MEMO

Date: April 11, 2014
To: Energy Trust Board of Directors
Phil Degens, Evaluation Manager
From: Lizzie Rubado, Sr. Solar Project Manager
Susan Jowaiszas, Sr. Marketing Manager, Commercial + Industry|Ag
Subject: Staff Response to the 2014 Commercial Solar Market Research Report

In 2013, Energy Trust set out to learn more about why customers adopt or don't adopt solar to develop effective marketing strategies for Energy Trust's commercial solar program in response to a decline in applications for commercial solar electric incentives since 2011.

The decline in solar PV projects is due to a variety of factors. In the past, commercial solar pretty much sold itself, as tax credits and Energy Trust incentives covered as much as 85 percent of system cost prior to the end of the Business Energy Tax Credit (BETC) in 2011. The economic downturn, coinciding with the end of BETC, also played a part in the decreasing number of projects. The presence of the experimental feed-in-tariff program and the intermittent availability of third-party ownership options complicate the financial landscape for customers. On the other hand, solar equipment prices are lower than they have ever been and Oregon has a robust and mature solar energy market place with skilled trade allies located throughout the state. Elsewhere in the country, commercial solar installations are booming.

To better understand why customers adopt or don't adopt solar, this study assessed Energy Trust's solar program database, reviewed secondary literature about the market, and summarized findings from in-depth interviews with 15 commercial solar electric adopters and 15 potential adopters (past participants in Energy Trust efficiency programs). We were also interested in which marketing messages resonated with customers, and specifically wanted to test whether customers were interested in messaging around "net zero" energy projects.

We learned that business customers have low awareness of Energy Trust incentives for solar. Also, customers who install solar with Energy Trust incentives don't necessarily correlate this with investing also in efficiency. Customers look for financial justification for installing solar, and simple payback is the most commonly mentioned criteria. When presented with the idea of combining solar and efficiency projects to move toward "net zero," customers were interested if the financials on solar penciled out. The study also

confirmed that building owners, rather than business owners, are the target audience for commercial solar marketing efforts.

Next Steps:

Program staff is integrating research findings into a comprehensive solar marketing plan. As part of the plan, marketing will be expanded to be more consistent throughout the year, will include stronger ties to efficiency programs, more accessible information on energytrust.org and utilize messaging strategies that hit on key decision-making criteria for owners.

research into action inc

Final Report

Research to Support a Commercial and Industrial Solar Marketing Strategy

March 7, 2014

Final Report

Research to Support a Commercial and Industrial Solar Marketing Strategy

March 7, 2014

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EXECUTIVE SUMMARY

This report documents findings from a qualitative market research study to support Energy Trust of Oregon's (Energy Trust) marketing strategy for commercial and industrial (C&I) solar photovoltaic (PV) installations.

This study involved three data collection activities: assessment of Energy Trust's solar program database; review of secondary literature; and in-depth interviews with 15 solar adopters and 15 potential adopters. Solar adopters were program participants in Energy Trust's C&I solar program and potential adopters were participants in Energy Trust's C&I energy efficiency programs who had not installed a PV system. Energy Trust staff performed the solar program database review; Research Into Action conducted all other activities. Below we present a summary of key findings, conclusions, and recommendations.

KEY FINDINGS

KEY FINDING #1: **The number of PV installations incented by Energy Trust in 2013 was notably lower than the number incented in 2012.** The frequency of Energy Trusts' incented PV installations declined from 131 in 2012 to 47 in 2013. Similarly, throughout the U.S. the growth of C&I PV installations declined in 2013 compared to 2012.

KEY FINDING #2: **Only a minority (12%) of the PV systems incented by Energy Trust were third-party-owned; however, they represented 36% of the total generation capacity**. In the U.S., third-party owned PV installations were common among large retail chains and manufacturing firms like Walmart or Apple.

KEY FINDING #3: **Solar adopters often participated in other Energy Trust programs.** Owners of nearly half (46%) of the incented solar installation sites received other (non-solar) Energy Trust incentives. Owners of nearly half (46%) of those sites with both solar and non-solar measures installed the solar measure before the non-solar measure.

KEY FINDING #4: **A majority of potential adopters were not aware of solar electric incentives from Energy Trust.** Two-thirds of the potential adopters (10 of 15) reported being unaware of the Energy Trust cash incentive for solar electric systems. Of those unaware of the incentives, four knew some incentives or tax credits were available, but had no detailed knowledge of what these incentives or tax credits were for.

KEY FINDING #5: **Respondents were motivated to install a PV system by tax credits or by saving money on energy costs.** One-third (5 of 15) of solar adopters mentioned tax credits and another one-third (5 of 15) mentioned saving money on electricity as the most important reasons for installing a PV system. Most potential adopters (9 of 15) cited "saving money on electricity costs in the long-run" as the primary reason for their interest in solar. Nearly all (28 of 30) respondents insisted that PV installation decisions "must pencil out" or "must be economical."

KEY FINDING #6: **Solar adopters differed from potential adopters in one important way: they came to different conclusions about the length of time required to recover the cost of the solar investment.** A majority of solar adopters (11 of 15) estimated their PV system would pay for itself in five to 10 years. In contrast, potential adopters who estimated the payback time for a solar investment reported that a solar installation would not pay for itself under ten years.

KEY FINDING #7: **In addition to perceiving a long payback, potential adopters reported additional barriers to solar adoption**: operating a business in leased space, having inadequate building structure for a solar installation (e.g., small roof), and believing that solar energy will not be economical for businesses who use little electricity.

KEY FINDING #8: **The financial messages about solar that received the highest ratings contained a statistic or number.** Among all messages, only these two included a statistic on tax credits and incentives for solar: 1) "There's never been a better time to go solar: 80% of the cost paid through tax credits and incentives." and 2) "If you are not going solar, you are leaving $ [dollars] on the roof. Up to 80% of system costs could be paid by tax credits and incentives." Solar adopters who explained their ratings most commonly said that they respond to financial messages that speak of "rapid return on investment," "payback being guaranteed," or "reducing operating expenses." Potential adopters who explained their ratings gave varied responses.

KEY FINDING #9: **Solar adopters tended to be more aware of the net zero energy concept than potential adopters.** Nearly half (7 of 15) of solar adopters were familiar with the term net zero, while just over one-third (5 of 13)[1] of potential adopters said they were familiar with the term. Additionally, interviewers read the description of the net zero concept to those who were unfamiliar with it to determine if, when prompted, the respondent would recall knowing about it. After

[1] Two potential adopters did not answer this question.

hearing the description of net zero, six of 16 respondents said they could now understand what the term meant; others were already familiar with it.

KEY FINDING #10:

Both solar adopters and potential adopters would investigate a net zero project if Energy Trust offered an incentive package for those projects. Nearly all (26 of 30) respondents would consider investigating an Energy Trust incentive package for combined energy efficiency and solar installations that would reduce the electricity consumption of at least one aspect of the building(s) to net zero. Fifteen of those who would consider investigating this package of incentives also said that moving forward with a net zero project would depend on whether that investment was financially sound—that is, whether the investment had a reasonable payback/return on investment/cost-benefit ratio or the presumed lower cost of energy/operations.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSION #1:

Cost savings drive interest in solar adoption. Most (10 of 15) solar adopters were motivated to install a PV system because of tax credits and the opportunity to save money on energy costs. Most (9 of 15) potential adopters cited saving money on energy costs as the most important reason for their interest in PVs. Additionally, both groups responded positively to the messages about the financial benefits of solar energy.

CONCLUSION #2:

The length of the payback estimate is the most critical financial criterion for businesses that are considering installing a PV system. Nearly all (28 of 30) respondents insisted that PV installation decisions "must pencil out" or "must be economical." Some adopters said that a payback of more than five or ten years was simply "too risky," and seemed to consider that conventional wisdom. Furthermore, adopters typically said they estimated a payback of fewer than 10 years for their PV system, while potential adopters believed payback for a PV system would be greater than 10 years. The majority (10 of 15) of potential adopters were unaware of the tax credits and Energy Trust incentives for PV installations, which could explain why they estimated a longer payback than did the solar adopters.

In addition, both groups rated these two financial messages as the most persuasive: "There's never been a better time to go solar: 80% of the cost paid through tax credits and incentives." and "If you are not going solar, you are leaving $ on the roof. Up to 80% of system costs could be paid by tax credits and incentives." Potential adopters considered messages that contained detailed financial information to be much more persuasive than those with less detailed or vague financial information, such as "Investing in a solar system is pursuing a healthy return on investment." Most (11 of 15) solar adopters, compared to minority (4 of 15) of potential adopters, rated the message "Investing in a solar system is pursuing a healthy return on investment." as very persuasive.

- **Recommendation:** Use marketing messages with detailed information about how much of the cost of a typical PV installation is covered by tax credits and incentives. Energy Trust might begin by adding the two messages containing detailed information on tax credits and incentives referenced above to existing solar marketing materials.
- **Recommendation:** Because there are no data regarding why the messages about tax credits and incentives are failing to reach potential PV adopters, Energy Trust should consider investigating how to increase awareness of tax credits and incentives among C&I customers in Oregon. One strategy in increasing awareness would be to elevate the level of marketing supporting C&I solar program (e.g., increase the frequency of ads or advertise through multiple channels), and measure the effect of this approach to the extent possible.

CONCLUSION #3: **Based on the available data, only building owners decide whether to install a PV system.** The three potential adopters who leased the building(s) in which their businesses were located expressed interest in solar energy, but said that, as lessees, they could not choose to install a PV system at their site. One landlord of a commercial space (a potential adopter) explained their firm was reluctant to invest in a PV system because the building's tenants pay their own electric bills, and thus the landlords would not receive direct financial gain from a PV installation.

- **Recommendation:** Because this study showed interest in solar among commercial tenants, investigate new paths to solar adoption by working with both landlords and tenants who are interested in PV systems. For example, would tenants be willing to pay a slightly higher electricity rate to offset some of the cost associated with a solar installation? Would property owners consider a solar installation if Energy Trust demonstrated that solar energy could attract tenants who would be willing to pay higher rents?

CONCLUSION #4: **Decision makers would consider a net zero energy proposition, but this proposition would be secondary to financial considerations.** Fifteen of 26 respondents who would consider investigating an Energy Trust's incentive package for a project with net zero energy goals said that moving forward with a net zero energy project would depend on whether the investment is financially sound—that is, whether the investment has a reasonable payback/return on investment/cost-benefit ratio or the presumed lower cost of energy/operations.

In addition, about one-half of respondents (8 solar adopters and 8 potential adopters) agreed that they might have an easier time making the business case for a project with net zero energy goals if the project could demonstrate that some portion of the company's energy use were net zero.

- **Recommendation:** Use net zero energy messaging to support the primary financial message. For example, if using case studies to market Energy Trust incentives, highlight how net zero energy project(s) and incentives would result in financial benefits to the decision-maker and provide information on why net zero energy is a viable proposition.

RESEARCH OBJECTIVES AND METHODS

RESEARCH PURPOSE

Energy Trust of Oregon (Energy Trust) offers cash incentives that can be combined with competitive state and federal grants, federal tax credits, and accelerated depreciation to make photovoltaic, or PV, systems more affordable to Oregonians.

Energy Trust commissioned this study to gain a deeper understanding of what potential and past C&I solar customers know and think about PV. Insights from this study will aid Energy Trust in the development of both short- and long-term marketing strategies for promoting C&I PV installations.

This study addresses five research objectives:

- Assess awareness and knowledge of solar electric costs, financial options, and incentives among potential C&I solar PV adopters;
- Identify characteristics of past C&I solar PV adopters;
- Investigate decision-making criteria and decision-maker behaviors relating to solar energy;
- Explore whether C&I decision-making differs between solar and energy efficiency projects; and,
- Solicit feedback on potential marketing messages for Energy Trust's C&I PV program.

METHODS

This study involved three data collection activities: assessment of Energy Trust's solar program database; review of secondary literature; and in-depth interviews with solar adopters (past participants in Energy Trust's C&I programs who installed a PV system) and potential solar adopters (past participants who installed energy efficiency measures, but *not* PV). Energy Trust staff performed the solar program database review; Research Into Action conducted all other activities.

Table 1 shows how the data collection activities map to the study's research objectives.

Table 1: Work Plan Activities and Research Objectives

Research Objectives	Data Collection Activities		
	Solar Program Database Analysis	Literature Review	In-Depth Interviews
1. Explore characteristics of PV adopters and potential PV adopters	✓	✓	
2. Assess awareness/knowledge of PV costs, financial options, and incentives among potential PV adopters			✓
3. Determine where current PV adoption sits on the "innovation diffusion curve"		✓	
4. Assess interest in PV and the criteria potential solar adopters would use when deciding whether to adopt PV			✓
5. Investigate decision-making criteria and decision makers' behaviors (i.e., why PV adopters chose to invest in solar)		✓	✓
6. Examine whether decisions about PV occur in isolation from energy efficiency upgrades, and if so, why	✓		✓
7. Test which solar messages resonate with potential PV adopters			✓

We now summarize the two tasks Research Into Action performed.

Literature Review

Research Into Action reviewed secondary literature on solar adoption to characterize the PV market and identify barriers to adoption among C&I customers. The solar industry is covered throughout the business and popular press (including publications such as *The New York Times* and *Wall Street Journal*), as well as in energy industry and renewables specialty publications from organizations such as Greentech Media, Solar Energy Industries Association, and Interstate Renewable Energy Council. In addition, many relevant studies address issues related to the adoption of PV, including those conducted by Lawrence Berkeley National Laboratory and the National Renewable Energy Laboratory. Appendix A contains a list of key sources examined in this study.

In-depth Interviews with Solar PV Adopters and Potential Adopters

Research Into Action conducted 30 in-depth interviews: 15 each with solar adopters (program participants in Energy Trust's C&I programs *who have already* installed a PV system, but not necessarily participated in energy efficiency programs) and potential adopters (participants of Energy Trust's C&I energy efficiency programs *who have not* installed a PV system).

Energy Trust staff provided the solar adopter and potential adopter lists, which were developed from the solar and energy efficiency program databases. A purposive sample (a non-representative sample of the larger population) was developed from these lists. The sample:

- Excluded publicly-owned buildings because many were mandated to install solar;
- Oversampled Portland General Electric (PGE) customers, because Pacific Power offered competitive grants for PV projects, reducing the influence of Energy Trust's PV marketing efforts on Pacific Power's C&I customers;
- Excluded or de-prioritized participants who had been surveyed recently through other channels such as Fast Feedback;
- Excluded large, national "big-box" chains (when identifiable) because any decisions regarding installation of solar are typically driven by non-local decision-makers;
- Excluded solar adopters who received the State of Oregon's now-lapsed Business Energy Tax Credit (BETC) because Energy Trust wanted to focus on decision-making in the post-BETC era; and,
- Included both commercial and industrial contacts, although the call list contained very few industrial contacts.

Both the solar adopter and potential adopter groups received an email alerting them to the upcoming research interview. Some of the potential adopters received an e-mail promoting Energy Trust's solar electric incentives prior to the interview as part of a marketing campaign test.

Table 2 displays the research topics explored during the in-depth interviews.

Table 2: Topics Examined in In-Depth Interviews

RESEARCH OBJECTIVES	TOPICS EXPLORED IN IN-DEPTH INTERVIEWS	LARGER GOALS (ENERGY TRUST WILL USE FINDINGS TO…)
Assess awareness/ knowledge of PV costs, financial options, and incentives among potential PV adopters	Ask potential PV adopters about awareness/ knowledge of: 1) PV costs; 2) Energy Trust incentives; 3) Financial options for PV installations; and, 4) Tax credits or benefits	**Devise a marketing strategy to target potential PV adopters**
Investigate PV decision-making criteria and behaviors among adopters	Ask adopters: 1) Why they installed a PV system; 2) How the decision-making process went; 3) Whether Energy Trust's incentive influenced their decision to install the system; and, 4) Whether they heard from contractors that the PV incentives were going to expire or change	
Assess what potential adopters require in order to install a PV system	Ask potential adopters: 1) If they have considered installing a PV system, and if not, why not; 2) What type of system and financial requirements they need to invest in a PV system; and, 3) What steps their company/organization needs to take to consider investing in a PV system.	**Determine whether or not to revisit the incentive package and other program tools and services**
Examine whether decisions about PV happen in isolation from energy efficiency upgrades, and if so, why	Ask all: 1) Whether different people in a company are making these decisions; and 2) Whether there are different budgets, timelines, and considerations for payback or ROI with respect to PV and energy efficiency projects.	**Determine whether existing marketing strategies can be leveraged or if there is a need for another strategy**
Investigate what PV messages resonate with potential adopters	Ask all: 1) If they are familiar with the term "net- zero"; and, 2) Test how they respond to "net-zero" or other messages provided by Energy Trust and suggested by Research Into Action	**Test marketing messages**

FINDINGS FROM THE LITERATURE REVIEW

The literature review resulted in five key findings, discussed in detail below.

RATE OF SOLAR ADOPTION

Throughout the U.S. in 2013, the growth of C&I PV installations was leveling off. Nationwide, the pace of C&I PV installations was slower in 2013 than 2012 (SEIA and GTM Research, 2013). The installed capacity of the C&I PV installations peaked in the 4th quarter of 2012 (300 Megawatts, or MW, installed) and declined in each quarter of 2013 (245, 210, and 200 MW installed in the 1st, 2nd, and 3rd quarters of 2013, respectively).

CHARACTERISTICS OF SOLAR ADOPTERS

Cumulative PV generation capacity had increased exponentially between 2009 and 2013. It has risen from 1,000 MW to 9,000 MW. This increase was primarily driven by commercial and utility-scale projects (Wesoff and GTM Research, 2013).

Major retail chains and manufacturing firms were adopting PV on a nationwide scale in 2013, and the media had taken note. Because C&I solar adopters vary, it was difficult to describe a *typical adopter*. However, many solar adopters appeared to be large retail chains and manufacturing firms like Walmart or Apple. This may suggest that the *early majority* had begun to adopt solar.

OREGON AS A PV LEADER

Oregon had strong policies supporting overall PV installation. Oregon was highly ranked (receiving a letter grade "A") for its net metering and interconnection policies from the Interstate Renewable Energy Council. Additionally, in 2012, Oregon was ranked 13th of the 50 states in per capita installed PV capacity (Dutzik and Sargent, 2013).

FUTURE TRENDS

Non-cost barriers might become more important when "solar parity" is reached. *Solar parity* occurs when the rate of return from an investment in PV roughly equals that of other market rate investments. Once solar parity is reached, cost barriers are reduced if not eliminated, and thus non-cost barriers become more relevant to decision-making. Non-cost barriers in pursuing a solar project include permitting process difficulties for solar installations (e.g., long wait times for permit approval), receptiveness of utilities to distributed generation, and availability of inspectors and solar technicians. Solar parity had been reached in 2012 in areas with strong solar resource and high electricity prices (Farrell, 2012).

RATE OF SOLAR ADOPTION

Figure 1: Percentage of New U.S. Electricity Generation in 2012, by PV and Other Sources

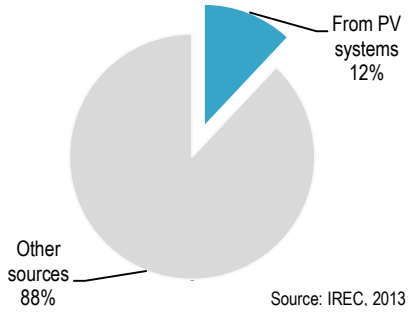
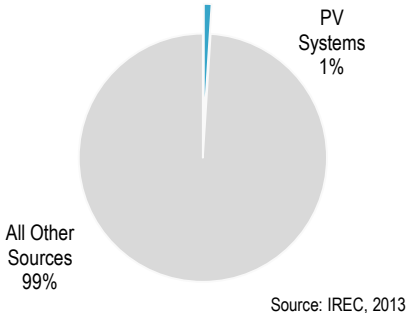


Figure 2: Total U.S. Electricity Generated by PV Systems, 2012



The diffusion of solar technology in the U.S. market was still very low as of 2012. Although PV systems represented 12% of new electricity generation in 2012 (Figure 1), they still generated less than 1% of total U.S. electricity (Figure 2) (IREC, July 2013).

The rate of increase of C&I PV installations had slowed in 2013. In the first quarter of 2013, U.S. C&I PV installed capacity (in MW) was 18% lower than in the preceding quarter (SEIA/GTM Research, 2013). This decline continued in the 2nd and 3rd quarters of 2013 (there is no data on the 4th quarter) (SEIA/GTM Research, 2013). Additionally, in 2012 the capacity of C&I PV installations (in MW) increased by 26% over 2011 (IREC, October 2013). Solar Energy Industries Association (SEIA) expects the non-residential sector at the national level to have flat installation rate in 2013.

Cumulative PV generation capacity had increased nearly 900% since 2009, with recent increases primarily driven by utility-owned projects. The cumulative PV capacity in 2009 was 1,000 MW. Cumulative capacity at the end of June 2013 was 8,900 MW. The utility-owned solar generation represented more than half of new PV capacity installed in the third quarter of 2013. Additionally, three-quarters of all PV systems were installed in the last 2.5 years (SEIA/GTM Research, 2013).

At the end of 2012, C& I, residential, and utility-owned solar generation totaled 1.0, 0.5, and 1.8 GW, respectively. Figure 3 tracks new capacity installed in each quarter from 2010 to 2013. The number of C&I PV installations per quarter varied slightly throughout this period and peaked in the last quarter of 2012. The growth rate of utility PV installations was more volatile; the rate declined in the first and third quarter of 2012, and first quarter of 2013, and increased again in the second and fourth quarter of 2012, and second quarter of 2013.

It may be useful to note that in the third quarter of 2013, the U.S. residential solar installations posted the largest gain ever (186 MW installed).

Figure 3: U.S. PV Installations by Quarter, 2011-2013

Adapted from source: SEIA/GTM, 2013

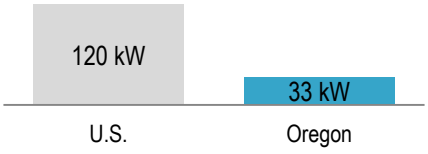
Compared to residential PV installations, C&I installations were fewer in number but greater in generating capacity. In 2012, the most recent year for which complete figures were available, U.S. C&I PV installations represented just 10% of all new installations but accounted for 30% of generation capacity (Table 3), totaling 3.3 Gigawatts (IREC, October 2013). In contrast, residential systems accounted for 90% of installations but only 16% of the installed capacity. Utility PV systems accounted for the remaining 54% of installed capacity (IREC, October 2013).

Table 3: Proportion of PV Installed Capacity by Sector

2012 Data	Percent of PV installations	Percent of installed capacity
Utility	<1%	54%
C&I	10%	30%
Residential	90%	16%

Source: Sherwood, 2013

Figure 4: Average Size of C&I PV Installation in the U.S. and Oregon, 2012



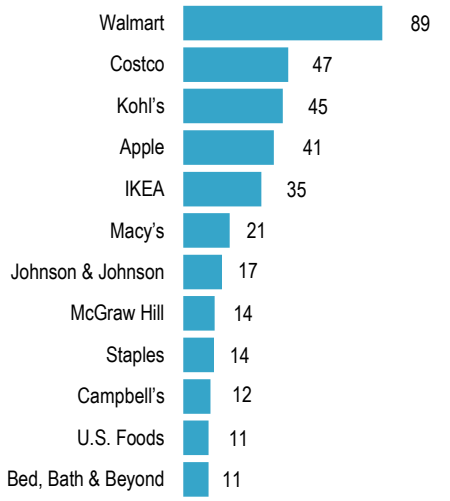
Source: Robertson, 2013; IREC, 2013

The average capacity of Oregon C&I PV installations was much smaller than the U.S. average. In Oregon, the average size of a C&I installation was 33 kW almost four times smaller than the U.S. average of 120 kW (Figure 4) (Sargent, 2013).

CHARACTERISTICS OF SOLAR ADOPTERS

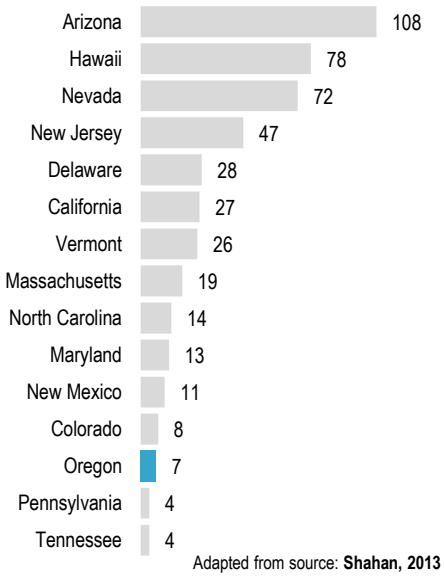
Major retail and manufacturing corporations were installing PV arrays as a business decision. Figure 5 shows the top 12 American companies with installed PV systems, ranked in descending order by total installed capacity per company (shown in MW) as of 2013. These firms made the decision to adopt

Figure 5: Top 12 Corporate Solar Adopters, by Total MW Installed, 2012



Adapted from source: SEIA and Vote Solar, *Solar Means Business 2013*

Figure 6: Top 15 Solar Adopting States, Ranked by Total Watts Installed Per Capita, 2012



Adapted from source: **Shahan, 2013**

solar centrally; the literature makes clear they are installing PV systems simultaneously at company properties across multiple states and multiple climate regions (Randall, 2013). Most of these arrays were reportedly installed through power purchase agreements, so the listed companies were ensuring a low electricity rate for their future more than they were investing in solar generation as a capital asset. Of note, firms listed by various literature sources were not limited to companies that brand themselves as environmentally progressive (SEIA and Vote Solar, 2013).

C&I solar adopters were diverse and thus a "typical" adopter was hard to describe. Solar adopters included C&I businesses in nearly every industry and in states with varying policy contexts (SEIA and Vote Solar, 2013). However, one California study sponsored by critics of distributed solar PV found that C&I solar adopters may be heavier users of electricity than other C&I customers in the same rate categories (California PUC, 2013).

In the State of Oregon, current large adopters were typically public schools and for-profit companies who were installing PV for utilities. These for-profit companies and public schools installed ten of the thirteen largest solar PV installations in 2011 and 2012 (2012 Renewable Northwest Project database).[2]

Oregon was ranked 13th in total installed PV capacity per capita, both cumulatively (18 Watts/person) and in 2012 installations (7 Watts/person) (Figure 6). (Sargent, 2013). One can see from the ranking that installed capacity per capita was not always highest in the sunniest states. Some of the leading states – including Vermont, Massachusetts, and Oregon – have less annual solar potential than other states listed in Figure 6. This implies that in addition to annual solar potential, other factors affect solar adoption (e.g., solar friendly policies and incentives).

Oregon's statewide net metering policies and utility incentives contributed to increasing adoption.

- **Net metering/interconnection policies:** Oregon has had net metering policies for commercial and residential PV systems since 1999 (dsireusa.org, 2014). Oregon's net metering and interconnection policies were highly rated by the Interstate Renewable Energy Council, which gave Oregon an "A" grade for both policies in 2013. This was an improvement from the previous "B" grades in prior years (IREC and Vote Solar, 2013). Net metering policies were important because the presence of "reliable and fair"

[2] Large PV Installations were defined as those that generated more than 100 kW of electricity.

compensation by utilities to PV system owners for excess electricity generation correlated with PV installation activity (IREC and Vote Solar, 2013).

Additionally, Environment America (a solar advocate media organization) rated 10 of 11 other Oregon solar policies as being "strong" compared to the other states in 2013.[3] The only policy *not* being rated as very supportive was Oregon's tax credit policy (Dutzik and Sargent, 2013).

- **Energy Trust incentives:** Beginning in 2003, Energy Trust has offered incentives to C&I customers of PGE and Pacific Power that install PV systems. Since Energy Trust began offering these incentives, businesses across Oregon had installed 812 C&I PV systems. Energy Trust's commercial PV outreach materials note that for many C&I organizations, 80% of the installation costs can be offset by federal tax credits and Energy Trust incentives.

FUTURE TRENDS

"Solar parity" is almost here! *Solar parity* occurs when the rate of return from an investment in PV roughly equals that of other market rate investments. This is a critical moment for solar, according to solar advocates, who think it will be a mistake if the federal tax credit is reduced (being considered for 2017) just when solar parity is reached in many states (Farrell, 2012). Solar parity occurred in 2012 in areas with strong sun and high electricity prices, like Hawaii, and advocates predict parity may be achieved within three years in several parts of the country, including Southern California and New York.

Almost all attention on increasing PV adoption had focused on costs, but advocates say industry, utilities, and policymakers need to begin addressing the significant non-cost barriers. Advocacy organizations such as Institute for Local Self-Reliance, Environment America, and Interstate Renewable Energy Council describe the need to remove remaining barriers when solar costs and energy savings reach parity with other investments. Their recommendations include:

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[3] Eleven categories of solar policies were identified and rated: 1) net metering; 2) interconnection; 3) solar rights; 4) solar (payment) rates; 5) renewable electricity standard; 6) mandate for utilities to include solar/distributed generation; 7) rebates and grants; 8) tax credits; 9) whether third-party PPAs are allowed; 10) PACE financing; and 11) mandate on renewables for public buildings. Oregon's tax credit is no longer available to commercial customers, hence the weaker rating for this policy.

- Improving the flow of objective information about costs, tax credits, and expected performance of various technologies and brands to those consumers likely to be interested in solar energy generation;
- Systematically pairing installers with potential customers in a deliberate, transparent way by centralizing information;
- Expert "coaching" of appropriate commercial building owners, as few owners and occupants have technical expertise or commitment to onsite PV generation; and,
- Improving interconnection procedures by revising the interconnection policies to ensure a fair (evidence-based) net metering energy rate and removing numeric caps on the volume of distributed energy allowed.

C&I DATABASE REVIEW

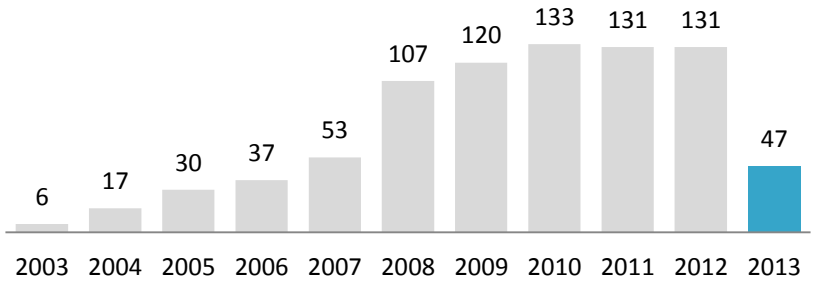
Energy Trust staff analyzed their program database to identify the "most likely to consider solar" market segments and characteristics of solar adopters. Key findings from this analysis appear below.

C&I PV ADOPTION IN ENERGY TRUST TERRITORY

Energy Trust has incented 812 PV systems since 2003. These systems represented 783 projects completed at 738 sites.

The number of PV installations incented by Energy Trust in 2013 was notably lower than the number incented in 2012. Specifically, the frequency of Energy Trusts' incented PV installations declined from 131 in 2012 to 47 in 2013 (Figure 7). Additionally, about one-third of incented PV installations in 2011 (35%) and 2012 (31%) were projects on low-income single-family or multifamily homes funded by the American Recovery and Reinvestment Act (ARRA). These single-family and multifamily projects were categorized as commercial because the properties were owned by businesses.

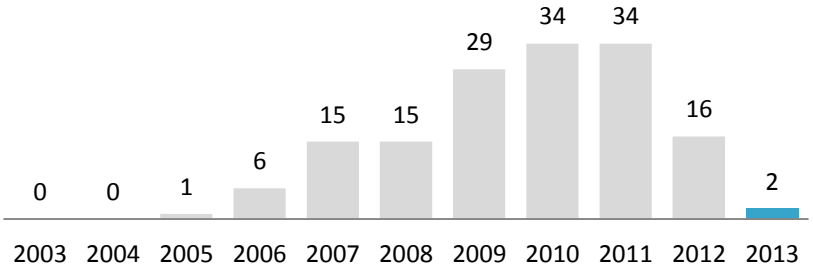
Figure 7: Number of Energy Trust-Incented PV Systems, by Year, 2003-2013



A key factor in this decline was the discontinuation of the Business Energy Tax Credit (BETC) by the State of Oregon. The Oregon Department of Energy stopped offering BETC for qualifying projects in 2011. Businesses still may receive a BETC if their projects were initiated before BETC was discontinued.[4] The number of PV projects receiving both the BETC and Energy Trust incentive declined precipitously after 2011 (Figure 8).

[4] Information retrieved from *http://www.oregon.gov/ENERGY/CONS/BUS/Pages/BETC.aspx on January 15*, 2014.

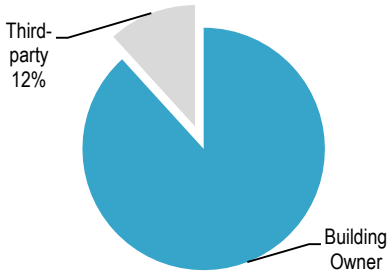
Figure 8: Number of Energy Trust-Incented Sites Receiving BETC by Year, 2003-2013



SOLAR PROGRAM PARTICIPANT CHARACTERISTICS

Ownership of PV Installations

Figure 9: Who Owns C&I PV Systems?

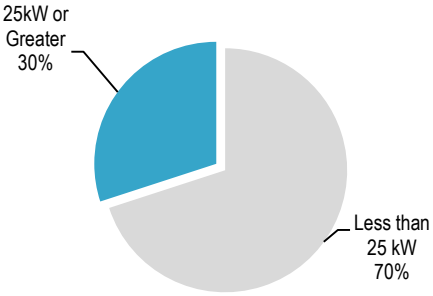


Solar adopters typically owned their PV installation. The majority (88%) of C&I PV systems were owned by the adopters (Figure 9). Only a minority (12%) of the PV systems were third-party-owned; however, they represented 36% of the total generation capacity.

Six companies owned most of the third-party-owned systems. Of the 88 third-party-owned PV projects, 60% were owned by six companies.

Size and Cost of PV Installations

Figure 10: Generation Capacity of the Energy Trust-Incented PV Projects

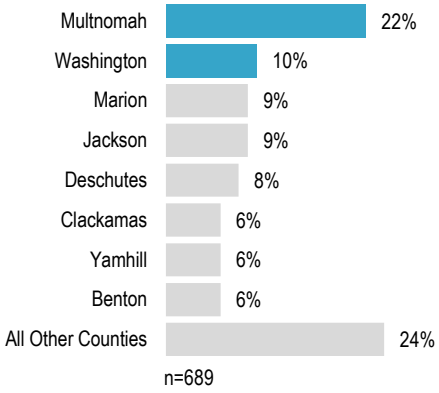


Most PV projects incented by Energy Trust were less than 25 kW in size. A minority (30%) of C&I PV installations incented by Energy Trust were 25kW or larger systems (Figure 10). The average size of the Energy Trust-incented PV installation was 41 kW.

Although costs vary depending on size, the overall cost of incented PV systems was declining. The installed cost per Watt generated of a PV system incented by Energy Trust (excluding Energy Trust's incentive and any other tax credits or grants) dropped by almost half, from about $9 per Watt in 2007 to approximately $5 per Watt in 2013.[5] The average cost of a PV installation was $257,620 across all the installations incented by Energy Trust since 2003.

[5] Energy Trust staff estimated these statistics using information from their program database.

Figure 11: Percent of Energy Trust-Incented Solar Installations, by County



Building and Business Characteristics

Solar PV projects were concentrated in the Portland metropolitan area. About one-third of all PV installation sites were located in Multnomah and Washington counties (Figure 11).

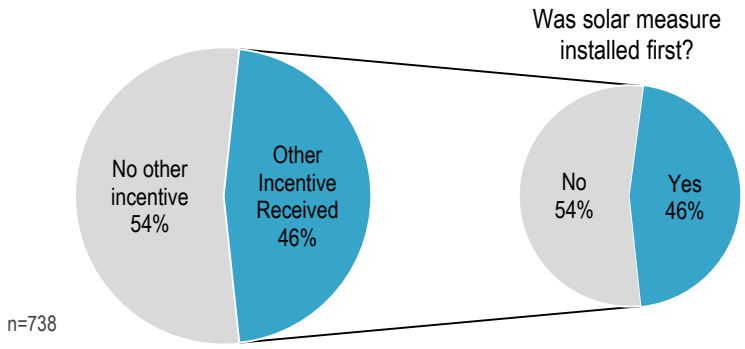
Most solar adopters owned the building where the PV system was installed. According to Energy Trust records, 52% of PV installation sites were owner-occupied. Most of PV installation sites were office buildings, followed by schools, retail establishments, and government buildings (Table 4).

Table 4: Primary Function of the Buildings with Installed PV Systems

Type	Number of Sites (n=274)	Percent
Office	63	23%
Schools (K-12)	38	14%
Retail	36	13%
Institution/Government	30	11%
Warehouse	25	9%
College/University	18	7%
Other Health	15	5%
Restaurant	10	4%
All Other	39	14%

Solar adopters often participated in other Energy Trust programs. Owners of nearly half (46%) of the incented solar installation sites received other (non-solar) Energy Trust incentives (Figure 12). Owners of nearly half (46%) of those sites with both solar and non-solar measures installed the solar measure before the non-solar measure.

Figure 12: Solar Installation Sites Receiving Other Energy Trust Incentives



PV CONTRACTOR CHARACTERISTICS

A small group of solar PV contractors had installed the majority of Energy-Trust incented C&I PV systems. Twenty-one PV contractors were responsible for just over two-thirds (68%) of all C&I PV projects incented by Energy Trust.

FINDINGS FROM IN-DEPTH INTERVIEWS

The findings from in-depth interviews with 15 solar adopters and 15 potential adopters are reported below in four sections:

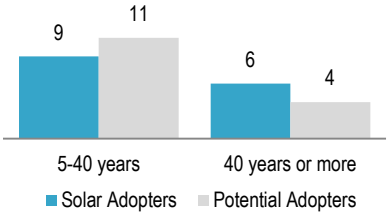
- Characteristics of solar adopters compared with potential adopters;
- Potential adopter awareness and knowledge of solar costs and incentives;
- Decision-making on solar and differences in decision-making between solar and energy-efficiency projects; and,
- Reactions to solar marketing messages.

SOLAR ADOPTER AND POTENTIAL ADOPTER CHARACTERISTICS

Business Characteristics

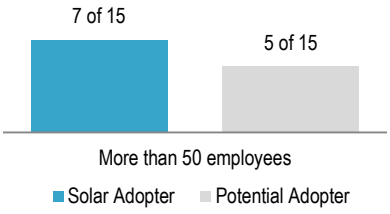
This section describes business characteristics of the 30 respondents with whom we spoke. These 30 respondents were not representative of the larger population.

Figure 13: Number of Interviewed Contacts by Business Longevity



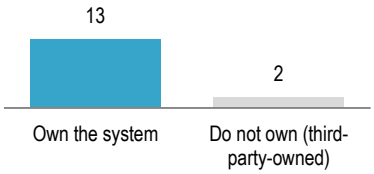
Respondents' organizations had been in operation for at least five years, and often many more. All respondents reported that their organizations have been in business for five years or more, with ten (about one-third) reporting they have been in business for more than 40 years (Figure 13). Solar adopters have been in business slightly longer than potential adopters.

Figure 14: Number of Interviewed Contacts by Firm Size



Solar adopters' businesses had more employees than potential adopters. About half (7 of 15) of the adopters we interviewed had more than 50 employees, four of which had 200 or more employees (Figure 14). In contrast, two-thirds (10 of 15) of the potential adopters had fewer than 15 employees. The largest potential adopter's business had 58 employees. There were some small family businesses among the solar adopters, with two-to-four decision-makers, showing that solar adoption is not limited to large organizations.

Figure 15: PV System Ownership Among 15 Interviewed Solar Adopters



Solar adopters typically owned the PV equipment. Most (13 of 15) adopters reported owning the PV equipment they installed (Figure 15). Two of those 13 owners said they were not aware of the option to contract with a third-party until the research interview. The two remaining adopters reported holding a power purchase agreement (PPA) with a third-party solar PV system owner, which included maintenance of the equipment.

One solar adopter seemed to have a variation on third-party arrangements. This adopter, a non-profit, reported *owning* their PV system, and also having a

construction and maintenance contract with a third-party company who is able to receive the tax credits for solar that are unavailable to the non-profit.

Choosing Not to Own a PV System

Why did you decide to lease rather than own the system?

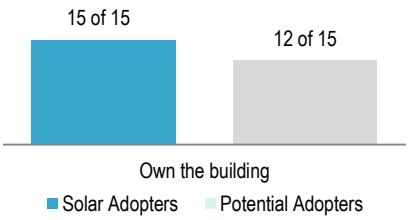
"Initially, when we looked to own the system it was prohibitively expensive. Also, things kept changing, every time we made a step forward, something changed. Tax credits changed, incentives changed, etc. It was easier later. Contractor owns the system and gets benefits; we just have an agreement with them."

~ Co-owner, Agricultural Solar Adopter

Reports in the literature indicated that a PPA is very common in commercial solar installations (Gasper, 2013). In our limited inquiry with two PPA holders, both in agricultural production, there were two reasons for choosing *not* to own the PV system. One respondent wanted to avoid the upfront investment because the company was relatively young (an organic farm in business for about eight years) and needed its cash for core business purposes. The other respondent said the PPA decision was driven by the desire to avoid the burden of estimating when costs would be recouped, leaving those financial risks up to the specialized contractor.

Building Characteristics

Figure 16: Number of Respondents Who Own Their Building(s)



All solar adopters and most potential adopters reported owning the building in which their business operates. Among 30 respondents, only three (all potential adopters) reported that they occupy leased space.

Two-thirds of the buildings owned or leased by respondents were built before 2000. Most respondents (23 of 30) reported occupying buildings constructed before 2000. There was no difference in building age between solar adopters and potential adopters. Both groups reported construction years that included every decade since World War II, and even several pre-1940 buildings.

Respondents' Role in Decision-Making

Nearly all (29 of 30) respondents were primary decision-makers in their organizations. Their titles included owner, co-owner, president, vice-president, director, or manager. Nine respondents specified a family role, such as wife, husband, or son, to explain their decision role in a "family business." One administrative assistant was interviewed who could not be characterized as a decision-maker—she was able to share her organization's decision process.

Tell me about any available rebates or tax credits that you are aware of for solar systems.

"I know that there are some rebates and tax credits, but I have no idea what they are."

~ President, Multi-family Residential Potential Adopter

"No, nobody tells me anything. I found out about the lighting rebate from a former neighbor …I would like to get a quarterly flyer, or a postcard, that describes programs to the small business owner…Or, even one of their marketing people calling me."

~ President, Laundry/Dry Cleaner Potential Adopter

"No I wasn't aware. I heard about the lighting incentive through the electrical contractor. ETO was not the driving force for the lighting upgrades. [Electrical Contractor] provided this as a fluke, and did the paperwork."

~President, Warehouse Potential Adopter

"Yes, I am aware of that [tax credits] might exist and could be researched. I was aware, at some point, for our own residential use, some window or furnace company was saying this is the last year to get some tax credit. So, I'm aware that some benefits come and go depending on the current situation."

~ Pastor, Church Potential Adopter

You mentioned that you are aware of solar rebates or tax credits. Do you have any sense about the size of that/these rebate(s) or tax credit(s)?

"Yes, one of the ETO guys lets me know about it all the time. From doing an ETO survey of our building. I think they called up and offered to do an energy audit."

~ Project Manager, Multi-family Residential Potential Adopter

POTENTIAL ADOPTER AWARENESS AND KNOWLEDGE OF SOLAR COSTS AND INCENTIVES

Awareness and Knowledge of the Incentives and Tax Credits

Energy Trust Incentive

A majority of potential adopters were not aware of solar PV incentives from Energy Trust. Two-thirds of the potential adopters (10 of 15) reported being unaware of the Energy Trust cash incentive for solar PV systems. Of those who were unaware of the incentives, four knew some incentives or tax credits were available, but had no detailed knowledge of what the incentives or tax credits were for.

Two potential adopters reported that they heard of the Energy Trust incentives, inadvertently, and one described methods Energy Trust could use to purposefully inform him.

Five potential adopters who *were aware* of Energy Trust solar incentives had detailed knowledge of these incentives. Four of the five *aware* potential adopters had detailed knowledge of these incentives that suggested there had been ongoing communication with Energy Trust. In fact, two organizations had explored solar incentives in sufficient depth to explain their non-adoption with calculations: one ranch owner had determined he was not eligible for rebates from Energy Trust or the utility, and he knew the exact financial conditions he would need to meet to move forward. An aerospace manufacturer knew that if Energy Trust provided 40% of the costs, his solar project would be economical and he would move forward. A third potential adopter had experienced an Energy Trust audit of the condominium building he maintained. An outdoor equipment vendor had installed home solar PV panels in 2010.

The following verbatim response contains relevant advice on improving awareness of Energy Trust solar incentives.

"I am not criticizing, but I honestly don't think they [Energy Trust] get the word out there. Before I got this job, I didn't know anything about ETO, I thought these energy activities were unique to [my new company]. A typical facilities manager is worried about the "to do" list and keeping business tasks moving, so ETO will want to aggressively outreach to someone like I was. I only heard about it because [my new company's sustainable division] is always keeping close to all energy innovations and they knew about ETO incentives. Smaller companies won't have that kind of division."

~ Operations manager, Auto Dealer Solar Adopter

Tax Credit Knowledge

Above, we note that for-profit solar adopters frequently mentioned a tax credit or "tax shelter" as a main reason to adopt solar PV. Among potential adopters, three had specifically explored tax credit eligibility or amounts (a restaurant owner, a ranch owner, and an outdoor equipment vendor with home solar panels). Four potential participants had general knowledge that tax credits exist, but were not specifically aware of detailed information relating to tax credits.

Solar Cost Knowledge

In the last year, prices of installed PV systems have fallen by more than 10% in Oregon. And they've fallen nearly 50% over the past four years. Does that surprise you?

"I was not aware and it does not surprise me. I expect things to evolve."

~ President, Warehouse
Potential Adopter

Most potential adopters (9 of 13)[6] reported being unaware of how much PV systems costs. Additionally, most (11 of 13) of potential adopters reported no surprise when interviewers explained that the PV systems have fallen by more than 10% in Oregon in the last year and by nearly 50% over the past four years. When asked if the declining price of PV installations would have any bearing on their company's decision to investigate solar, seven said possibly and two said not at this time.

DECISION-MAKING

Reasons for Interest in Solar

Most Important Reason

Why were you interested in solar? Which reason was the most important?

"Initially we were not interested but it was packaged by contractor as a tax shelter for a profitable business."

~ Vice President, Industrial Machinery
Solar Adopter

"To help on our power bill. To make our power bill cheaper…Doing environmental thing is added bonus but can't do it for those purposes only."

~ Co-owner, Irrigation
Potential Adopter

"Save money. When you are in business that is what it comes down to, if you didn't need money you wouldn't have the business, you would be living in Hawaii or something."

~President, Multi-family Residential
Potential Adopter

If we save money we can provide more services, that is how it works in our business. We are social workers, we stretch our dollars as far as we can. If we spend on bricks and mortar we have less to spend on staff."

~Facilities Director, Office
Solar Adopter

Solar adopters were motivated to install a PV system by tax credits and by saving money on energy costs. One-third (5 of 15) of solar adopters mentioned tax credits and another one-third (5 of 15) mentioned saving money on electricity as the most important reasons for installing a PV system. A few of these respondents explained how they would benefit from reduced energy expenses. Most said energy savings would offset installation or loan costs so the equipment would "pay for itself" sooner. Two non-profit organizations mentioned that reduced energy expenses would increase their ability to provide more of their mission services.

Potential adopters' primary reason for interest in solar was to save money on energy costs. Most potential adopters (9 of 15) cited "saving money on electricity costs in the long-run" as the primary reason for their interest in solar. They described their thinking about solar as a straightforward business decision to reduce operating expenses.

[6] Two respondents failed to provide feedback on this question and other questions pertaining to solar costs.

Other Reasons

Environmental reasons for considering a solar project were secondary to financial reasons, for both solar adopters and potential adopters. Eleven adopters and four potential adopters mentioned that installing solar benefits the environment or reduces carbon emissions, but characterized these factors as nice "side benefits" rather than their primary motivators.

Energy independence was a desirable undercurrent for some. Three respondents spoke of valuing solar because it provided energy independence: two urban property managers valued the idea of self-reliance for its own sake and one rural farm liked the protection from power outages as a way to safeguard refrigerated meat until its sale.

Financial Criteria

Are there any financial thresholds that a solar project has to meet? What are they?

"No particular financial thresholds, we just had to know yes we would get the rebates and tax credits, then we didn't hesitate to front the money. We knew that all up front $1,000,000 costs would be paid back over time, by tax credits over five years."

~ Partner, Warehouse Solar Adopter

"It had to pay for itself. Initial investment rolled into the loan and then with the tax credit, we subtracted the net costs from the savings on power bills…[projected] about 7 years I should end up at net zero. With the 4% interest rate change, now it is about 9."

~ President, Warehouse Solar Adopter

"If it will take 50 years to recover the cost, we would not be as eager to go into it than if it takes 10 years to recover the cost.

~Pastor, Church Potential Adopter

"It would have to have a two to five [payback] year period until we are in a gain on investment. From what I have gathered, [solar PV] is just too expensive, it is not going to pay off in a realistic time frame. We don't know if we will be in business in 20 or 30 years, so that is too long."

~ Director, Office Potential Adopter

In general, respondents insisted that solar PV installation decisions "must pencil out" or "must be economical." Nearly all (28 of 30) respondents, including those from the non-profit organizations, stressed the importance of financial criteria in their solar decision-making. Five adopters and nine potential adopters specifically mentioned that decisions to install PV are for the purpose of reducing operating costs. Adopters typically stressed at least one other reason than reducing operating costs (tax shelter, brand image, climate change, etc.), while potential adopters were more likely to emphasize saving money as a singular reason.

Solar adopters differed from potential adopters in one important way: they came to different conclusions about the length of time required to recover the cost of the solar investment. A majority of adopters (11 of 15) estimated their PV system would pay for itself in five to 10 years. In contrast, potential adopters who estimated the payback time for a solar investment reported that a solar installation would not pay for itself under ten years. Six potential adopters reported desiring a similar payback time but had estimated that their payback for solar would be over 10 years. The payback estimates of some potential adopters were quite long: 25 years, 50 years, and "longer than the PV panel life." Among potential adopters, five reported being very uneasy with a payback of more than 10 years, and one of these five respondents explained that a longer payback is unrealistic because their organization might not be in business 20 years from now.

Additionally, some adopters described a standard internal policy for length of payback period, independent of particular investment decisions. Others said that more payback time than five or ten years was "too risky" and seemed to consider that a common rule of thumb for any business.

What role did the Energy Trust incentive have in your decision to install the solar system?

"Huge [role]! There were three financial components: federal and state tax credits and Energy Trust incentive. Without any one piece, it might not have been done."

~ Vice President, Industrial Machinery Solar Adopter

"ROI needed to be 10% over a five year period, before we decided. The numbers looked better … [The Energy Trust incentive] cut down on the cost, part of the investment, without it the ROI would not have worked the same."

~ CEO, Office

What were the barriers you faced in installing a solar PV system?

"Things [incentives or tax credits] kept changing, every time we made a step forward, something changed. It was pretty convoluted, was frankly very frustrating. It was easier on our second project, we went with another contractor with a Power Purchase Agreement and he provided upfront capital."

~ Co-owner, Agricultural Solar Adopter

Has your organization considered installing a solar system?

"We are in a leased building, so I guess the short answer is no, unfortunately. Otherwise I am sure we would, it would make good sense for us. If I owned the building, I would do it in a heartbeat; we have two great southern exposure roofs."

~ President, Laundry/Dry Cleaner Potential Adopter

Influence of the Incentive in the Decision to Install Solar

Energy Trust incentive was one element of participants' financial calculation, and not always the deciding factor. Five participants mentioned that Energy Trust's incentive made the difference in meeting their internal payback criteria. Another five participants reported they had already decided to install a PV system and Energy Trust's incentive further supported that decision.

Barriers to Solar Adoption and Their Resolution

Solar adopters and potential adopters identified five barriers to solar adoption:

- **Payback time of over ten years.** As discussed already, the chief reported barrier to solar PV adoption was the estimation by potential adopters that a solar installation will not pay for itself soon enough–in under ten years. Once that issued had been raised and explained, respondents had little to say about other barriers.
- **The difficulty of coordinating various incentives.** Three adopters found it difficult to understand how much money they would receive from the federal and state tax credits and other incentives, and they report being uncertain about the exact amounts to put into payback calculations. Three adopters mentioned that offers by an installer or solar advisor to "do all the paperwork" and make the process easier were especially welcome.
- **Operating a business in leased space.** The three respondents who leased the building(s) where their businesses were located were potential adopters. None reported asking their landlord to consider a solar installation; they viewed their leasing situation as a barrier to solar adoption. Leasing space even proved to be a barrier to completing an interview about solar—two potential adopters declined to speak with us, offering by voicemail that they lease the space where their businesses were located and thus were not interested in solar.

  Another potential adopter who leased the building where their business was located expressed high interest in solar because their building had "two great southern exposure roofs" –that is, their building was a good candidate for a solar system.
- **Inadequate building structure.** One potential adopter said that their roof was too small to install a PV system that would produce a notable amount of energy.
- **Low electric use or an otherwise energy-efficient business.** Six of 15 potential adopters, *all property owners*, had never considered solar. Of those who never considered solar, three said they use so little electricity that solar panels would pay for themselves too slowly. Two of these respondents reported using waste heat from business equipment for heating.

Roles of People Who Were Influential in the Solar Project and Information They Needed

Owners and company officers reported playing the most influential role in solar adoption for their organization. Owners and officers described the need to protect the interests of their business by overseeing all major decisions on the project.

Solar installers were also noted as influential by eight adopters and two potential adopters. Three adopters described the roles of other important players they used for independent evaluation, including structural engineers to approve changes in the roof, tax accountants to verify expected profits and federal tax credits, or employees of the State of Oregon about qualifying for and receiving state tax credits.

What Adopters Wish They Had Known

Six solar adopters reported there was nothing they wished they had known about financing, installation, or performance before they undertook their solar energy project. Three adopters said the equipment had performed as expected, while one said the contractor's projections were way off whenever the operating scenario was less than "best case" (that is, when conditions were less than ideal with respect to cloud cover, ambient temperature, or panel cleanliness). Two adopters wished the scoping process had been less complex: one said they wished the application process had been easier to navigate, and another adopter (who eventually chose PPA with a third-party) was frustrated that the information about ownership costs and incentives was convoluted and kept changing.

Did you have any difficulty obtaining the information you needed to make the financial projections? Was there any other information that you wish you had known?

"Nothing really, it was straightforward analysis. The one thing I would do differently is install a larger system."

~ Partner, Warehouse Solar Adopter

"Obviously it was not wise to have the (five year) federal tax credits going to my mom, those dried up when she died unexpectedly after two years. I have also had trouble with Oregon Department of Energy, twice. Our buildings are each an LLC of their own, and, technically, change ownership frequently. I have needed to convince a number of people at DOE what my attorney had looked into, that the transfer of ownership I was proposing was legal."

~ Owner, Restaurant Solar Adopter

"I think at the time what would have really helped is impartial information. The people who were proposing the project were the ones trying to sell me the equipment."

~ President, Multi-family Residential Potential Adopter

What Potential Adopters Would Have Found Helpful

Nine of 15 potential adopters had considered solar PV panels. Three of them expressed a desire for solid, unbiased information. One found the bids from three contractors confusing, and the other two wanted impartial information on solar PV operations, costs, financing, maintenance, and roof requirements.

Decision-Making Differences Between Solar and Energy-Efficiency Projects

The decision process is similar for solar and energy efficiency projects and depends more on the cost of the capital outlay than on the type of investment. All respondents except one (a restaurant) reported the decision-making process is similar for energy efficiency projects and solar PV. Respondents noted that if the upfront costs were of a similar magnitude, the decision-making process would be virtually the same: projects would need to meet the same financial criteria and would go through the same steps. One respondent suggested that if a project has a substantially lower upfront cost, then the decision might be made by lower-level managers.

Would you go through the same process for an energy-efficiency upgrade as for the solar project?

Not different, except when the total project cost falls below a certain level, sometime the getting approval from the voting members of the corporation is not necessary."

~ Owner, Restaurant Solar Adopter

SOLAR MESSAGES

Most Persuasive Messages

You rated one or more messages regarding the financial benefits of solar as either very or extremely persuasive. Why?

[Reaction to a statement without any statistical information] "It has to be some truth to it. I would give that a 3 'cause again it is unclear if it is true. It is declarative statement, have to back it up." [Reaction to a statement with statistical information] "Fabulous, with some facts, I give it a 5."

~ Co-owner, Agricultural Solar Adopter

"Just the way that question is worded, it says solar would save me money. It communicates that it would save me money. I was not real thrilled with any of them, but when you are talking to business people, you want to lay out a simple, accurate message about how the numbers work out. And the positive gain needs to be soon enough to feel real."

~ Owner, Office Potential Solar Adopter

"I am not a big fan of blanket statements. I like ones that say a concrete fact."

~ Operations Manager, Office Solar Adopter

"The simplicity of the messages."

~ Co-decision Maker, Industrial Machinery Solar Adopter

Solar adopters and potential adopters provided feedback on nine marketing messages Energy Trust was using in their current marketing materials. On a 1-5 scale where "1" meant *not at all persuasive* and "5" meant *extremely persuasive*, both groups rated how persuasive these messages were in encouraging them to initiate a solar project at their company. The respondents also explained their reasons for these ratings.

Not all respondents provided feedback on every message because interview questions on solar messaging changed midway through the data collection process. After speaking with 15 respondents, we removed the least persuasive messages and added several additional messages to the interview guides. We specify which messages were removed and which were added in the tables below.

Financial Messages

The financial messages about solar that received the highest ratings contained a statistic or number. Among all messages, only these two included a statistic on tax credits and incentives for solar: 1) "There's never been a better time to go solar: 80% of the cost paid through tax credits and incentives." and 2) "If you are not going solar, you are leaving $ [dollars] on the roof. Up to 80% of system costs could be paid by tax credits and incentives."

Nearly all respondents (10 of 12) said that at least one of these messages was very persuasive (Table 5).

Table 5: Number of Those Rating Messages as Highly Persuasive (Rating of "4" or "5")

	Messages about Financial Benefits of Solar	Solar Adopters	Potential Adopter
Message with no Facts	Investing in a solar system is pursuing a healthy return on investment.	11 of 15	4 of 15
	Solar will let you take control of your operating costs.	7 of 15	4 of 15
	When I install a solar system, I hedge against rising energy prices.	6 of 15	7 of 15
	Messages Added Midway through Data Collection		
	Think Solar is unaffordable? Think again.	1 of 7	5 of 6
Message with Facts	There's never been a better time to go solar: 80% of the cost paid through tax credits and incentives.	5 of 6	5 of 6
	If you are not going solar, you are leaving $ on the roof. Up to 80% of system costs could be paid by tax credits and incentives	4 of 7	5 of 6

You rated one or more messages regarding the financial benefits of solar as either very or extremely persuasive. Why?

"Any way to reduce expenses is worth investigating. My energy costs are a very small percentage of my operating expenses, especially I barely use any electricity relative to my other expenses. So maybe I could be net zero, but reducing expenses always catches my attention. I am basically selfish."

~ President, Laundry/Dry Cleaners
Potential Adopter

"It is going to cost more and more for power eventually, over the next 25 years, so that was my main motivation then and would be now. I thought it would be a little bit better investment, but it will STILL offsetting twenty years down the road."

~ President, Warehouse
Solar Adopter

Potential adopters reacted only slightly more favorably than adopters to the two messages that included a statistic on costs covered by tax credits and incentives. Nearly all (5 of 6) potential adopters rated the two messages referenced above as very persuasive. Nearly all (5 of 6) solar adopters rated one of these two messages as very persuasive and just over half rated the second message as very persuasive.

Solar adopters and potential adopters reacted differently to the messages without any statistical information. For example, most (11 of 15) of the solar adopters said the message *"Investing in a solar system is pursuing a healthy return on investment."* was persuasive, while the minority (4 of 15) of potential adopters agreed. Conversely, the minority (1 of 7) of solar adopters, but the majority (5 of 6) of potential adopters, considered the message "*Think solar is unaffordable? Think again*." very persuasive.

It is not surprising that solar adopters would react negatively to the message *"Think solar is unaffordable? Think again."* because they would not have completed a solar project if they thought solar projects were unaffordable. Another indication that adopters believed that solar is affordable is that the majority of them (11 of 15) rated the message *"Investing in a solar system is pursuing a healthy return on investment."* as very persuasive. Also, in response to other questions, solar adopters typically reported an estimated payback of about 5 to 10 years for their solar project.

Solar adopters who explained their ratings most commonly said that they respond to financial messages that speak of "rapid return on investment,"

"payback being guaranteed," or "reducing operating expenses." One adopter (a non-profit organization) also explained that messages on solar and tax credits are not a persuasive message for them because they, as a non-profit agency, cannot use tax credits to offset the cost of the solar installation. Another adopter liked concrete statements.

Are there any reasons we didn't list that are as persuasive to you as the reasons we discussed above?

"Well, if anything, it would be too simply to package a couple of them so they are combined. You can make a positive difference in the community and save money, and hedge against rising costs. If the connection is explicit, that might be persuasive."

~ Pastor, Church
Potential Adopter

Potential adopters who explained their ratings gave varied answers. One potential adopter said that statements about tax credits and incentives made them think of the "price in a positive light." Another said that statements seemed true when saying tax breaks are present. The third respondent said that a statement about 80% of the cost being covered is a good "hook."

Several respondents offered some ideas on how Energy Trust could market solar energy to businesses. They said:

- "If there is a tax credit Energy Trust should advertise often."
- "There is value in combining messages to increase the appeal (e.g., 'you can make a difference in the community and save money')."
- "Use concrete messages such as 'reduce your electric costs by xx%' or 'did you know solar pays for itself in x years now?"

Environmental Messages

The environmental messages received the lowest ratings among all messages tested in this study. Table displays the two environmental messages respondents rated. Very few respondents rated these messages as persuasive. More solar adopters than potential adopters considered the environmental messages at least somewhat persuasive (Table 6).

Table 6: Number Rating Environmental Messages as "Highly Persuasive"[7]

Messages about Environmental Benefits of Solar	Solar Adopters (N=8)	Potential Adopters (N=8)
Messages Removed Midway through Data Collection		
Achieve green building ratings such as LEED and ENERGY STAR®	3	0
Solar demonstrates by environmental leadership in the community.	3	2

***You rated one or both messages regarding environmental benefits of solar as either very or extremely persuasive.* Why?**

"Green building ratings are probably required more and more in new buildings and so if you hear about solar to help meet those new standards, that would be [important]."

~ Partner, Warehouse Solar Adopter

"In a town like Portland, it's important to customers to have a green message from the business."

~ President & Owner, Restaurant Potential Adopter

Two solar adopters who rated the environmental messages as persuasive explained their responses. One adopter, who owns self-storage facilities, said that "green" building standards are being "required more and more in new buildings." His/her interest in solar would increase if he/she hears that solar energy systems can help meet these standards. The other adopter, who works for an environmental advocacy organization, reported that the organization highly values measures that are more "sustainable" and reduce their carbon footprint.

One potential adopter, a restaurant owner, who rated the environmental messages as persuasive explained that it is important to show to his customers who live in Portland that their business cares for the environment.

Resource Message

***You rated the message, "Solar helps me gain energy independence" as either very or extremely persuasive.* Why?**

"Hard to dispute."

~ Co-owner, Agricultural Solar Adopter

"Independence means I am not reliant on somebody else. The saving of the money and the ability to be self-reliant is good."

~Owner, Office Potential Adopter

Respondents did not rate the message *"Solar helps me gain energy independence"* as "very persuasive." Fewer than half of solar adopters and potential adopters reacted positively to this message (Table 7).

A few respondents who rated this message as very persuasive gave different reasons for the rating. One potential adopter said that energy independence is generally a good thing. One solar adopter reported that the message was hard to dispute. Another solar adopter said that for their organization, investing in solar is about reducing risks, which is a "straightforward business decision." This food service organization has valuable beef, lamb, pork, and chicken in its freezer throughout the year. Their PV system, including the back-up batteries, protects their meat from power failures.

[7] "Highly persuasive" ratings are "4" or "5" on a 5-point scale, where "4" was *persuasive* and "5" was *extremely persuasive*.

Have you heard of the term "net zero energy"?

"Never heard of it, but can understand what it is. Never seen it as promoted or talked about. I know that some colleague institutions have tried to install a wind turbine to get to zero net energy. But not heard of the term."

~ Vice President, Educational Solar Adopter

"No, not as a term on its own. Not hard to figure out what it means."

~ Owner, Restaurant Solar Adopter

If Energy Trust offered an incentive package for combined energy efficiency and solar installations that would reduce the electricity consumption and make at least one aspect of your building "zero net energy," would you investigate this opportunity?

"Depending on what the payback is, when will it be realized to be zero net? It has to be less than 30 years but there is no rule we follow as to how many years."

~ Director, Environmental Projects. Office Potential Adopter

"Zero net energy doesn't mean anything unless it is system wide. To become totally self-reliant is attractive, I am 100% on board. A fraction of that, I have to do a cost-benefit analysis."

~ President, Laundry/Dry Cleaner Potential Adopter

"I probably wouldn't, I am not going to spend any more money…Solar is not economical for my business, it is not going to work at that building. It is not that my business is too small, you can be a millionaire and still not want to waste money on solar."

~ Owner, Office Potential Adopter

Table 7: Number Rating Energy Independence Message as "Highly Persuasive"[8]

MESSAGES ABOUT SOLAR AND ENERGY INDEPENDENCE	SOLAR ADOPTERS (N=15)	POTENTIAL ADOPTERS (N=15)
Solar helps me gain energy independence.	6	4

Net Zero Energy Message

Energy Trust offers incentives to C&I customers for projects with "net zero" goals. The term *net zero* refers to buildings that generate as much electricity on-site as they use in a year. To understand what C&I customers think of net zero projects, we asked solar adopters and potential adopters to provide feedback on:

- Whether they are familiar with the term net zero;
- Whether they would investigate Energy Trust's incentive offer for projects with net zero goals; and,
- Whether demonstrating that some portion of the firm's energy use is net zero would make it easier to justify investing in a net zero project.

Familiarity With Net Zero Concept

Solar adopters tended to be more aware of the net zero concept than potential adopters. Nearly half (7 of 15) of solar adopters were familiar with the term net zero, while just over one-third (5 of 13)[9] of potential adopters said they were familiar with the term. Additionally, interviewers read the description of the net zero concept to those who were unfamiliar with it to determine if, when prompted, the respondent recalled knowing about net zero or felt they understood the concept. After hearing the description of net zero, six of 16 respondents said they could now understand what the term meant; others were already familiar with it.

Respondents who were aware of the net zero concept worked for various for-profit companies and non-profit agencies. There were no differences in the organization type between the solar adopters and potential adopters who said they were aware of the net zero concept.

8 "Highly persuasive" ratings are "4" or "5" on a 5-point scale, where "4" was persuasive and "5" was extremely persuasive.

9 Two potential adopters did not answer this question.

Interest in Energy Trust's Net Zero Incentive

Both solar adopters and potential adopters would investigate a net zero project if Energy Trust offered an incentive package for those projects. Nearly all (14 of 15) solar adopters and most (12 of 15) potential adopters reported that they would investigate Energy Trust's incentive package, if offered, for combined energy efficiency and solar installations that would reduce the electricity consumption of at least one aspect of the building(s) to net zero . Nevertheless, fifteen of those who would consider investigating this package of incentives also said that moving forward with a net zero project would depend on whether that investment is financially sound—that is, whether the investment has a reasonable payback/return on investment/cost-benefit ratio or the presumed lower cost of energy/operations.

Only a small minority reported not having any interest in considering a net zero project. Four respondents (one adopter and three potential adopters) expressed no interest in completing a project with net zero goals. They gave various reasons for their lack of interest, which were:

- The solar adopter said that their farm already is producing as much energy as it consumes, so they would not consider any other energy project.
- Each of the three potential adopters gave a different reason for their response. One said they would not want to spend any more money on energy projects. Another said that their tenants pay for electricity, so they do not gain directly from investing in a net zero project. The third respondent said that their heating bill already was very low ($40 a month) because they re-use the "waste" heat from their manufacturing process to heat the buildings.

If it is demonstrated that some portion of your company's energy use is "net zero" would that make it easier to justify the business case to decision makers about investing in these energy upgrades? Why?

"I don't know what would be distinctive about my experience, just I imagine it is always true that when you have value consideration and economic situation, the value aspect of the proposal gets the boost if the economics line up."

~ Pastor, Church
Potential Adopter

"To make it economical to do it. We don't have a lot of extra cash in this business, so we wouldn't do it for other reasons. Mainly looking into [a] cheaper source of electricity."

~ Co-Owner, Irrigation
Potential Adopter

"Because if they [owners] are able to know that they will get "free" electricity after costs have been paid over time, that does help make the case."

~ Co-owner, Manufacturing
Potential Adopter

"Yes it would…For a business your goal is to make money, you never do things you might do as a person that have expenses exceed income. Way over budget would be ok for building a home, but for a business that kind of investment will fail. Practically speaking, for a business, net zero is pretty much what has to be."

~ Partner, Warehouse
Potential Adopter

The Value of Demonstrating that Net Zero Concept is Viable

Both solar adopters and potential adopters said there is value in demonstrating that the net zero concept is viable. Most respondents (8 solar adopters and 8 potential adopters) agreed that it would make it easier to justify the business case to decision-makers to invest in a project with net zero goals if the project could demonstrate that some portion of the company's energy use were net zero. Only one respondent (a solar adopter) disagreed on this point. The rest of the respondents provided no feedback to this question.

Solar adopters reported that their decision to consider a net zero project would depend on their analysis of the funding for such a project. Five solar adopters said that they would consider a project with net zero goals if the project is financially feasible—either if the ROI were acceptable or if they could increase profits by lowering costs. One respondent (an environment advocacy

organization) reported that their approach in considering a net zero project would be to bolster their mission.

Similarly, potential adopters reported that their decision to consider a net zero project would depend on their analysis of the funding for such a project. Four potential adopters said that they would consider a project with net zero goals if the project is financially feasible.

CONCLUSIONS AND RECOMMENDATIONS

This chapter summarizes our key conclusions and recommendations.

CONCLUSION #1:

Cost savings drive interest in solar adoption. Most (10 of 15) solar adopters were motivated to install a PV system because of tax credits and the opportunity to save money on energy costs. Most (9 of 15) potential adopters cited saving money on energy costs as the most important reason for their interest in PVs. Additionally, both groups responded positively to the messages about the financial benefits of solar energy.

CONCLUSION #2:

The length of the payback estimate is the most critical financial criterion for businesses that are considering installing a PV system. Nearly all (28 of 30) respondents insisted that PV installation decisions "must pencil out" or "must be economical." Some adopters said that a payback of more than five or ten years was simply "too risky," and seemed to consider that conventional wisdom. Furthermore, adopters typically said they estimated a payback of fewer than 10 years for their PV system, while potential adopters believed payback for a PV system would be greater than 10 years. The majority (10 of 15) of potential adopters were unaware of the tax credits and Energy Trust incentives for PV installations, which could explain why they estimated a longer payback than did the solar adopters.

In addition, both groups rated these two financial messages as the most persuasive: "There's never been a better time to go solar: 80% of the cost paid through tax credits and incentives." and "If you are not going solar, you are leaving $ on the roof. Up to 80% of system costs could be paid could be paid by tax credits and incentives." Potential adopters considered messages that contained detailed financial information to be much more persuasive than those with less detailed or vague financial information, such as "Investing in a solar system is pursuing a healthy return on investment." Most (11 of 15) solar adopters, compared to minority (4 of 15) of potential adopters, rated the message "Investing in a solar system is pursuing a healthy return on investment." as very persuasive.

- **Recommendation:** Use marketing messages with detailed information about how much of the cost of a typical PV installation is covered by tax credits and incentives, and test, to the extent possible, how effective these messages are in the marketplace. Energy Trust might begin by adding the two messages containing detailed information on tax credits and incentives referenced above to existing solar marketing materials.

- **Recommendation:** Because there are no data regarding why the messages about tax credits and incentives are failing to reach potential PV adopters, Energy Trust should consider investigating how to increase awareness of tax credits and incentives among C&I customers in Oregon. One strategy in increasing awareness would be to elevate the level of marketing supporting C&I solar program (e.g., increase the frequency of ads or market through multiple channels), and measure the effect of this approach to the extent possible.

CONCLUSION #3:

Based on the available data, only building owners decide whether or not to install a PV system. The three potential adopters who leased the building(s) in which their businesses were located expressed interest in solar energy, but said that, as lessees, they could not choose to install a PV system at their site. One landlord of a commercial space (a potential adopter) explained that they were reluctant to invest in a PV system because their tenants pay their own electric bills and, as landlords, they would not receive direct financial gain from a PV installation.

- **Recommendation:** Because there is interest in solar among tenants, investigate new paths to solar adoption by working with both landlords and tenants that are interested in PV systems. For example, would tenants be willing to pay a slightly higher electricity rate to offset some of the cost associated with solar installation? Would property owners consider solar installation more if there was a possibility that solar energy could attract tenants who would be willing to pay higher rents?

CONCLUSION #4:

Decision-makers would consider a net zero energy proposition, but this proposition would be secondary to financial considerations. Fifteen of 26 respondents who would consider investigating Energy Trust's incentive package, if offered, for a project with net zero energy goals said that moving forward with a net zero energy project would depend on whether that investment is financially sound—that is, whether the investment has a reasonable payback/return on investment/cost-benefit ratio or the presumed lower cost of energy/operations.

In addition, about one-half of respondents (8 solar adopters and 8 potential adopters) agreed that it would make it easier to justify the business case to decision-makers to invest in a project with net zero goals if the project could demonstrate that some portion of the company's energy use were net zero.

- **Recommendation:** Use net zero energy messaging to support the primary financial message. For example, if using case studies to market Energy Trust incentives, highlight how net zero energy project(s) and incentives would result in financial benefits to the decision-maker and provide information on why net zero energy is a viable proposition.

APPENDICES

APPENDIX A: LITERATURE REVIEW BIBLIOGRAPHY

APPENDIX B: IN-DEPTH INTERVIEW GUIDES

A: LITERATURE REVIEW BIBLIOGRAPHY

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B: INTERVIEW GUIDES

C+I POTENTIAL SOLAR PV ADOPTERS – DRAFT INTERVIEW GUIDE 11/27/13

Name: _____

Date: _____

Interviewer: _____

Introduction

Hi, I'm [NAME] from Research Into Action. We are conducting a research study of the solar market on behalf of Energy Trust of Oregon.

I'm estimating this interview will take about no more than 20 minutes. Is now good time to talk? If not, could we schedule another time at your convenience?

[Interviewer: ask whether the interview could be recorded. If permission is given, record the interview.]

[Interviewer: record their response below. If respondents ask how we will ensure that their responses are confidential, say "we will keep your responses anonymous, so that they are presented in a way that could not identify you or your company."]

( ) Confidential

( ) Can share responses with Energy Trust

Roles and Responsibilities

First, I'd like to know a little more about you and your company.

1. What is the function of the business at this location – is it a manufacturing facility, an office, a hospital, or something else?
2. How many years has your organization been in operation?

   ( ) Less than one year
   ( ) 1 - 2 years
   ( ) 3 - 5 years
   ( ) 6 - 10 years
   ( ) More than 10 years
   ( ) Don't know

3. How many employees do you have? [If necessary, "How many in the State of Oregon?"]
4. What is your role in your organization?

Interest in Solar and Decision-making Criteria

5. Has your organization considered installing a solar PV system?

   [Interviewer: probe to code below for whether respondent is currently considering solar and check appropriate category. Also, for those who are considering or have considered solar, find out how far in that process they are/were (e.g., did they do internet or other research or have they talked to the contractor and obtained an actual quote for the project?)]

   [ ] Currently considering, not yet installed **[SKIP TO Q7]**

   [ ] Considered, but decided not to install **[SKIP TO Q7]**

   [ ] Never considered

6. **[ASK IF NEVER CONSIDERED THEN SKIP TO Q17:]** Is there any particular reason why you haven't?

7. What size of the system were you considering?

8. Tell me why you are/were interested in it.

   [*Interviewer: record verbatim responses, then **after the interview is over**, check all that apply from the list of codes given below. Also, if responses given are lacking sufficient detail, make sure to obtain enough detail.*]

   [ ] Long-term savings on energy bills

   [ ] Availability of incentives and rebates

   [ ] Tax benefits

   [ ] Declining cost of solar

   [ ] Environmental benefits

   [ ] Interest in new technologies

   [ ] Becoming more energy independent

   [ ] To hedge against rising electricity prices

   [ ] Support our organization's image/mission/customer values

   [ ] Keep up with energy trends

   [ ] Emissions reduction requirements/goals

   [ ] Other – please specify:_____

9. **[ASK IF Q8=multiple reasons, ELSE SKIP TO Q10:]** What is the most important reason that your organization is/was interested in solar?

10. What are/were the barriers your organization is facing for moving ahead with the solar project?

    [Interviewer: for those who considered a solar project, find out the reason, that is, what was the deal-breaker? Then ask about any other difficulties they encountered and ask what they did about those difficulties.

    *[Record verbatim response. **After the interview is over,** check all that apply from the list of codes given below. Also, if responses given are lacking sufficient detail, make sure to obtain enough detail.]*

    [ ] Access to upfront capital

    [ ] Access to adequate information

    [ ] Unfamiliarity/skeptical with technology and accompanying benefits (financial & energy

    [ ] Uncertainty about the amount of electricity the system would generate

    [ ] Finding an experienced contractor

    [ ] Appearance / aesthetics of PV system

    [ ] Total system cost

    [ ] Total upfront cost

    [ ] Operation & Maintenance (O&M) cost

    [ ] Estimated system payback

    [ ] Estimated taxes on system income

    [ ] Condition of existing roof

    [ ] Other – please, specify:_____

11. [**ASK IF CONSIDERED AND Q10=multiple barriers, ELSE SKIP TO Q12:**] What would you say is the most important reason you didn't move ahead with plans to install a solar system? [*Interviewer: probe for what was needed to resolve the barrier and why they didn't get it.]*

12. Were you looking to own or lease the system, or did you consider both options?

    ( ) Own

    ( ) Lease

    [Interviewer: if leasing option is not mentioned, assess whether they are familiar or unfamiliar with the leasing option and record that information. Provide an explanation of the leasing option, if necessary.]

( ) Both options

13. Can you tell me why?

14. **[ASK IF CONSIDERED, ELSE SKIP TO Q15:]** What information or resources have been or would be helpful to you as you consider/considered a solar PV system?

15. **[ASK IF CURRENTLY CONSIDERING ELSE SKIP TO Q17:]** If there was one person or group of people who would be the most influential in getting a solar project done, who is that? It can be someone inside or outside your organization (E.g., a solar installer).

    [Interviewer: we are not looking for the name; we are looking for the role or position of that person. Probe: what is the decision-making role of the "influential person."]

16. **[ASK IF CURRENTLY CONSIDERING:]** What would it take to resolve these issues? [*Interviewer: probe for what respondent is doing to resolve these issues.]*

17. **[ASK ALL]** Does your organization have financial thresholds that a solar project would have to meet?

18. **[ASK IF Q17=YES, ELSE SKIP TO Q21:]** What are they? *[If necessary, I'm thinking about payback period/Rate of Return on Investment (ROI), or maybe some other criteria that is unique to you.]*

    [Interviewer: capture enough detail. For example, if they considered payback, find out what metric they used and what was the cut-off criteria was – 2 yr., 5 yr., 10 yr., etc.]

19. **[ASK IF Q17=YES, and CURRENTLY CONSIDERING or CONSIDERED, ELSE SKIP TO Q21:]** While considering/when you considered a solar project, did you have all the information you needed to assess whether a solar project meets your financial thresholds?

20. **[ASK IF Q19=NO, ELSE SKIP TO Q21:]** What information or resources would be/would have been helpful to you?

Solar Messages

[ASK ALL]

Energy Trust is fine-tuning their solar program and communications/marketing to reach more business customers who might be interested in installing a solar electric system at their facility. I'd like to get your feedback on several potential themes to better understand if they're providing information that's helpful to you.

21. Are you familiar with the term "zero net energy"?

22. **[ASK IF Q21=not familiar with the term "zero net energy," ELSE SKIP TO Q23:]** "Zero net energy" means that a building generates as much electricity as it consumes. The "net zero " refers to the fact that the amount of electricity generated on-site, minus the amount of electricity consumed, is approximately zero, so in effect the building owner doesn't need to buy any electricity from the utility. Does this concept sound familiar to you?

23. You can also think about different *systems* within a building being "net-zero", rather than the whole building. For example, a building's lighting system can be called "net-zero" if the building's solar PV generates as much electricity as the building needs to power its lighting. If Energy Trust offered an incentive package for combined energy efficiency and solar installations that would reduce the electricity consumption and make at least one aspect of your building "zero net energy," would you investigate this opportunity?

24. **[ASK IF Q23=Yes, ELSE SKIP TO Q26:]** Why?

25. **[ASK IF Q23=NO, ELSE SKIP TO Q26:]** Why not? *[Probe: "Is there any additional information that would interest you? or Any questions that you have?"]*

26. **[If not addressed above, ask:]** If it is demonstrated that some portion of your company's energy use is "net zero " would that make it easier to justify the business case to decision makers about investing in these energy upgrades?

27. **[ASK IF Q26=Yes, ELSE SKIP TO Q29:]** Why?

28. **[ASK IF Q26=NO, ELSE SKIP TO Q29:]** Why not?

29. I am going to read you a few messages about benefits of solar. Please tell me how persuasive was each message in encouraging you to initiate a solar project at your company by using 1-5 scale where 1= Not at all persuasive and 5=Extremely persuasive. *[Interviewer: record rating]*

    "When I install a solar system, I hedge against rising energy prices."

30. How about, "Investing in a solar system is pursuing a healthy return on investment."

31. How about, "Solar helps me gain energy independence."

32. **DELETED 12/12/2013:** How about, "Solar demonstrates my environmental leadership in the community."

33. **DELETED 12/12/2013:** How about, "Solar helps me achieve green building ratings such as LEED and ENERGY STAR."

34. **ADDED 12/12/2013:** How about, "Solar will let you take control of your operating costs."

35. **ADDED 12/12/2013:** How about, "Think solar is unaffordable? Think again."

36. **ADDED 12/12/2013**: How about, "There's never been a better time to go solar. 80% of the cost paid through tax credits and incentives."

37. **ADDED 12/12/2013:** Lastly, how about: "If you are not going solar, you are leaving $ on the roof. Up to 80% of system costs could be paid by tax credits and incentives."

38. **[ASK IF some messages rated "4" or "5," ELSE SKIP TO Q40]** You rated some of these messages as either very or extremely persuasive. *[Interviewer: remind them of the message/messages that they rated as very/extremely persuasive]*. Can you explain why you gave that/these rating(s)?

39. Are there any reasons we didn't list that are as persuasive to you as the reasons we discussed above. [*Remind them of the message/messages that they rated as very/extremely persuasive, if necessary.]*

40. **[ASK IF NO messages rated "4" or "5," ELSE SKIP TO Q41:]** What would be a compelling reason for your organization to pursue a solar project?

Solar Decisions and Energy Efficiency Upgrade Decisions

[ASK ALL]

I'd like to ask you a few questions on whether your business' criteria for investing in a solar project is the same as the criteria for other energy-saving capital improvement projects, such as upgrading lighting.

41. If you were considering an energy-efficiency upgrade such as an efficient lighting or HVAC project, would approval of that type of project involve different decision-makers in your company from those who made the decision to install solar?

42. Would you go through the same process for an energy-efficiency upgrade such as the lighting upgrade project as for the solar project? *[Probe: Do you take the same steps, follow the same timeline, or have the same approval process?]*

43. How, if at all, are financial considerations different for these two types of projects? *[Interviewer: probe for payback, ROI]*

44. To your knowledge, has your business done any energy efficient building upgrades/ projects?

45. **[ASK IF Q44=YES, ELSE SKIP TO Q47:]** What kinds of projects?

46. Were you involved with those energy efficiency projects?

Awareness/ Knowledge of Solar Electric Costs & Financing

47. Tell me about any available rebates or tax credits that you are aware of for solar systems. *[Interviewer: check all that apply]*

    [ ] Energy Trust Incentives

    [ ] Federal Investment Tax Credit

    [ ] Federal Accelerated Depreciation

    [ ] Oregon Accelerated Depreciation

    [ ] Other – Please, specify:_____

    [ ] Not aware of any rebates or credits

48. **[ASK IF Q47=any option, ELSE SKIP TO Q49:]** You mentioned that you are aware of *[Interviewer: repeat their answer from the prior question]*. Do you have any sense about the size of that/these rebate(s) or tax credit(s)?

49. **[ASK IF Q47 NOT=Energy Trust incentives, ELSE SKIP TO Q50:]** Energy Trust offers cash incentives to make solar energy more affordable. Are you aware of these incentives?

50. How did you first hear about Energy Trust's solar PV incentive?

    ( ) Energy Trust website

    ( ) Energy Trust email

    ( ) Energy Trust representative

    ( ) Contractor

    ( ) Event – Which event? _____

    ( ) Media (TV, radio, newspaper ads)

    ( ) Friends, family, neighbor, co-worker, or other word-of-mouth

    ( ) Other – please specify: _____

    ( ) Don't Know

51. Do you have any sense of how much a solar system costs? *[Interviewer: if they provide you with some estimates, record as much detail as possible such as cost per panel, cost for certain size, or cost of the system they were looking into]*

52. In the last year, prices of installed photovoltaic systems have fallen by more than 10% in Oregon. And they've fallen nearly 50% over the past four years. Does that surprise you?

    [Note to the interviewer: this statistic was obtained from the Solar Energy Industry Association website. We want to know whether respondents previously knew about this information. If necessary, probe to capture this information.]

53. Will the fact that the price of solar is dropping pretty quickly have any bearing on your company's decision about investing in solar?

Final Questions

We are almost done. I have a couple of more questions.

54. Do you own or lease the building(s) in which your business is located?

55. About when was/were this/these building(s) built? *[Interviewer: if multiple buildings, obtain building age for each building]*

56. Finally, are there any issues or topics we haven't covered that you'd like to comment on?

THANK RESPONDENT

C+I SOLAR PV ADOPTERS – DRAFT INTERVIEW GUIDE 11/18/13

Name:

Date:

Interviewer:

Introduction

Hi, I'm [NAME] from Research Into Action. We are conducting a research study of the solar market on behalf of Energy Trust of Oregon. Energy Trust has identified you as someone who would be knowledgeable about solar systems since your business has installed a photovoltaic, or PV system(s) at [INPUT ADDRESS OF THE SOLAR SYSTEM SITE IF ONLY ONE SITE OR SAY "several locations" IF MULTIPLE SITES] in [INPUT YEAR INSTALLED].

I'd like to ask you a few questions about that solar project, including why your business made the decision to invest in a solar PV system. I'm estimating this interview will take about 20 minutes. Is now good time to talk? If not, could we schedule another time at your convenience?

[Interviewer ask whether the interview could be recorded. If permission given, record the interview.]

Would you like this interview to be confidential or can we share your responses with Energy Trust?

[Interviewer: Record their response below. If respondents ask how we will ensure that their responses are confidential, say "We will keep your responses anonymous, so that they are presented in a way that could not identify you or your company."]

( ) Confidential

( ) Can share responses with Energy Trust

Firm Type and Role of the Respondent

First, I'd like to know a little more about you and your company.

1. What is the function of the business at the site where the PV system is installed – is it a manufacturing facility, an office, a hospital, or something else?
2. How many years has your organization been in operation?

   ( ) Less than one year
   ( ) 1 - 2 years
   ( ) 3 - 5 years
   ( ) 6 - 10 years
   () More than 10 years
   ( ) Don't know

3. How many employees do you have? [If necessary, "How many in the State of Oregon?"]
4. What is your role in your organization?

5. To what extent were you involved in getting the solar PV system installed at your organization?

   [Interviewer: We are looking for the person who is a decision maker. If you reach someone who had limited involvement and could not answer our questions, probe to determine who is the appropriate contact.]

Decision-making Process

6. When did you first become interested in a solar installation for your company?

7. Why were you interested in a solar installation?

   [*Interviewer: Record verbatim responses, then **after the interview is over**, check all that apply from the list of codes given below. Also, if responses given are lacking sufficient detail, make sure to obtain enough detail*]

   [ ] Long-term savings on energy bills

   [ ] Availability of incentives and rebates

   [ ] Tax benefits

   [ ] Declining cost of solar

   [ ] Environmental benefits

   [ ] Interest in new technologies

   [ ] Becoming more energy independent

   [ ] To hedge against rising electricity prices

   [ ] Support our organization's image/mission/customer values

   [ ] Keep up with energy trends

   [ ] Emissions reduction requirements/goals

   [ ] Other – please specify:_____

8. **[ASK IF they gave multiple reasons in Q7, ELSE SKIP TO Q9]** Were any of the reasons you just mentioned more important than the other reasons? If so, what was/were the most important reason(s)?

9. What were the barriers your organization faced in installing a solar system?

   [Interviewer: Probe - "Anything else?]

   *[Interviewer: Record verbatim responses, **then after the interview is over**, check all that apply from the list of codes given below. Also, if responses given are lacking sufficient detail, make sure to obtain enough detail.]*

[ ] Access to upfront capital

[ ] Access to adequate information

[ ] Unfamiliarity/skeptical with technology and accompanying benefits (financial & energy)

[ ] Uncertainty about the amount of electricity the system would generate

[ ] Finding an experienced contractor

[ ] Appearance / aesthetics of PV system

[ ] Total system cost

[ ] Total upfront cost

[ ] Operation & Maintenance (O&M) cost

[ ] Estimated system payback

[ ] Estimated taxes on system income

[ ] Condition of existing roof

[ ] Other – please, specify:_____

10. How did you resolve these issues? *[Interviewer Note: Remind them what they mentioned in the prior question]*

11. **[If not addressed above, ask:]** Did installing the solar system help your business meet any organizational goals? For example, was it supported by a business plan, an organizational policy, or your business' mission?

12. Have you mentioned the solar system in any customer-facing materials, such as photos or mentions of the system on a website, in press releases, advertising, or elsewhere?

13. What role did the Energy Trust incentive have in your decision to install the solar system?

    [Interviewer Note: Looking for how much of a contributing factor they felt Energy Trust incentive was, or if having a rebate buy-down style incentive was beneficial or not.]

14. If there was one person or group of people who were the most influential in getting your solar project done, who was that? It could be someone inside or outside your organization (E.g., a solar installer).

    [Interviewer note: we are not looking for the name; we are looking for the role or position of that person.]

15. And tell me about their role(s)? *[Interviewer: We are looking for how they influenced the project.]*

16. **[ASK IF in Q15 the contractor was mentioned as the most important person or group]** What did your contractor/installer do to make the project happen? *[Interviewer: we are looking for how the contractor/installer influenced their decision-making process.]*

17. Thinking of your solar system, are you leasing that system from a third party, have some other 3rd party ownership arrangement, or do you own it?

    () Own

    ( ) Lease

    ( ) Other 3rd party arrangement

18. **[ASK IF Q17= Own, ELSE SKIP TO Q21]** Were there any financial thresholds that this project had to meet?

19. **[ASK IF Q18=Yes, ELSE SKIP TO Q21]** What were they? [If necessary, I'm thinking about payback period/ Rate of Return on Investment (ROI), or maybe some other criteria that is unique to you.]

    [Interviewer: Capture enough detail. For example, if they considered payback, find out what metric they used and what was the cut-off criteria -2 yr., 5 yr., 10 yr., etc.]

20. **[ASK IF they used some type of financial criteria as noted in Q18]** Did you have any difficulty obtaining the information you needed to make these financial projections? If so, what was the difficulty, and how did you overcome it?

21. **[ASK IF Q17= Lease, ELSE SKIP TO Q0]** Why did you decide to lease rather than own the system?

    *[Interviewer: Record verbatim responses, **then after the interview is over,** check all that apply from the list of codes given below; Probe - "Anything else? Also, if responses given are lacking sufficient detail, make sure to obtain enough detail.]*

    [ ] No upfront capital expense

    [ ] No Operation & Maintenance (O&M) costs

    [ ] Unable to directly use some/all tax benefits

    [ ] To hedge against rising electricity prices

    [ ] Other – please, specify: _____

22. Did you consider purchasing the system directly and using Energy Trust incentives to offset some of your installation cost?

23. Was there any other information about the financing, installation, use, or performance of your system that you wish you had known more about before you installed the system? If so, what was that?

Solar Messages

[ASK ALL]

Energy Trust is fine-tuning their solar program and communications/marketing to reach more business customers who might be interested in installing a solar electric system at their facility. I'd like to get your feedback on several potential themes or messages Energy Trust is considering.

24. Are you familiar with the term "zero net energy"?

25. **[ASK IF Q24= not familiar with the term "zero net energy," ELSE SKIP TO Q26]** "Zero net energy" means that a building generates as much electricity as it consumes. The "net zero " refers to the fact that the amount of electricity generated on-site, minus the amount of electricity consumed, is approximately zero, so in effect the building owner doesn't need to buy any electricity from the utility. Does this concept sound familiar to you?

26. You can also think about different *systems* within a building being "net-zero", rather than the whole building. For example, a building's lighting system can be called "net-zero" if the building's solar PV generates as much electricity as the building needs to power its lighting. If Energy Trust offered an incentive package for combined energy efficiency and solar installations that would reduce the electricity consumption and make at least one aspect of your building "zero net energy," would you investigate this opportunity?

27. **[ASK IF Q26=Yes, ELSE SKIP TO Q29]** Why?

28. **[If No in Q26]** Why not? *[Probe: "Is there any additional information that would interest you? or Any questions that you have?"]*

29. **[If not addressed above, ask:]** If it is demonstrated that some portion of your company's energy use is "net zero " would that make it easier to justify the business case to decision makers about investing in these energy upgrades?

30. **[ASK IF Q29=Yes, ELSE SKIP TOQ29]** Why?

31. **[ASK IF Q29=No, ELSE SKIP TOQ29]** Why not?

32. I am going to read you a few messages about benefits of solar. Please tell me how persuasive was each message in encouraging you to initiate a solar project at your company by using 1-5 scale where 1= Not at all persuasive and 5=Extremely persuasive. *[Interviewer: record rating]*

    "When I install a solar system, I hedge against rising energy prices."

33. How about, "Investing in a solar system is pursuing a healthy return on investment."

34. How about, "Solar helps me gain energy independence."

35. **DELETED 12/12/2013:** How about, "Solar demonstrates my environmental leadership in the community."

36. **DELETED 12/12/2013:** How about, "Solar helps me achieve green building ratings such as LEED and ENERGY STAR."

37. **NEW 12/12/2013:** How about, "Solar will let you take control of your operating costs."

38. **NEW 12/12/2013:** How about, "Think solar is unaffordable? Think again."

39. **NEW 12/12/2013:** How about, "There's never been a better time to go solar. 80% of the cost paid through tax credits and incentives."

40. **NEW 12/12/2013:** Lastly, how about: "If you are not going solar, you are leaving money on the roof. Up to 80% of system costs could be paid by tax credits and incentives."

41. **[ASK IF some messages rated "4" or "5," ELSE SKIP TO Q40]** You rated some of these messages as either very or extremely persuasive. *[Interviewer: Remind them of the message/messages that they rated as very/extremely persuasive]*. Can you explain why you gave that/these rating(s)?

42. Are there any reasons we didn't list that are as persuasive to you as the reasons we discussed above. [*Remind them of the message/messages that they rated as very/extremely persuasive, if necessary.]*

43. **[ASK IF NO messages rated "4" or "5," ELSE SKIP TO Q41:]** What would motivate you to pursue another solar project?

Decision-making Criteria for non-Solar Projects

[ASK ALL]

I'd like to ask you a few questions on whether your business' criteria for investing in a solar project is the same as the criteria for other energy-saving capital improvement projects, such as upgrading lighting.

44. If you were considering an energy-efficiency upgrade such as an efficient lighting or HVAC project, would approval of that type of project involve different decision-makers in your company from those who made the decision to install solar?

45. Would you go through the same process for an energy-efficiency upgrade such as the lighting upgrade project as for the solar project? *[Probe: Do you take the same steps, follow the same timeline, or have the same approval process?]*

46. How, if at all, are financial considerations different for these two types of projects? *[Interviewer: Probe for payback, ROI]*

47. To your knowledge, has your business done any energy efficient building upgrades/ projects other than your solar project?

48. **[ASK IF Q44=Yes, ELSE SKIP TO Q54]** What kinds of projects?

49. Were you involved with those energy efficiency projects?

50. **[ASK IF Q46= Yes, ELSE SKIP TO Q54]** What was your involvement?

Final Questions

We are almost done. I have a couple of more questions.

51. Do you own or lease the building(s) where the PV system is installed?

52. About when was/were this/those building(s) built? *[Interviewer: If multiple PV systems are installed at multiple buildings, obtain building age for each building]*

53. Finally, are there any issues or topics we haven't covered that you'd like to comment on?

THANK RESPONDENT