding of the technology and what it does, an issue also explored in our survey.

INFORMATION GAPS AND SOURCES

Overall, respondents claimed to be moderately familiar with solar technologies (2.94). On average, respondents claimed to be most familiar with parabolic trough technologies, although the data suggest that respondents are more familiar with solar energy in general than they are with specific technologies. Generally, people in El Centro reported to have less familiarity than those in Newberry Springs, and older respondents claimed to know more than younger ones. In addition, those with only a high school education reported to be less familiar with solar technologies than those with a master's degree. Finally, those who oppose solar appeared to claim slightly more familiarity with solar than those who support solar (Table 9.7). However, when regressed against opinion, knowledge of solar is not statistically significant to opinion, with R-Square at 1.24×10^{6} and a proxy correlation of -0.001. Table 5.9 offers a rough profile of those who reported to be most familiar with solar and those who reported to be least supportive of utility-scale solar development in their region.

Table 9.7 Profile of Respondents Who Claim to be Most Familiar and Least Familiar with Solar Technologies in General.

Familiarity With Solar		
Category	Most Familiarity	Least Familiarity
Community	Newberry Springs	El Centro
Age	60 or Older	40 or Younger
Residence Time	Less than 10 Years	10 to 20 Years
Education Level	Masters	High School
Support for Solar	Oppose	Support

In addition, opponents of solar reported to be more familiar with solar technologies (2.40) than did supporters (1.94), with a p-value of 5.3×10^{3}. But neither group claimed to be very familiar. In terms of information sources, we did notice a statistically significant difference in mean values associated with the value of local government as a source of information. Supporters reported 2.35, and opponents 2, meaning neither group holds local government in particularly high regard. Finally, opponents (30.4 percent) claim to participate more than supporters (16.2 percent), and opponents were again slightly more cynical than supporters, with 29.7 percent reporting that their opinion does not matter versus 17.5 percent, respectively.

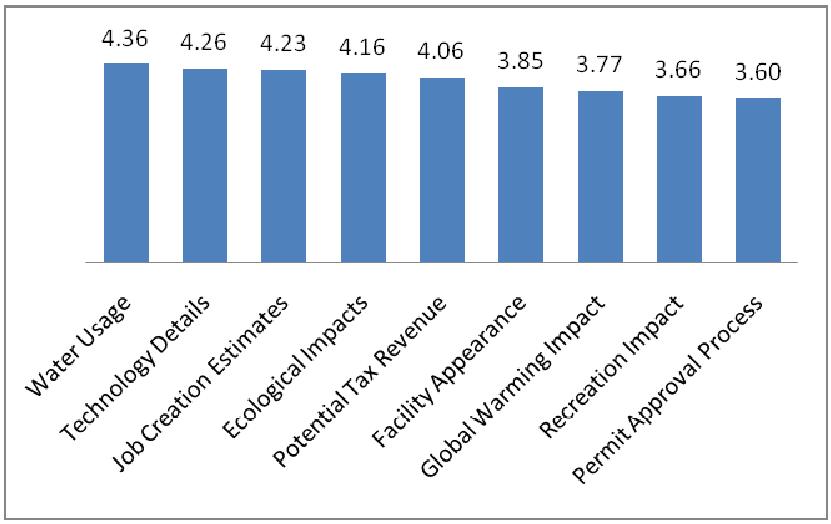


Figure 9.6Mean Response of the Value of Additional Information by Topic.

In addition to assessing what respondents claimed to know about solar, we measured what respondents said they might like to know about utility-scale solar facilities. While we did not frame the question by suggesting this information might help in decision making, we did hope to connect responses about useful information with concerns for and value placed on outcomes. (The question itself was, "In the future, how helpful would you find the following information about utility-scale solar facilities?") We also sought to know what people who support and oppose solar want to know. Respondents were asked to rank preferences on a scale of five, and as such, we looked at mean answers above three as being helpful and mean answers below three as trending toward less helpful. Assuming that logic, respondents on the aggregate indicated that all nine information options would be helpful to them, to varying degrees. In fact, none of the nine received a mean score of less than three when filtered through each of the four demographic categories designed into the survey (Figure 9.6). Given that the greatest proportion of respondents said they were uncertain if utility scale solar would have an impact on water resources, and that impact over water resources was reported to be the greatest concern, it might not be surprising that more information on water usage rose to the top as the most helpful. Details on the technology itself, job creation estimates, and ecological impacts fell behind water, in that order. In our observation, nothing else with regard to helpfulness of additional information stood out in the data as being significant.

Information Sources

From a list of 12 possible sources for solar information, 85 percent of respondents chose television and radio as their most helpful information source. Eighty-two percent use newspapers, 79 percent listen to family and friends, and 78 percent rely on the internet. Far fewer respondents reported to glean information from trade journals (60 percent), recreation clubs (63 percent), or teachers (63 percent). Drawing from Figure 9.7, while mass media is consumed at a higher rate than books and the internet, mass media is seen as less valuable. In addition, advertisements and the government are viewed as the least useful, which is consistent with a number of the open-ended responses we received that indicated a lack of trust in big business, government, and the BLM generally.

Respondents from Lucerne Valley tended to find these government sources less valuable than the mean, rating both local government and the Chamber of Commerce below a ranking of two on the five-point scale. This observation appears to be consistent with the overall opinion of respondents from Lucerne Valley, which is less than the mean.

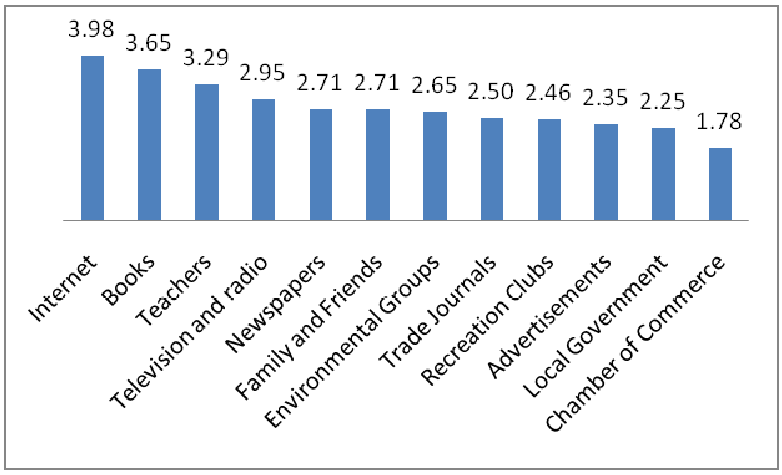


Figure 9.7 Mean Response of Value for Information Sources on a 5-point Scale.

SUMMARY

Overall, we found that residents in communities that will be affected by utility-scale solar are generally supportive. The following points summarize our additional findings:

- As evidenced in the open-ended responses, claims of support for solar did not necessarily equate to a lack of concern over potential outcomes.
- Of the list of possible positive outcomes, job creation and energy were reported to be the most valued. These potential benefits were also cited as the most likely to occur.
- Impact on water and habitat topped the list of those possible negative outcomes over which respondents were most concerned. However, opinion was mixed about their likelihood.
- Respondents also reported to know the least about how water would be impacted but to want more information about it relative to information on other possible outcomes. Open-ended responses also suggested a general concern over water.
- Respondents across the board seem to want more information about issues relevant to solar. While they reported to consume mass media more than other information sources, they tend to value information online and from teachers more.
- They also reported to value information from local governments and advertisers the least. This is consistent with many of the open-ended responses indicating a general mistrust of government organizations and private companies.
- Part of this mistrust appears to come from observation of what has happened in other communities, while some of it appears to come from a belief that they are left in the dark. In fact, the top two reasons people tended not to participate in the BLM process were lack of awareness and lack of belief that their opinions mattered.

- This lack of trust resulted in some believing that taxes will go up, property values will do down, and profits will not come to them. These views were, however, minority views.
- In fact, many are optimistic about job creation and additional energy. The economic impact was one issue over which respondents were split.
- Impact on the environment and land use seemed to be the most divisive issues. Some believe that the land is currently not of much use and should be used productively, while others believe that these facilities will do more harm than good. Yet, these issues do not necessarily correspond directly to support for or opposition to solar.
- Opponents of solar appear to differ the most from supporters in their concern over water resources. Habitat and viewshed appear to be close behind. For their part, supporters seem to value the potential increase in the availability of energy, more jobs, and greater commercial activity. Given that all mean responses to issues of concern fall below three, supporters appear to be generally optimistic whereas opponents tend to be more cynical of the positive outcomes.

We believe these results offer valuable insight into what matters to these residents, what they disagree over, what they know and do not know, and how best the BLM and other stakeholders can engage them.

Chapter 9

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