Electrical Energy Efficiency

Environmental Scan: Barriers & Opportunities

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Introduction

Alaska is an energy resource state with some of the highest energy prices in the nation. Alaskan energy consumers have a greater understanding of energy generation than in many places, yet we lag far behind in developing and exploiting our cheapest and cleanest resource—efficiency and conservation—particularly in relation to electric energy.

The State of Alaska maintains several successful programs to address thermal efficiency in the residential market through home weatherization efforts, most notably the low-income Weatherization (Wx) and Home Energy Rebate (HER) programs. More recently, RurAL CAP's *Energy Wise* program has begun to address residential electric energy as well as thermal consumption in households in rural Alaska communities, primarily by encouraging the use of compact florescent lamp (CFL) and maintenance and cleaning of refrigerators and freezers.

Several energy efficiency programs targeted to the commercial building sector are outlined below. All of these programs address energy savings in public building including, but not limited to, electric savings:

- Department of Transportation and Public Facilities runs a program to reduce energy consumption—both thermal and electric—for state-owned buildings
- Alaska Housing Finance Corporation (AHFC) offers a newly created public building revolving loan program which will facilitate energy efficiency upgrades to public buildings including schools, health facilities, tribal and local government buildings, etc.
- Alaska Energy Authority (AEA) provides a commercial energy audit program
- Alaska Building Science Network operates the Village Energy Efficiency Program

Two Approaches to Increasing Energy Efficiency

There are two general schools of thought as to how to decide what energy efficiency measures to target in both the commercial and residential sectors.

- Do the cheapest things with the biggest return on investment (ROI) first, leaving the more expensive stuff for later

- Do all energy efficiency and conservation measures up to the margin together, measuring ROI on the whole package of improvements

There are benefits and costs associated with both of these methodologies, but there is no doubt that greater total energy savings are found using the latter. The increased up-front costs associated with many efficiency technology upgrades are one of the primary barriers to efficiency for consumers whether they are individuals or large commercial enterprises.

Most states have moved beyond the initial sticker shock and now recognize that investment in energy efficiency and conservation programs is a good use of public dollars. In New York, utility customers and energy service companies (ESCOS) invest an additional $3 for every $1 the state government spends on energy efficiency (EE) measures, leveraging public funds for an even greater impact.

Overview of Recommendations for Alaska

Energy efficiency programs have been successfully implemented around the country and the world and many of them are absolutely applicable in Alaska. In places with high energy prices and extreme climate, the improved return on investment should create fertile soil for efficiency efforts. For the purposes of this report we have narrowed the list of energy efficiency recommendations to 12 that will have significant impact and are within the purview of the State's ability to influence. That is not to say that any of the multitude of other options available are not good ideas.

Recommendations fall into four general categories: 1) addressing existing barriers; 2) providing incentives; 3) targeting existing opportunities in underserved market segments; and 4) establishing policy that leads to lasting change.

REMOVE BARRIERS

1. **Empower the RCA**: Through legislative action empower the Regulatory Commission of Alaska (RCA) to regulate effectively
2. **Establish a single point of contact**: Create an umbrella organization to act as a single point of contact for independent power producers to bring renewable energy generation to the Railbelt system
3. **Remove utility disincentives to efficiency**: Draft nuanced regulations on rate increases that specify allowable rate increases associated with decreases in demand resulting from energy efficiency and conservation

PROVIDE INCENTIVES

4. **Lead by example**: Write and enforce policies that mandate energy efficiency measures in all departments of state government, focusing on procurement and public buildings, including schools

5. **Establish revolving loan funds**: Provide low-interest revolving loan funds for private commercial and residential users to do electric energy efficiency retrofits on specific list of measures. Tie loan for commercial users to an electric energy audit.
6. **Use tax incentives to promote efficiency**: Create tax incentives for efficiency including corporate tax breaks for companies that invest in energy efficiency and conservation measures. Allow municipalities to provide tax incentives through property tax credits.

TARGET UNDERSERVED MARKETS

7. **Power Cost Equalization (PCE) Communities**: Target outreach education and technical assistance focused on lighting and appliances/electronics to households using more than 500 kWh/month and private commercial facilities in rural Alaska
8. **Low-Income Urban Population**: Target outreach education and technical assistance focused on lighting and appliances/electronics to low-income households and private commercial facilities in urban Alaska communities

CREATE A FRAMEWORK FOR LASTING CHANGE

9. **Establish an Energy Efficiency Resource Standard (EERS)** for the state of Alaska
10. **Create an efficiency utility:** Create an independent entity that can act as an efficiency utility, providing services to meet demand, working with but not for existing utility companies
11. **Ensure sustainable funding:** Provide consistent and sustainable funding for electric energy efficiency programs. State legislature should direct RCA to include an efficiency charge in utility rate structure.
12. **Connect outreach, education with technical assistance**: Create a system in which outreach, education and technical assistance are connected, complimentary and attached to sustainable funding

    The four recommendations under the category of creating a framework for lasting change interconnected and are most effective if taken together. Establishing an EERS (Rec. 9) creates the need for ramped up efficiency efforts. This need can be met in several ways including through the creation of an efficiency utility (Rec. 10). Connecting outreach and education with technical assistance (Rec. 12) is an industry best practice that also fits well within the structure of an efficiency utility model (Rec. 10). Providing sustainable funding (Rec. 11) is clearly necessary for any effort to be successful in the long term. Each of these recommendations can stand alone, however the highest value will be found in taking them as a package.

Evaluating the Potential for Successful Electric End-Use Efficiency Implementation in Alaska

When evaluating the potential for end-use *electric* energy efficiency, the most significant barrier to successful implementation comes in the form of government subsidies provided on the supply side. Through grants that subsidize renewable and non-renewable electric energy generation we have effectively eliminated (or at least significantly diminished) any natural economic incentives for efficiency. The most recent large subsidy to the supply side, announced in June 2011, comes in the form of a $12 billion appropriation for the Susitna Hydro project to serve Southcentral Alaska and an in-state natural gas line.

Even in rural areas where electric rates are high relative to urban communities, electric bills are small (for those covered by PCE[1]) when compared to the cost of heating and transportation. Non-subsidized kilowatt hours (kWh) reflect actual costs and provide strong incentives to conserve. There is no suggestion that PCE should be reduced; it is a lifeline program with strong support. The social and economic benefits of the program outweigh the detriment of removing a financial incentive to conserve.

Electric end-use efficiency (EEUE) program and policy effectiveness are sensitive to rough alignment of retail prices and total system costs. Current and future prospects of mismatches between *price* and *cost* of heat and electricity present challenges for design and implementation of effective programs and policies. High price heating and electricity in rural Alaska (above PCE lifeline subsidy) may present the best opportunities for success through education, financing and third-party enterprises.

Table 1 summarizes the relationship between total systems savings and the current retail price of electricity in different regions of the state. Regions in which the system cost is aligned with the price charged to customers offer the greatest opportunities for effective implementation of EEUE programs. In particular large commercial customers benefit from alignment between system cost and price charged because it allows them to accurately assess the potential benefit of separate distributed generation systems that combine heat and power. Entities such as university and hospital campuses currently operate in a rate scenario that requires significant overhead and negotiation, creating unnecessary costs and barriers to efficient energy generation and use. Total system cost effectiveness of EEUE initiatives is sensitive to *relative value* of heat and light system costs.

[1] Power Cost Equalization (PCE) subsidizes residential electric rates in most rural communities for residential and community buildings.

Table 1: Regional EEUE Potential

Region	Total System Cost / Retail Rates (Price)	Notes
Rural-Diesel	High vs. High	Price and cost roughly aligned (above PCE lifeline subsidies); anticipate moderate market penetration of EEUE due to perception of high price of electricity; anticipate moderate gaps in local EEUE knowledge, equipment and financing; compare new policies and programs to existing EEUE policies and programs to assess incremental value of 1) information & education; 2) creative financing (on-bill financing); 3) third-party enterprise to bundle opportunities
Rural-Hydro (FDP)	Med vs. Low–Medium	Low to medium price vs. medium cost mismatch grows in relation to subsidized hydro/diminished diesel peaking; potential for higher penetration of electrical heat and low penetration of EEUE in the absence of high cost diesel peaking; effective EEUE policies and programs may be a challenge in light of low energy pricing and the promise of future subsidies for the supply side
Rural-Hydro (SE)	Low -Med vs. Med	Medium price vs. low to medium cost mismatch grows in relation to subsidized hydro/diminished diesel peaking; anticipate low market penetration of EEUE; effective EEUE policies and programs may be a challenge in light of low energy pricing and the promise of future subsidies for the supply side
Railbelt-ML&P	Low vs. Medium	Medium price vs. low cost mismatch in near term; anticipate low market penetration of EEUE; effective EEUE policies and programs may be a challenge in light of current low energy pricing and the promise of future subsidies ($12 billion+) for the supply side
Railbelt-GVEA	Medium vs. High	High price vs. medium cost mismatch in near term; anticipate moderate market penetration of EEUE due to perception of high price of electricity; anticipate modest gaps in local EEUE knowledge due to sustained policies and programs, incremental value possible in creative financing, third party enterprises to bundle opportunities; EEUE challenges remain in light of the promise of future subsidies ($12 billion+) for the supply side
Railbelt-CEA/MEA/HEA	Medium vs. Medium	Price and cost roughly aligned; anticipate moderate market penetration of EEUE due to perception of high price of electricity; anticipate moderate gaps in local EEUE knowledge, equipment and financing; compare new policies and programs to existing EEUE policies and programs to assess incremental value of 1) information & education; 2) creative financing (on-bill financing); 3) third-party enterprise to bundle opportunities

While efficiency provides benefit in all parts of the state, program spending should be focused in areas with the greatest potential for success and in areas that use fossil fuel to

generate electricity. The illustration below demonstrates the **relative difference** between heating and lighting costs in the near term. The difference is relative between electricity and heat costs, not between different utilities or regions of the state. Near term EEUE efforts are likely to focus on lighting whereas efforts to increase use of efficient appliances will tend to be longer term and may slightly change program economics.

High cost heat + low cost electricity = low value EEUE [SE AK low-cost hydro]

High cost heat + medium cost electricity = low-medium value EEUE [GVEA, ML&P]

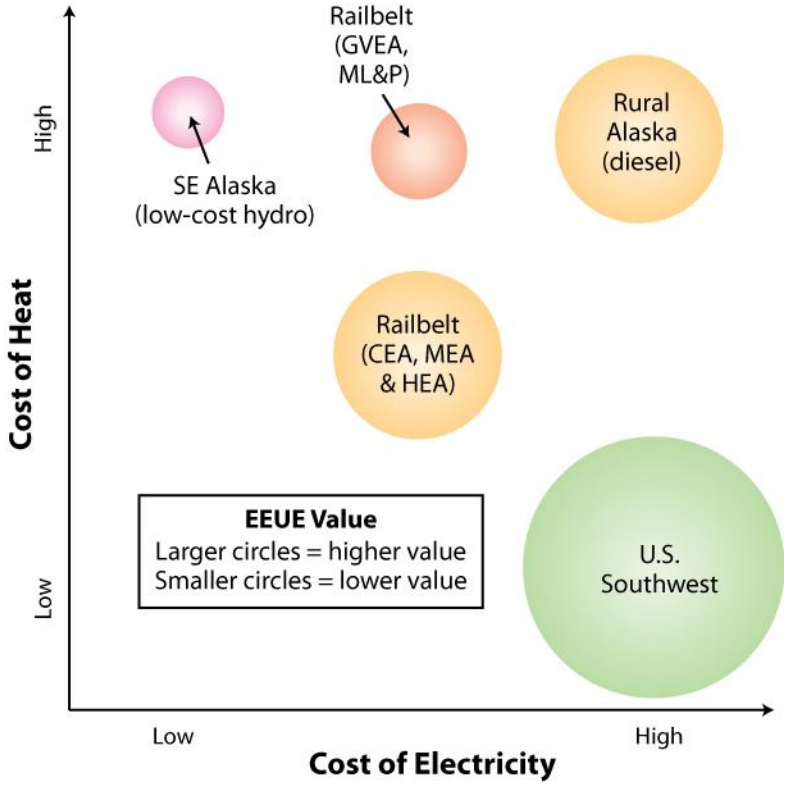
Medium cost heat + medium cost electricity = medium value EEUE [CEA, MEA, HEA]

High cost heat + high cost electricity = medium value EEUE [Rural AK]

Low cost heat + high cost electricity = high value EEUE [U.S. Southwest]

This relationship is illustrated in Figure 1, where larger circles indicate greater potential energy savings from EEUE programs and smaller circles indicate lower value EEUE, based on the relationship between heat and electricity costs.

Figure 1: Relative Potential for EEUE Initiatives



Recommendations to Remove Barriers

Empower the RCA

1. **RECOMMENDATION:** THROUGH LEGISLATIVE ACTION EMPOWER THE RCA TO REGULATE EFFECTIVELY

   The current structure of Railbelt utilities and the weak regulatory environment in which they operate is a significant barrier to implementation of energy efficiency measures. The RCA is charged with licensing utility companies, and it regulates about 30 utilities statewide. The number of regulated utilities is a relatively small percentage of the total, but those roughly 30 utilities represent the large majority of energy sold and customers served in the state.

   The RCA is at a significant disadvantage in performing its function for several reasons:

   - There is a sunset clause in RCA-creating legislation that brings the organization up for review every four years, limiting its ability to take chances or be innovative.
   - The commission has limited staffing for the workload associated with actively regulating such a large number of utilities spread out over such a large area.
   - The legislature has not given the RCA the authority necessary to enforce any but the most popular regulation; regulatory changes are only implemented with a high degree of buy-in from utility companies.
   - Utilities yield greater political power than their regulators.

   The RCA rarely if ever makes rulings they feel utilities will not support. It is clear that regulators would implement rulings that would be unpopular with utilities only at the direction of the legislature; legislative initiative is necessary to strengthen the position of the RCA on energy efficiency and end-use management.

   In addition to a weak regulatory environment, the structure of electric energy generation and distribution in Alaska differs from the Lower 48 in several ways.

   - First and foremost, Alaska has a large number of unique systems not connected to a grid.

- Most utilities in Alaska are not privately/investor owned; most are cooperatives or owned by a local government.
- There are a large number of independently operated utilities serving a relatively small number of customers (by Lower-48 standards) in the Railbelt.

Establish a Single Point of Contact

2. RECOMMENDATION: CREATE AN UMBRELLA ORGANIZATION THAT CAN ACT AS A SINGLE POINT OF CONTACT FOR INDEPENDENT POWER PRODUCERS TO BRING RENEWABLE ENERGY GENERATION TO THE RAILBELT SYSTEM

Railbelt communities use the majority of electric energy in the state—an amount of electricity that is comparable to one medium-sized utility in the Lower 48. These communities are served by five separate utilities. This structure makes system-wide change and power purchase negotiations difficult and expensive. Considerable time and funding has been expended in an effort to bring Railbelt utilities under some sort of umbrella organization that could provide coordinated planning, system-wide programs, and a single point of contact for power sales negotiations. Despite these efforts the Railbelt utilities are still operating as five distinct and disconnected entities.

Remove Utility Disincentives to Efficiency

3. RECOMMENDATION: DRAFT NUANCED REGULATIONS ON RATE INCREASES THAT SPECIFY ALLOWABLE RATE INCREASES ASSOCIATED WITH DECREASES IN DEMAND RESULTING FROM ENERGY EFFICIENCY AND CONSERVATION

Decoupling

The concept of separating the unit of energy sold from the financial well-being of a utility company is the driving principal behind decoupling. Under a decoupling schema, utilities can adjust their rates at regular (usually annual) intervals to increase their base rate in order to maintain their required revenue stream while the number of kilowatts sold may be decreasing due to energy efficiency programs.

To the consumer, decoupling could be virtually invisible. The job of the efficiency service provider (utility or other) is to design programs so that customers receive the same level of service for fewer kilowatt hours. The consumer is paying for service, not electricity; as long as service remains the same, the cost can also remain relatively stable. This is a somewhat radical idea that requires a paradigm shift in thinking about exactly what is purchased from energy companies. Some Alaska ratepayers may initially balk, but this way of thinking about energy companies is gaining in popularity throughout the country.

The RCA opened an information docket in spring 2011 to solicit input and begin to research the potential for decoupling Railbelt electric utilities. The majority of feedback from utilities was 1) that they do not need decoupling because they have simplified rate filing; and 2) that decoupling is inappropriate for co-ops or publicly owned utilities. Relatively few non-utility

entities weighed in on either side of the issue.[2] The RCA has since opened a new docket (fall 2011) regarding decoupling and energy efficiency.

Simplified Rate Filing (SRF)

Under the simplified rate filing system, utilities can adjust their rates to reflect changes in either price of fuel or demand for energy. Alaska statutes[3] allow for regular rate adjustments, increasing rates by up to 8 percent in any 12-month period and not to exceed 20 percent in any 3-year period. However, these statutory limits may not leave room for increases needed to offset decreased demand resulting from end-use efficiencies, especially given anticipated natural gas price hikes and planned capital investments.

It is generally anticipated that electric rates in Southcentral Alaska will go up for a number of reasons including significant capital expenditure to finance new energy generation and new natural gas contracts that reflect higher costs and decreased supply (at least in the short-run) of Cook Inlet gas. Railbelt utilities are poised to invest $1 to $1.5 billion in new energy generation infrastructure; this capital will become part of the rate base for many years to come. This capital investment could act as a disincentive for utilities to implement new energy efficiency programs: as the base rate increases due to capital expenditure, utilities may be reluctant to let it increase for other reasons (such as energy efficiency) for fear that rate payers will react negatively; or there simply may not be room for additional increases due to statutory limits.

A more nuanced statute guiding SRF that allows for an X percent increase due to cost of fuel or capital and a Y percent increase from decreased demand due to energy efficiency and conservation could incentivize efficiency under the current rate setting structure.

SRF serves the same basic purpose of decoupling in Alaska but has yet to motivate utilities to engage in meaningful end-use efficiency just as decoupling alone is an inadequate incentive. Decoupling can act as the carrot for a privately held utility and can offer some financial security for any type of utility, but a stick is also required to see real change. Utilities need a mandate to meet specific energy efficiency goals.

Caveats

Decoupling alone does not create adequate incentive for utilities to implement EEUE programs and policies. In Maryland gas utilities were decoupled with the intent of providing revenue stability by removing weather and efficiency impacts from revenue to the utility. This change was made with the expectation that efficiency programs would follow but they did not. The experience in Maryland is one of several examples that provide evidence that

[2] Personal communication with RCA staff, July 6, 2011

[3] Alaska Statutes 42,05.381€ and 3 AAC 48.700 to 3 AAC 48.790

decoupling alone is insufficient to promote energy efficiency and conservation programs; additional and more specific regulations and requirements are necessary.

Another potential pitfall under decoupling is that is removes some financial incentive *to the customer* associated with energy efficiency and conservation efforts. Once decoupled any efficiency or conservation measures will only impact the fuel portion of the bill so that the immediate cost reduction is diminished. In the longer term—depending on how many customers see consumption reductions— customer savings could be further reduced as rates are adjusted up to ensure utilities have enough money to operate. There are still cost savings to the customer associated with energy efficiency measures under a decoupled rate structure; they are just somewhat diminished.

Incentivized Rate Structure

Utilities regularly charge different rates to different classes of customers. Current differentiation by residential, commercial and industrial classification creates a situation in which consumers of large amounts of electricity are charged less per kWh than consumers of less energy. Conventional wisdom says that it is a detriment to the local economy to burden the business community or local industry with high energy costs; however within existing customer segments there is opportunity for further segmentation to incentivize efficiency. While it is not explicitly within the purview of the State to establish a rate structure that promotes efficiency, it is certainly within the purview of the RCA to allow it.

One successful example is BC Hydro's commercial customer rate structure. The utility evaluates each individual commercial user and creates a picture of their baseline energy use. The rate structure is then set so that if the commercial customer uses more than the baseline amount they pay a higher rate per kWh and if they reduce to a certain level they will pay less per kWh (for all kWhs used). The incentivized rate structure is coupled with financial and programmatic mechanisms that offer commercial customers a clear path to achieve energy savings.

An alternative to the individualized scenario described above is establishing levels at which rates go up or down for classes of customers. For example, a residential user might pay $0.10 per kWh for the first 500 kWh used per month and $0.15 per kWh for the next 500. Commercial users require a more detailed baseline evaluation to ensure that variables like size and type of business are considered.

Alaska is no stranger to this type of rate structure; in more than 180 communities in Alaska the State subsidizes the first 500 kWh per month. These rural residential households use fewer kWh per month despite having, on average, more people per household. There is no reason to think urban energy users would behave in a substantially different way if there were a strong enough disincentive above a certain consumption level.

Recommendations to Provide Incentives

Lead by Example

4. RECOMMENDATION: WRITE AND ENFORCE POLICIES THAT MANDATE ENERGY EFFICIENCY MEASURES IN ALL DEPARTMENTS OF STATE GOVERNMENT, FOCUSING ON PROCUREMENT USING LIFE CYCLE COST ANALYSIS AND PUBLIC BUILDINGS, INCLUDING SCHOOLS

There are several reasons why states engage in energy efficiency and conservation. Energy security and greenhouse gas reduction are primary amongst them. Greenhouse gas (GHG) inventory and target reductions have been established in 40 states. Alaska performed a GHG inventory in 2007 (assessing 2005) with estimates through 2020. Electricity is estimated to contribute 6 percent to total GHG emissions in the state. One of the first and simplest steps a state can take in reducing energy consumption is to reduce government energy use, setting an example for employees and residents. Leading by example is a well-established best practice around the world.

The State of Alaska has articulated a commitment to energy efficiency and has committed significant resources to improving thermal efficiency in residential buildings throughout the state. It has also demonstrated its commitment through good work in improving the efficiency of the buildings it owns. It is meaningful for government officials to practice what they preach and institutionalize efficiency and conservation within their own systems.

A procurement policy requiring that the energy efficient alternative be purchased whenever cost effective could not only save the State money in the long run, but it would send a clear message to the roughly 25,000 residents who work for the State of Alaska. Critical in this policy will be the requirement that all cost analyses use the full life-cycle cost of each product under consideration.

An education tool that has been considered but not yet implemented for public buildings is to display an energy use index. Displaying a building's energy use information is relatively easy and inexpensive once the information is collected. Displays not only remind users to think about the energy being consumed in the building but allow for multiple points of comparison, creating a frame of reference in which to consider energy use information for a large group of people.

Establish Revolving Loan Funds

5. **RECOMMENDATION:** PROVIDE LOW INTEREST REVOLVING LOAN FUNDS FOR PRIVATE COMMERCIAL AND RESIDENTIAL USERS TO DO ELECTRIC ENERGY EFFICIENCY RETROFITS. TIE LOAN FOR COMMERCIAL USERS TO AN ELECTRIC ENERGY AUDIT.

   Private commercial users are an underserved market segment for energy efficiency programs. In theory, there should be adequate market incentives to motivate owners to implement efficiency measures. As more energy service companies (ESCO) enter the market in Alaska, it is likely that the private sector will serve itself. ESCO sales people provide education and outreach, and if the economics make sense, private commercial owners will buy the services they are offering and improve the energy use in their buildings. The State can improve the economics by lowering the cost of money through low interest loans.

   Texas has a revolving loan fund that provides up to $5 million per project for efficiency measures in public facilities. Alaska could structure a similar loan program for private commercial users that would provide some of the additional funds needed to build efficiently or undergo energy retrofits. The loan program would achieve the most benefit by targeting small to medium, private, commercial users who are less likely to have access to capital for loans up to $200,000. Owners of large commercial space can already access cheap money through energy service companies or their own cash on hand.

   For loans to individuals and small to medium commercial users, a list of eligible efficiency measures can create a clear path for consumers and help to ensure energy savings. The list should be developed based on results of the end-use baseline survey currently being conducted through a contract managed by the Alaska Energy Authority. Anecdotally we know that there is pretty good saturation of efficient T-8 lighting in urban commercial space. However, most commercial lighting retrofits, particularly for smaller commercial spaces, are not managed by someone with expertise in lighting efficiency and thus tend to result in less than optimal efficiency. Requiring an efficient lighting consultation prior to lighting upgrades is an example of the level specificity that may be necessary to provide enough information and guidance to help commercial users achieve maximum benefit.

Use Tax Incentives to Promote Efficiency

6. **RECOMMENDATION:** CREATE TAX INCENTIVES FOR EFFICIENCY, INCLUDING CORPORATE TAX BREAKS FOR COMPANIES THAT INVEST IN ENERGY EFFICIENCY AND CONSERVATION MEASURES. ALLOW MUNICIPALITIES TO PROVIDE TAX INCENTIVES THROUGH PROPERTY TAX CREDITS.

   There are not currently any tax incentives designed to promote energy efficiency and conservation in Alaska, but under state tax code it is entirely possible to create them. Municipalities and other local governments can offer property tax credits for both commercial and residential energy efficiency measures, effectively improving the return on investment and shortening the payback period. For example, a municipality could give property tax credits for high performing buildings. The role of the State is to allow local

governments to create these tax incentives. The State can take a direct role by offering a corporate tax credit for implementing efficiency measures. Identifying high performing buildings will be easier once the baseline study currently underway is complete. Though a tax incentive program is not likely to substantially reduce energy consumption, neither does it represent a huge potential revenue loss.

Recommendations to Target Underserved Markets

Power Cost Equalization (PCE) Communities

7. RECOMMENDATION: TARGET OUTREACH EDUCATION AND TECHNICAL ASSISTANCE FOCUSED ON LIGHTING AND APPLIANCES/ELECTRONICS TO HOUSEHOLDS USING MORE THAN 500 KWH/MONTH AND PRIVATE COMMERCIAL FACILITIES IN RURAL ALASKA

Power Cost Equalization has been criticized for removing an efficiency incentive by lowering the cost of electricity through subsidy. However, average energy consumption per household in PCE communities is substantially lower than urban households and prices with subsidies are still higher than urban rates. The PCE program was developed to provide rural equity in spending when the State funded large energy generation capital projects for urban Alaska. PCE is now considered a necessary part of the infrastructure in rural communities where energy prices have continued to increase. Changes to the program that would incentivize efficiency have been suggested over the years, but none has been adopted. Any changes to the PCE program would be extraordinarily difficult to get passed through a legislative process.

Potential PCE program changes:

- Provide PCE-eligible customers with a set amount of money to subsidize energy consumption each month rather than tying the subsidy to use. If an electric customer gets to keep $X per month no matter how much or little energy they use, there is a financial incentive to reduce consumption and increase the amount of money they can retain for other uses.
- The State could invest in energy efficiency measures such as CFLs and efficient appliances in PCE communities to reduce overall consumption, thereby recouping its investment through decreased PCE payments.

When considering CFLs, it is worth noting that the lost heat associated with removing incandescent bulbs may offset some savings from decreasing electricity consumption, while transferring that cost directly to the consumer in the form of increased, unsubsidized, heating bills. Investigating potential savings associated with efficient appliances may be more fruitful in rural places that have high heating costs and well-built housing stock.

Within the context of a community in which PCE subsidies exist, the customers most likely to engage in electric end-use efficiency and conservation are PCE-*in*eligible customers and households that use more than 500 kWh per month (the subsidized level).

Low-Income Urban and Commercial Populations

8. RECOMMENDATION: TARGET OUTREACH EDUCATION AND TECHNICAL ASSISTANCE FOCUSED ON LIGHTING AND APPLIANCES/ELECTRONICS TO LOW-INCOME HOUSEHOLDS AND PRIVATE COMMERCIAL FACILITIES IN URBAN ALASKA COMMUNITIES

Low income urban residents are an underserved market with a natural economic incentive to favor energy efficiency implementation.

Efficient Lighting Programs

Historically, CFL and other efficient lighting programs have been the most cost effective, tried and true energy efficiency measure employed by utility EE programs. Beginning in 2012, the Energy Independence and Security Act (EISA) will raise the minimum energy efficiency standard allowed for incandescent light bulb manufacturers, requiring them to be 30 percent more efficient. This change will eventually decrease the impact of CFL programs because all lighting options will be more efficient. However, there is still considerable electric energy savings potential in lighting programs for a few key reasons: incandescent bulbs will not disappear January 1, 2012, and the U.S. House recently passed an amendment to EISA unfunding the enforcement component of this legislation. Additionally, there is still considerable energy savings potential in promoting highly efficient lighting options, particularly outdoor LED and T8/T6 conversions in the commercial sector.

Urban Alaskans living in Southcentral are poised to see dramatic increases in electricity rates in the next 5 years creating additional pressure on ratepayers and on low-income households in particular. The timing is right to target this population with a message that they can take preventative action to take control of rising utility costs.

Private Commercial Sector Focus

Many states with high energy efficiency savings focus more than half their utility program efforts on the commercial and industrial sectors. In 2011 Vermont increased the portion of its annual EE budget focused on business customers from 66 to 70 percent. Massachusetts spends 72 percent of its EE budget on commercial and industrial, 24 percent on residential and 4 percent on low-income customers. Minnesota spending on commercial and industrial customers is more than three times its spending on residential customers.

Some utilities model EE budgets to match energy consumption by customer type; for instance, if a utility sells 30 percent of its energy to commercial customers, it spends 30 percent of its EE budget targeting those same customers.

Opportunities for electricity savings in the commercial sector can vary substantially by business type but often include lighting retrofits, electronic equipment management, and procurement policies.

Best practices in electric end-use management suggest that commercial sector users respond best to personalized energy savings plans that are tailored to their specific business type. BC Hydro creates an individualized savings plan and associated rate structure for all interested large commercial users and has seen high rates of success.

Identifying Alaska Targets

Identifying appropriate targets within the Alaska energy landscape nearly always leads to increased focus on thermal energy savings. There is less information available about potential savings on the electric side and fewer human resources devoted to addressing electric inefficiency. This lopsidedness is a natural outcome of the cold climate and the disproportionately large burden heating bills represent to Alaska businesses and households.

The Energy Wise program run through RurAL CAP recorded site visits and energy evaluations in 1,016 homes in rural Alaska. The end-use findings related to electricity in these rural communities seem to offer some direction for potential opportunities for savings. Most notably:

- Very few of the homes visited had CFLs installed in *all* of their fixtures. It is worth noting that the heat energy lost in moving from incandescent to CFL bulbs is significant in rural homes where heat energy is expensive and homes are becoming better insulated.
- 37.8 percent of households had more than one freezer and 12.6 percent had three freezers. The average age of freezers in the households was 7.8 years for the first freezer, 13.7 years for the second freezer and 16.3 years for the third freezer. Energy Star recommends that freezers manufactured prior to 1993 (18 years old) be replaced. Energy Star goes on to encourage people who live in communities where energy rates are higher than the national average (which applies to all rural communities in which Energy Wise operates) to consider replacing units manufactured between 1993 and 1999 (12 years old).

Table 2 shows the total system perspective on benefits from an energy efficient lighting initiative over approximately 4 years calculated by subtracting the incremental cost of make-up heat from the avoided cost of electricity per kWh. Table 3 shows a total system perspective on net benefits over a 5- to 15-year horizon for appliance and electric device investment. Tables 2 and 3 notes :

- The subscript “e” denotes electrical energy (as opposed to thermal energy).
- Short term avoided costs are based on fuel savings projections
- The estimated incremental cost of make-up heat from the perspective of a home or business owner is based on the near term price of fuel and average efficiency for the dominant heat source in the market, converted to kWh equiv for comparison purposes with incremental cost of electricity. These estimates are an attempt to characterize median values in the respective

geographic markets and do not necessarily reflect the wide range of individual circumstances that may be present in each market, e.g., substitution of wood heat for fuel oil.

Source: Analyses performed by Mark A. Foster of Mark Foster and Associates

Table 2: Net benefits of EEUE over 4-year lighting initiative horizon

Region	Estimated short-term utility avoided cost of electricity (per kWh)	Incremental cost of make up heat (per KWh_e)	Net system savings (per kWh)	Notes
Rural-Diesel	25 to 50¢	16 to 32¢	+7¢ to +18¢	Net system savings
Rural-Hydro (FDP)	2 to 25¢	10 to 15¢	-8¢ to +10¢	Results sensitive to extent of diesel peaking
Rural-Hydro (SE)	2 to 25¢	10 to 15¢	-8¢ to +10¢	Results sensitive to extent of diesel peaking
Railbelt-ML&P	3¢	3¢	Break even	System savings offset by make-up heat cost
Railbelt-GVEA	11¢	12¢	Break even to slightly negative	System savings offset by make-up heat cost
Railbelt-CEA	6¢	3¢	+3¢	Net system savings
Railbelt-MEA/HEA	6¢	4¢	+2¢	Net system savings

Table 3: Net benefits of EEUE over 5- to 15-year electric device/appliance horizon

Region	Estimated short-term utility avoided cost of electricity (per kWh)	Incremental cost of make up heat (per KWh_e)	Net system savings (per kWh)	Notes
Rural-Diesel	25 to 50¢	16 to 32¢	+7¢ to +18¢	Net system savings
Rural-Hydro (FDP)	2 to 25¢	10 to 15¢	-8¢ to +10¢	Results sensitive to extent of diesel peaking
Rural-Hydro (SE)	2 to 25¢	10 to 15¢	-8¢ to +10¢	Results sensitive to extent of diesel peaking
Railbelt-ML&P	8 to 12¢	6 to 10¢	+2¢	Net system savings
Railbelt-GVEA	4 to 16¢	4 to 14¢	Break even to slightly positive	Results sensitive to trucking ANS NG to Fairbanks
Railbelt-CEA	8 to 12¢	6 to 10¢	+2¢	Net system savings
Railbelt-MEA/HEA	8 to 12¢	6 to 10¢	+2¢	Net system savings

Recommendations to Create A Framework for Lasting Change

Establish an Energy Efficiency Resource Standard (EERS)

9. **RECOMMENDATION:** ESTABLISH AN ENERGY EFFICIENCY RESOURCE STANDARD FOR THE STATE OF ALASKA

In 2010 the state legislature passed Senate Bill 220, the Alaska Sustainable Energy Act, which set a goal of increasing energy efficiency by 15 percent per capita by 2020. At the same time it passed HB 306, the State Energy Policy, which laid out five main goals: 1) establishing a statewide energy policy; 2) establishing a thorough and coordinated approach to supporting energy efficiency and conservation; 3) encouraging economic development in Alaska; 4) supporting energy research, education and workforce development; and 5) coordinating governmental functions to support these actions.

The legislature sent a clear message about energy efficiency and conservation. At the same time it dramatically increased funding to address residential thermal energy use. However, little has been done to address electric energy use. In part, this is the due to the nature of the bills passed; they were clear in setting goals but gave little in the way of guidance on how to get there. AHFC and the Alaska Energy Authority have stepped up their efforts to address energy efficiency through programs that address both thermal and electric, but still the primary focus is thermal energy use.

Establishing an Energy Efficiency Resource Standard (EERS) is a natural next step in moving Alaska toward its stated goal of 15 percent energy reduction through efficiency, as well as addressing goal two of HB 306 to establish a thorough and coordinated approach to supporting energy efficiency and conservation.

It is likely that any effort to implement an EERS will be met with strong resistance, but the benefits to establishing one are clear. It is recommended here because it is a best practice in energy efficiency efforts throughout the country and dovetails with the recently passed legislation. Establishing an EERS for the Railbelt now is also timely as the State is in the midst of a push to develop extremely costly new generation capacity.

The legislature could set an EERS for the State of Alaska with segmentation by region—Railbelt, 4-Dam Pool, and Rural. It could be structured to produce a range of results, such as

a 1.5 percent energy reduction annually to support Alaska's goal of reducing consumption per capita by 15 percent by 2020 through efficiency measures. It is important when establishing EERS not to allow the level to be set too low. Utilities will be inclined to advocate for efficiency standards that can be easily met, when this happens the EERS runs the risk of becoming a ceiling rather than a floor. There are a large variety of programs that can assist in meeting an EERS once it is established.

How an EERS Works

EERS are typically set by the legislature and codified by the utility regulatory body. As of June 2011 EERS have been established in 26 states; of those, only eight were in place prior to 2008. More than half the states in America have energy efficiency resource standards—states with existing, well-established energy efficiency and conservation programs as well as those with virtually none. Creating EERS in states with limited-to-no-experience with electric energy efficiency programs has proven successful in laying the groundwork for efficiency programs and beginning the process of market transformation.

The specific standard and the manner in which it is achieved ranges from very aggressive to relatively conservative. For example, California requires that utilities implement all cost effective energy efficiency measures including supply side measures, demand side management, and efficiencies in distribution systems *before* they are allowed to invest in any new energy generation, including renewable generation. California has a large array of energy efficiency and conservation programs and their regulatory body provides both financial incentives and punitive measures to ensure that utilities work hard to meet aggressive efficiency goals.

Strategies for Success

In summer 2011, the American Council for an Energy Efficient Economy (ACEEE) evaluated both established and "rapid start states[4]" that are successfully meeting their EERS goals.[5] It is worth noting that the utilities reviewed in this report included privately held, investor-owned, local government-owned, and cooperative utilities.

Key strategies from states that are successfully meeting their EERS goals:

- **Increase program funding:** Investment in energy efficiency and conservation programs is an absolute must. Most states with EERS have some form of sustainable funding stream to ensure that programs are funded into the future. A system benefit

[4] A rapid start state is defined as a state that had little to nothing in the way of energy efficiency and conservation programs prior to adoption of an Energy Efficiency Resource Standard.

[5] *Energy Efficiency Resource Standards: State and Utility Strategies for Higher Energy Savings*. Seth Nowak, Martin Kushler, Michael Sciortino, Dan York and Patti White, June 2011 Report Number U113 ACEEE

charge is one common funding mechanism and is discussed further in another section of this report.

- **Establish supportive utility regulatory policies:** This refers to policies like decoupling that allow utilities to stay financially viable under a scenario of decreasing demand.
- **Establish complementary policies to capture non-program savings** including education and outreach, building energy codes, procurement policies, appliance standards etc.
- **Involve stakeholders in collaborative processes for program development and implementation:** In Minnesota EE groups were brought together to focus on four policy barriers and issue areas in an effort to reduce energy consumption through efficiency: behavioral programs, low income, codes and standards, and utility infrastructure improvements. The Alaska Energy Authority's Energy Efficiency Partnership is a local example of efficiency stakeholders working in a collaborative process to move forward a common agenda.
- **Invest in outreach and education**: All states that successfully met their EERS committed significant resources to outreach, education and workforce development programs.

Key strategies utility efficiency program administrators are using to meet resource standards:

- **Identify and prioritize targeted technologies, end-uses and end users:** In Vermont, demand side management (DSM) utility programs are target**e**d to specific decision makers. For example, if public schools are the target, program information is sent to building/facilities managers, not to the accounting department even though they receive the utility bill.

  Surveys can guide program development and measure progress toward goals. The California Commercial end-use survey identifies energy end-use by building and business type so that program managers can effectively target programs by end-use, type of user and building type.
- **Develop programs capable of delivering deep savings first:** Several states have decided to not just pick up the low hanging energy efficiency fruit but to target a portfolio of EE programs to achieve deeper savings from the beginning.
- **Create programs for new and emerging technologies:** The Alaska emerging energy technology fund could be more focused on efficiency. Several other states have efficiency innovation funds and also support university efficiency technology incubators. Alaska's investments in this regard tend to focus more on the renewable generation side than on efficiency.
- **Extend portfolios and programs to reach new and underserved markets:** In Alaska this might be heavy rural users or low income urban users.

- **Take on innovative advertising and promotional approaches and increase incentives to raise customer participation**: Competitions should reward participants (as well as garner attention) by giving away a car or a whole home retrofit instead of power strips or CFLs.

Leading industry experts and program managers agree that if the *funding* and *political will* are there, energy utilities engaged in end-use management will continue to develop, evolve, and extend efficiency programs to meet energy efficiency standards.

Policies to facilitate success:

- **Sustainable funding**: Through systems benefit charge or other similar mechanism.
- **Regulatory mechanisms to address utility motivation:** Industry experts are divided on the most effective financial mechanism to separate volume sales from utility profits. Two common mechanisms are decoupling and shareholder incentives.
- **Rate design (e.g. use more => pay higher rate)**: Typical rate design rewards high energy users with lower rates, most often by differentiating customer classes (residential/commercial/industrial). However, even within a customer class (usually commercial or industrial) there are often lower rates offered to large users. This structure runs counter to incentivizing efficiency and conservation.
- **Leadership and political commitment**: All states that successfully meet their EERS note that leadership is essential. Leaders and politicians must value efficiency as a resource.
- **Include other types of energy policies**: Disclosure of building energy use, labeling equipment and buildings, building energy codes, appliance standards, etc.

Three primary challenges to meeting EERS:

- **Lack of political will**: "The challenges are not technical and economic (in terms of cost-effectiveness). We have measures that can accomplish the savings – and more new ones coming all the time. The question is the level of political support and the willingness to spend the money."[6]
- **Financing that is inconsistent or inadequate**: programs need full, long term funding
- **Shortage of skilled and experienced staff**

Create an Efficiency Utility

10. RECOMMENDATION: CREATE AN INDEPENDENT ENTITY THAT CAN ACT AS AN EFFICIENCY UTILITY, PROVIDING SERVICES TO MEET DEMAND, WORKING WITH BUT NOT FOR EXISTING UTILITY COMPANIES

Consumers demand the services that energy provides. The energy infrastructure is meant to meet this demand and has in some ways lost sight of the product they should be providing. Consumers demand energy services, and utility companies provide kilowatt hours, BTUs of gas and gallons of fuel. Some states have shifted their thinking about the product that the energy industry should be providing and have created energy efficiency utilities to assist traditional utility companies in providing consumers with the services they demand: light, electronics that work when they are needed, appliances that cook food, clean clothes, comfort in their homes and places of work, etc.

An efficiency entity that is independent of generation utilities provides several benefits over integrating efficiency programs into existing utility companies. Most notably it creates a structure in which someone (or some entity) is focused on and accountable for efficiency outcomes. Traditional utility companies are in the business of generation, it is their primary focus - the task they specialize and excel in.

This recommendation is to create an independent energy service company that provides services using efficiency and conservation programs to meet energy demand. The company would be charged with meeting specific levels of service through efficiency programs. The concept of an energy service company that sells only efficiency measures runs counter to the way consumers have been trained to think about energy and about spending. Despite this seemingly significant barrier, efficiency utilities are working well in other places. It is extremely important in considering how to establish a statewide entity charged with providing efficiency services to be certain that the relationship between the traditional utilities and the new entity is one of collaboration and equal power. If the efficiency entity lacks independence and authority they will fail to be effective. Vermont is the leading example of a successful efficiency utility.

Efficiency Vermont

Formed in 1999 by legislative action, Vermont's efficiency utility is one of the oldest and most successful examples of an efficiency utility in the country. Efficiency Vermont is charged with:

- Acquiring maximum, cost-effective, demand-side resources through comprehensive approaches to reducing customer electricity requirements

- Avoiding or deferring capital investments that would otherwise be required to maintain reliability of the electric system, both statewide and in specified target areas.[7]

Efficiency Vermont is funded by an "efficiency charge" on ratepayer electric bills. Prior to 1999 ratepayers were funding energy efficiency programs housed in individual utilities with a similar efficiency charge. All but one traditional electric utility in Vermont has closed their efficiency programs and turned that responsibility over to Efficiency Vermont. Creating one efficiency utility allows for economies of scale, focus on efficiency, depth of expertise and commonality in services provided to consumers statewide. It is important to note that utilities already had existing efficiency programs because Vermont had legislatively mandated least-cost resource acquisition. Efficiency Vermont is essentially charged with meeting these efficiency goals on behalf of the electric utilities in exchange for the funds collected from ratepayers; traditional utilities are purchasing efficiency services from the efficiency utility.

From inception until 2008, Efficiency Vermont operated as a regulated utility under a three year renewable contract with the State of Vermont. This structure was recently updated to allow for more long-term planning and investment. In 2008 legislation was passed instructing utility regulators to appoint an efficiency utility for a 12-year contract period under a modified structure that requires 20-year budget and resource acquisition goals (similar to traditional utilities). Pieces of the original structure considered important to maintain included: performance-based contracts with penalties for failing to meet goals, flexibility in mechanisms employed to meet those goals, independent evaluation of performance, branding of Efficiency Vermont, which belongs to the state and is maintained regardless of contractor. Finally there was recognition that the technical expertise developed in staff was of great value and efforts should be made to maintain continuity in that regard.

There are a numbers of players in Alaska currently promoting energy efficiency programming but all, with the exception of AHFC thermal energy efficiency programs (HER/Wx), are relatively small scale compared to efforts in other states. There is very little in the way of end-use efficiency programs targeting electricity use. Alaska has long suffered from having a large number of small programs operating with limited capacity and failing to collaborate with one another. The benefits of centralizing efficiency services are apparent in Vermont's success; it is likely that those benefits would be even more substantial in Alaska. The following recommendation suggests some mechanisms to pay for an efficiency utility in Alaska.

[7] *Taking the Efficiency Utility Model to the Next Level*, Blair Hamilton, Vermont Energy Investment Corporation, Paper presented at the ACEEE Summer Study on Energy Efficiency in Buildings, Pacific Grove, Calif., Aug. 2008

Ensure Sustainable Funding

11. RECOMMENDATION: PROVIDE CONSISTENT AND SUSTAINABLE FUNDING FOR ELECTRIC ENERGY EFFICIENCY PROGRAMS. STATE LEGISLATURE SHOULD DIRECT RCA TO INCLUDE AN EFFICIENCY CHARGE IN UTILITY RATE STRUCTURE.

There is often strong reaction from utilities to the idea of a system benefits charge, with the most regularly used argument being that rate payers will reject increases in their rates to pay for energy efficiency and conservation programs. However, GVEA funds their efficiency programs through a charge to ratepayers without resistance or complaint. Another example of price flexibility in the electric market is GVEA's popular roll-up program in which bills are rolled up to the nearest dollar with the excess donated to local charity. Other utilities in the railbelt system administer some level of energy efficiency programing, most in the form of information provided to customers on their websites and through mailings. All of these efforts are in some way paid for through a charge to consumers; it isn't called a system benefits charge or an efficiency charge, but it is a cost born by all ratepayers for the benefit of the larger system. While current efforts are commendable they fall considerably short of what is needed to see real change in energy consumption.

If rate payers do not pay for efficiency programs these costs will have to be State funded. There are presently two potential opportunities to negotiate for efficiency program money. The Susitna hydro project is an enormous supply-side subsidy and a case could be made to provide funding for efficiency in meeting some of that same future demand. The oil and gas tax negotiations that are sure to ensue during the next legislative session present another opportunity to negotiate for efficiency funding.

How System Benefits Charges Work

System benefits charges are used to fund energy efficiency and conservation programs in states throughout the U.S. Charges are sometimes based on usage and sometimes a simple flat rate. Mature energy efficiency programs are being delivered at a cost to consumers of roughly 3 cents per kWh with program costs that tend to be stable over time.[8]

Initiation of a system benefits charge is often achieved through legislative mandate. Legislative bodies can also specify an administrator or administrative structure for spending system benefits charge funds. There are three common implementation mechanisms for EE programs funded with a system benefits charge: 1) administration by the utility; 2) administration by an independent government entity or other non-utility entity; and 3) some hybrid version of the first two.

[8] Barriers and Incentives: Enabling Energy Efficiency, Presented to: Coalition for Clean Affordable Energy, October 29, 2007, Wayne Shirley

A system benefits charge provides stable funding for energy efficiency and conservation programs. It dramatically increases the likelihood that those programs will be able to affect change; it diminishes exposure to fuel price increases and volatility, and enhances energy security, GHG emissions and other environmental and financial costs associated with increased power generation.

Connect Outreach, Education and Technical Assistance

12. **RECOMMENDATION:** CREATE A SYSTEM IN WHICH OUTREACH, EDUCATION AND TECHNICAL ASSISTANCE ARE CONNECTED, COMPLIMENTARY AND ATTACHED TO SUSTAINABLE FUNDING

An efficiency outreach and education campaign should be implemented by marketing professionals. Wild-caught Alaska salmon is not marketed by fishermen or a department within state government; it is promoted by a professional marketing firm. A comprehensive and coherent marketing campaign to promote energy efficiency, with clear metrics to measure success, will prove more cost efficient and infinitely more effective than a seemingly cheaper "in-house" effort in the long run.

Energy efficiency campaigns often fail because they do not provide a clear and understandable path for consumers. There is often a disconnect between the message and the desired outcome. People need clearly defined steps to follow, and sometimes they need help. Creating a system that marries outreach and delivery of technical assistance (TA) is one way of overcoming this barrier to efficiency implementation.

Technical Assistance

Many states around the country have found success in funding centralized and accessible technical assistance. There is a large body of research indicating that consumers need more than just information about efficiency measures and their benefits; they need a clear path to completing those measures. This plays out in both the residential and commercial sectors. There are significant electric energy savings to be found in Alaska's private commercial sector and relatively few programs aimed at assisting businesses in realizing those savings.

The idea of putting everything a customer needs in one place is well-tested and proven in mega-stores and malls around the world. One-stop shopping for energy efficiency is currently unavailable in Alaska despite broad consensus among efficiency stakeholders that it is needed. Technical assistance can provide ease in accessing energy audits, financing improvements or purchases, and implementing change. TA provides the clear pathway that customers need in order to do something with the information they have about energy efficiency. State-supported TA can range from simple and highly targeted to comprehensive and universally available.

An example of a highly targeted TA program is Kentucky's Energy Efficiency Program for Schools (KEEPS), which works to reduce energy consumption in 174 school districts across the state. The program establishes and supports education, demonstration and deployment programs that advance efficiency and renewable energy. They provide web-based resources

to schools, regional network coordination, outreach and training, and tracking and reporting logistics, as well as a recognition program.

Recommended campaign components:

- Education about *where* electricity is used in the home - target large energy users (e.g. hot water heaters) and be specific
- Work with vendors to push efficient products

People do not accurately perceive what actions will save the most energy[9]; they overestimate savings associated with actions and conservation and underestimate savings associated with choosing efficient products. Overall curtailment activities like unplugging appliances, driving less, and turning off lights are more highly valued by users than efficient light bulbs, appliances and cars. This suggests there is a lot to be gained from helping people understand more accurately how to save energy.

Some strategies to increase awareness that are low cost and low effort:

- Enhance labeling on utility bills to provide a better explanation of use and comparisons with other similar buildings in the area
- Post building labels showing energy consumption for commercial space (on the building itself) and for residential units online in the MLS residential real estate listings
- Encourage electrical energy audits for homes and commercial units

Appliance Standards

Barriers to widespread saturation of efficient appliances include limited consumer knowledge, cost, panic purchasing when something breaks (EE option not in stock), bundling EE with high-cost bells and whistles (adding to the cost barrier). States can overcome these barriers with minimum efficiency standards for appliances sold within state borders. State standards are sometimes set to Energy Star standards, since those are regularly updated. Other states, like California, use a unique and higher efficiency standard.

Most appliance standards are enforced as part of the building code enforcement division with limited checking at vendor sites. In the absence of site checks, complaints from competing manufacturers also help catch appliances that do not meet standards. California devotes only four full-time staff statewide; in most other places with state appliance standards, enforcement is done by less than one full-time person. This is a low-cost initiative that can have significant and lasting impacts on energy consumption. While EE products are generally more expensive than inefficient options on the market, they are coming down in price, and actually provide dollar savings to the consumer over the life of the product.

[9] Public perceptions of energy consumption and savings – Shahzeen Z. Attari, Michael L. DeKay, Cliff Davidson, and Wandi Bruine de Bruin

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