COLD CLIMATE HOUSING RESEARCH CENTER
CCHRC

# GVEA Energy$ense

## Program Review & Recommendations

by:
Cold Climate Housing Research Center

January 2014

Cold Climate Housing Research Center
1000 Fairbanks St.
AK 99708

907.457.3454
www.cchrc.org

GVEA
Golden Valley Electric Association
Your Touchstone Energy® Cooperative

# Contents

## Purpose and Background

The Cold Climate Housing Research Center prepared this report to document Golden Valley Electric Association's (GVEA) existing Energy$ense programs, evaluate them in the context of exemplary energy efficiency programs throughout the country, and provide recommendations for improving them to better achieve GVEA's goals.

Utilities have offered energy efficiency programs since the 1970s (York, Witte, Nowak, & Kushler, 2012). These programs accounted for a total $4.6 billion of utilities' budgets in 2010, according to the American Council for an Energy Efficient Economy (ACEEE). The goals for the programs vary, but include cost savings for customers, protection against rising fuel costs, environmental benefits, developing alternative energy sources, and stretching electric capacity (York, Witte, Nowak, & Kushler, 2012). These energy efficiency programs have been successful and proliferated due to the fundamental fact that energy efficiency is almost always the least cost resource, averaging about 3-4 cents per kWh saved (Davies, 2013).

GVEA implemented Energy$ense, a set of energy efficiency programs, in 1992. Since then, the programs have evolved slightly over time and last underwent a formal evaluation in 1999. Now GVEA would like to update the program to achieve the most cost-effective electricity cost reduction per member and to increase participation in the program.

- The first section of this report, the *Program Overview and Recommendations*, provides a short overview on the Energy$ense programs and selected information on peer utility programs. It lists the advantages and disadvantages of each of the Energy$ense programs within the context of peer-reviewed utility programs. This section concludes with statements about the future emphasis of the Energy$ense programs and recommendations to modify the current programs within the context of this emphasis.
- Second, this report discusses the Energy$ense programs as they currently exist in the *Existing Energy$ense Programs* section. This section provides information on each Energy$ense program (Home$ense, Business$ense, and Builder$ense). It describes the process of each program, costs for recent years, cost benefit information, the marketing of the programs, and participant feedback.
- Finally, the characteristics of exemplary energy efficiency programs in the United States are discussed in *Peer Utility Programs* and on Alaska utility programs in *Complementary Alaskan Programs*. This last section also lists energy efficiency programs in Alaska that offer opportunities for future collaboration with GVEA.

Readers familiar with GVEA's programs may wish to read only the first section of the report, which provides a summary of each phase of the project, and refer to the latter sections of the report for background information only as necessary. Others who would like to gain an understanding of GVEA's energy efficiency program and of peer programs will benefit from reading the report in its entirety. These readers should feel free to begin with the latter sections and finish reading with the *Program Overview and Recommendations* if they would like to first learn about efficiency programs in depth.

## Program Overview and Recommendations

The Golden Valley Electric Association (GVEA) initiated a review of its energy efficiency programs, collectively called Energy$ense, in April 2013. The intent of this review is twofold: First, GVEA wanted to document the current implementation of the Energy$ense programs to evaluate their strengths and weaknesses and second, GVEA wanted recommendations on updating the Energy$ense programs within the context of GVEA's 2013 strategic planning and other exemplary efficiency programs. The Cold Climate Housing Research Center (CCHRC) was asked to participate in this review. The project timeline is as follows:

| |
|---|
| Spring 2013: The Energy$ense review project was initiated. |
| Summer 2013: CCHRC documented the current Energy$ense programs and peer exemplary programs. CCHRC also provided draft recommendations at this time. |
| October 2013: GVEA staff reviewed the draft report and participated in a discussion to decide a program direction. |
| December 2013: CCHRC provided GVEA with a second draft report incorporating the program direction of education. |
| January 2014: The final report will be provided for GVEA's board for the January 27th board meeting and their upcoming strategic planning session. |
| 2014: GVEA staff and board members will decide on modifications to the Energy$ense programs according to their strategic goals and input from the recommendations in this report. |

This section presents a short overview on the Energy$ense programs and selected information on peer utility programs. It then lists the advantages and disadvantages of each of the Energy$ense programs within the context of this information. Finally, it concludes with the program goals from GVEA's strategic planning and recommendations on how to modify the current program to fit the updated program goals.

### Energy$ense Programs

Energy$ense consists of three programs: Home$ense, Builder$ense, and Business$ense. Builder$ense and Home$ense are aimed at homeowners. The Builder$ense program provides rebates for energy efficient equipment installed in new construction and remodels, and the Home$ense program provides current homeowners with one-on-one education to reduce electricity use, and thereby costs, and provides homeowners with basic electrical energy efficiency upgrades. The Business$ense program is aimed at commercial GVEA members and provides a rebate to businesses who retrofit their lighting.

In terms of program expense per kWh saved, Builder$ense is the most cost-effective of the three programs. Over the lifetime of the program, it is estimated that Builder$ense operated with a program cost of $0.04 per kWh saved, compared to the cost of the Home$ense and Business$ense programs, $0.05 per kWh saved. The Home$ense program has reached the most customers – in 20 years of operation, audits have been provided to 7,958 homes. Builder$ense has served just over 1,000 residences, and Business$ense rebates were issued to 215 businesses. While the Home$ense has a slightly higher cost than the Builder$ense program (1-cent-per-kWh-saved), it also has an educational aspect that improves GVEA's relationship with customers and empowers customers to take charge of their own electrical use. Recent surveys of Home$ense participants confirm that the

majority of participants sign up for the program to reduce their bill and save energy, and find that the program helps them to better understand their electric bill and how their behavior can lower their utility costs.

## Peer Programs

While utilities throughout Alaska provide energy efficiency programs for their customers, none are as thorough as the Energy$ense program. Most notably, Chugach Electric offers an online service called MyPower that allows customers to track electric usage and compare it to similarly sized homes in their area. Homer Electric Association offers a loan program to customers who wish to purchase an energy efficient appliance up to $5,000, and the City and Borough of Sitka recently implemented a rebate program for the purchase of Energy Star appliances. Additionally, non-utility Alaska programs exist to stimulate energy efficiency improvements in Alaska's residential, commercial, and public facility sectors. Alaska Housing Finance Corporation (AHFC) runs the Home Energy Rebate Program, which provides up to $10,000 to homeowners completing energy efficiency home improvements based on a pre- and post- audit process. AHFC also operates a Weatherization Assistance Program for income-eligible households and an Energy Efficiency Revolving Loan Program for public buildings. Each of these programs utilizes an auditing and improvement process. The Alaska Energy Authority operates a Village Energy Efficiency Program and a Commercial Building Energy Audit Program. The Commercial Building Energy Audit Program provides business owners with an energy efficiency audit for their building.

CCHRC also reviewed energy efficiency programs in the Lower 48 that were considered exemplary by ACEEE or utility employees. These included programs from the Seattle Lighting Design Lab, Puget Sound Energy, Energy Trust of Oregon, PG&E in California, Efficiency Vermont, the New York State Energy Research and Development Authority, and Columbia Gas in Ohio. While each of these programs operates in a unique manner, they all exist to provide customers with avenues to improve energy efficiency. In many cases, they also focus on demand side management, either by reducing overall consumption or reducing consumption during peak usage periods. General characteristics of these programs are listed below:

1. Program Funding: In many cases, utilities provided funding for efficiency programs through system benefit charges. Utilities also contributed funding to programs they did not operate directly, such as in the case of the Energy Trust of Oregon and Efficiency Vermont.
2. Options: Each program offered customers a variety of options for energy efficiency, including education, rebates, home audits, technical assistance or consultations, use-tracking, and weatherization programs.
3. Member financing: Utility customers were offered an array of financing options for energy efficiency projects. Financing options included incentives, rebates, upstream financing, and loans (some with on-bill or other utility-managed payback plans).
4. Member education: Every program offered informative websites. Other education options included customer support, use-tracking, consultations, and audits.
5. Marketing: In addition to traditional media campaigns, programs were marketed online through websites, through customer service phone lines, and by contractors who had partnered with the utility to offer some of the efficiency programs. Some programs also used media to advertise times when peak usage was high enough to require the use of more expensive fuel for production. An example of this system is the red-yellow-green campaign used by multiple utilities in Alaska.

6. Partnerships: In very few cases were efficiency programs offered by only one agency. Many of the programs are funded by multiple utilities to serve the customers of the entire region. Examples of these partnerships include Seattle Lighting Design Lab, NYSERDA, Efficiency Vermont, and the Energy Trust of Oregon, and the Northwest Energy Efficiency Alliance.

The ACEEE reviews energy efficiency programs every 5 years to observe common trends and characteristics of the more successful (or exemplary) programs. In the 2013 review the following applicable characteristics were found (Nowak, Kushler, Witte, & York, 2013):

- Programs are increasingly seeking to target niche markets and customer sub-segments, such as underserved or low-income customers.
- Programs have been made easier to use by offering one-stop shopping and simplifying the application and financing process.
- Financing options are expanding.
- Relationship building is important to assure follow-through by clients in implementing programs.
- Programs have grown larger with more statewide approaches.
- Many "tried and true" approaches continue to provide savings.
- Programs must adapt and tune core offerings to continue to grow, incorporate the latest technology, and deliver savings.

## Advantages and Disadvantages of Current Energy$ense Programs

This section contains the advantages and disadvantages of the 2013 individual programs as identified through interviews and documentation in summer 2013.. Recommendations for the programs were written with these evaluations in mind.

### *Home$ense Program Evaluation*

Advantages of the Home$ense program include:

Participants surveyed overwhelmingly indicate that the Home$ense program has met their expectations. Other advantages of this program are as follows:

1. It provides homeowners with one-on-one education about electricity usage. This relationship-building aspect is in line with the ACEEE characteristics of exemplary programs.
2. The one-on-one education aspect of the Home$ense program allows it to be tailored to individual homeowners, which makes the program user-friendly and adaptable.
3. Employees implementing the Home$ense program (Jim Lee, Charles Davis, and former employee Todd Hoener) as well as GVEA staff say that the educational aspect of the Home$ense program is its main strength and that the program empowers people to take control of their own energy use.
4. Home$ense is marketed to all homeowners and especially those with high energy bills and/or low income, which is in line with the ACEEE characteristic of exemplary programs to target underserved customers.

Disadvantages of the Home$ense program include:

1. Homeowners who wish to make their home more energy efficient are only offered one option by GVEA, which is the Home$ense audit. There is no option for homeowners who have scheduling issues with the audit, already understand electricity, would like to do more in-depth energy reduction measures such as replacing inefficient appliances, or do not wish to invite an auditor to their home.
2. There is no follow-up option for homeowners who would like to continue making energy efficiency changes (such as switching out appliances) after a Home$ense audit. Additionally, the program does not offer (or partner with an organization that offers) financing options for larger energy efficiency upgrades.
3. Some participants find that the Home$ense program cannot help them because they are already doing everything the audit covers; many of these members could be helped if there were more options than just the audit.
4. GVEA's goals for the Home$ense program have evolved over the two decades the program has been offered, for instance focusing on reducing energy bills, or shifting to focus on education. This, in combination with the limited data available to measure the program's success in achieving the evolving goals, has increased the difficulty of informing GVEA where to allocate resources most effectively.
5. There is no metric for success for the Home$ense program.

### *Builder$ense Program Evaluation*

Advantages of the Builder$ense program include:

The Builder$ense program provides rebates for new home construction and major remodels for installing energy efficient equipment. Some advantages include:

1. The program offers a possibility to partner with builders in the area.
2. The program targets homeowners and builders of new houses, which can build customer relations with people new to the area or utility. This is in line with the ACEEE characteristic of exemplary programs of building relationships. It also targets a niche market, another ACEEE characteristic of exemplary programs.

Disadvantages of the Builder$ense program include:

1. Many Interior builders are unaware that the program exists.
2. In 2013 the Builder$ense program funding was fully used before the end of the year and more applicants were interested in utilizing the program. There appears to be strong interest in implementing energy efficient lighting and other electrical devices. It is unclear if a financial incentive is driving this interest at present given the payback performance of many modern products.
3. There is no rebate option for homeowners wishing to install more expensive appliances such as Energy Star refrigerators, water heaters, etc.
4. There is no educational aspect to the Builder$ense program, which leaves homeowners and builders to decide for themselves which equipment to buy and why.
5. It is unclear whether and to what extent these upgrades would occur without incentive.
6. There is no metric for success for the Builder$ense program.

### *Business$ense Program Evaluation*

Advantages of the Business$ense program include:

1. The Business$ense program targets commercial GVEA members. This is similar to many other utility exemplary programs, who offer different programs for residential and commercial electricity users.
2. The Business$ense program has already resulted in informal collaboration between GVEA and at least one lighting retrofit consultant company. It is an opportunity for GVEA to collaborate with other institutions on energy efficiency programs and their marketing.
3. The Business$ense program requires that businesses improve their lighting peak load and overall demand while not decreasing lighting output, ensuring that rebates save energy while not decreasing the quality of the lighting.

Disadvantages of the Business$ense program include:

1. In 2013 the Business$ense program funding was fully used before the end of the year and more applicants were interested in utilizing the program. There appears to be strong interest in implementing energy efficient lighting and other electrical devices. It is unclear if a financial incentive is driving this interest at present given the payback performance of many modern products.
2. There is no educational aspect to the program. There is no guidance within the program to help businesses decide what type of lighting to buy or why they should participate in the program. This may be especially problematic for smaller businesses who cannot afford a lighting consultant.
3. There is no rebate option for businesses who wish to implement energy efficiency equipment or strategies other than lighting retrofits, such as switching to more energy efficient appliances, HVAC equipment, or building control systems.
4. A few large rebates can deplete program funds, leaving no funds for smaller businesses that may take longer to hire a lighting consultant and/or complete a retrofit.
5. Currently there is no follow-up survey or verification of energy savings for participants, so formal feedback on the program is limited.
6. The contractor who advertises the program feels that some business would undertake the retrofit without as much incentive.
7. There is no metric for success for the Business$ense program.

## Program Direction

GVEA's staff reviewed the Energy $ense programs in Fall 2013. Program employees and GVEA staff participated in interviews and discussions that resulted in the selection of a primary future program direction for the Energy$ense programs. GVEA staff and program employees drew on their own experiences from GVEA's 20 years of experience implementing energy efficiency programs, budgetary considerations, and the advantages and disadvantages of the Energy$ense programs as identified during CCHRC's program review .

GVEA staff concluded that focusing on educating GVEA members is the primary strategy they would like to discuss with the GVEA board. Based on discussion with the board and other stakeholders, GVEA staff will

further refine its strategy and implementation tactics. GVEA listed the following advantages of a focus on educating GVEA members on energy efficiency:

- GVEA staff and current project employees have emphasized that education is currently the main strength of the Home$ense program and feel the Energy$ense programs as a whole can build on this philosophy.
- Educating GVEA members on electric use empowers them to take control of their own electric use and bills.
- Education can be used to help GVEA members change their habits.
- Education will establish and grow a relationship between members and GVEA.
- Education is a base from which to grow a strong energy efficiency program in the future.
- GVEA would like to optimize the cost of energy efficiency programs, and education provides GVEA members information and habits that can lead to implementation of energy efficient choices.

## Recommendations

This section contains suggested modifications to the Energy$ense program to achieve GVEA's goals. These recommendations build on the platform of GVEA's focus on education.

The recommendations are categorized into short-term recommendations meant to supplement changes planned for 2014 and long-term recommendations to further GVEA's goals in future years. In addition to furthering GVEA's primary goal of education, the set of long-term recommendations is based on the following contexts:

- Energy efficiency as a low-cost resource: National research has demonstrated that energy efficiency is a competitive resource when compared to other fuel sources used in the United States for electrical production. These national reviews consistently show that energy efficiency programs cost about 3-4 cents per kWh saved (Davies, 2013). This is less than GVEA's cost of electricity produced from coal, significantly less than that produced from wind or hydro, and almost 10 times less than that produced by diesel.
- Bill reduction: In accordance with the ACEEE characteristic of exemplary programs to reach out to low-income and underserved customers, the GVEA energy efficiency programs should reduce energy bills of low-income customers. Additionally, the programs should reduce energy bills of all customers.
- Relationship-building: Another characteristic of ACEEE exemplary programs is that these programs build relationships over time with their participants. This characteristic goes hand in hand with GVEA's goal of education, but will also involve on-going efforts to build a relationship beyond one educational session.

### *Home$ense Program Recommendations*

Based on GVEA's strategic decision regarding Home$ense, GVEA staff will make recommendations to modify the current Home$ense audit process to substantiate its focus as means to educate GVEA members. This approach helps build relationships and tailors the education aspect to individuals. The recommendations will address optimizing the number and type of products given to the homeowner during the audit process while allowing

some flexibility in which products are distributed, in order for the auditor to tailor the products to the individual home.

GVEA staff will also consider expanding the Home$ense program to include homeowner workshops and to increase their participation in community outreach events. These potential changes are addressed in the first two tables below, in order to include CCHRC's comments on the implementation of the changes, and to provide resources identified during the program review.

The remaining recommendations represent CCHRC's further suggestions based on research conducted during the course of this project.

| **GVEA Concept 1** | **Offer homeowner workshops** |
|---|---|
| **Timeframe** | Short-term |
| **Implementation** | GVEA can engage other organizations with experience in offering workshops to develop or collaborate on a homeowner workshop on electrical efficiency. |
| **Background** | Homeowner workshops will provide another option for homeowners to learn about electrical efficiency. This is especially helpful for homeowners who do not wish to participate in the existing audit, and also provides a follow-up for homeowners who do participate in an audit.<br>To avoid market saturation, GVEA should collaborate with other programs that offer homeowner workshops to develop a workshop that could stand alone or be taught in conjunction with another workshop.<br>Homeowner training through workshops has the potential to increase the efficiency of Alaska homes: ACHP reports that homeowners who participated in its workshops and in the Home Energy Rebate Program (HERP) saw an average reduction of 42% in energy usage, as compared to a 30% reduction seen by homeowners who only participated in HERP. |
| **Resources** | There are a number of organizations in Alaska that offer workshops for homeowners:<br>ACHP provides classes and training for Alaska residents, and can provide resources on developing workshops.<br>AHFC provides workshops for first-time homeowners and can share resources on developing workshops.<br>The Alaska Center for Appropriate Technology (ACAT) offers webinars for homeowners.<br>Wisdom and Associates also offers classes, primarily for the building industry.<br>REAP provides outreach for workshops and training throughout Alaska and could provide resources on marketing the workshop. |

| **GVEA Concept 2** | **Expand community outreach activities** |
|---|---|
| **Timeframe** | Short-term |
| **Implementation** | GVEA already conducts community outreach with borough schools and can continue this outreach.<br>GVEA should expand outreach efforts to include the greater community, for instance participating in events such as the Home Show and Tanana Valley State Fair. GVEA could also partner with the University of Alaska, for outreach on energy savings. |
| **Background** | Outreach at community events gives GVEA an opportunity to market programs, hand out workshop schedules, distribute energy efficiency literature, connect with members, and gather feedback on the programs.<br>Schools offer the opportunity to educate youth, who may be future GVEA members and can affect electrical consumption both now and in the future.<br>Many other Alaska utilities, including Chugach Electric Association, AEL&P, Matanuska |

| | |
|---|---|
| | Electric Association, and Homer Electric Association also offer outreach opportunities. |
| **Resources** | AK EnergySmart is an Alaska-specific energy education curriculum for schools that GVEA could incorporate into its current outreach efforts.<br>Other Alaska utilities (listed above) can provide details and lessons learned on their own outreach efforts. |

| **CCHRC Recommendation 1** | **Create a consumer guide to electrical efficiency specific to Interior Alaska** |
|---|---|
| **Timeframe** | Short - term |
| **Implementation** | GVEA should develop a "Consumer Guide" to electric efficiency for Interior homeowners. GVEA could expand on its existing room-by-room checklist by adding explanation, cold climate context, potential savings, how-to steps, energy calculators specific to Alaska, and advantages and disadvantages of different habits and products. The comprehensive guide could be made available on GVEA's website, in Home Audits and workshops, and during public outreach campaigns. |
| **Background** | GVEA currently does not have a single comprehensive resource for residential members giving electrical efficiency tips specific to Interior Alaska. Several homeowners, especially those looking to build or retrofit a house, mentioned that such a guide would be very useful. While there is a lot of information available on electrical efficiency, homeowners sometimes find it difficult to apply that information to their particular situation – especially in Alaska, where rule-of-thumb information provided by national organizations does not always apply. Also, a consumer guide could help empower the do-it-yourself homeowner, for whom a workshop or audit does not have appeal, while also serving as a "next step" for homeowners who participate in audits or workshops to track their progression to electrical efficiency.<br>The development of a consumer guide offers GVEA an opportunity to collaborate with other energy efficiency organizations in Alaska, as well as local building supply stores and energy auditors. |
| **Resources** | The Alaska Craftsman Home Program (ACHP) has experience developing materials for homeowners who participate in its workshops.<br>ACAT provides information on energy efficient Alaska homes.<br>Wisdom and Associates has experience developing materials to educate homeowners and professionals on electrical efficiency.<br>The Renewable Energy Alaska Project (REAP) can connect GVEA with other organizations that work with homeowner outreach.<br>The author of this report, CCHRC, has experience creating homeowner guides and educational materials. |

| **CCHRC Recommendation 2** | **Help homeowners track electric use** |
|---|---|
| **Timeframe** | Short-term |
| **Implementation** | Homeowners need to track usage in order to see the results of habit change and energy efficient products. GVEA currently allows homeowners to rent Kill-a-Watt meters to test the usage of individual appliances, but does not offer a whole-house method of tracking energy bills other than the monthly summaries available on the electric bills.<br>Feedback on energy usage and on comparison with social norms are two drivers for people to implement energy efficiency (Mazur-Stommen & Farley, 2013).<br>Options could include lending out TED devices, pursuing the use of Smart Meters, and |

| | |
|---|---|
| | collaborating with Chugach Electric Association to implement MyPower and OPower, two web-based applications that allow users to compare their own usage to previous months and to other utility members. |
| **Background** | Chugach Electric Association has been testing MyPower and OPower with its members and the programs will undergo a review and modification in spring 2014. GVEA will then be able to collaborate with Chugach Electric Association to obtain their lessons learned and implement the programs. |
| **Resources** | GVEA is welcome to contact Kate Ayers, the Energy Efficiency and Conservation Specialist for Chugach Electric Association. Contact information is Kate_Ayers@chugachelectric.com and 907-762-4323. She has experience with implementing MyPower and OPower.<br>GVEA could also contact PG&E in California, who participated in an interview for this project, and provided information on its log-in website that gives customers energy usage and cost by hour, day, or month, and compares a home's usage to similar houses.<br>Beyond Opower (opower.com ), other companies offering usage-tracking interfaces for customers include:<br>• Tendril (tendrilinc.com)<br>• C3 (c3energy.com)<br>• Aclara (aclaratech.com) |

| **CCHRC Recommendation 3** | **Measure the outcome of the Home$ense program** |
|---|---|
| **Timeframe** | Short-term |
| **Implementation** | It is necessary to measure the outcome of the Home$ense program to determine its effectiveness in meeting GVEA's goals of educating members. (Note that in evaluating a program, it is important to distinguish between measuring output vs. outcome. For example, number of audits would be an output; number of kWh reduced/audit would be an outcome.)<br>1. GVEA should continue to estimate electrical reduction from audits.<br>2. GVEA should engage ACHP on methods to estimate workshop outcomes.<br>3. GVEA should continue to track program participation and cost.<br>4. GVEA should explore opportunities to track electrical usage of members before and after audits and workshops, for instance using software applications. Example applications include those listed in recommendation 4 (Opower, Tendril, C3, and Aclara). This information could be reported in aggregate to review the programs.<br>5. GVEA should continue to collect surveys and interview program participants. This information should be tallied and analyzed on a regular basis. |
| **Background** | By measuring efficiency program outcomes, GVEA will learn how the programs are achieving the intended goals. This information can be provided to members and used to improve the program. |
| **Resources** | ACHP has experience measuring workshop outcomes and can help GVEA to develop metrics to measure their own efforts.<br>REAP (contact is Shaina Kilcoyne, Energy Efficiency Director, 907-929-7770, s.kilcoyne@realaska.org) can connect GVEA with other organizations with experience in measuring education outcomes. |

| CCHRC Recommendation 4 | **Offer small loans for low-income members or on-bill financing for all members.** |
|---|---|
| **Timeframe** | Long-term |
| **Implementation** | GVEA should explore financing options for residential members who would like to complete larger efficiency retrofits, such as changing out an appliance to a more efficient one, but cannot afford the upfront cost. |
| **Background** | Many other utilities offer loan programs to members, including the Homer Electric Association in Alaska. Such a program would provide a follow-up option for homeowners who have received education through GVEA's programs but do not have the upfront capital to implement all changes. |
| **Resources** | GVEA should contact the Homer Electric Association for information on its on-bill financing program.<br>Also, the City and Borough of Sitka has implemented a rebate program for appliances and could provide lessons learned. |

| CCHRC Recommendation 5 | **Investigate ways to expand energy efficiency programs to build on the education foundation.** |
|---|---|
| **Timeframe** | Long-term |
| **Implementation** | Many utilities offer energy efficiency programs beyond education in order to facilitate using energy efficiency as a resource. These programs take many forms, and can be tailored to the community. Examples include:<br>-Rebates for electrically efficient appliances<br>-Upstream financing<br>-Demand-side management programs<br>-Rate reduction mechanisms |
| **Background** | Energy efficiency is a low-cost resource for utilities throughout the nation (Davies, 2013). GVEA uses very high-cost diesel to produce 30-40% of its electricity; if energy efficiency programs were put in place to significantly reduce the total overall use of electricity, there could be a net savings to the total membership when considering the cost of the programs along with the reduction in rates. |
| **Resources** | ACEEE publishes periodic reviews of utility energy efficiency programs and sponsors conferences for utilities to learn from other program implementations. GVEA should engage with ACEEE to see which programs could benefit its members in the future, after the educational base of Energy$ense has been established. |

### *Builder$ense Program*

Under the program direction of education, GVEA staff will address reducing or discontinuing Builder$ense rebates and instead focus its efforts to serve members through energy efficiency education. Should the program be discontinued, CCHRC recommends that resources such a consumer guide and workshops for the 2014 Home$ense program are created for both new construction and retrofits and be made available to builders and new homeowners.

### *Business$ense Program Recommendations*

To focus Business$ense on education, GVEA staff's recommendation will address reducing or phasing out the rebates offered to businesses for lighting retrofits. The recommendation will consider interviews through this program review that suggest that businesses have incentives to switch to efficient lighting without a rebate.

Instead, GVEA staff and board will consider shifting the program to provide education to businesses through workshops on energy efficient lighting and increasing community outreach activities to commercial members. GVEA's potential plan to offer workshops and increased outreach are addressed in the first two tables below, in order to include CCHRC's comments on the implementation of the changes and to provide potential resources.

The remaining recommendations represent CCHRC's further suggestions based on research conducted during the course of this project.

| **GVEA Concept 1** | **Offer workshops on efficient lighting for GVEA commercial customers** |
|---|---|
| **Timeframe** | Short-term |
| **Implementation** | GVEA will begin to offer lighting efficiency workshops to commercial customers as part of its refocusing of the program on education. The workshops should address the electrical use of lighting, energy efficient lighting options, potential payback periods, low maintenance lighting options, and advantages of completing a lighting retrofit. |
| **Background** | Many commercial businesses are paying for lighting retrofits even without a rebate because of the potentially quick payback period and the lower maintenance needs of energy efficient lighting. However, there is a barrier to lighting retrofits for businesses that find the options for energy efficiency lighting difficult to navigate. A comprehensive workshop can remove this barrier by providing an equal opportunity for education for businesses of all sizes. |
| **Resources** | Rob Hill of Genesis Energy Systems, LLC has worked with GVEA members in the past and is familiar with the current Business$ense program. As an independent lighting consultant, he is willing and available to help GVEA develop a workshop for businesses.<br>Contact information:<br>Genesis Energy Systems LLC<br>5401 Cordova Street Suite 303<br>Anchorage, Alaska 99518<br>907-344-1215 main<br>907-230-3775 mobile<br>www.genesisenergysystems.com<br><br>Also, GVEA should engage the Seattle Lighting Design Lab. The Seattle Lighting Design Lab offers workshops and has hosted them in Fairbanks in the past at the request of Todd Hoener.<br>Other organizations offering workshops in Alaska include ACHP, ACAT, and Wisdom and Associates. |

| **GVEA Concept 2** | **Provide outreach to commercial customers** |
|---|---|
| **Timeframe** | Short-term |
| **Implementation** | GVEA should engage commercial customers at local building workshops and through local contractors who can help to market the workshops. |
| **Background** | Outreach efforts will help GVEA market the lighting workshops, build relationships in the community, and gather feedback on the program. |
| **Resources** | Alaska organizations such as REAP and the Alaska Building Science Network can help with outreach efforts to commercial customers. |

| **CCHRC Recommendation 1** | **Measure the outcome of the Business$ense program** |
|---|---|
| **Timeframe** | Short-term |

| | |
|---|---|
| **Implementation** | It is necessary to measure the outcome of the Business$ense program to determine its effectiveness in meeting GVEA's goals of educating members.<br>1. GVEA should engage ACHP on methods to estimate workshop outcomes.<br>2. GVEA should track workshop participation.<br>3. GVEA should explore opportunities to track electrical usage before and after workshops and lighting retrofits, for instance by implementing software applications.<br>4. GVEA should collect surveys and interview workshop participants. This information should be tallied and analyzed on a regular basis. |
| **Background** | By measuring efficiency program outcomes, GVEA will know how the program is performing. This information can be provided to members and used to improve the program. |
| **Resources** | ACHP has experience measuring workshop outcomes and can help GVEA to develop metrics to measure their own efforts.<br>REAP can connect GVEA with other organizations with experience in measuring education outcomes:<br>Contact information:<br>Shaina Kilcoyne, Energy Efficiency Director<br>907-929-7770<br>s.kilcoyne@realaska.org |

| **CCHRC Recommendation 2** | **Offer small loans or on-bill financing for small businesses.** |
|---|---|
| **Timeframe** | Long-term |
| **Implementation** | GVEA should explore financing options for commercial members who would like to complete a lighting retrofit but cannot afford the upfront cost. |
| **Background** | Many other utilities offer loan programs to members, including the Homer Electric Association in Alaska and the City and Borough of Sitka. While these programs are for residential members, they could be scaled up for commercial projects. This could be especially useful for GVEA's small business members. |
| **Resources** | GVEA should contact the Homer Electric Association for information on how their on-bill financing program operates.<br>Also, the City and Borough of Sitka has implemented a rebate program for appliances and could provide lessons learned. |

| **CCHRC Recommendation 3** | **Investigate ways to expand energy efficiency programs to build on the education foundation.** |
|---|---|
| **Timeframe** | Long-term |
| **Implementation** | Many utilities offer energy efficiency programs beyond simply education in order to facilitate using energy efficiency as a resource. These programs take many forms, and can be tailored to individual communities. Examples include:<br>-Rebates for electrically efficient appliances<br>-Upstream financing<br>-Demand-side management programs<br>-Rate reduction mechanisms<br>-Commercial energy audits |
| **Background** | Energy efficiency is a low-cost resource for utilities throughout the nation (Davies, 2013). GVEA uses very high-cost diesel to produce 30-40% of its electricity; if energy efficiency programs were put in place to significantly reduce the total overall use of electricity, there |

| | |
|---|---|
| | could be a net savings to the total membership when considering the cost of the programs along with the reduction in rates. |
| **Resources** | ACEEE publishes periodic reviews of utility energy efficiency programs and conferences for utilities to learn from other program implementations. GVEA should engage with ACEEE to see which programs could benefit its members in the future, after the educational base of Energy$ense has been established. |

## Conclusion

GVEA's Energy$ense programs were documented and reviewed over the course of this project. After the review, GVEA staff chose to focus the 2014 Energy$ense programs on education for the purpose of empowering members to understand and reduce their electric use. Education is the basis for any effective energy efficiency program. Newer programs based on education and behavior change are showing sustained reductions of 5-20% in consumer energy use (Davies, 2013). Recommendations have been provided by CCHRC for GVEA board and staff to consider during their planning process to modify the current programs to implement the direction of education.

Considering that GVEA uses high-cost diesel to produce 30-40% of its electricity, there is an opportunity to use energy efficiency programs to significantly reduce the use of electricity by members and thus reduce the cost of producing electricity. This could result in a net savings to the total membership when considering the cost of the programs along with the reduction in rates resulting from a decreased use of diesel. Therefore, in the intermediate term, GVEA should consider building a set of robust energy efficiency programs on the educational base that will be established next year. In the longer term, it may be advantageous for GVEA to partner with other utilities and agencies in Alaska to achieve some economies of scale in offering this set of energy efficiency programs.

## Existing Energy$ense Programs

The Golden Valley Electric Association (GVEA) provides electricity to areas of Interior Alaska, including Fairbanks, North Pole, Delta Junction, Nenana, Healy, and Cantwell. GVEA was incorporated in 1946 and is owned by 34,480 members (GVEA, 2012). GVEA uses a large variety of fuels to produce electricity; 43% comes from fuel oil and the remainder from coal, natural gas, hydro, and wind (see Figure 1).

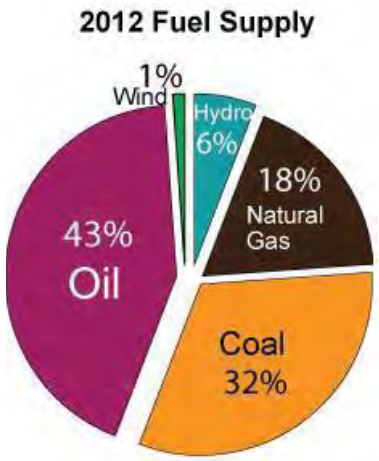


Figure 1: Fuels used to produce electricity in 2012; figure courtesy of (GVEA, 2012)

GVEA members use anywhere from a few kilowatt-hours (kWh) to tens of thousands of kWh of electricity per month. The average residential member uses 660 kWh/month, but some use much more. In order to help members reduce their energy costs, GVEA offers a number of free or low-cost services.

GVEA offers some basic energy efficiency services for free to all members, though currently no records are kept on these services. GVEA's website lists energy-saving tips and habits. Members can call or visit the office to speak with a customer service representative about questions on electricity use and billing. Also, GVEA provides the monthly electrical usage for the prior 12 months on each bill to allow electric users to compare their current use to prior months and years.

GVEA also has an energy efficiency program that has been in operation for almost 20 years. The Energy$ense program has three components: Home$ense (started in 1992), Business$ense (1994), and Builder$ense (1993). Each program targets a different segment of GVEA members.

## History of the Energy$ense Programs

GVEA first began an energy conservation program in the 1970s, and the GVEA Board of Directors first approved an energy conservation policy in 1987 (GVEA, 1999). In 1991 GVEA published an integrated resource plan that identified energy efficiency as a "fuel source" and lowest-cost option to meet growing demand for electricity. In response, the Energy Efficiency Advisory Committee recommended the Energy$ense programs in 1992.

GVEA formally committed to use resources to reduce electricity demand in 1994 as part of the Healy Clean Coal Plant accords, an agreement between the state of Alaska, GVEA, and the Alaska Industrial Development and Export Authority. The agreement to protect and benefit the environment around Healy and Denali National Park and Preserve was made for a number of clients: the Alaska Center for the Environment, the Alaska Federation for Community Self-Reliance, the National Audubon Society, the Denali Citizens Council, the Environmental Defense Fund, the National Parks and Conservation Association, the Sierra Club, the Northern Alaska Environmental Center, the Wilderness Society, and Dave Lacey (GVEA, Trustees for Alaska, & AIDEA, 1994). As part of this agreement, GVEA committed to establishing a program to reduce electric demand in its service area. Additionally, the agreement specified that the program should include a supplementation of the existing Home$ense program to provide electricity-saving devices to homeowners (GVEA, Trustees for Alaska, & AIDEA, 1994).

A 1999 evaluation of Energy$ense by GVEA provided details on the progress of the program. As of 1999, almost 3,000 GVEA members had used the Energy$ense programs and benefitted from the operational savings, energy savings, and education. GVEA has also benefitted from the program in the following ways (GVEA, 1999):

- Energy efficiency programs reduce the overall revenue requirements for building new capacity.
- The programs meet the terms set forth in the Healy Clean Coal Plant Agreement in 1994.
- The programs would fulfill the requirement of an energy efficiency program if GVEA applied for an ISO 14001 certification [ISO 14001 is an environmental management certification].
- GVEA is able to offer expertise and resources to its members, who live in an extreme climate with high energy costs.

## Home$ense Program

GVEA's Home$ense program is an electrical efficiency program, designed to provide homeowners with a professional evaluation of a home's electricity consumption as well as useful insight and materials to aid homeowners in meeting energy reduction goals. The program costs $40 for the homeowner, or is offered free with the Low-Income Weatherization Assistance Program. Any residential GVEA member, including those living in apartments or duplexes, is eligible for the program.

The program begins with a home visit from an energy auditor. To schedule an audit, a homeowner can call member services at GVEA to sign up, or qualifying members can receive the audit as part of the Weatherization program. A trained energy efficiency auditor then visits the home to perform an energy assessment and educate the homeowner on ways to lower energy costs. The audit typically lasts one to three hours.

During the assessment the auditor educates the homeowner on best practices for energy efficiency. The education aspect of the assessment focuses on helping homeowners understand their electric bill and how they can reduce it. For instance, the auditor will share behaviors and tips that can lead to energy savings, such as turning off the TV when not in use or using motion sensors for porch lights. Homeowners also learn the typical electric usage of common appliances, like clothes dryers, computers, freezers, and water heaters, and approximately how much these appliances cost to run each month. The auditor uses a Kill-a-Watt meter to

demonstrate the electric usage of appliances. The audit is very customer-driven, and the auditor focuses on answering the concerns and questions of the homeowner.

The auditor provides an electric usage log and shows homeowners how to identify possible causes of high electric usage (see Appendix C: Electric Usage Log). Throughout the audit, the homeowner and the auditor fill out a checklist on home electrical usage and behavior (see Appendix B: Electrical Energy Efficiency and Conservation Checklist). This allows the homeowner to identify methods to use less electricity and provides an estimation of potential savings.

At the end of the audit, the homeowner should be able to identify which appliances use the most electricity. They will also know how electricity is generated and sold, and should understand that their electric bill is not a fixed amount, but rather can be changed through behavior and appliance upgrades.

In addition to the education component, the auditor will install some devices to help the homeowner save energy, and explain how the devices keep electric bills low. The following may be installed as part of the assessment at the auditor's discretion:

1. LED lights to replace incandescent bulbs
2. A refrigerator thermometer and coil-cleaning brush
3. A plug-in timer for a vehicle (one is included in the audit)
4. Smart Strip surge protectors
5. An electric water heater blanket
6. Up to 10 lineal feet of pipe wrap
7. Two faucet aerators
8. One low-flow shower head

These products can lower energy costs by reducing energy use. The auditor explains how the products work and demonstrates that efficient products offer the same convenience for less electricity. This provides context when homeowners look at larger appliances such as televisions or clothes washers (J. Lee, personal communication, June 28, 2013).

The Home$ense program has changed slightly since it began in 1992. The handouts and devices installed by the auditor have changed. However the main process of the audit has remained the same: an auditor visits a home to provide one-on-one education about electric bills to the customer.

GVEA has begun to measure the program's success in meeting its objectives. GVEA collects information on the number of page views on the Home$ense website to track the effectiveness of marketing. Beginning in January 2013, GVEA also incorporated a homeowner survey to the Home$ense program, which is mailed to customers after they receive an energy audit (see Appendix D).

### *Perspectives on the Home$ense Program*

Jim Lee is the construction manager at Interior Weatherization and has 15 years of experience working with the Home$ense program. He says that GVEA offers the Home$ense program as a way to educate customers so that they can make decisions about their behavior and use of electricity. The weatherization program has received

comments thanking them for their knowledgeable auditors who were able to tailor the audit to the specific house, concerns, and billing issues (J. Lee, personal communication, June 28, 2013). Mr. Lee says the program is very valuable in that it empowers homeowners to make their own choices about electric use and introduces them to products that can save energy while providing the same convenience. He believes it is important for the program to maintain an emphasis on education, with a secondary goal of lowering electric bills. It is very important not to simply install products with no explanation–for instance, homeowners can still bypass a timer for a car plug-in if they do not understand how it works and how it can reduce their energy use. With education, homeowners understand how to use the products and also make additional changes on their own (J. Lee, personal communication, June 28, 2013).

Dave Rich is the GVEA quality control officer. He thinks the Home$ense audit as conducted is a good idea but could benefit from being streamlined and made more applicable (D. Rich, personal communication, July 24, 2013).

Todd Hoener, who previously directed the Energy$ense programs, argued against using reduction in usage as a way to measure the success of the Home$ense program. He described his reasons in a 2007 memo. First, he believed a change in usage could not be attributed to the Home$ense audit because households are dynamic, appliances can be added or removed from a home, weather varies from month to month and year to year, and behavior is unpredictable. Even if the electricity usage goes down, there is no way to attribute it to a home audit. Instead, he recommended that Home$ense focus on member education and best practices. Therefore, the number of clients who participate in the program is a better measure of success, because the more people that understand efficiency the more they will be able to establish and maintain a household energy plan.

Charles Davis of CNC Power Plus has been providing Home$ense audits for 10 years. He first began providing them as part of Interior Weatherization, and later for GVEA. He agrees with other interviewees that the strength of the Home$ense program is its focus on education, and feels that his job is very gratifying, especially when he is able to share knowledge on how electricity works. For instance, he reports that many customers are surprised at the importance of using a timer, or turning off heat tape during the summer (C. Davis, personal communication, July 29, 2013). For this reason, he focuses on helping people change their behavior instead of just focusing on the end energy savings. When given a dollar savings, people can fixate on that number instead of using their knowledge on how electricity works to employ several efficiency behaviors. In general, Mr. Davis finds that the majority of homeowners are happy to discover that timers can be used to reduce the energy use of vehicle plug-ins and heat tape. They are least receptive to advice on actual behavior change, like washing clothes with cold water instead of warm. He finds that many people who have been doing something one way their entire life, such as washing clothes with warm water, are reluctant to hear that a change, such as using cold water, will save energy while still cleaning their clothes. Because of the education aspect of the audit, communication skills are extremely important for auditors–both listening to customer complaints, concerns, and questions, and conveying knowledge about electricity (C. Davis, personal communication, July 29, 2013).

### *Cost Analysis for 2012 and 2013*

Homeowners who apply for an audit pay a fee of $40, unless they qualify for a free audit from Interior Weatherization. Occasionally, GVEA offers discounts or coupons for the audits, which reduces the fee for the

homeowner. The cost to GVEA for a basic audit is $175. This is paid to either CNC Power Plus, who performs audits for GVEA members, or to Interior Weatherization, who performs free audits to low-income members. Additional fees are added if travel out of the Fairbanks North Star Borough is required, or if follow-up visits or phone calls are necessary. The following table gives the cost breakdown for a Home$ense audit.

| **Action** | **Cost to GVEA** | |
|---|---|---|
| Home$ense audit by GVEA (cost of the auditor) | $175 | |
| Travel out of FNSB (per auditor per day, not per audit) | $95 | |
| Travel out of FNSB through Weatherization program | $95 | |
| Materials, supplies, and products purchased outside GVEA's purchasing system and stored off GVEA premises | Cost + 15% | |
| Materials, supplies, and products purchased through GVEA's purchasing system and stored on GVEA premises | CFL/LED lights with various wattages | $2.08 - $18.23 |
| | Car timer | $18.27 |
| | Fridge brush | $1.88 |
| | Fridge thermometer | $2.30 |
| | Foam pipe wrap | $5.95 |
| | Water heater blanket | $14.94 |
| | KW meter | $15.00 |
| | Smart strip | $21.57 |
| | Bath aerator | $0.45 |
| | Kitchen aerator | $1.20 |
| | Showerhead | $3.10 |
| | Shower wand | $8.50 |
| Stipend for cell phone use, per month, per cell phone | $40 | |

In 2012, GVEA conducted a total of 645 audits: 262 audits from GVEA and 383 audits performed under the Weatherization program. These audits resulted in the following costs:

Contract labor and product costs: $163,944
Energy efficiency specialist labor: $24,827
Marketing costs: $4,376
Total cost (labor + product + marketing): $193,147
Average cost per audit (Total ÷ 645 audits): $299.45

During the first half of 2013, 405 audits were performed for a cost of $215,812, or $533 per audit. However, the total cost includes products that have been purchased for future audits should the board approve additional funding at the July board meeting. GVEA anticipates that if funding is received, the 2013 Home$ense program will provide 805 audits for a total cost of $367,812 ($457 per audit).

## Business$ense Program

The Business$ense program is a rebate program that promotes electrical energy efficiency for commercial GVEA customers. State and local government buildings became eligible to participate in the program in 2012. Businesses are eligible for a rebate of up to $20,000 for retrofitting older lighting with more energy efficient options. While there are some specifications for the new lighting, businesses are able to choose new lighting systems that will work for them.

To receive the rebate, businesses must submit a proposal to GVEA that includes an estimation of anticipated savings from electric bills. GVEA reviews the proposal andcalculates a rebate amount based on the load reduction of the lighting plan. The rebate can only cover the cost of lighting equipment and installation by a licensed electrical contractor (not design work) and can cover up to 50% of the project cost, or $1,000/kW. Businesses are expected to contribute at least 2 years worth of electrical savings toward the project.

Proposals are reviewed on a first-come, first-served basis as funding becomes available. Each proposal contains an efficiency measure evaluation worksheet, in which the business describes the retrofit in 5 steps:

1. Existing Facility Configuration: The business provides details on each light fixture in the building, including location, type, energy demand in kW, and hours of operation.
2. Proposed Facility Configuration: The business provides details on the proposed lighting retrofit, including the new energy demand. Businesses must maintain the same, or improved, light output with the lighting retrofit.
3. Totals: The spreadsheet calculates the energy demand and annual energy use for the current and proposed lighting.
4. Incremental Savings: The business provides information on the operational costs of both lighting systems.
5. Project Cost, Simple Payback, and Estimated Rebate Calculations: The business estimates the simple payback without the rebate, the estimated rebate, and the payback with the estimated rebate.

GVEA will conduct a pre-project inspection and issue a contract if the project is determined to be beneficial to both GVEA and the business. The rebate is issued after a post-project inspection.

To begin, participants can call GVEA to receive a booklet on how to submit a proposal, and on the requirements for the lighting equipment (Appendix E). GVEA also has an Energy Efficient Lighting Proposal Guide, which gives a detailed explanation of the application process. It includes a sample contract and worksheets for submitting a proposal.

The Business$ense program has been suspended for 2013 because it has already distributed its allocated funding for the year.

### *Perspectives on the Business$ense Program*

Business$ense has been used extensively by Genesis Energy Systems, a high-efficiency lighting retrofit company based in Anchorage. Rob Hill owns Genesis Energy Systems and has used Business$ense for the past 2.5 years for commercial and government lighting retrofits in the Interior. He says it adds value to a lighting retrofit for a customer, and he acts as an interface between GVEA and companies, giving them information and helping them apply for the program (R. Hill, personal communication, June 24, 2013). Mr. Hill says the Business$ense program is one of the best energy efficiency programs he has seen. However, he does feel that some improvements could be made to make the program available to more businesses, as funds have already been exhausted for 2013. For instance, if GVEA could offer a workshop or another type of education to businesses, he says it would increase participation in the Business$ense program (even with a smaller rebate), eliminate confusion about lighting retrofits, and allow businesses to see the merit of energy retrofits even without a rebate program (R. Hill, personal communication, June 24, 2013).

Dave Rich began working with Business$ense in 2013 and says the program helps businesses use electricity more efficiently. He believes that businesses discover the program through several avenues: through GVEA advertising, from a hired contractor, or through a vendor. Contractors and vendors already advertise their services on the basis of energy savings from retrofits, so the program helps to reduce payback time even further. In Mr. Rich's experience, most people who begin the program finish it, although sometimes this takes longer than expected as they may lapse in the process. Mr. Rich says he believes the $20,000 rebate is excessive for upgrades because the energy savings alone are very beneficial (D. Rich, personal communication, July 24, 2013).

### *Cost Analysis for 2012 and 2013*

In 2012, 19 businesses were issued rebate checks through the Business$ense program. The 19 checks totaled to $123,167, for an average size of $6,282.

The Energy Efficiency Specialist position, which includes $1,500 in marketing costs, cost $23,212. This results in a total program cost for 2012 of $146,379, or $7,704 perrebate.

During the first half of 2013, 39 businesses received rebates that totaled to $328,000. The program has been suspended due to depleted funding.

## GVEA's Builder$ense Program

The Builder$ense program is similar to the Home$ense program in that it targets GVEA residential customers. However, the Builder$ense program promotes electrical efficiency in new construction by offering a rebate to builders for installing efficiency measures during construction. Remodels and additions are also eligible for the

program. To participate, builders need to contact GVEA to schedule an inspection. After the inspection, GVEA processes the rebate (see Appendix E for a sample application). In some cases, the rebate goes to the builder, but in other cases, such as for light bulbs, only the homeowner is eligible to receive the rebate.

The energy efficient equipment must be installed according to code to receive the rebate. Also, lights must be hard-wired into a fixture. The following equipment rebates are available:

| Equipment | Rebate |
|---|---|
| Fluorescent lamps<br>*minimum of 4 must be installed | $20 for linear tube fixtures<br>$10 for hard-wired compact lamp fixtures |
| Compact fluorescent lamps (CFLs) | $3 |
| Light-emitting diode lamps (LEDs) | $10 |
| LED pin-type lamp | $15 |
| Exterior photocell/motion detector | $10 |
| High intensity discharge (HID) – exterior light fixture | $20 |
| Vehicle timer | $20 |
| Vehicle switched outlet | $10 |
| Insulating blanket for electric water heater<br>*must be at least R-11 | $10 |
| Water heater timer | $30 |

### *Cost Analysis for 2012 and 2013*

The Builder$ense program issued 43 rebate checks in 2012 for a total of $40,646, which includes marketing costs, staff costs, and rebate checks. This results in an average cost per rebate of $945.

In the first half of 2013, 59 rebates were issued for a total of $41,000 before the program was suspended due to depleted funds. Therefore, rebates in 2013 cost an average of $695.

## Previous Energy Efficiency Specialist Perspective

Todd Hoener began working at GVEA as the energy efficiency specialist in 1995 shortly after the Energy$ense programs were established. He ran the three Energy$ense programs for nearly 10 years before retiring in February 2013. During his tenure at GVEA, the Energy$ense programs kept the same basic structure as when they were created by consulting group CH2M Hill and a GVEA committee in the early 1990s. However, he worked to emphasize the programs' focus on education, especially with the Home$ense program. He emphasized the importance of behavior change in establishing long-term efficient practices. Mr. Hoener also continually worked to update and improve the programs: he made small changes based on employee feedback, updated the calculations used to determine the effectiveness of the programs for reporting purposes, sought out education on efficiency programs through conferences, and initiated a program review by Electric Power and Research Institute. He offered suggestions on how to improve the programs:

- Establish a dedicated purpose for the programs. The purpose should clearly reflect GVEA's intent and be used to market the program.

- The energy efficiency specialist should work with the marketing department at GVEA to develop a marketing strategy for the programs.
- The energy efficiency program should be integrated into GVEA's everyday operations. The efficiency program has the potential to pay for itself by helping customers reduce their energy needs so that they can pay their bills in a timely fashion.
- The energy efficiency programs should maintain an educational focus to empower people to change their behavior and reduce their energy consumption.

## Marketing of Energy$ense Programs

The Energy$ense programs are marketed through GVEA's public relations division. The Home$ense program is featured most prominently in the marketing campaign. Marketing is year-round but also features a few short campaigns.

The current goals of the marketing campaign are:

- Perform 80 Home$ense audits per month
- Reduce average residential electrical usage by 5% per month
- Improve customer satisfaction with the Energy$ense programs

GVEA markets the Home$ense program to the following audiences:

- Employees
- Board members
- Members in delinquent status
- Members with above average usage
- Member billing statements (electronic and paper)
- Members on fixed incomes (seniors)
- General membership via communications such as the Ruralite magazine, the annual meeting, and the Home Show
- Kids/schools
- GVEA office visitors

GVEA has used a number of channels to market the program, including paid media, direct mail, coupons in shut-off notices, lobby coupons, and a "Power to Use Less" promotional campaign. The utility also has a Facebook page for announcements and videos on YouTube about the audits and how to use energy-saving appliances such as vehicle timers. References to the Energy$ense program have been included in other advertising campaigns as well, including:

- Ruralite feature articles
- Bill inserts
- Annual meeting
- "On-hold" messages
- Fairbanks Daily News-miner online ads

- Go Winter! Expo/HomeShow

Builder$ense was marketed at the annual Interior Alaska Builders Association (IABA) Home Show in the past, but this part of the marketing campaign has not continued. Instead, it is advertised in the Home Tab (a Fairbanks Daily News-miner feature) and in the IABA Construction Directory. In the past, postcards about the program were also mailed to new connect accounts in Delta Junction.

In addition to marketing the Energy$ense audits, GVEA also advertises the opportunity for members to check out a Kill-A-Watt meter and publishes articles on efficiency tips in newsletters. The Kill-A-Watt meters are available in public libraries, borough schools, and at the University of Alaska Fairbanks. In the near future, GVEA is coordinating with the Alaska Energy Authority and the Fairbanks North Star Borough School District to bring "Energy Hog," an energy education program offered by the Alliance to Save Energy, to local schools.

## Cost Benefit Analysis of Energy$ense Programs

GVEA has kept records on the costs of the Energy$ense programs, participation in the programs, and the estimated lifetime electrical savings from each program. The procedure for setting up the analysis done by GVEA was set up by consulting company CH2M Hill.

*Expenses*: The expenses include all expenditures related to the program, including GVEA and contractor labor. They also include the actual rebate checks for Builder$ense and Business$ense as well as marketing costs.

*Total participation*: The participation for the Home$ense program includes both Weatherization audits and audits done by GVEA. The participation for the Business$ense and Builder$ense programs is the number of rebate checks issued.

*Estimated energy savings*: The estimated energy savings for a particular year come from tracking statements on each completed program. In the tracking statements from the Home$ense program, the energy savings represent the 5 year life-cycle of the energy-saving device, and so are divided by 5 before being added to the yearly energy savings estimation.

*Cumulative kWh savings*: The cumulative savings takes into account the lifetime of the efficient equipment installed and thus is a sum of the current year's savings and the savings from the previous four years.

*Cost per kWh*: This column gives the cost spent for each kWh that was saved through efficiency during that year for the Energy$ense programs. For the Home$ense and Builder$ense programs, the cost is divided by five times the estimated energy savings for that particular year. The five years represents the amount of saved kWh over the lifetime of the device. The Business$ense uses a 10-year lifetime on efficient equipment.

### *Home$ense*

Home$ense audits began in 1992, with a total of 386 audits given during that year.

| Year | Annual Expenses | Total participation | Estimated Energy Savings | Cumulative kWh Saved | Cost per kWh |
|---|---|---|---|---|---|
| | | | kWh | kWh | $/kWh |
| 1992 | $180,210 | 386 | 665,044 | 665,044 | $0.05 |
| 1993 | $192,620 | 540 | 1,095,993 | 1,761,037 | $0.04 |
| 1994 | $158,661 | 398 | 569,672 | 2,330,709 | $0.06 |
| 1995 | $120,884 | 316 | 403,860 | 2,734,569 | $0.06 |
| 1996 | $90,888 | 283 | 346,375 | 3,080,944 | $0.05 |
| 1997 | $125,611 | 388 | 578,457 | 2,994,357 | $0.04 |
| 1998 | $83,258 | 350 | 522,483 | 2,420,847 | $0.03 |
| 1999 | $62,191 | 252 | 443,898 | 2,295,073 | $0.03 |
| 2000 | $63,489 | 252 | 446,107 | 2,337,320 | $0.03 |
| 2001 | $53,651 | 187 | 292,662 | 2,283,607 | $0.04 |
| 2002 | $36,098 | 148 | 261,958 | 1,967,108 | $0.03 |
| 2003 | $34,513 | 198 | 324,550 | 1,769,175 | $0.02 |
| 2004 | $43,437 | 144 | 249,092 | 1,574,369 | $0.04 |
| 2005 | $45,009 | 292 | 352,465 | 1,480,727 | $0.03 |
| 2006 | $38,791 | 184 | 264,424 | 1,452,489 | $0.03 |
| 2007 | $60,371 | 359 | 555,908 | 1,746,439 | $0.02 |
| 2008 | $158,133 | 762 | 463,068 | 1,884,957 | $0.07 |
| 2009 | $135,771 | 593 | 341,772 | 1,977,637 | $0.08 |
| 2010 | $189,273 | 654 | 475,263 | 2,100,435 | $0.08 |
| 2011 | $153,560 | 627 | 685,568 | 2,521,579 | $0.05 |
| 2012 | $193,147 | 645 | 800,000 | 2,765,671 | $0.05 |
| **Total** | **$2,219,556** | **7,958** | | **44,144,093** | |

The Home$ense program has been in operation for 20 years, providing home audits to 7,958 homes. During that time an estimated 44 million kWh hours were saved through energy efficiency – an average cost of $0.05/kWh over the life of the program when calculated using the total program expenses and cumulative energy saved as of 2012. Average costs calculated by year appear in the last column of the table, and range from a low of $0.02/kWh saved in 2003 to a high of $0.08/kWh in 2009 and 2010.

### *Business$ense*

The Business$ense program first offered rebates in 1994. The first year of the program drew the highest participation, with 33 businesses qualifying for a rebate check. The program has since provided rebates for almost two decades, reaching a total of 215 businesses.

| Year | Annual Expenses | Total Participation | Estimated Energy Savings | Cumulative kWh Saved | Cost per kWh |
|---|---|---|---|---|---|
| | | | (kWh) | kWh | ($/kWh) |
| 1993 | $37,905 | 0 | 0 | 0 | |
| 1994 | $177,161 | 33 | 506,548 | 506,548 | $0.04 |
| 1995 | $350,830 | 27 | 1,430,381 | 1,936,929 | $0.03 |
| 1996 | $105,751 | 9 | 304,235 | 2,241,164 | $0.04 |
| 1997 | $60,601 | 3 | 1,705,450 | 3,946,614 | $0.004 |
| 1998 | $73,669 | 9 | 346,739 | 4,293,353 | $0.02 |
| 1999 | $44,052 | 4 | 183,720 | 3,970,525 | $0.02 |
| 2000 | $36,843 | 4 | 85,989 | 2,626,133 | $0.04 |
| 2001 | $63,346 | 7 | 161,080 | 2,482,978 | $0.04 |
| 2002 | $51,421 | 10 | 198,666 | 976,194 | $0.03 |
| 2003 | $14,464 | 2 | 15,012 | 644,467 | $0.10 |
| 2004 | $47,354 | 6 | 130,080 | 590,827 | $0.04 |
| 2005 | $52,466 | 5 | 273,775 | 778,613 | $0.02 |
| 2006 | $90,219 | 10 | 436,587 | 1,054,120 | $0.02 |
| 2007 | $54,445 | 6 | 149,418 | 1,004,872 | $0.04 |
| 2008 | $121,792 | 7 | 265,402 | 1,255,262 | $0.05 |
| 2009 | $146,348 | 16 | 342,877 | 1,468,059 | $0.04 |
| 2010 | $134,465 | 20 | 316,765 | 1,511,049 | $0.04 |
| 2011 | $97,982 | 18 | 352,800 | 1,427,262 | $0.03 |
| 2012 | $146,379 | 19 | 534,624 | 1,812,468 | $0.03 |
| **Total** | **$1,907,493** | **215** | | **34,527,437** | |

The total expenses over the life of the program without the first year, when there were no rebates issued, are $1,869,588, which resulted in an estimated 34 million kWh saved. This results in an average cost of $0.05 per kWh over the operational life of the program through 2012. Average costs calculated per year, appearing in the last column of the table, are at this cost or lower, and range from $0.02/kWh to $0.10/kWh.

### *Builder$ense*

Builder$ense first offered rebates in 1993. Rebates are offered for both new construction and remodels of existing homes.

| Year | Total Expenses | Total participation | Estimated Energy Savings | Cummulative kWh Saved | Cost per kWh |
|---|---|---|---|---|---|
| | | | (kWh) | kWh | ($/kWh) |
| 1993 | $34,295 | 5 | 18,358 | 18,358 | $0.37 |
| 1994 | $48,988 | 13 | 29,768 | 48,126 | $0.33 |
| 1995 | $40,782 | 28 | 75,961 | 124,087 | $0.11 |
| 1996 | $21,407 | 27 | 75,011 | 199,098 | $0.06 |
| 1997 | $27,052 | 46 | 98,892 | 297,990 | $0.06 |
| 1998 | $28,176 | 44 | 99,900 | 379,532 | $0.06 |
| 1999 | $35,168 | 64 | 187,915 | 537,679 | $0.04 |
| 2000 | $38,683 | 62 | 193,065 | 654,783 | $0.04 |
| 2001 | $23,072 | 31 | 94,729 | 674,501 | $0.05 |
| 2002 | $42,082 | 52 | 186,269 | 761,878 | $0.05 |
| 2003 | $42,275 | 54 | 109,943 | 771,921 | $0.08 |
| 2004 | $47,461 | 60 | 236,022 | 820,028 | $0.04 |
| 2005 | $58,006 | 75 | 725,735 | 1,352,698 | $0.02 |
| 2006 | $54,609 | 78 | 445,543 | 1,703,512 | $0.03 |
| 2007 | $63,215 | 94 | 714,157 | 2,231,400 | $0.02 |
| 2008 | $78,216 | 77 | 620,271 | 2,741,728 | $0.03 |
| 2009 | $91,516 | 77 | 281,882 | 2,787,588 | $0.07 |
| 2010 | $50,470 | 73 | 293,718 | 2,355,571 | $0.03 |
| 2011 | $45,347 | 49 | 237,490 | 2,147,518 | $0.04 |
| 2012 | $40,646 | 43 | 182,416 | 1,615,777 | $0.04 |
| **Total** | **$908,671** | **1,052** | | **22,223,773** | |

Over nearly two decades, 1,052 rebates have been distributed to homes through Builder$ense. The total program cost, $908,671, was responsible for an estimated savings of 22 million kWh. Builder$ense has operated with an average cost of $0.04/kWh over the life of the program when calculated with total costs and cumulative energy savings through 2012.

Overall, the average delivery price of 4-5 cents per kWh for the three programs is close to national norms and establishes energy efficiency as a low cost resource for electricity “production.”

## Participant Feedback and Energy Savings

To obtain a picture of the energy savings possible from the Energy$ense programs, researchers analyzed electrical records from a small sample of businesses and homes that have participated in one of the three programs. In each case, the electrical use from a particular month before the audit was compared with the same month after the audit–for instance, if an audit occurred in July 2012, researchers compared the electrical usage from June 2012 to June 2013, May 2012 to May 2013, etc. This corrects for the seasonal variability in electrical usage as occupants will use lighting and heating equipment more often during the winter. The number of months compared depended on the number of available records. Overall, records were obtained for the following:

- 25 homes having Home$ense audits in between July 2011 and July 2012
- 14 businesses having Business$ense rebates in between July 2011 and June 2012
- 20 homes having Builder$ense audits in between July 2011 and August 2012

Figure 2 below shows the average monthly change in electrical use for each home or business, when comparing periods before and after audits. A negative change represents a decrease in electrical use, meaning that the average monthly use after the audit was less than the average monthly use before the audit. A positive change represents an increase in electrical use after the audit. Both types of changes occurred when analyzing records from all three programs, although the majority of homes and businesses experienced a negative change. In some cases, especially with the Business$ense program, this average monthly change was equal to or over 500 kWh of savings. In other cases, homes and businesses experienced an increase in electricity. Reasons for this

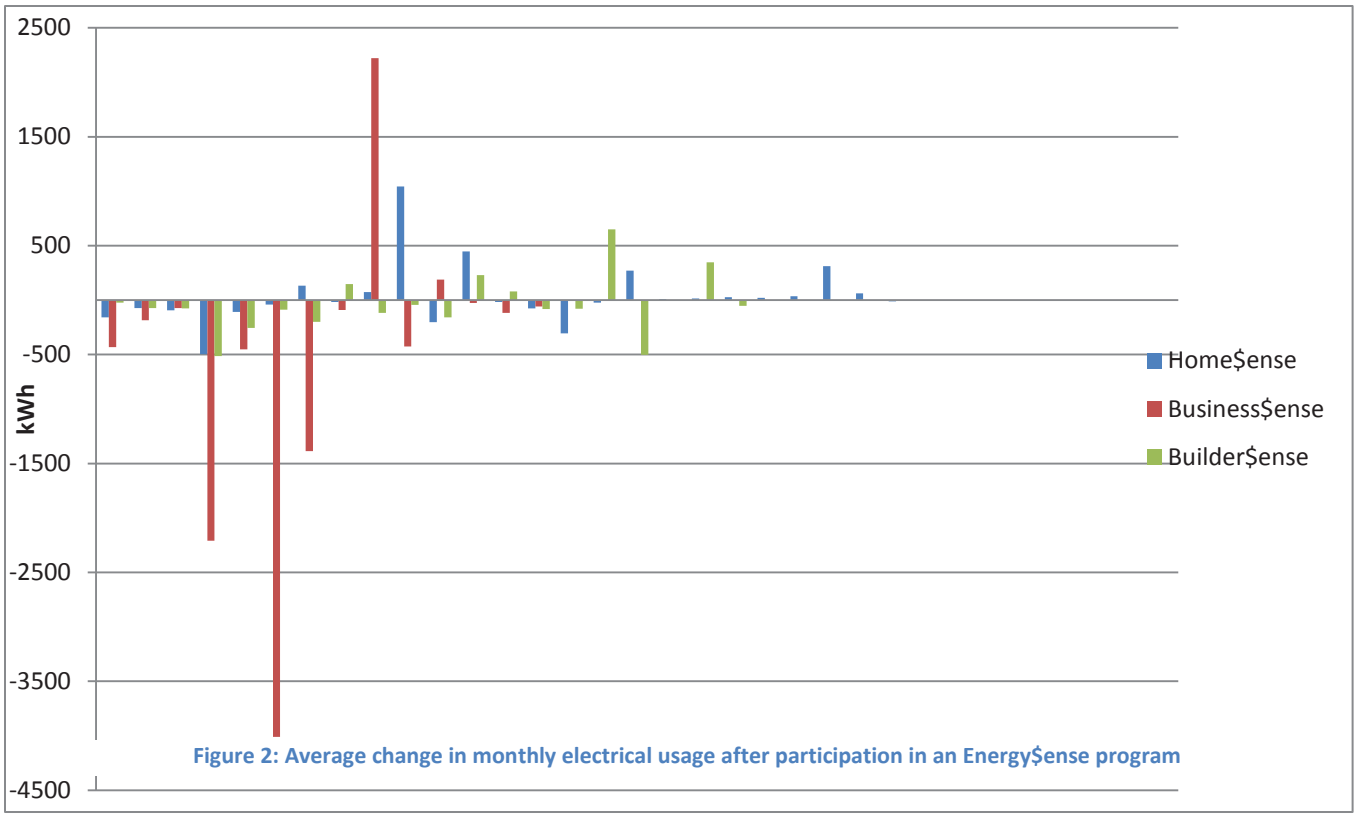


Figure 2: Average change in monthly electrical usage after participation in an Energy$ense program

change are speculative but may include:

- Addition of extra appliances or equipment. Building owners may have pursued an efficiency program in anticipation of a rise in usage due to the purchase of a new appliance or piece of equipment. In this case, audits may have lessened the anticipated rise in usage.
- Addition of extra space. This is especially true of the Builder$ense participants surveyed, because each one was a remodel (instead of a new build). If the remodel included an expansion, electrical usage would be expected to increase.
- Change in occupancy. New employees, renters, and other occupants will affect electric usage. Also, changes in daily occupancy patterns, such as vacations, guests, or extended leave will result in usage changes.
- While results were compared month by month to correct for weather patterns, an especially cold or warm month will change electrical usage regardless. This analysis did not include a comparison of heating degree days on compared months, so while general weather patterns will be the same, month-by-month comparison still introduces weather-related uncertainty.

The median change for the surveyed participants was negative for each program.

| Program | Number of buildings analyzed | Median monthly improvement (kWh) |
|---|---|---|
| Home$ense | 25 | -10 |
| Business$ense | 14 | -151 |
| Builder$ense | 20 | -75 |

While these numbers are informative, the formal annual cost benefit analysis in the previous section is a much better indication of the overall energy savings resulting from the Energy$ense programs. The small sample size analyzed here was meant to showcase the results of a few individual buildings from the program and should not be interpreted as a comprehensive analysis.

Researchers were also able to analyze 108 surveys from Home$ense participants. In January 2013, GVEA implemented a follow-up survey for Home$ense participants. Since that time, approximately 115 surveys have been returned to GVEA, of which 108 had sufficient information. The survey is located in Appendix D. Survey results indicated that the auditor arrived on time for 94% of the audits was professional, courteous, confident, and attentive. In 104 out of 108 surveys, homeowners indicated that the audit met their expectations:

- 106 out of 108 homeowners found the checklist and auditor recommendations helpful
- 106 out of 108 homeowners plan to follow up with recommendations
- 106 out of 108 homeowners said they now understand more about their bill, electric usage, and the potential energy savings of changing their behavior and improving energy efficiency
- 91 out of 108 have changed their behavior (conserved) or purchasing decisions (energy efficient devices) as a result of the audit

The survey also asked homeowners how they had learned about the audit. More than one answer could be chosen.

- 28 people through the Ruralite publication
- 13 people online
- 7 people through television
- 30 people through a family member or friend
- 1 person through the radio
- 18 people by reading a bill insert
- 11 people through other means, including GVEA employees who learned about the program at work

Finally, homeowners indicated their reason for participating in Home$ense. Again, more than one answer could be chosen.

- 83 people were motivated to save energy
- 97 people wanted to lower their bill
- 74 people wanted to reduce their usage
- 42 people participated because of a promotional price

Thirty-seven homeowners also took the time to fill out a comment section. These comments were overwhelmingly positive, with 26 comments either thanking the auditor, expressing that the program met expectations, or explaining that they found the audit helpful and informative. Two homeowners did not like the lights provided with the audit and three homeowners commented that the auditor told them there wasn't much else that they could do to lower usage. The remaining comments were specific to individual audits or homes (i.e. one homeowner said that the smart strips were on backorder and he had not received his yet).

## Peer Utility Programs

This section contains details on energy efficiency programs offered by other utilities in the United States. It begins with the latest findings from an American study on energy efficiency programs, then describes some recent strategies available in the United States to help people with energy efficiency, and finally provides short descriptions of exemplary energy efficiency programs.

## ACEEE Exemplary Programs

Every five years since 2003 the American Council for an Energy Efficient Economy (ACEEE) has published a national review of exemplary energy efficiency programs. In the 2013 review ACEEE selected a total of 63 programs for recognition in the exemplary or honorable mention categories, including 23 program categories from 36 states. A number of common trends and characteristics were observed in this year's review (Nowak, Kushler, Witte, & York, 2013):

- An increasingly common strategy was to target niche markets and customer sub-segments, including underserved customers.
- Programs have grown larger with more statewide approaches.
- Many "tried-and-true" approaches continue to provide savings.
- Programs must adapt and tune core offerings to continue to grow, incorporate the latest technology, and deliver savings.
- Programs have become more user-friendly by offering one-stop shopping and simplifying application and financing processes.
- Financing options are expanding across all program types.
- Relationship building is important to assure participants follow through and implement program elements.

This ACEEE review concludes that:

> Energy efficiency programs for electric and natural gas customers are a proven means to help customers reduce energy costs. The savings achieved through such programs constitute a significant, low-cost energy resource for helping utilities meet system energy needs. These programs also provide important environmental and economic benefits.

The review also contains profiles of award-winning energy efficiency programs. Two of the programs reviewed by ACEEE are described here because they are similar to programs currently offered by GVEA. One is a program for energy efficient lighting in commercial applications, and the other focuses on energy efficiency in new construction.

*Exemplary Commercial Lighting Program – Puget Sound Energy*

PSE's Enhanced Lighting Program offers a bonus incentive for customers who implement comprehensive retrofits involving all lighting for a building. This program provides incentives of $0.30 per kWh/yr saved, up to a maximum of 70% of the eligible project cost, for custom lighting retrofits that replace all inefficient lighting, interior and exterior, with more efficient options like CFLs, LEDs, T8s, T5s or others.

To qualify for the increased incentives of the Enhanced Lighting Program, projects must be comprehensive and follow complete program requirements. One of these requirements is to change all the lights to more efficient options, inside and out.

*Exemplary Commercial New Construction Program – Energy Trust of Oregon*
The Energy Trust New Buildings program works with developers and owners of new buildings and major renovations to reduce gas and electric use. It uses a tiered incentive based on a "good, better, best" set of energy efficiency goals, which approach net-zero in some cases. The incentive is up to $0.30 per kWh saved and is funded through a system benefit charge, or a surcharge on customer utility bills. The program is extremely comprehensive, ranging from the design phase through modeling assistance, commissioning, and post-occupancy evaluation. It targets the building envelope, equipment choice, HVAC and lighting controls, plug loads, water heating, solar thermal use, motors, and variable speed drives. The *New Buildings* program has been in existence for 10 years and has helped customers save more than $1 billion on energy bills. It delivers these energy efficiency services at a cost of 2-4 cents per kWh and 30-40 cents per Therm.

The New Buildings program offers:

- Comprehensive assistance with design, equipment installation, commissioning, and post-occupancy monitoring and evaluation
- Tiered incentives and enhanced technical assistance to support projects on the path to net-zero energy use
- 100 standard energy efficiency measures, not including lighting measures
- Tiered "good, better, best" packages for six small commercial building types

## Energy Efficiency Strategies

Utilities and other organizations have found new, creative ways to give customers more choices in financing and participating in energy efficiency programs. For instance, two new financing options exist for building occupants looking to pay for energy efficiency improvements. Another strategy, Smart Meters, empowers people to track their own electrical use.

*Property Assessed Clean Energy Financing (PACE Financing)*
PACE is a method of financing energy efficiency upgrades and renewable energy projects through a property tax assessment. Ideally, the energy savings exceed the property tax assessment so there is a net gain for the property owner. There are no upfront costs for the property owner, and as the repayment is tied to the property itself, it can be transferred to new owners if the property is sold. It can be used in the residential and commercial sectors.

PACE financing first began in 2008 in pilot programs and today exists in 28 states and the District of Columbia (PACENow, 2012). Currently, there are no PACE programs in Alaska. Many PACE programs feature a similar task list for participants (PACENow, 2012):

1. The local government establishes a PACE program

2. Building owners must outline a project that will reduce energy costs
3. The local government finances the energy project and adds an assessment to the building's property tax
4. The building owner pays for the energy project through the tax assessment for up to 20 years, while enjoying lower energy costs

A disadvantage to PACE financing for residential properties is the opposition by the Federal Housing Finance Agency, Freddie Mac, and Fannie Mae because of concerns that PACE financing could take precedence over an existing mortgage. If the PACE lender is paid before the mortgage lender in the case of default, it increases risk for mortgage lenders (Alliance to Save Energy, 2011). Due to this opposition, many residential PACE programs have been suspended in recent years.

An example program is DC PACE COMMERCIAL in the District of Columbia, which began in 2012. This program aims to help commercial and tax-exempt property owners implement energy efficiency and water conservation improvements. Project financing is available for projects costing between $250,000 and $10 million and is paid back over a period up to 20 years. The program requires each applicant to receive an energy audit (which can be included in the project cost) to estimate the energy savings of the project and ensure it meets an identified energy need. Finally, the project must meet certain criteria (DC PACE COMMERCIAL, 2012):

- The building must be in the District of Columbia
- Net emissions of greenhouse gases must be reduced
- Energy utility costs must be reduced
- Annual energy savings must exceed annual debt service of the loan

*Smart Meters*

Smart meters are beginning to replace analog electric meters in buildings in the United States. Like the analog meter, smart meters provide information on electric usage to utility companies so customers can be billed. However, they also can record hourly electric usage, which can help customers understand exactly when they use the most electricity, and provide information about demand to the utility.

One in three households now has a smart meter (Institute for Electrical Efficiency, 2012). The Blue Planet Foundation describes the benefits of a smart meter by comparing it to a grocery bill. Just as an itemized grocery bill allows customers to see exactly where their food money is spent, a smart meter allows electricity users to track the times when their house uses the most power (Blue Planet Foundation, 2013).

*On-bill Financing*

On-bill financing is a method used by some utilities to provide customers financing for energy efficiency improvements in their buildings and remove the barrier of high upfront costs for energy upgrades. Typically, the utility loans the customer money for the energy upgrades and the customer pays back the loan, interest-free, through a monthly fee added onto the utility bill. Currently, 20 states have utilities with on-bill financing or plans to begin programs (Bell, Nadel, & Hayes, 2011), which can target homeowners or businesses.

According to a 2011 report by the ACEEE, there are several advantages to on-bill financing. First, the energy efficiency upgrade often lowers the customer's utility bill, allowing the customer to use the energy savings to

pay part of or the entire monthly fee. Second, utilities can offer this service to renters, who are often overlooked in other programs. Finally, bill payment history, instead of credit rating, can be used as a qualifier for the program, allowing customers with poor credit history to participate. Disadvantages to on-bill financing include the modifications that utilities must make to billing systems, the risk that customers may not pay the monthly fee, and the cost to run the program (Bell, Nadel, & Hayes, 2011).


Sources: Brown 2009; DSIRE 2011; Fuller 2009, Hayes et al. 2011a; LCEA 2011
Notes: States with on-bill programs—AL, AR, CA, CT, GA, KS, MA, NE, NH, NJ, OR, RI, SC, and WI.
States with pilot and/or pending programs—HI, IL, IN, KY, MI, and NY.

**Figure 3: This map shows states with on-bill financing programs and those with plans to begin programs. Figure courtesy of (Bell, Nadel, & Hayes, 2011).**

Bell, et. al. (2011) includes several examples of on-bill financing programs by utilities. A few are documented below as examples.

- Rural Energy Savings Program from the Electric Cooperatives of South Carolina: Customers are identified through high bill complaints. They can then request a loan administered by their utility and financed by the USDA. An energy audit of the customer's home determines whether energy efficiency measures would result in savings. If so, they are installed and a second audit is conducted to ensure they are working. After that, the loan is repaid by the current homeowner through utility bill payments. The loan is tied to the property, so if the house changes hands, the new occupant carries the remainder of the loan.
- United Illuminating in Connecticut: This program provides small business with loans up to $100,000 to improve lighting, HVAC, and refrigeration systems. Customers with a good bill payment history can qualify for a loan and receive incentives to subsidize some energy upgrades.

- Kansas How$mart: This program targets customers with billing concerns and also advertises through contractors. It provides free energy audits to customers, who are then required to complete the suggested energy upgrades or pay a fee. The upgrades can be paid for by a low-interest loan paid back through charges on the utility bill. The additional charge on the bill must be less than 90% of the estimated savings from the energy upgrades.

## Energy Efficiency Programs

The following programs were identified as having exemplary energy efficiency programs based on ACEEE reports, conferences on energy efficiency, word-of-mouth, and observations that some program offerings were similar to Energy$ense programs.

### *Seattle Lighting Design Lab*

The Seattle Lighting Design Lab (SDL) is a lighting education facility promoting commercial and industrial energy conservation that is funded by electric utilities in the Pacific Northwest. Begun in 1989, the Lighting Design Lab works to transform the Northwest lighting market by promoting quality design and energy efficient technologies through education and training, consultations, technical assistance, and demonstrations. The lab is operated by the Seattle City Light utility with support from Northwest regional utilities and the Northwest Energy Efficiency Alliance (an energy efficiency utility funded by NW electric utilities). The Lighting Design Lab serves those in the Northwest working on commercial lighting projects, including lighting designers, specifiers, architects, interior designers, engineers, contractors, and facility managers.

Services Offered by SDL:

*Consultations*
Lighting specialists meet with clients to review project plans and recommend efficient lighting and control strategies.

*Qualified LED Product Lists*
The lab maintains two lists–one for LED lamps and one for fixtures and tubes. Northwest utilities use these lists to approve lighting rebates while products are awaiting Energy Star or Design Lights Consortium approval.

*Classes and Workshops*
These range from classes on basic lamp technologies and design to advanced controls workshops, both on-site and in cities throughout the Northwest. For a period of time, Todd Hoener arranged for SDL to offer a class every other year in Fairbanks on advances in lighting technology. While SDL is focused mostly on commercial projects, these classes were also useful to residential builders. SDL has an excellent *Green Home Lighting Guide* for residential applications.

*Technical Assistance*
Lighting specialists answer questions about lighting problems, energy codes, new technology, or obscure products.

*Tours*
The lab has a demonstration area where one can make side-by-side comparisons of lighting technologies and test out a variety of controls. The effect of different lamp types on color can be seen in color boxes. An average tour takes about an hour.

*Mock-ups*
A 1,200-square-foot mockup facility has a moveable 15-foot ceiling that accommodates a full-scale installation of a lighting system to make sure it meets projected needs.

*Technical Information*
SDL has a wealth of information in the form of lighting layout guides, articles, case studies, lighting and energy codes, product catalogs, and information on utility lighting rebate programs.

*Lighting Evaluations*
The lab conducts informal testing of lighting products. Recent tests include LED PAR 38 and T8, Induction lamps, and LED streetlights.

*Outdoor Lighting Center*
The lab's full-scale mockups of arterial roadways are performed at an off-site outdoor lighting center capable of comparing 3 streetlights at a time at a height upwards of 30 feet.

*Conference Rooms and Classroom*
SDL has two small conference rooms and a 80-person classroom available for rent.

### *Pacific Gas &Electric (PG&E) in California*

The following information is from http://www.pge.com/ and, where noted, from an interview with a PG&E representative.

PG&E in California was incorporated in 1905 and is one of the largest combination (natural gas and electric) utilities in the United States. It services 5.1 million electric customers and 4.3 million natural gas customers, or approximately 40% of Californians. The utility has a large environmental program, which includes providing renewable power and customer programs to help Californians reduce energy costs with efficiency and renewable energy.

PG&E has a panel that decides which energy efficiency programs to offer based on several factors, including available funding and projected energy savings for customers. Programs are reviewed on a regular basis and modified if necessary due to funding or other issues (PG&E energy advisor, personal communication, August 1, 2013).

*Website*
PG&E has a comprehensive website with information on energy efficiency programs. The website also features energy saving tips for consumers, buyer's guides for vehicles, homes, windows, and appliances, and a list of external websites that provide more information on energy efficiency.

*Energy Upgrade California*

This statewide program is partially funded by California utilities and gives homeowners an incentive package for increasing a home's overall energy efficiency. Homeowners can choose between a Basic Package of upgrades to qualify for up to a $1,000 incentive and an Advanced Upgrade Package to qualify for up to a $4,500 incentive. The basic package focuses on the building shell and includes upgrades like air sealing, attic insulation, duct sealing, hot water pipe insulation, and combustion safety testing. The advanced package includes the same projects as the Basic Package as well as upgrading to more efficient heating and cooling appliances, upgrading windows, replacing ducts, and adding wall insulation. The final incentive depends on the estimated energy savings from the upgrades. To participate, homeowners must contact a contractor participating in the program. The contractor performs the upgrades and submits an application to the program for the homeowner to receive the incentive.

*My Energy*

This log-in website for PG&E customers displays energy usage and cost by hour, day, or month, and compares a home's usage to similar houses. The Home Energy Checkup tool, inside My Energy, helps homeowners learn about energy usage of various appliances and create a personal energy plan. The checkup will provide general suggestions on energy efficiency, recommend appliances, and inform customers about PG&E rebates or programs that could help them.

*Home Money Saver*

This is another website for PG&E customers. An interactive diagram of a house shows customers how they can save money on energy for each room and appliance through energy tips and rebates or incentives. For example:

- Refrigerator: A $75 rebate is provided to customers who purchase a Consortium for Energy Efficiency Tier 3 model. A $35 rebate is available to customers who recycle an old refrigerator or freezer. Tips for efficient operation include placing the refrigerator in a cool location away from heat sources and sunlight and checking the seal on the refrigerator. Other resources include pointing customers to the SmartRate program and resources for low-income assistance.
- Clothes Washer: A $50 rebate is provided to customers who purchase a Consortium for Energy Efficiency Tier 3 model. PG&E has also teamed with water agencies to provide additional rebates. Tips include matching loads to washer settings and using the extended spin function.
- Floor insulation: The website points customers to the Energy Upgrade California program, which provides incentives for home upgrades.

*Rebates*

PG&E provides rebates for energy-saving appliances and home improvements. Customers can apply online for the rebate or by completing and mailing a paper application. As part of the rebate application, customers must provide a proof of purchase and agree that verification of the purchase may occur where a representative of PG&E or a third party may visit the home to check that the appliance was installed.

Equipment eligible for rebates must exceed ENERGY STAR qualifications. PG&E looks at the Consortium for Energy Efficiency upper tier for equipment to offer rebates on (PG&E energy advisor, personal communication, August 1, 2013).

| | |
|---|---|
| High-Efficiency Clothes Washer | $50 |
| High-Efficiency Refrigerator | $75 |
| High-Efficiency Gas Storage Water Heater | $200 |
| Electric Heat Pump Water Heater | $500 |
| Variable Speed Pool Pump | $100 |

Rebates are also provided for businesses. There are multiple rebates available to commercial customers. The rebates include appliances used for irrigation, greenhouses, appliances, water and space heating equipment, insulation, lighting, and ventilation.

*Savings by Design*

This program encourages energy efficient construction for commercial buildings. Program applicants are offered services such as design assistance, incentives for designers and owners, and educational resources.

*On-bill financing for Commercial Businesses and Government Agencies*

On-bill financing is available to help commercial and government building owners finance energy efficiency retrofits. PG&E pays the upfront costs of the projects, and then the customer pays PG&E back through a monthly charge on the utility bill. There is zero interest charged in the program, and financing is available for several technologies, such as lighting, refrigeration, and ventilation and heating equipment upgrades.

*SmartRate*

This program gives customers a reduced rate on typical summer days if they reduce their energy use on "SmartDays" during the summer. On these days, which total to less than 15 per summer, customers are encouraged to use less electricity between 2 pm and 7 pm, and in fact will pay a higher rate for electricity used during that time. However, they receive a discount during all other times during the summer. Notification of a "SmartDay" occurs by email or phone the day before and PG&E provides tips to help reduce electricity use during these times. For 2013, the discount on electricity was almost $0.03/kWh, and the surcharge on electricity during SmartDays was an additional $0.60/kWh.

Commercial customers can also participate in demand response programs such as peak day pricing, scheduled load reduction, automated demand response control systems, and permanent load shifting using thermal storage. Finally, businesses can receive incentives for installing power generation equipment. The equipment can be renewable (wind turbines, waste heat to power, biogas, solar) or non-renewable (internal combustion engines, microturbines, gas turbines).

Customers can also choose to only participate in SmartAC, in which the homeowner allows PG&E to install a device on the home's air conditioner that reduces its power usage in the event of an energy supply emergency. Customers receive $50 for participating in the program.

*Renewable Energy*

PG&E's website also provides information on renewable energy, discussing both its benefits and costs. There are a number of incentive programs in California for renewable energy, and PG&E provides customers with information about these programs. They also offer SmartMeters to renewable customers so that they can monitor their net energy usage.

### *Energy Trust of Oregon*

The following information is summarized from http://energytrust.org/.

The Energy Trust of Oregon is a non-profit organization that helps utility customers generate renewable energy and improve energy efficiency. Formed in 2002, it provides services to commercial, industrial, and residential customers of Portland General Electric, Pacific Power, NW Natural, and Cascade Natural Gas.

Residential program areas include:

1. *Residential weatherization* Energy Trust provides energy-saving tips, help finding contractors, and incentives for weatherization. To qualify for incentives (such as $150 for sealing air leaks or $100 for adding duct insulation), homeowners must use a certified contractor, provide the invoice, and meet program specifications for energy savings. Energy Trust also offers customers an online tool to assess their home, an option to speak with an energy advisor on the phone, and home visits by an energy advisor.
2. *Heating* Homeowners can receive cash incentives up to $800 for heating-related improvements, such as installing high efficiency space or water heating appliances or advanced control systems.
3. *Appliances* Energy Trust gives cash incentives up to $75 for installing high efficiency clothes washers, refrigerators, and freezers. They also offer cash for recycling old appliances.
4. *Buyer's guides* The Energy Trust website offers tips for purchasing efficient lighting and showerheads. Also, homeowners can provide information on their home to receive an energy saver kit. The kits are customized according to a questionnaire that homeowners fill out, and can include items such as high efficiency lights or low-flow faucets.
5. *Renewable energy* Homeowners can qualify for incentives up to $5,000 for installing solar electric, solar hot water, wind, and hydroelectric systems.

Commercial program areas include:

1. *Equipment upgrades and remodels* Energy Trust gives businesses technical assistance choosing equipment to increase energy efficiency. Efficiency equipment, and equipment for renewable energy projects, can qualify for a cash incentive if it meets certain requirements.
2. *New construction and remodel* Incentives are also offered for businesses that are retrofitting or adding buildings. All phases of a project – design, installation, and completion – are eligible for different incentives. Special programs exist for property managers installing efficient equipment in multifamily properties and non-profit corporations.

Energy Trust's programs are designed to fulfill the organization's Strategic Plan, which is made available to the public. The plan details specific goals on energy reduction and renewable energy production. This plan is

published annually. Energy Trust also publishes reports its their programs, results, and processes, and an annual report with cumulative savings from all programs.

### *Efficiency Vermont*

The following information is from http://www.efficiencyvermont.com, and where noted, a representative from Efficiency Vermont.

Efficiency Vermont provides Vermonters with strategies to reduce energy costs and protect the environment. It is operated by the Vermont Energy Investment Corporation, a non-profit corporation that offers resources to businesses, homeowners, renters, and builders throughout Vermont (there are a few programs operated locally by different organizations).

Efficiency Vermont was formed in 1999 by the Vermont Legislature and began offering services in 2000. Previously, Vermonters received energy efficiency services from their individual utilities. Efficiency Vermont allows the same energy efficiency programs to be offered statewide.

Energy efficiency programs are chosen by the Vermont Service Board, a part of the Vermont Energy Investment Corporation. Each program application includes the requirements and expected savings of the program. The majority of the cost-benefit analysis is done before the program is enacted. After programs begin, there are basic check-ups to ensure they are operating as planned. Loan programs are set up with third-party lenders and have a more complex start-up process (E. Farrell, personal communication, August 1, 2013).

Efficiency programs are advertised through the website and marketing. Contractors and utilities also regularly refer people to Efficiency Vermont's programs (E. Farrell, personal communication, August 1, 2013).

*Website*

Efficiency Vermont's website contains energy-saving tips for appliances and buildings. It also contains information on:

- Efficiency Vermont's programs
- Tips for recycling old appliances and operating current appliances efficiently
- Tips for buyers and businesses searching for new appliances, heating equipment, and lighting
- Energy tips for specific commercial enterprises found in Vermont, such as ski areas, agricultural businesses, and data centers
- Energy efficiency events and news
- Information on energy audits
- Interactive tools for homeowners to identify areas of high energy use and solutions
- Information and links to programs that can provide home energy loans and financing

*Rebates*

Rebates are offered for some household appliances. The rebates range from $25 for a dehumidifier to $200 for a pool pump. To qualify for the rebate, people must complete a checklist of questions, provide a receipt of the purchase, and include a recent electric bill. The survey includes questions on the building, home appliances,

appliance use, and optional information such as why the efficient appliance was purchased, how people heard about the rebate, and whether the rebate affected their decision to buy the appliance.

Rebates are also offered to a variety of businesses. Rebates are available for equipment needed by the majority of businesses, such as lighting equipment and controls, and heating and ventilation equipment. Efficiency Vermont also offers rebates for specialized agricultural equipment.

Equipment eligible for rebates is chosen from two sources. The first is the Consortium for Energy Efficiency, which ranks products as Tier 1 (ENERGY STAR), Tiers 2, 3, and 4 (more efficient than ENERGY STAR) and an Advanced Tier for the most efficient equipment. Efficiency Vermont also consults the Design Lights Consortium, which certifies that lighting meets criteria for light output and maintenance (E. Farrell, personal communication, August 1, 2013).

*ENERGY STAR Homes*

Efficiency Vermont certifies homes that meet ENERGY STAR requirements. ENERGY STAR homes must meet guidelines for energy efficiency set by the Environmental Protection Agency. There is another certification, Energy Code Plus, which builders can meet with new homes. Energy Code Plus indicates that the builder has met Vermont's Residential Building Energy Standards.

*Vermont Weatherization*

This program is available to income-eligible Vermonters. Efficiency Vermont helps to connect Vermont citizens to a local weatherization agency.

*Energy Leadership Challenge*

Businesses pledge to reduce energy usage by 7.5% during the time period of this program. In return, Efficiency Vermont helps them create an energy savings plan and provides technical and financial assistance in carrying out the plan. When a business signs up for the program, it is assigned an account manager who helps them apply for an incentive for an energy audit, provides analysis of the business's utility bills, and supports them in adopting Smartgrid technology and connecting with efficiency resources.

*Business Energy Loan*

Efficiency Vermont offers financing for businesses who wish to make energy efficiency improvements. In general, businesses have two options. The first is a Business Energy Loan of up to $30,000, which is designed to have a monthly payment less than the energy savings from the efficiency upgrade. The second is an Energy Conservation Loan, which can fund projects that cost up to $150,000. Businesses can apply for this loan if Efficiency Vermont certifies that their project is cost-effective. In addition, a green revolving fund can be used by higher education institutions for energy efficiency projects. After the project is completed, a portion of the savings is directed back into the fund until the project is paid off.

*Customer Support*

Efficiency Vermont has Customer Support Specialists on hand to help customers make sense of the information. The same specialist can maintain contact with the business or individual throughout the entire efficiency upgrade process.

### *New York State Energy Research and Development Authority (NYSERDA)*

The following information is summarized from http://www.nyserda.ny.gov/.

NYSERDA was formed in 1975 with the original goal of reducing New York State's petroleum consumption through research and development. Now, the mission of NYSERDA has shifted slightly to helping New Yorkers reduce energy consumption. It is funded by a system benefit charge on electric and gas utility sales that was established by the New York Public State Commission, federal grants, and voluntary contributions from the New York Power Authority and the Long Island Power Authority.

NYSERDA funds both research projects and energy efficiency programs. It also monitors energy supply and consumption data for the state and releases this data to the government and the public. Energy efficiency programs begin as a request for proposals that address an energy or environmental challenge. Public and private individuals or businesses can respond to the request and, if their proposal is approved by a team of NYSERDA and non-NYSERDA experts, receive funding to run the program.

Current energy efficiency programs being offered include those listed below. These are by no means all of the programs offered by NYSERDA.

*Programs for Existing Commercial Buildings*

Up to $60,000 in rebates exists for facilities to upgrade to more efficient equipment, including lighting, heating, ventilation, refrigeration, and gas equipment. Business can apply for the rebate after installing the upgrade. Up to $2 million is available for larger projects such as electric, natural gas, electric storage, or demand response programs. For these projects, businesses should apply early, when they contract for the project.

*Programs for New Construction*

Businesses can apply for incentives to purchase and install energy efficient equipment such as lighting, heating, ventilation, air conditioners, and other equipment. Also, businesses can receive design assistance on incorporating energy efficient technology. Buildings that receive LEED certification also can apply for incentives. NYSERDA offers green design charrettes for building developers to learn about the LEED certification.

*Homeowners*

Homeowners can apply for a home energy assessment at reduced cost to see how energy is wasted in a home. Then, NYSERDA offers low-interest financing and a 10% cash-back incentive to homeowners who invest in energy upgrades. Low-income households can also qualify for grants.

NYSERDA's website also offers tips on buying energy efficient equipment, saving energy, and funding renewable energy.

### *NISource – Columbia Gas of Ohio*

The following information is summarized from https://www.columbiagasohio.com/.

Columbia Gas of Ohio runs a Home Performance Program to help its natural gas customers reduce their energy costs. The program begins with a Home Energy Audit, which costs the homeowner $50, or $20 for low-income customers. The auditor uses a blower door test to measure air leaks, a combustion efficiency analyzer to check

gas stoves and heaters for safety and efficiency, and thermal imaging to check insulation. The homeowner will also receive a low-flow showerhead and a programmable thermostat if needed, both of which will be installed by the auditor.

The Home Energy Audit will provide the homeowner with suggested energy efficiency improvements, such as insulation upgrades, air sealing, and furnace or boiler replacements. The homeowner will also receive a report on the home's energy usage, improvements, and estimated savings from the improvements. If the homeowner chooses to implement the upgrades, he or she is eligible to apply for rebates of up to 70%.

The utility offers a similar program, WarmChoice, for customers who qualify for low-income payment programs. WarmChoice provides basic weatherization for these customers at no charge and has been found to reduce gas usage by an average of 28%.

Columbia Gas of Ohio provides the program to help customers save money, make homes safer, and help the environment. The utility also provides energy-saving tips and references ENERGY STAR's interactive website on home energy use for customers to discover even more ways to save energy.

# Complimentary Alaska Programs

Other utilities and non-utility agencies in Alaska offer assistance to Alaskans to implement energy efficiency measures. These complimentary programs may provide opportunities for future collaboration.

## Alaska Utilities

No other utilities in Alaska offer energy audits similar to GVEA's Energy$ense, although several target customers with high electricity bills in different ways. Mainly, many utilities provide information for customers on how to lower their energy bills. Chugach Electric also runs an online bill analysis program. Below is a list of the state's larger utilities and their energy efficiency programs.

*Alaska Electric Light &Power in Juneau*

AEL&P offers fact sheets and shopping guides for electrical appliances and electric bills. It also has handouts and website information with suggestions on how to reduce electric bills. AEL&P participates in the Southeast Alaska Building Industry Association Home Show in Juneau as well.

*Matanuska Electric Association in Anchorage*

MEA offers a webpage with tips on how to conserve electricity. It also refers customers to the ENERGY STAR Home Energy Yardstick, an online tool that allows people to assess their energy use compared to other homes. Further, MEA participates in several events in the community, such as the state fair and home show, providing energy efficiency guides and answering questions. In the near future, the utility will roll out a program with the National Information Service Cooperative that will allow members to access more information on their electric bill and compare it to similar homes in Alaska and elsewhere.

*Municipal Light and Power in Anchorage*

ML&P maintains a web page on saving energy. If customers have trouble paying their energy bills, the utility refers them to other organizations who can provide more individualized assistance, such as the Alaska Housing Finance Corporation's Home Energy Rebate Program or the Heating Assistance Program. For community outreach, ML&P has booths at the Alaska Women's show, Renewable Energy Alaska Project Energy Fair, and other community events like farmer's markets. These booths focus on both energy efficiency and safety. Additionally, they hold a school contest on electric safety and energy efficiency.

*Chugach Electric*

Like other large utilities in Alaska, Chugach Electric maintains a website with an energy efficiency section that contains tips, links to Alaska-based energy saving resources, links to national energy saving resources, and instructions for checking out a Kill-A-Watt meter.

The utility recently started two online programs for residential customers, MyPower and OPower. OPower is a social energy application that is accessed through Facebook. It gives people a place to connect and share energy efficiency information, compare their electric use to similar homes or friends, and form teams to compete to save energy. MyPower is accessed through a member's online bill. It provides personalized tips on saving energy and allows users to track their energy usage, create an energy plan, compare electric usage to neighbors, and compare monthly electric usage from year to year. MyPower stores member data in its system and provides comparison data by averaging 100 nearby homes, so that homeowner identities are protected. Similarly,

because Chugach participates in OPower, members can access their electrical information through the OPower application. OPower is available to anyone, but only people whose utilities participate are able to access their billing information; other people must enter it in by hand.

Both OPower and MyPower are designed to engage the electric customer. The programs are funded through the Alaska Energy Authority's "Biggest State to Biggest Saver" grant from the Department of Energy and will operate through April 2014. At that time, Chugach will evaluate how many members took advantage of the two programs and decide whether or not to continue them.

Chugach employs an energy efficiency and conservation specialist who is responsible for running and evaluating the MyPower and OPower applications and creating "challenges" for customers. The employee participates in community outreach at fairs, farmer's markets, and the annual meeting and also runs the Kill-a-Watt rental program. For commercial customers, the conservation specialist writes a newsletter and organizes classes on efficiency.

*Homer Electric Association in Kenai Peninsula*

HEA offers energy-saving tips on its website and runs a Q&A email response to questions for "Mr. WiseWatts." The utility offers net metering for customers with renewable electricity and runs a Kill-a-Watt program for people to borrow the meters. The utility also offers efficiency tips at an annual energy fair and runs a contest in local schools where students design a poster with an electric efficiency message.

HEA also refers customers struggling with their bills to programs like AHFC's Heating Assistance Program and the Weatherization program. The utility has a loan program for customers to purchase energy efficient appliances under $5,000. Approved applicants repay the loan over the next 3 years through a separate bill.

*City and Borough of Sitka*

The electric utility in Sitka is contained within the City and Borough of Sitka. Sitka's electricity is supplied by hydropower, making it more affordable than for other towns that rely on diesel generators . However, the electric department has to watch usage to ensure that electric demand does not result in a need for additional capacity. For this reason, the City and Borough of Sitka recently implemented an Energy Star Rebate Program to encourage electrical conservation. The program began with an online survey to gauge public interest and rank the appliances that the Electric Department should consider for the program. The program was then approved and funded by the City Assembly. It ran from February 2012 to January 2013 when funds ran out. The appliances that were funded appear in the table below (Agne, 2013).

| **Appliance** | **Total Money Dispensed** | **Number of Items** |
|---|---|---|
| Freezer | $2,970 | 18 |
| Heat pump hot water heater | $1,800 | 3 |
| Refrigerator | $18,750 | 75 |
| Washing Machine | $15,950 | 58 |
| Heat pump | $60,000 | 40 |
| **Total** | $99,470 | 194 |

*Red-yellow-green Systems*

Many utilities in the state also have a red-yellow-green system to indicate to customers when using electricity may result in higher bills, because the electricity is being produced using costlier fuels. These utilities include: City and Borough of Sitka, Municipal Light & Power, Chugach Electric, Matanuska Electric Association, and the Homer Electric Association.

## Alaska Housing Finance Corporation

The Alaska Housing Finance Corporation (AHFC) is a public corporation whose mission is to provide Alaskans access to safe, quality, affordable housing. AHFC operates a number of programs, including two that help homeowners make energy efficiency improvements to their houses: the Home Energy Rebate Program and the Energy Efficiency Revolving Loan Fund.

*Home Energy Rebate Program*

The home energy rebate program provides up to $10,000 to Alaska homeowners for energy efficient home improvements. The program requires homeowners to first obtain an "as-is" energy rating of the home, then make improvements, and finally obtain a "post-improvement" rating to be eligible for the rebate. There are no income requirements for the program, and any house that is owner-occupied year-round is eligible as long as the residence has not participated in the Weatherization program.

The energy ratings look at the home's overall efficiency, thus giving homeowners some flexibility in choosing which energy improvements to make. During the ratings, the home's energy performance is calculated by looking at several factors, including doors, windows, insulation, and heating system. The energy rater will discuss ways to improve the home's rating. Homeowners must pay out of pocket for the improvements and are responsible for scheduling the energy ratings and submitting paperwork and receipts. The amount of the final rebate will depend on the improvement between the "as-is" and "post" energy ratings. To qualify for the full $10,000 rebate, the home must improve by at least five steps, where one step is one upward movement on a 6-star scale. The rebate amount depends on how many steps the homeowner achieves.

| Number of steps | Rebate Amount |
|---|---|
| One | Up to $4,000 |
| Two | Up to $5,500 |
| Three | Up to $7,000 |
| Four | Up to $8,500 |
| Five | Up to $10,000 |

New homes follow a modified procedure in the New Home Rebate Program, which provides a $10,000 rebate for new 6 Star homes and a $7,000 rebate for new 5 Star + homes.

*Weatherization Assistance Program*

The Weatherization program provides grants to non-profit organizations for improving homes of low-income Alaskans at no cost to the resident. The weatherization organization for the GVEA service region is Interior Weatherization, which is based in Fairbanks. Both homeowners and renters are eligible for weatherization

services, provided they meet income requirements. Homeowners are not allowed to participate in both the Weatherization program and the Home Energy Rebate Program.

*Energy Efficiency Revolving Loan Fund*
The energy efficiency revolving loan fund is a program to improve the energy efficiency of education and government buildings. Building owners use the loan to make energy efficiency improvements identified during an Investment Grade Audit, and then repay the loan with energy savings from the building improvements. There is no maximum loan amount.

Buildings that are eligible for the program include:

- University of Alaska buildings
- Buildings owned by regional education areas
- State of Alaska buildings
- Alaska municipality buildings

The loan can be used to pay for materials, shipping, and any labor not completed by the building owner.

## Alaska Energy Authority

The Alaska Energy Authority (AEA) works to reduce the cost of energy in Alaska through a variety of energy planning, research, training, and assistance programs. While some programs are focused on energy production, others are designed to increase the energy efficiency of buildings in the state.

*Village Energy Efficiency Program*
The Village Energy Efficiency Program, started in 2005, aims to reduce energy use and cost in public and community buildings and infrastructure. Communities with the highest cost and greatest volume of fuel use are considered the highest priority for the program.

*Commercial Building Energy Audit Program*
This energy audit program provides up to $6,500 for an energy audit for a commercial building. The audits provide building owners with a plan to make their building more energy efficient. Buildings must be less than 125,000 square feet.

## Alaska Energy Efficiency Partnership

The Alaska Energy Efficiency Partnership is made up of state and federal government programs, utilities, state legislative offices, non-profits, universities, businesses, and tribal organizations. The partnership website (http://www.akenergyefficiency.org/) can serve as a starting point to direct Alaskans to resources for energy efficiency. Utilities in the partnership include:

- Alaska Energy Light & Power serving the Juneau area
- Alaska Village Electric Cooperative serving 53 villages
- Chugach Electric Association, Municipal Light and Power and Matanuska Electric Association serving the Southcentral region
- GVEA in the Interior

- Homer Electric Association

The website has information for residential and commercial buildings, tools for teachers, and links to jobs and training opportunities. Both the residential and commercial websites include calendars of energy events, savings calculators, and tips for finding contractors and getting an energy assessment. Tips on energy projects are divided into categories of quick fixes, easy upgrades, and DIY projects.

## Renewable Energy Alaska Project (REAP)

REAP, formed in 2004, is a group of more than 80 members, ranging from utilities (GVEA is a member), native corporations, private companies, local governments, and non-profits. REAP works to facilitate the development of renewable energy in Alaska through collaboration, education, training, and advocacy.

While many of its programs focus on renewable energy, REAP also runs rePOWER Southeast, which uses demand-side management techniques to reduce energy use in Kake, Craig, and Sitka. REAP also provides energy efficiency resources to Alaskans, conducting community outreach through its website and fairs. The website contains both energy efficiency tips and information on programs that help citizens make energy efficiency upgrades.

## Alaska Craftsman Home Program (ACHP)

ACHP is an educational program that provides classes for contractors, homeowners, energy raters, and other professionals. Many classes are free and range from 2-day certification classes in Advanced Cold Climate Home Building Techniques to 2-hour classes on specific topics like fixing air leaks. The 2-hour Energy Savings with Lighting and Appliances covers Energy Star appliances and efficient lighting, topics also covered in Home$ense audits.

## Wisdom and Associates, Inc.

Wisdom and Associates, Inc. is an Alaska business offering home inspections, energy ratings, indoor air quality investigations, and continuing education programs for building professionals. Topics range from plumbing and mechanical building codes to basic building science, heat pumps, and blower doors. Wisdom and Associates also performs several different types of inspections. Energy ratings and code inspections provide homeowners with a general view of their home, while other inspections focus specifically on ventilation and indoor air quality. Finally, Wisdom and Associates has several free building calculator tools on its website.

## Works Cited

Agne, J. (2013). *Energy Star Rebate Program Final Report.* Sitka, AK: City and Borough of Sitka.

Alliance to Save Energy. (2011). *Fact Sheet: Property Assessed Clean Energy Financing.* Washington, D.C.: Alliance to Save Energy.

Bell, C., Nadel, S., & Hayes, S. (2011). *On-bill Financing for Energy Efficiency Improvements: A review of current program challenges, opportunities, and best practices.* Washington, D.C.: American Council for an Energy-Efficient Economy.

Blue Planet Foundation. (2013). *Understanding Smart Meters*. Retrieved July 11, 2013, from Blue Planet Foundation: http://blueplanetfoundation.org/understanding-smart-meters.html

Davies, J. (2013). *2013 ACEEE National Conference on Energy Efficiency as a Resource Report.* Fairbanks, AK: CCHRC.

DC PACE COMMERCIAL. (2012). *Finance your high-performance building upgrade.* Washington, D.C.: Government of the District of Columbia.

GVEA. (2012). *2012 Annual Report.* Fairbanks: Golden Valley Electric Association.

GVEA. (1999). *Evaluation of the benefits and potentials of the Energy$ense program.* Fairbanks, AK: GVEA.

GVEA. (2012). *Where the power comes from*. Retrieved June 25, 2013, from Golden Valley Electric Association: www.gvea.com/energy/power

GVEA, Trustees for Alaska, & AIDEA. (1994). *Agreement between Trustees for Alaska, Golden Valley Electric Association, Inc., and the Alaska Industrial Development and Export Authority regarding the Healy Clean Coal Project.* Juneau, AK: Trustees for Alaska.

Institute for Electrical Efficiency. (2012). *Utility-Scale Smart Meter Deployments, Plans, and Proposals.* Washington, D.C.: The Edison Foundation.

Mazur-Stommen, S., & Farley, K. (2013). *ACEEE Field Guide to Utility-Run Behavior Programs.* Washington, D.C.: ACEEE.

Nowak, S., Kushler, M., Witte, P., & York, D. (2013). *Leaders of the Pack: ACEEE's Third National Review of Exemplary Energy Efficiency Programs.* Washington, D.C.: American Council for an Energy-Efficient Economy.

PACENow. (2012). *What is PACE?* Retrieved July 24, 2013, from Financing Energy Efficiency: http://pacenow.org/about-pace/what-is-pace/

York, D., Witte, P., Nowak, S., & Kushler, M. (2012). *Three Decades and Counting: A Historical Review and Current Assessment of Electric Utility Energy Efficiency Activity in the United States.* Washington, D.C.: American Council for an Energy-Efficient Economy.

## Appendix A: Interviewees

The following individuals were interviewed as part of the assessment of GVEA's Energy$ense programs. Thanks to all of them for contributing valuable information and sharing their knowledge on the programs.

| Name | Company | Location | Notes |
|---|---|---|---|
| Charles Davis | CNC Power Plus | Fairbanks, AK | Has provided Home$ense audits for 10 years. |
| Corinne Bradish | GVEA | Fairbanks, AK | Public relations officer at GVEA. |
| Dave Rich | GVEA | Fairbanks, AK | Quality Control Officer at GVEA. |
| Erin Farrell | Efficiency Vermont | Vermont | Customer service specialist at Efficiency Vermont. |
| Information Insights | Information Insights | Fairbanks, AK | Information Insights was the original designer of the Energy$ense program. However, they no longer have records of the project. |
| Jim Lee | Interior Weatherization | Fairbanks, AK | Construction manager at Interior Weatherization. Interior Weatherization partners with GVEA to provide Home$ense audits to weatherization clients. |
| Kate McKeown | Chugach Electric | Anchorage, AK | Energy Efficiency and Conservation specialist at Chugach Electric. |
| PG&E Energy Advisor | PG&E | San Francisco, CA | This energy advisor works with the low-income weatherization program. However, she was able to provide information on other PG&E programs as well. |
| Rob Hill | Genesis Energy Systems | Anchorage, AK | Independent consultant who is familiar with the Business$ense program. Genesis provides lighting retrofits for commercial and |

| | | | |
|---|---|---|---|
| | | | government buildings. |
| Shaina Kilcoyne | Renewable Energy Alaska Project (REAP) | Anchorage, AK | Energy efficiency director at REAP and works with energy efficiency programs throughout the state. |
| Todd Hoener | Self | Fairbanks, AK | Previously the energy efficiency specialist at GVEA. |

# Appendix B: Electrical Energy Efficiency and Conservation Checklist

As part of a Home$ense audit, the energy auditor sits with the homeowner and fills out a checklist on the house and electrical usage. Using this tool, the auditor and the homeowner decide on strategies for reducing the electrical usage in the home and estimate the savings. The checklist appears below and on the next page.

## GVEA Home$ense Audit Program

### Electrical Energy Efficiency & Conservation checklist

**Member (s):**_____

**Email:**_____

**Auditor:**_____

HOME$ense GVEA's Energy Audit

**MEMBER HOUSEHOLD USE INFORMATION**

**DWELLING DESCRIPTION** (general: e.g., single story?, condo?, apartment? Etc.) _____

**DWELLING SIZE** (approx.)_____ s.f.

**HOUSEHOLD MEMBERS**_____

Last **JANUARY'S** avg. kWh/day (from bill) _____

Last **JULY'S** avg. kWh/day (from bill) _____

**ELECTRIC HEAT** — Primary? ☐ Yes ☐ No

**ELECTRIC HEATER(S):** #_____

- Unplug; fix cold problem first

**REFRIGERATOR** (primary)

Yr. purchased (or, age): _____

**REFRIGERATOR** (second, if any)

Yr. purchased (or, age): _____

kWh use / hour (est.): _____

$ / month (average): _____

- Temp range: +34° to +38°
- Keep 3/4 or > full
- Clean coils every 3 months
- Locate away from heat sources

**FREEZER** (primary, if any)

Yr. purchased (or, age): _____

- Temp range: 0° to +5°
- Defrost if 1/4" or > frost

**FREEZER** (second, if any)

Yr. purchased (or, age): _____

**DISHWASHER**

Yr. purchased: _____

Loads per week: #_____

- Set "No Heat" drying cycle
- Wash with "energy saver" cycle

**ELECTRIC WATER HEATER**

Yr. purchased (or, age): _____

- Temp range: 120° to 130°
- Insulate tank & pipes
- Flush sediment once/yr.
- Consider installing timer (few users)

**LIGHTING**

3 hr. or > on: #_____

- Use CFLs or LEDs for "On" > 3 hr.
- (IMPORTANT: CFL or LED must be rated for dimmer or 3-way, if used in such fixtures)
- Use higher wattage CFL than "comparable" replacement for CFL (more light, still less energy)
- Use occupancy sensors & timers
- Keep defuses and shades clean
- Use day-lighting first; use with light colored, reflective surfaces
- Use LEDs for holiday lighting

**ELECTRIC CLOTHES DRYER** #_____

Loads per week: #_____

- 1st, consider clothes line or drying rack
- Dry full loads
- Clean lint screen each drying
- Dry successive, multiple loads
- Consider moisture sensor replacement

**WASHING MACHINE** #_____

Loads per week: #_____

- Cold water wash
- Pre-soak heavily soiled loads

**ELECTRIC COOKING STOVE TOP RANGE & OVEN**

#_____

- Fit pans to burner size
- Use pan lids to retain heat
- Pre-heat oven for only 5 minutes
- Microwave or crock pot for smaller servings

**SHOWERHEADS / HOT H2O FAUCETS**

#_____ Showers per week:# _____

- Low-flow fixtures and aerators
- Repair leaks immediately
- Showers use 50% less H2O than baths

**YARD SECURITY LIGHTING**

#_____

- Dusk-to-dawn sensors
- Metal halide, LEDs

**OUTDOOR VEHICLE PREHEATING:**

#_____

- 3 hours max for well-maintained vehicle
- Timer or switched outlet

**ELECTRONICS, TVs, COMPUTERS, PLUG-INS ETC.**

#_____

Control; use surge suppressors

- Turn off when not using / unplug is best

**OTHER HIGH USERS** (describe) #_____

_____

_____

- Reduce use, turn off, unplug unused devices
- Purchase **ENERGYSTAR** when replacing other appliances, devices, equipment

## Home$ense Audit Provided Services & Installations Provided

Home$ense audit: # _____

District 6 (Delta): # _____

District 5 (Nenana): # _____

CFL: _____ watts / Qty: # _____

CFL: _____ watts / Qty: # _____

CFL: _____ watts / Qty: # _____

LED: _____ watts / Qty: # _____

LED: _____ watts / Qty: # _____

LED: _____ watts / Qty: # _____

Electric water heater insulation blanket: # _____

Pipe wrap insulation: # _____

Water heater thermostat setting from:
_____ F° to _____ F°

Timer, vehicle preheating: # _____
*(member must have a vehicle and plugged in outside)*

Smart Strip: # _____

Coil cleaning brush: # _____

Fridge thermometer: # _____

Showerhead: # _____

Faucet aerator: # _____

Other tools, products or devices:

_____

_____

_____

## Behavior / Conservation recommendations

(1) _____

(2) _____

(3) _____

Estimated (very rough estimate) possible Electricity Use Reduction per Month with Recommendations & Measures & considering member lifestyle: _____

**LAMPS:** *Replacement lamp installations should NOT reduce the lumen output currently being produced by the fixture. If you cannot install the product, DO NOT leave lamps or other products for member installation, unless there is a reasonable, appropriate and significant probability device will be installed and used.*

Auditor's explanation and/or description for any items, installations, services and/or procedures not completed/ and/or installed:

1. _____
2. _____
3. _____

## Declarations

The above services & products were provided to member's satisfaction:

_____ _____
*Member signature* *Date*

H$ cost $ _____ Promo Code _____

Services & products provided in accordance with GVEA Home$ense Performance Specifications.

**The GVEA-authorized Home$ense auditor is the final authority on devices and products installed and services provided (i.e., number or whether feasible).**

NOTE: GVEA will attempt a future call-back to inquire about the member's success in lowering electric use.

_____ _____
*Auditor's signature* *Date*

# Appendix C: Electric Usage Log

As part of a Home$ense audit, the energy auditor explains to the homeowner how to fill out an electric usage log. By filling in the log each day, the homeowner can detect days with high electrical usage and identify the appliances that cause them. The sample electric usage log appears below.

## Keep an electric usage log

Pick a time when you will be able to read your meter every day. Read the meter, and record the Date and Today's Read in the columns. Bring the previous day's read into the Yesterday's Read column. Subtract Yesterday's Read from Today's Read and record the result in the kWh Used column. Compare today's kWh Used with yesterday's kWh Used. Are they different? Can you think of things that might have caused the difference? Record those ideas in the Possible Causes of Change column.

| Date | Today's Read | Yesterday's Read | kWh Used | Possible Causes of Change |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

**Did you know?** An electric meter is more accurate than your vehicle's gas gauge. Very few meters are inaccurate. And when they are inaccurate, they usually run slow (in your favor).

GVEA
Golden Valley Electric Association
Your Touchstone Energy® Cooperative

GVEA offers **Builder$ense and Business$ense rebate programs** as well. Find out more on our website: gvea.com/rebates.

Golden Valley Electric | 758 Illinois St., Fairbanks, AK 99701 | www.gvea.com | phone: (907) 452-1151

## Appendix D: Home$ense Survey

Home$ense surveys are mailed to GVEA members who complete a Home$ense audit.

HOME $ense
GVEA's Energy Audit

**THANK YOU** for allowing us to do an energy audit of your home. To help us improve this service, we'd like to ask for a few minutes of your time to give us some feedback. A postage-paid envelope is enclosed for your convenience.

1. Did the Home$ense auditor arrive on time?
   ☐ Yes ☐ No ☐ Not Sure

2. Was the Home$ense auditor courteous, professional and attentive?
   ☐ Yes ☐ No ☐ Not Sure

3. Did you have confidence in the auditor's work and recommendations?
   ☐ Yes ☐ No ☐ Not Sure

4. Did the Home$ense audit meet your expectations?
   ☐ Yes ☐ No ☐ Not Sure

5. Were the checklist and recommendations helpful?
   ☐ Yes ☐ No ☐ Not Sure

6. Will you and other household members follow up on the recommendations?
   ☐ Yes ☐ No ☐ Not Sure

7. Did you learn about other energy-saving resources that are available such as other agencies?
   ☐ Yes ☐ No ☐ Not Sure

8. Do you think you understand more about your bill, your electric usage and the amount of money you might save on energy bills by changing your behavior and improving efficiency measures?
   ☐ Yes ☐ No ☐ Not Sure

9. Have you changed your behavior (conserved) or purchasing decisions (energy effiienct devices) as a result of the Home$ense audit?
   ☐ Yes ☐ No ☐ Not Sure

10. How did you hear about the Home$ense audit?
   ☐ Ruralite magazine ☐ Online ☐ Television
   ☐ Family/friend ☐ Special promotion
   ☐ Radio ☐ Bill insert ☐ Not Sure

11. Why did you decide to sign up for the Home$ense energy audit of your home? *(Check all that apply)*
   ☐ Save energy
   ☐ Lower my bill
   ☐ Reduce my usage
   ☐ Promotional price for the audit
   ☐ Other_____

12. Can you identify anything you or other household members didn't get out of the Home$ense audit that you hoped to when you signed up?
   _____
   _____
   _____
   _____

*Thank you for your time and feedback.*

***OPTIONAL***

Name:_____

Address:_____

Contact me at: _____

GVEA
Golden Valley Electric Association
Your Touchstone Energy® Cooperative

## Appendix E: Builder$ense Application

Homeowners and/or builders who apply to the Builder$ense program fill out an application to receive a rebate for energy saving fixtures. The application appears below.


# Builder$ense Application

**Golden Valley Electric Association**
P.O. Box 71249
Fairbanks, AK 99707
452-1151 - Ask for Builder$ense
www.gvea.com

Date _____

GVEA Account # _____ Meter # _____ Location of Home _____

Applicant Name _____

Mailing Address _____

Daytime Phone # _____ Home Phone # _____

Also: LED Fixture #30

Complete the table of eligible measures:

| Quantity | Measure Installations | Rebate Amount | | For GVEA Use Only # Eligible | For GVEA Use Only Rebate |
|---|---|---|---|---|---|
| | Fluorescent Linear Tube Fixture *(T-12 do not qualify)* | $20 | | | $ |
| | Fluorescent Hard-wired CFL Fixture | 10 | | | $ |
| | Compact Fluorescent Lights | 3 | | | $ |
| | LED Lamps | 10 | | | $ |
| | Photocell/Motion Detector | 10 | | | $ |
| | HID Fixture, HPS or MH <70W *(please provide verification)* | 20 | | | $ |
| | Vehicle Timer | 20 | | | $ |
| | Vehicle Switched Outlet | 10 | | | $ |
| | R-11 Water Heater Blanket | 10 | | | $ |
| | Water Heater Timer | 30 | | | $ |

☐ New Construction ☐ Major Rehab/Remodel/Addition

Total $_____

Applicant Signature _____

_____
Reviewers Signature/Date

# Appendix F: Business$ense Lighting Requirements

## GVEA's Business$ense Program

### Qualifying specifications for equipment installed or retrofitted

To qualify for rebates under Business$ense:

1. Equipment must meet all applicable Federal, State and local building codes.
2. Only lighting-related equipment is eligible for rebates. All equipment must carry applicable U.L. listings for the specific application (or Canadian Standards Association equivalent).
3. Equipment is only eligible for rebates if it reduces the facility's ***demand*** for electric energy (measured in Kw). This is distinct from a facility's ***use*** of electric energy (measured in kwh).
4. Equipment is only eligible for rebates if it is a permanent installation or reconfiguration of equipment which would require a planned or concerted effort to alter. For example, simple replacement of 40 watt fluorescent tubes with 34 watt fluorescent tubes would ***not*** be eligible. Likewise, simply removing two lamps from fixtures which can hold four lamps would ***not*** be eligible.
5. Permanently replacing or retrofitting a four lamp fixture so that it will accommodate fewer lamps is eligible. Reduced wattage lamps are eligible ***only*** when installed ***in conjunction with*** such replacement or retrofit.
6. Proposals must be accompanied by "cut sheets" on all proposed equipment. Cut sheets are flyers supplied by manufacturers to provide technical information on their products. Your equipment vendor should be able to provide these.
7. Proposals must also be accompanied by copies of project drawings depicting the facility with the locations of its current equipment and with the locations of proposed equipment.
8. Except for lamps, equipment must be warranted against defects in material and workmanship for at least three years.

**Exclusions:**

The following equipment and measures are not eligible for rebates under Business$ense:

1. Energy-use (kwh) reducing equipment, unless the equipment also reduces energy demand (Kw).
2. Any equipment which, in GVEA's judgment, is not permanently installed on the facility's premises.
3. Cleaning equipment.
4. Control equipment which reduces the power factor of fluorescent or HID fixtures. (For example, current limiters.)
5. Actions such as cleaning, lubricating, adjusting, reconnecting, etc., which are nearly all labor and result only in restoration of nominal efficiency levels.
6. The corrections of problems which have been caused primarily by deferred maintenance.
7. Delamping or reduced wattage lamps when not performed in conjunction with permanent fixture replacement or retrofit.
8. Operations and maintenance measures.
9. The cost of retaining a lighting consultant, vendor, installation contractor or design firm to recommend lighting changes and/or prepare the lighting proposal.
10. The cost of permits, taxes, waste disposal, and other incidental costs.
11. Any equipment without applicable U.L. listings for the specific application (or Canadian Standards Association equivalent).

# 2013 ACEEE (Seventh) National Conference on Energy Efficiency as a Resource

**Nashville Tennessee – September 22-24, 2013**

**Report by Dr. John Davies**

## Main lessons from this conference:

- Energy Efficiency is a major energy resource and is growing across the US
- In most areas, EE programs achieve 0.5 to 2.0% annual energy cost reductions at a levelized cost of 3-4 cents per kWh; this amounts to about $30-40 per customer annually
- Industrial and commercial programs have levelized costs of 1-2 cents per kWh
- Many jurisdictions are requiring that utilities implement all cost-effective energy efficiency measures
- In a number of competitive markets, energy efficiency programs are bidding against conventional energy resources
- Energy efficiency is usually the least-cost resource and in several markets is the second or third largest energy resource
- In several areas, EE programs have removed the need for 10s of power plants
- EE programs are getting larger – they are offered at state or regional scales and most often across the territories of several utilities
- Gas and electric EE programs are being integrated
- There is still a need for solid measurement and evaluation of EE programs to document job creation, energy savings and non-energy benefits such as better health outcomes
- The low-hanging fruit of CFLs has leveled-off and LEDs are poised to take over
- Upstream EE programs are proving quite cost effective
- There has been a steady increase in behavioral EE programs; they show real savings
- Customers mostly care about service, so programs need to look simple to them even if the financing and delivery is complex programmatically

## Notes from the conference –

Powerpoints are at http://aceee.org/conferences/2013/eer/program

A white paper summary of the conference can be found on the ACEEE website:

*Seventh National ACEEE Conference on Energy Efficiency as a Resource: Report to the US Dept. of Energy* by Seth Nowak, October 2013

**ACEEE welcome talks**

Martin Kushler, Conference Organizer for ACEEE -

- PowerPoint Presentations will be posted to website following the meeting.

- This is the 7th conf on Energy Efficiency as a Resource, SE making progress, record attendance
- Deregulation and market forces did not lead to optimal allocation of resources
- EE helped CA recover from 2007 crisis and this lead to EE being taken more seriously.

Molly Crips, Tennessee Office of Energy Programs

- Welcome y'all,
- Tasmania - farthest travel to get to conference
- Tenn. EE Init. - telling the story, monetizing EE benefits, see www.tnenergy.org

Bob Martineau, Commissioner, Tennessee Dept Environment & Conservation (formerly an attorney of environmental law at EPA) – Examples from Tennessee

- Tenn. EE Init. - get word out through conferences and other public programs
- ORNL RE efforts - solar projects
- Nissan: mfg LEAF and rechargeable batteries, their plant is EE
- Bridgestone America reduced energy consumption by 25% over 20 yrs.
- There are some green lighting companies in Tennessee
- TVA upstream programs – working with retailers to bring down cost of new lighting, e.g.
- New energy efficiency paradigm - show me the data! Require data back from projects that are funded.
- EE is a cut in overhead cost – view point of executives focused on business plan
- Office building firm reduced cost by $350K per yr at total cost of $600K
- Wastewater utility EE program - 17% annual cost reduction, state lead-by-example case
- EE makes environmental and economic sense

Karl Dean, Mayor of Nashville

- EE leadership, goal 25% reduction, LEED construction standards,
- Political agenda: schools, public safety, jobs, and growth
- Energy is an issue - want Nashville to be leader in EE (jobs and growth)
- 20% reduction over next decade in energy used for homes and buildings
- Residential leverage - Nashville EE Works (NEW), 3850 evaluations, of these 50% have invested 9 million dollars which is also creating local jobs
- Program is in mayors office now, will move it to a volunteer, non-profit organization to keep momentum after he leaves office
- Business too: public convention center, largest green roof in US, LEED silver zoning requirement in “the Gulch” (a trendy redevelopment neighborhood of small shops and restaurants), need open space - buying it! Clean up river and creeks.

Bob Balzar, VP EE and Demand Response, TVA (Tennessee Valley Authority)

- Responsible for long-term EE sustainability and business plans
- TVA sees EE as a key energy resource
- EE must be embedded in an organization, lots of folks at TVA have done this
- Avoided need for 900 MW plant at accost of $300 million

- Annual savings of $100 million in fuel and O&M - cost is 2 cents per kWh,
- Alabama saves is a good financing model
- North Carolina adopted RPS (Renewable Portfolio Standard)

**KEYNOTE – Colette Honorable, Chair Ark Public Service Commission**

Introduction by Rich Sedano, Regulatory Assist Project (worked for Howard Dean).

> Colette is highly regarded in Arkansas. She is noted for her inspiration, vision, and pragmatism. Her motto is – "If we do regulation well, EE will do well."

Colette Honorable: "*Counting on EE Now and in the Future - Building Public Utility Energy Efficiency Programs - the Arkansas Journey*"

A state PUC should welcome diverse input because debate and tension lead to the best result.

Arkansas Energy Conservation Endorsement Act (ECEA) of 1977
Adopted at a time of energy insecurity, the focus of the law was on three areas:

1. Insulation programs for all customer classes;
2. Renewable programs; and
3. "Programs which result in the improvement of load factors, contribute to reductions in peak power demands, and promote efficient load management, including the adoption of interruptible service equipment and alternative or additional metering equipment designed to implement new rate structures"

ECEA authorized EE only if good for utility and ratepayers.

Since 1977 progress in breaking down barriers to EE programs has been slow.
Recently there has been great progress in the southeast US and Arkansas:

- Required utilities to submit comprehensive plans in 2010
- Program cost recovery rider - includes lost fixed-cost recovery
- Set EE targets - robust EM&V key
- Largest IOU will avoid need for 700 MW of new capacity over 10 yrs
- Customer satisfaction is 95-100% - customer education and engagement is key

Single, 70-person state office contracts with many utilities to deliver EE programs across the state; it coordinates audits for electric and gas EE programs.

There is a current Arkansas PSC docket to study the statewide EE potential and to consider unification of weatherization and utility EE programs.

The Clinton Climate Initiative is assisting Arkansas with policy development for a state EERS (EE Resource Standard). [An EERS establishes specific, long-term targets for energy savings that utilities or non-utility program administrators must meet.]

Colette Honorable, next chair of NARUC (Nat'l Assoc of Regulatory Commissioners):

"If we take an all-of-the-above approach and do our job right, it will improve environment."

**National Overview 10 AM Monday**

NEEP - Jim O'Reilly (New England EE Partnerships)

- Most jurisdictions are requiring implementation of *all-cost-effective* EE measures
- EE programs are funded with about 40$ per capita revenue from rate-payers
- Metropolitan areas are creating EE standards, including requirements for EM&V
- Ongoing discussions on how should cost-effectiveness be calculated?
- All types of energy savings should be accounted for: need money to implement
- There has been no new load growth in NE states (due to EE) in past few years
- NEEP is creating a regional EE Database
- There is a new focus on inclusion of CHP systems in EE strategy

MEEA - Stacy Paradis (Midwest EE Alliance)

- In 2010, region spent 1.8M$ on EE
- Worked on EE codes, mostly implementing IECC, also doing benchmarking
- A huge turnover in elective offices lead to (failed) legislation to repeal EERS
- Clearly need to tell the story: EE makes jobs and saves money

NEEA - Susan Stratton (Northwest EE Alliance)

- Have saved 5100 average MW (aMW) since 1997
- EE is now second largest resource behind hydro
- EE programs are spending annually about $33 per capita
- WA state has a decoupling mechanism in rate structure
- OR & ID have net metering at retail rate; MT is studying it
- Producing a *Case for EE Report* - lower avoided costs, non-EE benefits credit
- There are more integrated electric and natural gas EE programs

California EE Industry Council - Margie Gardner – The council is a statewide nonprofit that represents the EE industry, excluding utilities.

- Over past few decades 29 new power-plants have been avoided by EE
- EE is now the #2 energy resource in CA
- Council works toward conversations instead of litigation in EE policy development
- Prop 39 - Clean Energy Funding for Schools - EE will capture largest share of $$
- AB 758 - Existing Buildings - Goal is net-zero in residential & commercial bldgs

SPEER - Doug Lewin (South-central Partnership for EE as a Resource)

- Working on benchmarking EE efforts and developing PACE financing
- EE is being sold in regional energy markets along with conventional sources

SWEEP - Maureen Quaid (SW EE Project)

- Many EE programs achieving savings about 1 % of retail sales
- NM has reduced customer bill by 3% using EE

SEEA - Mandy Mahoney (SE EE Aliance)

- TVA leadership for EE demand response programs
- EE is tough to maintain with high turnover in elected officials
- All SE states have adopted building EE codes
- NC has REPS (Renewable Energy Portfolio Std) based on savings
- There is business support for EE & RE programs that show savings
- Working on building labeling & merger of Wx with electrical EE work
- A clear utility business model for EE will keep funding high

SEEA Successes –
Stake holder discussions and agreement on EE savings metric
EE spending up, TVA programs swamped other EE programs (upstream low cost),
Mississippi used ACEEE 51st ranking to move to an all-of-the-above policy

SEEA Threats –

- NAHB effort to eliminate improvements in 2015 IECC
- Public Utility commissions becoming more conservative
- Alabama does not have leadership in governor,
- New legislators do not have EE on their agenda and legislative backtracking
- Need data, (productivity vs efficiency)
- Need better way to tell story, must get EE seen as a resource that can be counted on, especially in O&G states,

Public Policy Considerations –

- Legislators support “lead by example”, save public $$
- Government role is important because EE is LT process
- Frame: “If you waste energy you are costing me money.”
- Get EE on agenda at other venues - PUDs etc
- Work to frame issue; intervene in regulatory hearings
- Need solid studies to support EE value
- Form a PAC to elect legislators who value EE
- Advertise real people who are causing real savings
- Use “self-direct” vs. “opt out” for industrial EE programs
- Big industrials are a political force; need to show that EE benefits industrials too
- Lighting market going “upstream”
- People are much more concerned about comfort than cost savings
- Even EE industry does not think of itself as a resource,

- Find market-based solutions where EE competes for share
- Regulators need to rethink their role, as loads drop does EE lose argument?
- EE needs an agent to get all-cost-effective measures, each of the 50 states is different

**Next Generation Residential EE Programs**

Seth Bauer - Top Ten USA - "Has your residential program moved you to Tiers?"

- Nonprofit utilities, ecova, nrdc, neep,: bring EE to consumers by ranking products like CR website and TopTen list
- Tiers: either boost baseline or race to the top:
- EG, (boost baseline):
    - Energy Star - no incentive
    - CEE Tier 3 - $75 incentive
- OR (race to top)
    - Energy Star = 100
    - Federal Std + 25% = 125
- Master the "up-sell" - go to Tier III, win-win
- Educate consumers that there is a delta (better performance with higher price)
- Set tiers to be: understandable, available, marketable, a reasonable fit to the range of inventory, spaced over rational savings deltas
- Tier up, not down

Chris Caldwell - ECOVA – LED: ready for liftoff?

- Folks buy light bulbs to provide light, not save money
- LED not most cost-effective choice yet; also not omni-directional
- Lots of metrics for good light - use ones that matter to people, not just easy to measure

Michael Rosenberg - Whole House Retrofit

- Use multiple measures on multiple energy systems

Seth Craigo-Snell - where are we headed - how are going to promote EE products

- Hard to sell heat pump water heaters at $1,200 in a crisis replacement
- Strategy differences: promote products in way appropriate to consumers situation

**2b - integrating EE and Demand Response**

Matt Klosiniski (Milepost Consulting) and Nancy Jenkins (Southern Cal Edison) - Integrating the DSM organization for EE and DR program delivery

- Integrated demand side management - both EE and demand response
- Pilot the integration of DR into EE programs
- Demand response (peak avoidance) how to make DR a resource that can be bid into grid supply
- Why are local gov'ts so slow to participate? Funding, technical expertise,
- Energy Leader Model:
    - Staged approach
    - Education and awareness
    - Increased incentives, more with more participation
    - Tech support
    - Reward leadership
    - Recognition among peers
- 5% savings per stage of load reduction
- Flex Alert - reduce load when needed by grid

Christine Donovan (VEIC)- EE and the smart grid: pilot programs on EE and conservation behavior

- Smart grid – two-way communication - collect and communicate data to allow management of energy use
- Can see how customer behavior affects energy use
- Wx innovation pilot program
- AMI automated meter, in-home display, web portal (suggested EE & DR response), and energy coaches
- Web-portal - last time visited: ave. two months!
- In-home display - checked weekly by 58%
- Energy specialist helped save energy
- 70% of residents said they implemented changes suggested
- Top five lessons learned:
    1. In-home display favored over web portal
    2. Proactive customer service can increase EE
    3. Timing of calls important
    4. Privacy concerns - get customer permission up front
    5. Use vendor with track record
- Closing: smart grid can help EE and DR programs - human change requires human touch

Colleen Snee (Johnson Controls) - EE and the smart grid - lessons learned for commercial and industrial sectors

- Pennsylvania Act 129 2008? DR = peak shavings (no customer investment required)
- Active Load Management - drives further reductions (can help balance RE)
- PJM - reliability program
- 90 separate dispatches,
- customers like tangible events, act today get check tomorrow

- has to be on smart phone - people are not looking at computers anymore
- use DR revenue for EE measures!!

*** could you set up a "DR" program to reward intermittent reductions to get LT load reduction

Ben Davis (Mass Dept of Public Utilities) - Grid modernization in Mass: the role of EE

- get stakeholders together to modernize grid
- what policy changes are needed to improve grid
- why do this - reliability
- Mass does not have AMI meters AMR automated meter reading
- working group report
- grid mod and EE are these different?
- both important

Tom Eckman - NW Power and Conservation council

- EE is about the same as coal and 3rd behind hydro in NW

Scott Johnstone, VEIC, we only win if we deliver results

- Vermont = 36% transportation, 35% com & ind, 29% residential
- 12% of energy supply from EE at cost of 3.4 cents/kWh, next resource = 8.4 cents/kWh
- NE forward capacity market, now EE is number one bidder in Vermont
- Need 1. policy, 2, regulation, 3. implementation
- Policy: all fuels, all cost effective, goals set in # of homes retrofit per year
- In Vermont EE - flat load growth for 20 yrs in IRP (3% per yr)

Jeff Schlegle - Mass

- Policy: all cost effective EE, full flexible cost recovery (additional surcharge for EE), Decoupling, Positive incentive for EE to utility, stakeholder council
- Goals: 2% + per yr for more than a decade, 6 billion of savings in first 3 yrs
- Got 95% of planned savings at 75% of planned cost (3 yrs)
- Cost is about 3-4 cents/kWh

Q&A

Tom (made wine of low hanging fruit, got drunk and gave up)

- Waste has to be immoral, illegal, and un-profitable (need education and codes)
- Use total energy approach, get rid of caps on DG, put RE jobs in coal country

Jeff

- At 2.5%, could get to more if go outside of EE world: climate, jobs, econ dev't, allocate resources differently
- DG will eventually replace GT, change business model!!

- Simplexity = energy service co of future, got to be simple to consumer, complex to business
- iphone costs more than utility phone => people don't care about electricity cost; they care about service
- Earnings per share is best metric for IOU
- Deeper: need to really get ALL cost effective EE

**EE Potential 10:15 AM**

Howard Geller – SWEEP - EE Potential Study (20B$ bonanza)

- Commercial and industrial EE cost = 2.2 cents/kWh, residential = 3.6 cents/kWh
- Expected savings in 2020 are around 20%
- High EE implementation enables closing or avoiding 32 plants (400 MW each)
- Avoided costs about 4 b$ per yr by 2020
- Monetized health benefits = $544 million
- Benefit = 40 B, cost = 20 B net = 20 B  SIR = 2
- Need goals state by state
- Remove disincentives, decouple
- Incentivize utilities
- Involve all utilities
- Federal standards and local codes not included
- www.20billionbonanza.com & hgeller@swenergy.org

Mathias Bell, Rocky Mt Institute - Beyond 2%: Connecticut Comprehensive Strategy

- Mid-pack would be top tier a few yrs ago, how many states are getting 2%???
- Connecticut has been a leader; still the opportunities that remain are significant
- Legislature asked for study by (?) Dept Energy and Environmental Protection
- Existing buildings are by far most of the opportunity for energy savings
- Reduce energy use in state buildings by10%
- Wx 80% of CT homes
- All cost eff EE -> 8 B$
- Sales and marketing approach - not much known
- 90% of customers have not done audit, 90% who do audit don't save much
    - ⇨ have to improve marketing, sales, and counseling efforts
- Funding
    1. Decoupling needed
    2. Need business innovation
    3. Empower people with education and tools
    4. Financing, upfront costs are issue everywhere - revolving fund, secure bonds for upfront capital

- Contact: mbell@rmi.org {RMI has 80 staff}

Maggie Molina, ACEEE - National Review of Cost of Conserved Energy

- EE is still the least cost resource = 3.3 cents/kWh
- There is a lot of potential out there
- Used utility-cost-test method
- Collected EE annual reports from 17 states (net vs. gross, at site vs. at gen)
- Calculated levelized cost of saved energy
- Cost range is 1 to 5.5 cents/kWh; average is around 3.3 cents per kWh saved
- Lots of data issues across states - but EE remains "first fuel"

**Unlocking Potential of Behavior Programs**

Anne Doughterty, Illume Advising The Promise and Reality of Behavior Programs

- They started in 2009, 1 in 10 in 2010, now 1 in 4, EE programs use behavior elements
- Achieving 0.1 to 27% savings, see OPOWER
- How long will savings last? After one year, savings drop to 40% from measures done by customers
- Most programs focus on high-energy users
- Some programs attribute as much as 50% of savings to behavior

Geraldo Galmdez, Entergy Arkansas - Lessons from low-income residential reward programs

- Study used random control group over 6 months
- Measured 16,840 MWh of savings attributed to behavior element based on $10 gift card
- Amounted to 16% of total EE program savings

Ali Bozorgi, ICF International - DSM portfolio planning: quantitative analysis of feedback-based behavior programs

- Enhanced billing got 1.9% reduction
- Feedback based EE programs got 3.47% reduction

Jim Kapsis, Opower - Long Term Treatment of Behavioral EE in EERS

- 10K control group needed for statistical power
- Economic EE = achievable potential (estimated)
- For 292 utilities estimated resource is
    - 19 TWh of annual savings
    - 3,200 MW in peak savings
- Contact: jim.kapsis@Opower.com

**Big Data**

Steven Meyers, EnerPath – Big Data: What is it?

- Consider the amount of data that Amazon collects (billions of transactions)
- SBDI (small bus direct install) (91% interested in residential EE companies)
- We collect more data than excel can handle; easily for lots of customers
- Small cost, collect data on many aspects of business, want high adoption rates
- All data starts electronically, collect data and provide information
- Manage follow up sales and contacts in database
- Use data to grow sales, improve cost-effectiveness, get deeper savings, manage workflow, improve accountability, wow customers,
- SBDI owns database: cleans data, give cleaned and improved data back to utility
- Contact: EnerPath www.enerpath.com

James Bradford, Mesa Point Energy – Pros and Cons of using TRM for DSM program measurement

- Technical Reference Manual prescribes how to do program evaluation and calc savings
- Can provide reliable estimates and save M&V dollars
- But often misleading – make sure that TRM works for your application

Dan Teague, WegoWise – Tracking and Benchmarking for Maximum Savings (new tools)

- Wego: water, electricity, gas and oil – Company automates tracking of data
- Collect building characteristic data + monthly energy use data & weather data
- Calculate Btu/conditioned SF/HDD each month (CDD?)
- Allows one to identify the bad buildings or errors in operations or billing
- Benchmarking targets best bets, drives participation
- Automated so allows tracking across all fuels (water too)