Evaluation Committee Meeting

August 26, 2011 Noon-3pm

Attendees

1. Debbie Kitchin, Board Member – Committee Chair
2. Dan Enloe, Board Member (by phone)
3. Ken Keating, Expert Outside Reviewer
4. Margie Harris, Executive Director (by phone)
5. Phil Degens, Evaluation Manager
6. Sarah Castor, Evaluation Sr. Project Manager
7. Brien Sipe, Evaluation Project Manager
8. Ashley Jackson, Trade Ally Coordinator
9. Debbie Menashe, Senior Counsel
10. Diane Ferington, Residential Sector Lead
11. John Volkman, General Counsel & Policy Director
12. Lakin Garth, Planning Project Manager
13. Lewis Colon, Sr. Manager - Strategies and New Initiatives, Conservation Services Group (CSG)
14. Pete Catching, Planning and Economic Analysis Manager
15. Steve Lacey, Director of Operations
16. Sue Fletcher, Communication and Customer Service Sr. Manager
17. Susan Jamison, Residential Marketing Manager
18. Ted Light, Planning Project Manager
19. Tim Davis, Sr. Manager - Contractor Programs, CSG
20. Tom Beverly, Trade Ally Manager

The meeting began at noon with a review of the agenda.

Agenda

1. 2011 Trade Ally Survey
2. 2009 Existing Homes Billing Analysis – Gas Measures
3. Thermal Imaging Pilot

1. 2011 Trade Ally Survey

Contractor: Research Into Action

Phil presented results from the draft report. The survey is now in its seventh year; it was fielded in February and March, 2011 and asked questions about the 2010 program year. Energy Trust collaboratively implemented the survey with Research Into Action. The objectives were to assess firm demographics, collect feedback on marketing and communications initiatives and data on market behavior and technology installation. Ken asked what “collaboratively implemented” meant. Phil said that the online survey was fielded through Energy Trust’s survey account and announcements were sent out by Energy Trust staff; Research Into Action edited the survey and analyzed the results, as well as sent out gift cards to respondents entered into a drawing for completing the survey.

Changes to the survey for 2010 included: replacing open-ended questions with categorical questions, adding sections for ductless heat pump contractors, and questions on the trade ally rating system. Real Estate trade allies were not invited to participate in the survey; they were surveyed as part of the New Homes Process Evaluation (draft expected soon).

There were 218 completed responses from 1,450 survey invitations and respondents represented 192 unique companies or franchises.

Table 1. Respondents by Primary Program

	2011	2010
Residential	105	154
Commercial	32	60
Solar	20	38
Industrial	8	9
Other renewables	9	5
Other	18	7

Firmographics were very similar to last year. One fourth of trade allies rated their participation with Energy Trust as having a negative economic impact. Dan noted that the result for this question lined up with the opinion of the star rating system for trade allies, indicated the two might be related. Ken asked if a negative impact was really indicated or if it meant weak or no impact. According to the scale used for the question, a response of 0-4 should mean a negative impact; but respondents may have been confused or they may really believe there is a negative impact.

Most trade allies report completing the bulk of paperwork for incentives, rather than the customer completing it. Many felt that the paperwork was excessive or too complex. They reported that management or administrative staff were more likely to complete the paperwork than sales staff or technicians. Ken noted that these people were the furthest away from the actual work or site knowledge. Diane said that in small businesses, a manager may also be a technician. Phil added that respondents reported completing work in the office not the field, and that we should be trying to make the paperwork easier for trade allies, not just participants. Debbie K. noted that there is a science to making forms efficient and easy to complete, and we should be tapping it.

This year, only 11% of respondents were unfamiliar with the Oregon state tax credits, less than in previous years, but there were still many suggestions for increasing the use of the tax credits. Diane said that ODOE has reached out to our program management contractor for existing homes, CSG, to see how we can align processes.

Trade allies report marketing a variety of different financing programs. Phil said that we should encourage all kinds of funding sources, not just Clean Energy Works (CEW) or Umpqua Bank's GreenStreet Lending. Tom added that Energy Trust is developing a lending ally network.

While many trade allies did not use EBIX, an insurance verification service contracted by Energy Trust, the ones that did still had complaints about the experience. Tom said that once the new information systems are put in place next year, we should be able to track insurance on our own without using EBIX.

More than 19% of respondents reported that they offer services in Washington, up from 10% last year. Barriers still include lack of awareness and the "of Oregon" in Energy Trust's name.

With regard to trainings and trade ally roundtables, Tom noted that we already cover most of the topics trade allies report interest in, but more than a third still don't find them useful or valuable. Debbie K. suggested that perhaps some attendees find the information to be too basic and maybe some topics should be more technical or in-depth. Sue would like to see results separated into Portland Metro and non-Metro trade allies, noting that non-Metro roundtables tend to be more conversational and open compared to Portland. Tim thought this might be due to Portland roundtables being attended by owners rather than techs. Diane suggested combining roundtables and trainings in outlying areas. Debbie K. also noted that the start time of the roundtables may need to vary by region. Margie would also like to see some of these preferences by Metro versus non-Metro.

Results from the section on communications verify that Energy Trust is using methods and frequencies that are preferred by trade allies. The majority of respondents receive the *Insider* newsletter and usually read it. Phil noted that preferences have shifted over the years to electronic communications.

All trade allies were asked about the star rating system, which currently only applies to residential trade allies. About half of respondents were aware of the system and those respondents were divided in opinion on the clarity of rating criteria, usefulness and how well the rating system might apply to the commercial sector. Fairness of the system was also a concern for almost a third. Steve thought it interesting that there weren't more objections to the system. Tom noted that Energy Trust has been working to adjust the system for rural and new trade allies who haven't completed as many projects. Ken asked if trade allies could opt out of the rating system and Diane said no. Ken thought the system might favor the favorites and hurt the new trade allies. Tim said that the system is now based more on quality of installation than on project volume.

Table 2. Trade Ally Satisfaction (% rating 4 or 5 on a five-point scale)

	Energy Efficiency Trade Allies	**Solar Trade Allies**
Overall satisfaction with Energy Trust	74%	78%
Knowledge of Energy Trust programs and procedures	80%	85%
Interactions with Energy Trust staff	77%	81%
Quality assurance/quality control process	68%	--
Quality of responses to your requests	68%	81%
Response times to requests for information	66%	70%
Response times to requests for assistance on forms	57%	--
Turnaround time for incentive application/approval of paperwork	56%	67%
Incentive payment processing time	53%	48%
Quality of your relationship with Energy Trust inspectors	--	63%
Scheduling of Energy Trust inspections	--	62%
Quality of Energy Trust inspections	--	58%

Overall, 74% of energy efficiency and 78% of renewable trade allies are satisfied with Energy Trust, about the same as last year. However, satisfaction with payment processing time was significantly lower this year compared to last. Sarah noted that the survey is usually fielded in February or March – immediately after the end-of-year spike in applications, which was particularly high this year; at this time satisfaction with processing time is bound to be at its lowest of any point in the year. Phil repeated suggestions from past years on changing Energy Trust processes to allow for bulk processing or direct payment to the contractor. Steve noted that there was a drop in satisfaction with the quality of response to requests for both energy efficiency and renewable trade allies. This is interesting because energy efficiency trade allies receive responses from the PMCs and renewable trade allies receive responses from Energy Trust staff.

Of those who perceived a change in their relationship with Energy Trust over the past year, nearly half of respondents felt it had improved, while less than 10% felt it had declined.

Trade allies were also asked some questions about the main category of measures they reported installing. Among residential trade allies, efficient gas furnaces and heat pumps continued to dominate installations. Margie asked how long we expect to offer incentives for heat pumps and how we will judge whether they are still necessary. Phil said that we will monitor national efforts to increase the code and provide the Department of Energy with information on the transformation of our heat pump market. Ken noted that we could move to incentivizing a higher efficiency level and that the marginal cost of efficient heat pumps does not seem to dissuade people from buying them. Dan added that there is a broad range of efficiency levels available in the market. Ken said that when the tax credits for heat pumps are removed the marginal cost for an efficient unit may fall.

This year, nine trade allies reported primarily installing ductless heat pumps (DHPs). Dan asked if DHPs are being installed in manufactured or prefab housing. Sarah said that the early results of the New Homes Process evaluation, which interviewed manufactured home builders, show that the manufactured homes market is in such rough shape right now that builders are not interested in trying out new (to them) technologies. For existing home retrofits, Phil noted that DHPs are best for non-ducted homes.

Among other residential measures, windows continue their steady trend toward increasing efficiency levels, as well as becoming more readily available. There is also a lot of overlap in the activity and potential of air sealing and insulation measures.

Commercial lighting trade allies report that high performance T-8 and T-5 lighting make up about 77% of their installations. Occupancy sensors are often installed, but other controls for lighting are seldom used, despite years of program effort to get them to take off.

Overall recommendations from the study include:

- **Financing:** Large numbers of trade allies are familiar with Umpqua Bank's Green Street loans and other financing programs and many actively offer them. Energy Trust should continue to make contractors aware of these financing services and options to enable them to communicate the benefits of these services to customers accurately.

- **Training:** Continue training programs that support trade allies' efforts to work with the programs and market their services to customers.
- **Roundtables:** Clearly delineate roundtables by program and consider more specific topics to allow trade allies to attend those portions most relevant to their business. Continue to develop and expand web-based roundtables.
- **Website:** Attempts should be made to increase awareness of trade ally-specific resources on the website and to increase ease of navigation. In further efforts to upgrade the website, priority should be given to the forms and program incentives pages.

Debbie K. recommended that technical trainings be done as webinars.

Phil remarked that there is still a lot of confusion about DHPs and we need to monitor the market and make sure they are used in appropriate applications to maximize savings and customer satisfaction.

With regard to a comment from trade allies that customer reviews should be viewable on the Find a Contractor web page, Margie inquired about an Angie's List approach or collaborating directly with Angie's List. Tom said that there are legal limitations for us around customer reviews and that we have approached Angie's List, but they do not want to partner with other organizations. Dan suggested that we should approach them again and try harder to persuade them; he is willing to help if needed.

2. 2009 Existing Homes Billing Analysis – Gas Measures

Brien presented the results of the billing analysis, done in-house. The project was a comprehensive look at gas measures through the standard track, Home Performance with Energy Star (HPwES) track and Home Energy Reviews (HERs). It is important to note that during the study period, average residential gas loads were down 14% due to mild weather and the economic recession.

Billing data were normalized for weather and cleaned according to standard protocols. A group of 30,000 randomly selected non-participant homes was use as a comparison group. Two methods were used to estimate savings: a difference-in-differences model to identify household-level and bundled measure savings, and multiple variable regression to determine measure and unit level savings.

For the standard track, average savings per treated home (all measures) net of the comparison group were 73 therms, about 10% of total gas load. Analysis of measure bundles confirms the non-additive nature of measure savings.

Dan made a suggestion last week that savings for insulation and windows should be shown per 100 square feet of treated area, so the figures weren't shown to several decimal places. Brien liked the idea, and extended it to show shell insulation per 1,000 sq ft, duct insulation per 200 linear feet and windows per 200 sq ft. He also presented air and duct sealing per 1,000 and 500 CFM reduction, respectively.

Table 3. Estimated Savings by Measure (numbers in italics are not statistically significant)

Measure	2006-2007	2008	2009
Air sealing (per 1000/CFM)	*0*	*5*	**15**
Duct sealing (per 500/CFM)	**24**	*6**	**12**
Gas furnace	**77**	**68**	**65**
Windows(per 200/sq. ft.)	**22**	**39**	**38**
Ceiling insulation (per 1000/sq. ft.)	**52**	**52**	**45**
Floor insulation (per 1000/sq. ft.)	**35**	**51**	**36**
Wall insulation (per 1000/sq. ft.)	**52**	**62**	**38**
Duct insulation (per 200/Lft.)	**14**	**28**	-**

* Includes the high volume contractor discussed below.
** The 2009 sample of duct insulation projects was too small to provide a meaningful estimate.

The year 2009 marked the first time we have found measurable savings for air sealing. For other measures, average savings were slightly lower than in previous years, likely due to the interaction with the recession. Debbie K. said that since the recession is temporary and measures may save more in future years, we should revisit these estimates. Phil explained that we simply take a three year moving average of savings, to smooth out recessions. Ken said one could look at the percent savings over time to control for the changing baseline of consumption. He also noted that when multiple measures are installed it can be hard to get a precise answer for each measure; these estimates look pretty stable.

The HPwES program is aimed at comprehensive retrofits and uses diagnostic tests for duct and home air loss; 2009 was the first program year with enough projects to evaluate and about 100 homes were included in the analysis.

The average savings for a treated home was 148 therms, about double the standard track estimate. This was just under 20% of the average household gas load. However, the modeling software used for HPwES estimated savings of about 314 therms (based on overestimated gas loads), resulting in realization rates between 35% and 47%. It is recommended that the new modeling software calibrate energy usage to utility bills. The cost-effectiveness of the program should also be re-evaluated in light of these first billing analysis results. Lakin asked if the estimated savings included instant savings measures (ISMs: CFLs, aerators and showerheads); Brien said yes.

Phil pointed out that saving 20% of gas usage is very good; it is just that the model overestimated usage from the beginning. Ken asked what modeling software the program would be using going forward; Energy Measure Home (EMHome) is the new software and it should allow for calibration to billing data. Brien added that at the recent evaluation conference, we heard similar stories of low realization rates due to modeling software from programs around the country and in Europe. Ken said that he is on the committee that will be evaluating the ARRA funding and thinks other programs will have similar results. They are spending more money per project, but will probably only see more projects, not more savings per project.

Diane is confident that EMHome will produce more accurate savings estimates. Tim added that EMHome is designed to be more conservative. Debbie K. asked, even if we get better savings estimates, will HPwES still be cost-effective? Brien said the Planning team will re-evaluate and compare to the standard track. He also said that some of the cost of HPwES is

from contractors doing low savings measures because they are trying to do everything possible in the house at once. Diane added that CEWO, which uses the HPwES approach, has goals beyond energy savings, and even HPwES has goals around health and safety that don't always save energy.

Debbie K. asked how the cost of diagnostic testing affects cost-effectiveness. Brien said that we pay a separate incentive ($150) for the Home Performance assessment. Tim said that the cost of that assessment has come down significantly in the last few years as the number of contractors has grown.

Table 4. Estimated Savings for Baseload Measures

	Estimated Savings	**95% CI**	**Predicted Savings**
HERs	36	6	38
ESKs	12	7	10
Tankless Water Heaters	58-66	13-29	65

"Baseload measures" – including instant savings measures (ISMs) from Home Energy Reviews (HERs) and Energy Saver Kits (ESKs), and tankless water heaters – were analyzed separately from the other tracks because of the small expected savings (for ISMs) or issue with fuel switching (for tankless water heaters).

Average savings from aerators and showerheads in HER homes with gas water heat were 36 therms, almost exactly what was expected; average savings for these measures distributed through ESKs was 12 therms, also close to the initial estimate. Neither of these savings numbers needs to be adjusted going forward.

Tankless water heaters saved an estimated 58-66 therms, consistent with 2007 and 2008 impact evaluations. It was expected that the incremental cost of tankless water heaters would decrease over time, but this hasn't happened; as a result, the measure is no longer cost effective and Evaluation recommends that the incentive be removed. Ken asked about new homes; Phil said that the cost to install a tankless unit is lower in new homes because the gas plumbing and electrical needs are designed in, whereas in existing homes costs for these factors are significant. Ken pointed out that just before the recession, 26% of new homes in California were built with tankless water heaters; the measure is really growing.

Brien then discussed an issue with a high volume contractor in the Existing Homes program. In 2008 and 2009, one air and duct sealing contractor (a trade ally at the time) was responsible for over half of standard track projects in those measure categories, and was found to have low quality control (QC) pass rates for their projects. The program invested significant resources to retraining the contractor and improving the quality of their work. The incentive was also restructured, from paying per CFM reduction to a percent of cost. From the billing analysis, it appears that this investment did result in measurable savings for this contractor's work, comparable to other trade allies. Despite this improvement, the contractor was removed as a trade ally due to their inability or unwillingness to align with Energy Trust program goals. The contractor misrepresented the restructuring of the incentive as the end of the offer to customers to get more jobs in before the change. In addition, the contractor began submitting high numbers of 'test-only' projects where they did not perform work but received incentives for testing the homes.

Debbie K. asked if the trade ally has tried to be reinstated. Diane said they have renamed themselves and resurfaced here and elsewhere around the Northwest, but everyone in the NEEA network is aware of this.

Margie asked what Energy Trust has learned from this experience. Diane said we recognize the need for earlier QC/quality assurance (QA) and more interaction with new contractors. Dan asked if we plan to do anything to try to repair any damage to Energy Trust's reputation. Debbie said it was worth considering whether to offer affected customers additional QA at this stage to correct the work if necessary. Diane said that other contractors typically won't go into affected homes if they know this particular contractor worked there because they are afraid there will not be enough savings to receive the incentive. She also noted that Energy Trust is not allowed to book savings or pay for the same measure done twice at a site. Ken said it should still be possible to get savings out of the sites done before the retraining, although it could be that they had selected sites that were less leaky in the first place. He also said that the incentive already paid to these sites should be considered a sunk cost and not the basis for decisions. Margie said that not every customer would take up an offer of additional corrective work, which would reduce the cost. Diane added that we have already worked with the contractor in question to fix some jobs.

Debbie M. suggested that we consider the precedent we would be setting by paying to correct this contractor's work. We might be expected to fix all such problems that arise in the future and Energy Trust has always said that we cannot guarantee contractor work or energy savings. Margie said it is worth exploring the costs and benefits of making some reparations. Debbie K. seconds Margie's view. Brien noted that this contractor's work affected between two and three thousand sites; perhaps 10% of those received remedial work, according to Diane.

Brien said the program is continuously trying to find ways to get all contractors to do high quality work. A checklist for air sealing has been implemented and the incentive restructuring should lead contractors to do comprehensive work rather than meeting the minimum requirements. The program has also intervened early with a non-trade ally contractor who has been submitting poor quality insulation jobs. The problem was identified by quick QC/QA work.

Another possible mitigation strategy would be requiring the contractor to be a trade ally in order to pay an incentive. The majority of work is already done by trade allies. Diane would like to go to a trade ally-only model at least in the Metro area; it might be unreasonable in rural or outlying regions. Steve asked how difficult it is to become a trade ally. The biggest constraint is that we require more insurance than the state's Construction Contractor Board. We also require attendance at two 1.5 hour webinars.

3. Thermal Imaging Pilot

Contractor: Watershed Sciences, Inc.

Phil presented preliminary findings from a thermal imaging pilot. Phil had been hoping to do this kind of study from satellite images for several years, but the technology is still not deployed; he found that Watershed Sciences had the capability to do the work via flyovers in a small plane. Airborne thermal infrared (TIR) remote sensing has been used to assess heat

loss from buildings in Canada and Denmark. Potential uses of such study include better diagnostics for energy efficiency improvements, better targeting of services and long-term impact evaluation.

The data was collected on February 2, 2011. The weather needed to be cold and clear with no standing snow to gather the best images. The site was 14,165 acres in southeast Portland. Images show the range of radiant energy from different surfaces such as roofs, trees and the ground. Watershed Sciences was able to use country tax assessor data (matched through GIS) to identify structure footprints and LiDAR to exclude non-building features from the analysis. Radiant energy statistics were computed for all 64,597 structures within the survey area to enable the identification of trends and differences between building and neighborhoods.

The images can identify “hotspots” (areas of higher radiant energy) on individual structures, but difficulty in interpreting these results from the following factors:

- Spatial misalignment, causing energy from adjacent or obscuring objects to be associated with the building footprint
- Physical characteristics of the roof, such as slope and reflectivity of material that influence a building’s absorptive and emissive properties
- Lack of ground level validation data; a building with relatively high heat emission may be a function of poor insulation or the resident preferring a high internal temperature and the TIR cannot distinguish between the two scenarios.

Energy Trust does not plan to share the dataset outside the organization for the foreseeable future. We need to study further whether or how TIR imagery can be used. Watershed Sciences is currently linking the TIR database with normalized addresses for each structure, which will allow us to associate energy consumption or program tracking data.

Preliminary analysis could be available next year, focusing on:

- The accuracy of the TIR in predicting heat loss from attics or walls
- How TIR heat loss images correlate to levels of energy consumption
- Accuracy of hotspot analysis in identifying building issues
- Usefulness in the commercial sector

Debbie K. asked whether, for initial screening of buildings, it wouldn’t be easier or less expensive to look at billing data. Phil said that we are currently restricted by our data-sharing agreement with the utilities. Debbie pointed out that the TIR data cannot tell us whether the home is a rental or various other factors that affect eligibility. Margie asked how southeast Portland was selected for the study. Phil said we wanted a dense urban area with homes of various ages.

Margie asked if board members were sensitive about the use of the study. Debbie K., the only attending board member remaining at the meeting, said that she was not opposed to the use for targeting neighborhoods; she just wanted to use the most cost-effective approach. Over the whole service territory, using billing data would probably be cheaper and easier to gather. Margie said she would expect some discomfort by people concerned about privacy issues.

Lewis asked if we would do a pilot of targeting marketing with the results of the study, to test it out. Phil said that once we finish matching to address data we might be able to do a pilot. He also said that utilities in the Boston and Toronto areas are exploring gathering TIR imagery of buildings there for the same purpose; once other utilities join in and people see how the information is used they won't be so uncomfortable with it. Margie thinks that this approach might help us be successful in areas where we haven't connected before. She sees the advantages, but she is also cautious about perception by others.

The meeting adjourned at 2:45pm.