



## Hood River Conservation Project

### An Experiment in Going Deep Community-wide

The Hood River Conservation Project (HRCP), a \$20 million program in the early 1980s, tested the limits of the cost effectiveness of a residential energy improvement program. HRCP installed, for free, any weatherization measures that a household energy assessment showed were within a prescribed cost threshold per unit of energy saved. HRCP's marketing was based on social science research that analyzed the social networks within the community. Most customers learned of the program through word of mouth. The program achieved a high response rate for home energy assessments (91% of all eligible participants) and for the subsequent implementation of conservation measures (85% of all eligible participants).

### Background

The 1970s oil embargo and the Three Mile Island nuclear accident generated significant interest in determining the extent to which efficiency programs could be relied upon as a resource to reduce energy use. At the suggestion of the National Resources Defense Council (NRDC), a federal power agency (BPA) and a utility (PP&L) developed HRCP to assess the practical limits of home energy-improvement programs in delivering cost-effective energy savings.<sup>1</sup> Many studies had shown the potential for energy efficiency measures to cost-effectively reduce demand. HRCP was intended to help resolve lingering uncertainty about the extent to which efficiency measures would prove to be more cost-effective in practice than traditional options, such as building power plants. “We were pioneers in the sense that just as you can measure the output of a power plant, you can also measure the ‘output’ of a weatherization program,” noted evaluator Eric Hirst, who was part of the HRCP evaluation team (Hirst 2010). Bonneville Power Administration (BPA) provided the funding for the program, and Pacific Power and Light (PP&L) administered the program.

The HRCP focused primarily on residential buildings using electric heating and had established an allowable expenditure on installed measures of \$1.15 per estimated first-year kWh saving, based on the avoided costs of building a new coal-fired base load power plant (Hirst 1987b). In comparison to previous programs, HRCP would implement for “free” any weatherization measures that were within the \$1.15/kWh savings threshold to interested homeowners. Because HRCP was designed to test the limits of a residential weatherization program, it also included measures that were more aggressive than those typically found in conventional Pacific Northwest programs (e.g. triple glazed windows). HRCP included many measures, however, the program did not include the replacement of heating or water-heating equipment due to program cost thresholds. Through HRCP, two-thirds of the homes installed ceiling insulation, storm windows, caulking, door weather-stripping, and outlet gaskets (Hirst 1987b). In contrast, less

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<sup>1</sup> The Pacific Northwest Electric Power and Planning and Conservation Act was passed by Congress in 1980 and it required the regional council to develop a long-term plan for how the region's long-term power needs will be met. Specifically, Bonneville Power was charged with first evaluating conservation and renewable co-generation options (those that were cost-effective) before building new conventional generation plants.



than 15 percent of homes received duct insulation and thermal doors (Ibid). While many of these measures are standard today, at the time there was uncertainty about the cost-effectiveness of such home weatherization measures.

Given its ambitious scope, the program evaluated some weatherization measures and design characteristics that were ultimately deemed too costly (Hirst 1987b). “If you don’t push the limits, you don’t know what the limits are,” said evaluator Ken Keating who was part of the BPA team with HRCP (Keating 2010). Understanding this context is important when evaluating the total cost for HRCP’s conservation measures: not all of the measures saved more in energy than they cost.

## **Program Implementation**

### *Making Efficiency Easier for Homeowners*

The first step for homeowners to participate in HRCP was to sign up for a home energy assessment. For the assessment, a vendor hired by HRCP examined the insulation levels in floors, walls, ceilings and heating ducts (if applicable); type of glass used in doors and windows; and whether or not there was a water heater wrap (Hirst 1987b). The assessments identified leaks, poor insulation and other shortfalls in weatherization. A computer program then analyzed the assessment results to determine expected electricity savings and costs for the weatherization measures needed.<sup>2</sup> Once homeowners provided written approval of the weatherization measures, contractors were randomly assigned to the projects. After the work was completed, project inspectors examined the work and corrective action was taken, if necessary, to ensure that all work met industry standards.

### *Organizing Input*

The development of a Regional Advisory Group and its consensus-oriented approach was an important factor in the program’s success. From the outset, the project involved a broad set of stakeholders, including many organizations that traditionally had been adversaries. For example, the Regional Advisory Group included representatives from BPA, Hood River Electric Cooperative, Natural Resources Defense Council, Northwest Power Planning Council, Northwest Public Power Association, Pacific Northwest Utilities Conference Committee, and PP&L. To effectively harness the potential of this diverse group, it was necessary to foster open dialogue and promote cooperation. Staff said they applied skills from other community organization efforts (G. Peach, Personal Communication, 2010). These techniques proved effective in engaging the broad set of stakeholders involved with HRCP.

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<sup>2</sup> In mid-1983, there were not well-established prices for many of the weatherization measures included in HRCP (Hirst 1987b). As a result, HRCP staff initially solicited competitive bids from five local contractors and reviewed these bids in terms of expected cost effectiveness given the \$1.15 limit. The competitive bidding process created a significant administrative burden that led to project delays. After several months, HRCP was able to use the bid information to establish reasonable unit prices.

## *Designing a Research Program for Evaluation*

Hood River, a semi-isolated community, was selected for the pilot for two reasons. First, Hood River was deemed to be representative of Oregon (i.e. results/findings would be generalizable). Second, Hood River was served both by PP&L, an investor-owned utility, and Hood River Electric Cooperative. Evaluators therefore could to examine whether the program delivered different results in communities with different utility models.

Given the ambitious scope of the HRCP, the staff designed a rigorous evaluation process. HRCP recognized the importance of evaluating the effectiveness of marketing and outreach efforts. One of HRCP's five project objectives was to test what efficiency marketing techniques were most effective.

Marketing a program such as HRCP to a single town presents unique challenges for research design. Specifically, the reliance on broad marketing communications efforts like billboards and radio spots as well as word-of-mouth information make it nearly impossible to exclude and/or control who receives information about the program. As a result, it is impractical to isolate a random sampling of households within the community. So instead of selecting a control group within Hood River, the program identified two comparison communities (Grants Pass, OR and Pendleton, OR) with similar electricity rates, populations, locations, economies, and climates. In addition, a random sampling of PP&L customers across the region was identified to provide an additional comparison group.

## **Engaging People to Drive Demand**

The upfront time and effort that HRCP invested into understanding the local community played a key role in the program's marketing and was seen in details like tapping into the community's pride in its orchard-based livelihood with the HRCP logo design (see Figure A).



*Figure A: Logo from Hood River Conservation Project*



Prior to the official program launch, HRCRP spent a year assessing likely reception to the program, issues that might arise and what messages and messengers might be effective. HRCRP hired a sociologist to interview 60 residents and produce a Community Assessment (Social Impact Research 1983; Hirst, 1987b). According to the study, Hood River residents had an aversion to handouts, dislike of orders from outsiders, and concern over fairness (e.g. eligibility for electric heated homes versus oil heated homes and the perceived fairness for those homes that had already made home energy improvements earlier) (Hirst 1987b). There was also some suspicion about the rate impact of efficiency efforts. Specifically, PP&L rates had recently gone up 40%, so people were suspicious that the program costs would simply result in additional rate hikes. “People were suspicious of free. ‘It took marketing corrections throughout the project,” to address these concerns, recalled BPA evaluator Ken Keating (K. Keating, Personal Communication, 2010).

To address these concerns, messaging emphasized the voluntary nature of the program and that only cost-effective retrofits would be covered. If measures were deemed to exceed the cost-effectiveness limit, homeowners could opt to drop the measures that exceeded the limit or pay for these measures themselves. To foster goodwill across the community, homes with oil and gas heating were also offered a free energy assessment - although they were not eligible for free weatherization measures.

HRCRP aimed at 100% participation among eligible households. “(Outreach) was not done through conventional marketing, it was done through what today you’d call social networking,” noted H. Gil Peach, who was part of the PP&L team working on HRCRP (G. Peach, Personal Communication 2010).

Program managers recruited approximately 10% of Hood River households to participate in a variety of pre-program studies, such as end-use monitoring of homes. This one-on-one contact with HCRP staff raised awareness of program offerings. Many pre-program recruits became early program adopters, but they also served as enthusiastic HRCRP champions (Hirst 1987). These early participants helped bring neighbors and friends aboard.

Word-of-mouth marketing proved to be a powerful mechanism for encouraging others to get involved. Over time, there was a snowball effect. The proportion of people who learned of the project from a friend, relative, or neighbor, or community leader grew from 52% of participants (Hirst, 1987, p. 26) in the first 3 months to more than 80% in HCRP’s last 6 months.

HRCRP also did traditional marketing including newspaper advertisements that featured customer testimonials. Coupled with newspaper coverage of the program, this avenue was effective in generating program awareness – more than a quarter of Hood River residents reported learning about the program from the local newspaper. HRCRP’s marketing plan was designed to start with low-cost efforts and then escalate into more expensive efforts, if needed.

In the final months of the program, HRCRP adopted more aggressive, and expensive, marketing techniques, from phone calls to going door-to-door to get the stragglers. Even so, early program



success eliminated the need for many of the more expensive options that were identified in the initial HRCP marketing plan.

The home energy assessment offered a valuable marketing opportunity. As part of the HRCP home energy assessment, all electric customers received four low-cost measures: outlet gaskets, an electric water heater wrap, hot water pipe wrap, and a low-flow showerhead as well as energy efficiency materials (Phillips et al 1986). These measures offered some small, yet potentially meaningful changes, to reduce energy use immediately. Moreover, the level of satisfaction with the assessments was an important factor in overall customer satisfaction with HRCP.

## Lessons Learned

A successful marketing effort may generate a large turnout that can overwhelm program staff, lead to delays in services and result in customer dissatisfaction. HRCP adjusted to the groundswell of customer interest by increasing its field office staff and the number of contractors (Hirst 1987b). Demand still exceeded HRCP's capacity. HRCP staff said the long hours took a toll, and avoiding employee burnout is key for program longevity.

HRCP also struggled to get a computer tracking system running, which led to delays in processing some homeowner requests (Flynn Brown 1986). While the use of a computer may have been more unusual for a program in the 1980s, the broader issue should not be taken as an artifact of the time. Developing new systems to process, manage, and track programs can be complex. Given this complexity, programs may need to budget extra time and money for these systems.

One insight from customer interviews was that residents saw contractors as ambassadors for the program. Poor quality work early on produced negative attitudes about the program. During the first phase of HRCP, almost half of the projects failed inspection and required additional work from the contractors (Hirst 1987b). To address quality control issues and delays, two contractors were eliminated and new contractors were added (Hirst 1987b). HRCP's ability to monitor and quickly respond to perceptions about the program was important to its overall success.

HRCP also provides lessons regarding the importance of setting clear, upfront expectations. Many homeowners did not understand the program definition for what constituted "most effectiveness." Customers received seemingly inconsistent answers from HRCP staff (Brown 1986). Although the retrofits were touted as cost-free, homeowners still bore the cost of any required preparation work for the home energy improvement (e.g. replacing broken windows, repairing dry rot, exterminating vermin, and in some cases, removing old insulation) (Brown 1986). Some disgruntled customers refused to make the repairs, and for other customers, these repairs presented a real economic barrier to program participation. A cutting-edge HRCP experiment with weatherizing mobile homes also incurred some disappointment.



On one level, HRCP's difficulties may be natural for any new program. Even a carefully designed program will encounter bumps along the way, but HRCP's experience suggests that a program's overall success can ride on anticipating issues and adjusting course as needed.

## **Impact, Cost & Evaluation**

HRCP demonstrated that “if you reduce the amount of effort required by participants, you can achieve high savings and high participation” (Keating 2010). Among the 3,500 eligible households, 91% received an assessment and 85% of the eligible households implemented at least one of the recommended measures. Moreover, participants were from the “traditionally hard-to-reach groups,” including low-income households, renters, and residents of multi-family buildings (Hirst 1987c).

HRCP participants saved, on average, 2,600 kWh in the first year (Hirst 1988). The weatherization measures cost approximately \$4,400 per house, or \$1.70 per kWh of first year savings (Hirst 1988). Several factors led costs to exceed the \$1.15/first year kWh limit (Hirst 1987c). These included overambitious engineering estimates, fuel switching, and behavioral changes (Hirst 1987c).

Engineering estimates were in their infancy during HRCP and led to inflated estimates of savings potential. One insight gained from the HRCP is that certain assumptions (e.g. all rooms are heated at the same temperature, ducts don't leak, calibrating estimated baseline use with actual pre-retrofit usage) don't match with reality. Early software in the 1980s didn't account for such nuances. Given these issues, it's not entirely surprising that the actual HRCP energy savings (2,600 kWh) were 43 percent of what the home energy assessments had predicted. These estimates were further complicated by homes that exhibited low savings potential and/or fuel switching. By design, HRCP was focused on 100% community participation. As a result, this group included mobile homes, multi-family homes, and single-family homes that used electricity as a secondary heating fuel (Hirst 1988). Because this mixed group had lower savings potential as compared to single-family homes that used electricity as its primary source of heating, it also dragged down the average in actual savings.

Changing demographics, economic conditions, and behaviors impacted energy use and the estimated cost-effectiveness of certain measures. Many HRCP participants relied on wood as a primary heat source due to the proximity to forests, recent electricity rate increases, and a depressed economy. As economic conditions improved, people relied more on electric heating and enjoyed increased thermal comfort. Moreover, the community experienced an influx of new people (many of whom were wealthier) and these new homeowners also moved away from wood heating (Keating 2010). “Some people sold their homes and the new people didn't have any desire to haul ashes,” noted Keating. According to HRCP's evaluation, energy savings in year two and three decreased from the previous year, likely due to changes in demographics, economic conditions, and behavior.



As part of the program evaluation, there was follow-up with non-participants. Interestingly, the non-participants were wealthier, lived in newer homes, and had lived there fewer years than participants — they may have had had less interest and/or need for weatherization (Hirst et al 1987c).

From the outset, marketing was budgeted to be six percent (\$1,796,000) of the total cost of operations (Philips et al 1987). Because of the early success in attracting participation through word-of-mouth, approximately 75% of the planned marketing budget was not spent (Hirst 1987b). Total marketing costs for HRCP were \$113,269, as reported in May 1986 (Philips et al 1987).