

Residential Retrofit

HomeBase Retrofit Program Vermont Gas Systems, Inc.

PROGRAM OVERVIEW

Vermont Gas Systems' (VGS) HomeBase Retrofit Program is designed to reduce natural gas consumption and peak day demand in residential buildings that use natural gas for space heating. When applicable and cost-effective, domestic hot water conservation measures are also installed. The program has been offered with only minor modifications since 1993, and is currently available to any VGS residential customer using 1,400 ccf per year or greater (total normalized natural gas use for all end-uses). On a case-by-case basis, services are also made available to owners of smaller houses not meeting the 1,400 ccf/year minimum where it can be established that usage is high for the size of the house. Services are also available to houses not using the 1,400 ccf/year minimum when renovation projects are planned that might include the opportunity to improve the efficiency of the structure or systems, or where the occupants may qualify for low-income assistance. Vermont Gas Systems has approximately 30,000 residential meters, with an average annual per meter gas consumption of roughly 1,000 ccf. In 2001, VGS had approximately 4,600 residential meters with annual use exceeding 1,400 ccf.

An energy audit is performed on each participating building to identify technically feasible energy-saving measures at no cost to the building owner. The audit includes detailed examination of the insulation characteristics of the exterior surfaces of the building, blower door testing including zone pressure diagnostics where appropriate, heating system steady-state efficiency testing, carbon monoxide and draft testing for the combustion equipment, testing of domestic hot water temperature, and evaluation of any existing or potential health and safety issues that could be impacted by the installation of any retrofit efficiency measures. The building's previous natural gas consumption patterns and potential improvements are modeled using a computer audit tool developed by VGS. Savings estimates are "trued up" by adjusting the heating degree days used in the model such that calculated pre-retrofit gas usage matches actual usage records. Building owners are provided with a written report summarizing the audit results and detailing the project economics and incentives available for cost-effective measures.

VGS provides cash incentives to property owners who install the measures recommended by this program. Incentives equal 33% of the installed measure cost if the building owner pays the heating bill for the property. Where tenants pay the gas bill in rental properties, the incentive to the owner is 50% of the installed measure cost. In either case, VGS will offer reduced interest financing for the balance of the installed measure cost through the Vermont Development Credit Union (VDCU). VGS pre-pays VDCU to buy-down the loan interest to the following rates, depending on the customer's preferred loan term: 0% for three years, 2% for five years, or 4% for seven years. VGS guarantees the loans, and files a lien on the subject property as security. Upon receiving notification of loan approval, VGS gives the contractor the go-ahead to schedule installation.

As of the end of 2002, VGS enhanced this retrofit program offering by providing homeowners with the opportunity to increase the interest-subsidized loan principal by up to \$5,000 for the purpose of installing a high-efficiency heating system to replace an existing low-efficiency furnace or boiler. In order to take advantage of this offer, customers must also agree to install all of the recommended retrofit insulation and air sealing measures.

In addition to financial incentives, building owners are provided with technical assistance, project management services, and quality control inspections at no cost. Customers have the choice of obtaining competitive bids, or having VGS assign a pre-screened contractor through the "FastTrack" option. "FastTrack" contractors have submitted unit pricing to VGS, which VGS auditors use to prepare job cost estimates, thereby offering better price control to the customer.

Where the building owner's income is at or below 150% of federally established poverty levels, the incentive is 100% of the project cost. The 100% incentive also applies to buildings that are owned by not-for-profit organizations and are at least two-thirds occupied by low-income tenants. Low-income customers who live in one-to-four unit buildings and are interested in participating in the HomeBase Retrofit Program are referred to Champlain Valley Weatherization Service (CVWS) for priority assistance. CVWS verifies the customer's income status and eligibility, performs the energy audit, submits the recommended measures to VGS for screening, and coordinates the installation of the cost-effective energy-saving measures. VGS contributes a portion of the income verification, auditing, project management, and measure costs. CVWS also submits lists of recommended measures to VGS for screening for VGS customers who have applied for services through the Weatherization program, ensuring that qualifying low-income customers receive incentives from VGS whether they apply through VGS or through CVWS.

The program is not limited to any specific type of measure, and the incentives and financing are not capped for any individual customer. All potentially cost-effective and technically feasible natural gas saving measures are evaluated, both in terms of customer economics and avoided cost benefits for Vermont Gas. Typical measures include dense-pack cellulose, blower door-directed air sealing, duct sealing and insulating, and heating system replacement. VGS assesses potential negative impacts of retrofit work and works with customers to address these issues prior to retrofit work being carried out. VGS requires the replacement of active knob and tube wiring prior to retrofit shell measures, and moisture and indoor air quality problems are also identified and addressed. VGS has been a national leader in partnering with the U.S. EPA to identify houses containing vermiculite insulation where testing of potential asbestos contamination of the vermiculite could be carried out. The EPA brochure "Current Best Practices for Vermiculite Attic Insulation" was largely based on research conducted in houses identified by VGS for this study. EPA had been unable to identify any existing housing stock outside of Libby, Montana where testing could be conducted prior to VGS' involvement. VGS follows EPA recommendations and does not recommend or provide incentives for any work that will disturb Vermiculite insulation.

PROGRAM PERFORMANCE

Program results through December 2002 are summarized below:

- Audits completed: 1,923
- Customers with installations: 1,011
- Total utility cost: \$2.66 million
- Annualized Mcf savings estimate: 52,233 Mcf
- Peak day savings: 686 Mcf
- Lifetime savings: 1,096,945 Mcf
- Average annual savings per participant: 51 Mcf
- Historical utility cost per annual Mcf saved: \$50.90

The annual budget and program goals for FY2003 are given below:

- Audits planned: 230
- Customers with installations: 152
- Utility cost: \$300,000
- Annualized savings goal: 5,420 Mcf

VGS includes a customer satisfaction survey along with each rebate check to ensure customer satisfaction. Questions address satisfaction with scheduling, customer service on the phone, the auditor, the audit report, contractors, the installation of the equipment, and the incentives and financial arrangements. In the spring and early summer of 2002, VGS contracted with Dr. James M. Sinkula to tabulate and statistically analyze the results of the surveys that have been returned to VGS over approximately a five-year period. Responses were scored on a 5-point scale with 1 being the highest. The responses indicate a very high level of customer satisfaction with the program. The mean for the question “Overall, how satisfied are you with your participation in this program?” was 1.3, with no dissatisfied responses.

VGS also conducted a limited internal evaluation analysis using PRISM software to analyze actual savings for program participants. A group of approximately 150 program participants with installations in 1996 and 1997 were analyzed in 1999. This study was not independently reviewed. Of the 150 program participants, 73 were considered to have acceptable usage data when PRISM-recommended criteria were applied to the analysis. This group showed a mean realized savings of 348 ccf per year, for approximately 16% average savings. When less stringent data criteria were used, a group of 121 participants remained, with a mean savings of 360 ccf and 16.7% average savings. The corresponding control group actually saw increased usage of approximately 20 ccf/year. The savings numbers presented above were not adjusted to reflect this apparent increase in the non-participant group.

LESSONS LEARNED

Vermont Gas Systems HomeBase Retrofit Program provides a comprehensive, turn-key service offering a “house-as-a-system” approach to enhancing home performance. The program is flexible to meet the specific requirements of any type of residential building found in VGS'

territory, from moderately sized single-family dwellings to large, master-metered apartment buildings. The fact that the program has been offered in a consistent format for ten years has allowed VGS to expand the market and contractor base for retrofit services, and has provided opportunities to build customer confidence in the types of work that is typically recommended. VGS building specialists are well trained and experienced, and regularly attend trade conferences such as Affordable Comfort to keep current with energy efficiency trends. While the program is natural gas-focused, VGS staff routinely refer electric efficiency opportunities to Burlington Electric and Efficiency Vermont.

While VGS has been cautious about shifting too much responsibility (and hence liability) from the installation contractor to the utility, experience has shown that in order to keep jobs moving to completion, it is necessary for VGS to take a strong leadership role. VGS increased its involvement significantly over the first two years of program implementation. In addition to performing field audits and drafting reports, VGS auditors' tasks typically include writing job specifications, choosing contractors, making follow-up calls, chasing down signed contracts, reminding contractors to schedule and complete jobs, carrying out final inspections, and providing contractors with punch lists. Despite the best of intentions, customers and contractors both face many competing priorities, and strong VGS involvement has been needed to ensure that this is a production program rather than just an audit program. Even with significant participation by VGS staff, the time lag between audit and completion is often 3–9 months.

Identifying qualified installation contractors has been a significant hurdle for this program—one that has re-appeared at several points during the programs' implementation history. VGS has worked to develop a strong base of local installation contractors who are capable of meeting high standards for both customer satisfaction and energy performance. VGS has provided free training and low-interest loans to contractors wishing to “tool-up” with insulation blowers and blower doors. VGS has found it necessary to repeat such offers periodically to replace contractors who become unavailable for any number of reasons, including relocation, shift in business focus, or the inability to consistently meet VGS' performance standards. The greatest threat to program success has consistently been the struggle to maintain a strong contractor base.

The degree of customer interest in this program, while always present, has varied with external conditions, and this has also created challenges. Whole-house energy retrofits can create an imposing inconvenience for home occupants, lasting between a few days to several weeks or more. Understating the temporary inconvenience of this type of work has occasionally led to disgruntled customers, though in the long term most customers forget the inconvenience as soon as they feel the benefits of improved comfort and reduced heating costs. As would be expected, the program has been most popular and successful during periods of colder weather and higher rates. The local and national economic climate also appears to drive customer interest. Several successive warm winters in the late 1990s came at a time of relatively low rates, during a period of significant economic growth. VGS found that customers were often less interested in pursuing installations when their gas bills didn't seem so high in this context. However, since 2001, VGS has had to increase both its audit and installation capacity in order to respond to customer demand.

Because of the high level of service provided, this program provides tremendous benefits in terms of customer satisfaction and loyalty. VGS continues to add customers at the rate of 1,000–1,500 per year, and many of these new customers are in older homes that were formerly served with fuel oil or propane. The addition of these homes expands the potential retrofit market, and it is anticipated that this program will continue for the foreseeable future.

PROGRAM AT A GLANCE

Program name: HomeBase Retrofit Program

Targeted customer segment: Residential homeowners

Program start date: 1993

Program participants: 1,923 audits performed; 1,011 customers with installations of measures recommended in audits (data through December 2002)

Approximate eligible population: Approximately 4,600 customers with annual gas use greater than 1,400 ccf; other residential customers may qualify on case-by-case basis.

Participation rate: About 42% of the eligible population has received audits; about 22% has installed measures.

Annual energy savings achieved: Annualized savings are 52,233 Mcf for the program; lifetime savings are 1,096,945 Mcf; average annual savings per participant are 51 Mcf; peak day savings (system) are 686 Mcf.

Cost effectiveness: Historical utility cost is \$50.90 per annual Mcf saved.

Budget

Year	Program Costs
2001	209,640
2002	282,234
2003 (preliminary)	318,000
2004 (projected)	369,643

Customer costs: The average total project cost in 2002 was approximately \$2,900, with the customers' average cost typically being 2/3 of the project cost. In some cases, customers incur additional costs in order to prepare homes for retrofit, including costs for upgrading unsafe wiring, lining chimneys, installing sheetrock over surfaces to be insulated where the existing surface won't support dense-pack insulation, etc.

Funding source: All of VGS' programs are funded through rates. Program expenses are deferred until reviewed by the DPS and PSB. Upon approval, expenses are amortized in rates over a three-year period.

Best person to contact for information about the program:

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