
Energy Efficiency Program

Residential Home Energy Audit and Weatherization Program

Program Overview

Description

The Residential Home Energy Audit and Weatherization Program through joint implementation with Questar Gas and program administrator, Nexant, Inc. (Nexant) targets separately metered residences receiving service on the GS-1 or GSS rate schedules. A qualifying residence is a structure that has up to and including four separately metered residential dwelling units. This program includes two primary components: home energy audits and rebates for weatherization measures.

The home energy audit includes two separate delivery channels. Customers will be able to request a self-completed mail-in audit survey at no charge, or request that a Questar Gas Company (Questar Gas) technician come to their home and conduct an in-home audit. Questar Gas will require customers to pay a \$25 fee per residence for the in-home audit, which is fully refundable upon implementation of any Questar Gas recommended energy-efficiency measure that is not provided in conjunction with the Home Energy Audit.

Associated with both home energy audits (in-home or mail-in), participating customers will receive a customized report recommending home improvements that can be implemented to reduce natural gas usage. During the in-home audit, Questar Gas technicians will offer certain energy-efficiency measures identified in Table 1 below at no charge or with a rebate in the case of the programmable thermostat. Customers choosing to complete the mail-in audit survey will receive at no charge a packet containing appropriate low-cost energy-efficiency measures for installation in their residence.

Also offered through the program will be incentives for qualifying weatherization measures. While audit activities offered through the program will help customers identify opportunities for weatherization measures, participation in the audit portion of the program will not be a prerequisite to qualify for weatherization-measure incentives. Weatherization measure delivery will leverage the marketing access and existing delivery channels of local businesses, wholesalers and retailers. For some measures, customers will be required to have measures installed by a pre-qualified contractor in order to qualify for incentives.

Where weatherization measures overlap with those offered under Rocky Mountain Power's Home Energy Savings program, coordination between the programs has been made to align eligibility requirements and key measure assumptions.

Objective

The Home Energy Audit and Weatherization Program is one of several initial energy-efficiency programs offered by Questar Gas. The program will seek to increase customer awareness of energy efficiency and be a feeder for other Questar Gas energy-efficiency programs while providing cost-effective customer natural gas savings on its own merits.

Program Design

Program Measures

Table 1 lists the low-cost energy-efficiency measures and eligibility requirements included within the audit portion of the program. Table 2 provides similar information for energy-efficiency measures under the weatherization component of the program.

Table 1. Audit Energy-Efficiency Measures

	Water Heater Blanket	Pipe Insulation	Faucet Aerator	Low Flow Shower Head	Programmable Thermostat¹
Baseline requirement	Gas water heater warm to the touch or as determined by audit	Gas water heater, no pipe insulation	Gas water heater, ≥ 2.75 GPM	Gas water heater, ≥ 3.0 GPM	Gas heat, non-programmable thermostat
Minimum efficiency requirements	R-7 water heater blanket	First 4ft HW, first 2 ft CW	< 2.0 GPM	< 2.5 GPM	2006 Energy Star requirements
Measure lifetime (yrs)	10	10	10	10	15

¹ Programmable thermostats will only be available to customers where an in-home or mail-in audit is completed.

Table 2. Weatherization Energy-Efficiency Measures

	Windows	Wall Insulation	Attic Insulation	Floor Insulation	Duct Sealing	Duct Insulation
Baseline requirement	Existing home with gas heat	Existing home with gas heat	Existing home with gas heat	Existing home with gas heat	Existing home; gas heat; ducts in unconditioned space	Existing home; gas heat; uninsulated ducts in unconditioned space
Minimum efficiency requirements	U - .35; SHGC - 0.33 ¹	Increments of R-11 or higher	Increments of R-19 or higher	Increments of R-19 or higher	PTCS ² Levels	R-6 or higher
Measure lifetime (yrs)	25	45	45	45	20	20
Installation by pre-qualified contractor required	No	No	No	No	Yes	Yes

¹ SHGC = Solar Heat Gain Coefficient

²PTCS = Performance Tested Comfort System.

Program Incentives

Audit related energy-efficiency measures are outlined below in Table 3. These measures, as listed below, will be provided and installed by Questar Gas during in-home audits when eligibility requirements are met.

Table 3. Audit Energy Efficiency Measures

DSM Measure	QGC Install	QGC Provided	Incentive \$	Unit
Water Heater Blanket	Yes	Yes	n/a	each
Pipe Insulation	Yes	Yes	n/a	each
Faucet Aerator	No	Yes	n/a	each
Low Flow Shower Head	No	Yes	n/a	Each
Programmable Thermostat ¹	n/a	n/a	\$30.00	Each

¹ Programmable thermostats will only be available to customers where an in-home or mail-in audit is completed.

Weatherization energy-efficiency measures are provided below in Table 4 and include the associated available incentive per unit. These measures will be available to residential customers based on measure eligibility requirements.

Table 4. Weatherization Energy Efficiency Measures Incentives

DSM Measure	Incentive \$	Estimated Gross Incremental Customer Cost	Unit
Windows	\$.95	\$1.30	sq. ft.
Wall Insulation	\$.45	\$.64	sq. ft.
Attic Insulation	\$.35	\$.51	sq. ft.
Floor Insulation	\$.35	\$.42	sq. ft.
Duct Sealing	\$225	\$310	each
Duct Insulation	\$250	\$347	each

Projected Participants

Table 5 summarizes the projected number of audits that will be conducted under the program.

Table 5. Audit Participants by Program Year

Program Year¹	On-site Audits	Mail-in Audits	Total
Year 1	1,695	1,695	3,390

¹ Program year represent 12-month cycle.

Customer Participation Process

Figure 1 illustrates the customer participation process for both the mail-in and in-home audit options. Figure 2 illustrates the customer participation process for weatherization measure incentives.

Figure 1. Home Energy Audit Process

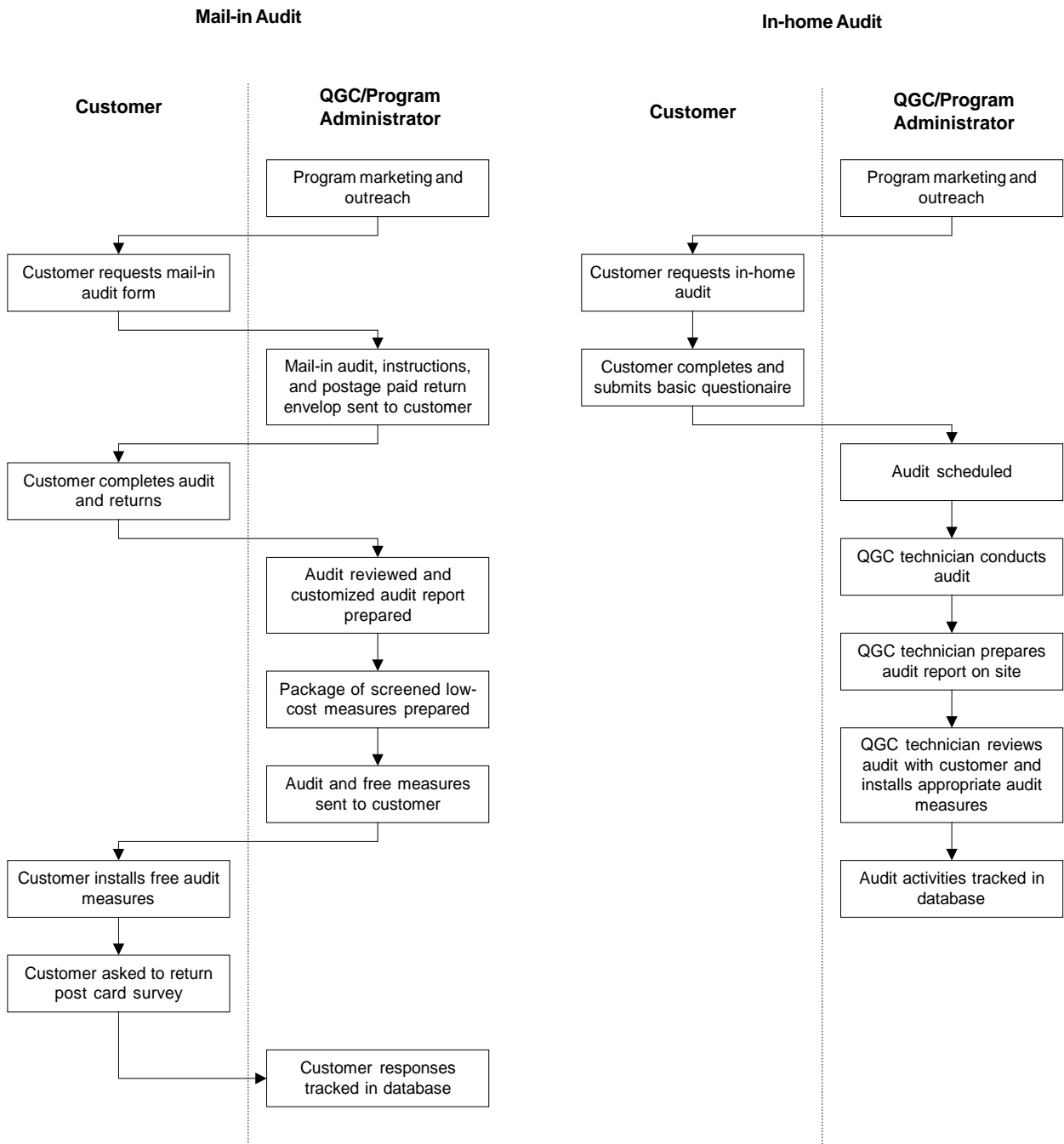
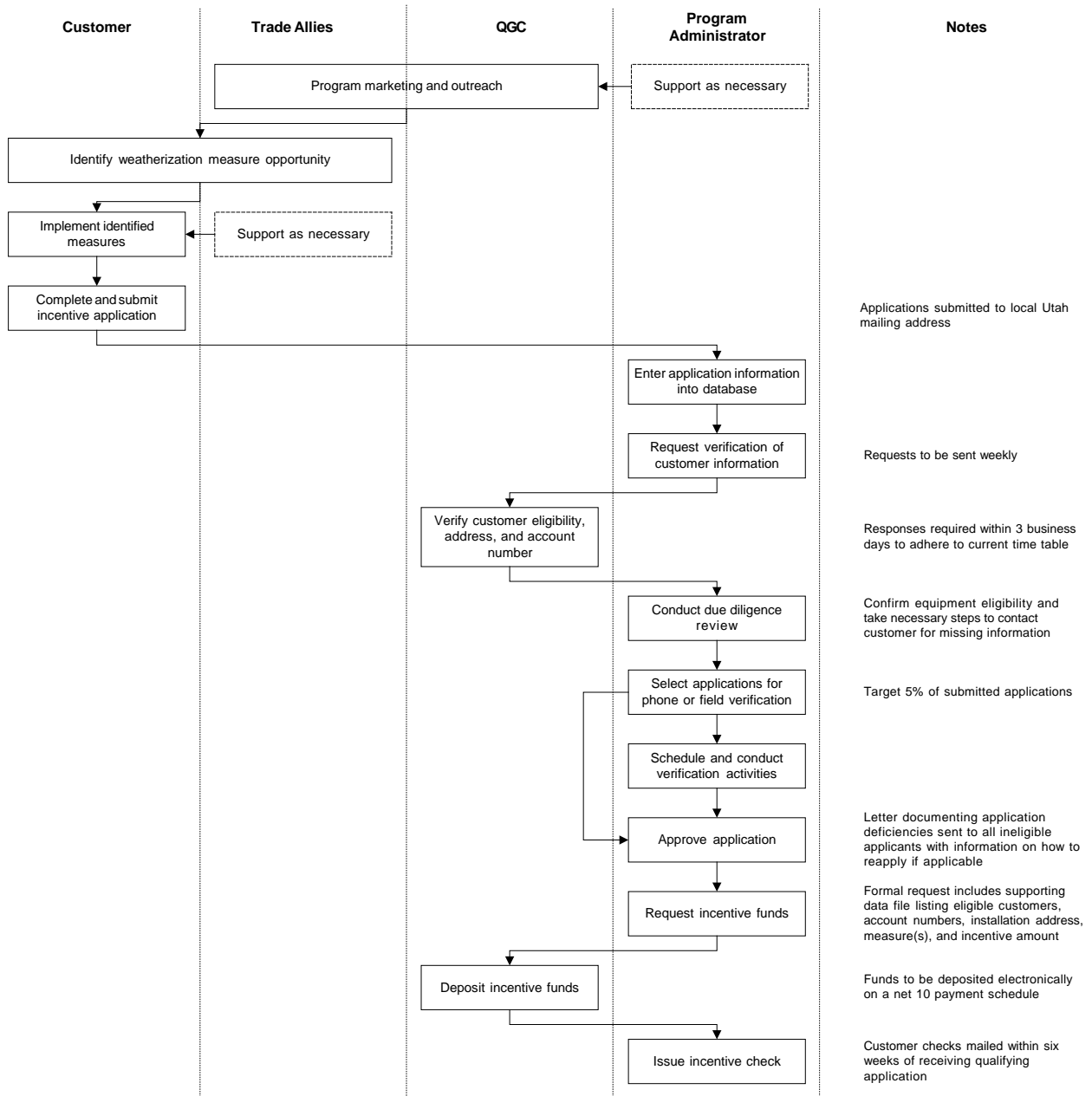


Figure 2. Weatherization Measure Application Process



Marketing & Promotion

Questar Gas will provide marketing and promotional support for the Residential Home Energy Audit and Weatherization Program to encourage customer participation and help program cost effectiveness. Initial marketing strategies will include:

- On-line brochure and associated program information placed on Questar Gas's dedicated energy efficiency website.
- Placement of point-of-purchase brochures and advertising with applicable appliance and equipment dealers and contractors.
- Education and awareness meetings with participating trade allies on program aspects.
- Notification in company newsletters and bill inserts (when applicable) of program information and availability.
- Referrals and customer awareness assistance from the State of Utah Low Income Weatherization Assistance Program.
- Cross-marketing with other Questar Gas energy-efficiency programs and activities, i.e. consumer and trade shows, special promotions, direct sales and rebate check inserts.
- Possibly some targeted direct mail advertising based on age of home and specific market segments expected to benefit the most for home audits.
- In addition, as with all Questar Gas Demand Side Management (DSM) programs, market transformation education and awareness advertising will incorporate the Residential Home Energy Audit and Weatherization Program into the overall energy-efficiency campaign advertisements and strategies.

Trade Ally Management

Trade Ally Identification & Recruitment

Questar Gas and Nexant will implement the following process to identify, screen, and recruit trade ally participants.

Step 1. Identify vendors and contractors that serve the area and develop a targeted list of the most influential and active. Examples of sources that will be used to identify and populate the trade ally network include:

- Questar Gas marketing representatives, project managers, and consultants.
- Existing contacts with national and regional equipment distributors.
- Attendance at applicable customer meetings, trade shows, and professional associations.
- Local chamber of commerce offices.
- Telephone directory and web searches.

Step 2. Questar Gas and Nexant will develop and hold targeted program overview sessions to describe the program, available opportunities, next steps for potential trade ally members and the participation process.

Qualification of Trade Ally Applicants

Interested vendors and contractors identified through the recruitment process will be required to complete and submit a trade ally application and participation agreement. In the review of applications received, Nexant will screen all applicants to maintain the integrity of the trade ally network. Examples of items that will be considered during the trade ally application evaluation process include, but are not limited to:

- Experience and qualifications of key individuals.
- Current licensing and status with respective State of Utah Department of Commerce offices or other governing bodies.
- Number and type of complaints on file with licensing agencies and other sources (e.g. Better Business Bureau).
- References.

All related information and findings from the trade ally application and agreement process will be summarized on an evaluation form and filed with the original application for future reference and reporting needs.

Alliance Participant Maintenance

Questar Gas and Nexant will work closely with new trade allies to identify and support efforts to initiate projects and become comfortable with the process. Questar Gas and Nexant will maintain an updated listing of all trade ally participants for distribution to interested customers, account representatives, customer service representatives, as well as the general public.

Alliance Support and Project Facilitation

Questar Gas and Nexant will develop and maintain the following functions to support trade ally participants and help meet program savings goals:

- Dedicated program email addresses where Trade Allies can submit inquiries or request additional support/information.
- Dedicated toll free phone numbers to reach the appropriate program coordinator.
- Ensuring the availability of customer-oriented marketing materials and updating existing information and develop new pieces as necessary.
- Maintaining regular email and phone communication.
- Offering and conducting annual training sessions.
- Holding regular face-to-face meetings with targeted trade ally participants.
- Providing assistance with determining customer eligibility, qualifying equipment, and available rebates.
- Supporting trade ally efforts to identify viable energy savings opportunities and estimate the potential energy and cost savings for the customer.
- Helping Trade Allies leverage the availability of other available rebates to further improve customer paybacks.
- Updating program materials such as applications and program manuals.

Projected Savings

Tables 6 and 7 present the estimated first year gross customer savings for the audit and weatherization measures, respectively.

Table 6. Audit Energy Efficiency Measure Gross Savings Estimates (Dth/yr)

Program Year	Water Heater Blanket	Pipe Insulation	Faucet Aerator	Low Flow Shower Head	Programmable Thermostat	Total
<i>Unit</i>	<i>Each</i>	<i>system</i>	<i>each</i>	<i>each</i>	<i>Each</i>	
<i>Unit Savings (Dth/unit/yr)</i>	2.20	1.40	.44	5.79	2.66	
Year 1	1,615	2,468	970	6,381	902	12,335

Table 7. Weatherization Energy Efficiency Measure Gross Savings Estimates (Dth/yr)

Program Year	Windows	Wall Insulation	Attic Insulation	Floor Insulation	Duct Sealing	Duct Insulation	Total
	<i>sq.ft.</i>	<i>sq.ft.</i>	<i>sq.ft.</i>	<i>sq.ft.</i>	<i>System</i>	<i>System</i>	
<i>Unit Savings (Dth/unit/yr)</i>	.042	.007	.007	.009	5.70	8.95	
Year 1	269	702	636	827	268	421	3,122

Implementation

An overview on the implementation process associated with the program is provided in Figures 1 and 2 in the *Customer Participation Process* section above. Additional information regarding the scope of the mail-in and in-home audit process is provided below.

Mail-In Audits

Customers should be able to complete the mail-in audit within thirty to sixty minutes. The process will require customers to walk around their homes and collect information about natural gas-consuming appliances and equipment (e.g. number, location, size, model number, etc.), but will not require any special equipment, skills, or detailed measurements to be taken.

Input from completed and returned surveys will be used to prepare a customized audit report for the customer. The report will contain information on the estimated breakdown of natural gas usage by major end-use calibrated to the customers past usage history if available. The report will also contain a prioritized list of recommended energy-efficiency measures that the customer should implement, based on estimated cost, payback, and complexity. Where applicable, information on how to apply for available incentives from Questar Gas will also be included.

In-Home Audits

Questar Gas customers who request an in-home audit from one of Questar Gas' audit technicians may be requested to complete a basic questionnaire (e.g. customer information, usage patterns, etc.). If the number of in-home audit requests exceed Questar Gas' capabilities to complete them in

a timely manner, customers may be screened and prioritized based on age of house, natural gas usage, size of house, age of appliances, eligibility for weatherization assistance, ability to complete the mail-in audit process, or other metrics identified by Questar Gas. Any customer who cannot be offered an in-home audit within a reasonable timeframe will be redirected to the mail-in audit portion of the program.

The in-home audit process will collect and/or augment the following customer information:

- Building shell information (e.g. insulation levels, window types and sizes, conditioned square footage, etc.)
- Gas appliance information (e.g. number, type, age, size, etc.)
- Heating system information (e.g. age, size, model number, nameplate efficiency, etc.)
- Usage patterns (e.g. temperature set points, number of occupants, etc.)
- Primary infiltration reduction opportunities identified by visual inspection (e.g. sealing windows, doors, electrical outlets, plumbing vents, fireplace dampers, etc.)

In-home audits will be conducted using handheld wireless devices, allowing Questar Gas audit technicians to conduct the audit in real-time, download the information to a central database, and then retrieve and print the audit report while on site. This functionality will allow the audit technician to review the report and answer any remaining customer questions at the time of the audit, helping to increase customer awareness, education, persistence in customer behavioral changes, installation of additional energy-efficiency measures, and participation in other Questar Gas energy efficiency programs.

The Residential Home Energy Audit and Weatherization Program can be launched within 45 to 60 days following Public Service Commission approval with the availability of processes demonstrated in Figure 1, as well as the availability of in-home and mail-in audits, initial trade ally contacts, marketing and advertising support and data tracking systems.

Administration

Figures 1 and 2 in the *Customer Application Process* section above illustrate the framework of the administration process for the program. Under program administration activities, application processing will balance the need to ensure customer and measure eligibility, verification of measure installation, and program administrative costs.

Due-diligence application review activities will include, at a minimum, verification of the following items:

- Customer account number.
- Installation address for submitted account number.
- Valid equipment installation date.
- Equipment eligibility.

- Equipment capacity and efficiency ratings, where applicable.
- The requested incentive amount.

Questar Gas will augment the application process quality control measures with random telephone and field inspections to ensure program integrity. These verification activities will serve to verify the following information:

- Installation address.
- Equipment make and manufacturer.
- Equipment model number.
- Equipment size.

The verification process will balance the need for randomness, the need to maintain a robust sample size, and the need to verify the compliance of multiple equipment installers. Nexant will target these additional quality assurance and quality control measures on approximately 5% of all submitted applications. Program Measurement & Evaluation

Program Budget

Audit and Weatherization Program Budget					
Development	Marketing	Delivery	Incentives	Evaluation	Total
\$143,400	\$0	\$574,503	\$179,500	\$25,000	\$922,403
15.5%	0%	62.3%	19.5%	2.7%	100.0%
Audit and Weatherization Program Customer Savings					
Participants	Net Annual Dth Savings	Avoided Net Gas Cost per Year		Simple Payback	
3,891	12,366	\$98,119		9.4	

Measurement & Verification

To support management of this program, all pertinent program rebate information will be tracked in a database developed for the program. The database will provide a near-real time listing of current customer applications, customer information, equipment information, customer costs, savings, and rebates by technology.

Moreover, the audit related information from the program will be tracked and available for reporting, including number of program participants, measure participation and audit related information specific to the home and customer (provided by customer and/or Questar Gas Technician).

Cost Effectiveness

MEASURE	Total Resource Cost		Participant Test		Utility Cost Test		Ratepayer Impact Measure Test	
	NPV	B/C ¹	NPV	B/C ¹	NPV	B/C ¹	NPV	B/C ¹
Windows - Residential	\$68,260	3.4	\$121,212	4.4	\$70,689	3.7	\$47,193	2.0
Wall Insulation	\$78,496	1.4	\$307,333	2.2	\$105,582	1.6	\$36,072	1.1
Duct Sealing	\$37,081	1.8	\$100,494	2.6	\$41,640	1.9	\$20,555	1.3
Duct Insulation - Residential	\$80,280	2.5	\$164,975	3.4	\$85,771	2.7	\$52,663	1.6
Roof Insulation - Residential	\$96,586	1.6	\$288,692	2.4	\$119,126	1.8	\$55,735	1.3
Floor Insulation	\$203,808	2.5	\$427,456	3.5	\$200,516	2.4	\$118,107	1.5
Water Heater Blanket	\$219,566	8.8	\$344,163	10.8	\$212,555	7.1	\$152,378	2.6
Pipe Insulation	\$394,500	21.5	\$562,314	24.4	\$389,690	17.2	\$288,608	3.3
Faucet Aerator	\$144,526	9.0	\$220,943	10.8	\$140,017	7.2	\$100,300	2.6
Low Flow Showerhead	\$958,510	52.4	\$1,358,472	59.3	\$953,851	41.9	\$716,387	3.7
Programmable Thermostat - Residential	\$161,674	5.4	\$260,289	6.7	\$163,423	5.7	\$114,681	2.4
Program Costs	-\$2,139,622	0.0	\$0	N/A	-\$2,139,622	0.0	-\$2,139,622	0.0
Totals	\$303,666	1.1	\$4,156,343	5.4	\$343,236	1.1	-\$436,943	0.9

Program Evaluation

Questar Gas will perform a Residential Home Energy Audit and Weatherization Program evaluation over the life of the program. An in-depth, independent evaluation will be conducted once the program has been operating for a period of time in which customer savings can be reasonably and accurately evaluated (year two or three).

A limited evaluation will be conducted following the one year program anniversary. The cost for this limited evaluation is included in the program budget as shown above in the Program Budget section. The limited evaluation will focus primarily on customer awareness of the program, adoption rates by customers, program process efficiency and customer satisfaction with the program. Results from evaluations will be used to refine the program and to increase the accuracy of future DSM modeling.

¹ Net Present Value of benefits divided by the Net Present Value of costs.