Solar Photovoltaic Program
Final Impact Evaluation

For

Energy Trust of Oregon

By

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Executive Summary

This study reviewed consumption records (utility bills) for participants in the Energy Trust solar photovoltaic (PV) program. The goal was to determine if the expected reduction in electricity occurred for participants.

The methodology of reviewing utility bills is subject to some uncertainty. In many cases, the home is under construction prior to the solar installation so the energy consumption is not typical. During the analysis procedure, we attempted to remove cases with atypical records but we are not certain that we have accounted for all such projects.

The solar installations also included a dedicated meter to record electricity production with reading taken by the participants. These meter readings are probably a better measure of solar production and have been normalized to reflect annual energy generation. Major conclusions are:

- PV readings taken by the participants appear to be the best measure of actual solar production. This generation averaged 3,176 kWh or 99% of expected.
- PV readings agree reasonably well with expected energy production. This suggests that the installations are generally performing as contractors promised.
- Net kWh production to the grid as estimated from billing data does not appear to differ by climate zone. This is somewhat surprising but a small difference may be masked by variability in the observations.
- Analysis of consumption records (utility bills) suggests less reduction in total energy consumption than expected. The regression estimate of consumption change averages 2,409 kWh or 73% of generation. While the reduction is statistically significant, it is not clear if it represents consumer “takeback” or inconsistent data reflecting partial occupancy prior to the solar installation.
- A comparison group showed small downward trend that was not statistically significant. However, if the regression estimate of energy change is derated for this trend, the net energy production would average 2,154 kWh or 65% of expected.

Energy Trust Staff Response to Report Findings and Conclusions

Energy Trust staff is pleased with the study's finding that the installed PV systems, on average, are performing as expected. The study does indicate the possibility that regional differences in expected and actual performance might exist. These differences may be due to the engineering model or its inputs or to the presence of systematic regional factors

Energy Trust plans on review the engineering models and their inputs for accuracy and to perform more detailed analysis of the installed system database to see if regional differences exist and if they are ongoing. Energy Trust already communicates with installers if, and when, specific system performance issues are identified.

Though the study did not conclusively identify the level of "takeback" present, it is clear to Energy Trust staff that this issue warrants further research as it may impact forecasts of electricity delivered to the gird from residential solar electric systems. Energy Trust plans to monitor this "takeback" to see if it persists over time for participants and with new participants.

To support the research into system performance and participant behavior over time Energy Trust plans on contact all participants on an annual basis to gather metered kWh production data as well as PV system and demographic data. Participants will be able to provide this information via mail or through a web-based survey.