Alaska Energy Efficiency Program and Policy Recommendations

DRAFT

Final Report to
Cold Climate Housing Research Center
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Alaska Energy Efficiency Program and Policy Recommendations
Interim Report
June 12, 2008

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Introduction

Alaska residents see the cost of energy as a major issue. As utility bills skyrocket, this issue escalates, affecting homeowners, renters, businesses and industry. Legislators are concerned and looking for the best strategy to provide some form of relief to residents.

The Anchorage Chamber of Commerce Southcentral Energy Task Force report *Hope is not a Strategy* describes the impact of increased energy prices on Alaska families:

> "High energy prices have eliminated a great deal of discretionary income for many Alaska families; the situation in rural Alaska is especially troublesome."

One strategy for addressing energy cost stands out: increased energy efficiency. As the Interior Issues Council's Cost of Energy Task Force report, *Fairbanks Energy*, notes:

> "Conservation and efficiency increases are by far the most effective means of reducing cost, reducing emissions and reducing fuel usage. The beauty of increasing efficiency is we can start today."

Numerous studies show that energy efficiency measures can be undertaken at low cost, paying back initial investment in a matter of months or a few years. The high return on investment of energy efficiency is a key reason that major corporations are investing heavily in their own energy conservation measures, for both cost savings and decreased greenhouse gas emissions.

Governor Palin's administrative order establishing the Climate Change sub-Cabinet echoes the emphasis on cost savings and reduced greenhouse gas emissions, calling on the group to develop recommendations on

> " . . . the opportunities to reduce greenhouse gas emissions from Alaska sources, including the expanded use of alternative fuels, energy conservation, energy efficiency, renewable energy, land use management, and transportation planning."

Recognizing the need to take action, the Alaska Housing Finance Corporation (AHFC) and the Alaska Energy Authority (AEA) asked the Cold Climate Housing Research Center (CCHRC) to sponsor a comprehensive review and analysis of the energy efficiency policies and programs in the State of Alaska. CCHRC contracted in December 2007 with Information Insights and its subcontractor, the Rocky Mountain Institute, for this study. The review focuses on programs that address end-use energy consumption in space heating and electrical needs of residential and commercial users. Although the funders recognize the dire energy situation in rural Alaska, primary emphasis of this report is on Railbelt communities, recognizing that there is an existing rural energy plan.[1] The study is not intended to address transportation or industrial energy efficiency opportunities.

[1] Alaska Rural Energy Plan: Initiatives for Improving Energy Efficiency and Reliability – by MAFA in collaboration with Northern Economics
http://www.akenergyauthority.org/AEAdocuments/REPV1ExecutiveSummary.pdf

This interim report summarizes the background of existing energy programs and policies in Alaska, gives an overview of the best programs and policies from outside Alaska, and proposes initial recommendations for state action. The final report in June 2008 will provide complete recommendations, a detailed implementation plan, and statutory and budgetary changes necessary to complete the plan.

Energy in Alaska

Perhaps not surprisingly, Alaska has focused on energy supply, rather than demand. Alaska is an energy giant – a leading energy supplier of oil and gas, the state also has tremendous reserves of coal, and substantial renewable energy resources in hydro, wind, geothermal, biomass and solar energy. But while renewable resources are plentiful, the energy they can produce will be slower to market. Energy efficiency measures can be implemented immediately; they represent the low hanging fruit in the overall plan to create energy sustainability.

Alaska uses significant amounts of energy. In 2005 Alaska used 0.8 percent of total U.S. energy consumption with only 0.2 percent of total population. It is worth noting that the military is a significant user of energy, as are the air freight, and oil and gas industries:

- **Alaska total energy consumption in 2005 = 779 Trillion BTUs**
    - Residential 55.7 Trillion BTUs
    - Commercial 62.4 Trillion BTUs
    - Industrial 417.3 Trillion BTUs
    - Transportation 263.8 Trillion BTUs

The State of Alaska lags somewhat behind other states in energy planning in general, and in policies and programs for energy efficiency in particular. A recent report by the American Council for an Energy Efficient Economy (ACEEE) ranked Alaska 41st on their State Energy Efficiency Scorecard[2]. ACEEE rates states by activity and spending in each of the following eight categories:

- Utility spending on energy efficiency: this measure rates the annual per capita utility spend on energy efficiency programs. To receive half the possible points, or 7.5, a state must have annual spending of $11.25 per person.
- Energy efficiency resource standards (EERS): this measure rates standards that are set by state government and require utilities to meet certain energy savings targets within an established timeframe.
- Combined heat and power (CHP): this measure looks at four state policies that promote combined heat and power. The four policies are standard interconnection rules, presence of an incentive program, inclusion of CHP/waste heat recovery in the state EERS, and output based emissions regulation.
- Building codes: this measure rates the energy efficiency requirements in both residential and commercial building codes.

[2] . State Energy Efficiency Scorecard for 2006" by the American Council for an Energy Efficient Economy, published June 2007 http://www.aceee.org/

- Transportation policies: this measure evaluates states on policy initiatives that encourage transportation efficiency. The specific measures are: California's tailpipe emissions standards, exemplary land use policies, transit funding, and state fleet requirements.
- Appliance standards: this measure is scored on how many appliance efficiency standards have been implemented since 2002.
- Tax incentives: this measure rates the availability of tax incentives for: green commercial, energy efficient new residential, weatherization, efficient equipment and vehicles.
- State lead by example: the criteria for rating state lead by example are: energy efficiency performance criteria (i.e. Energy Star or LEED), new and existing state building energy use targets, energy efficient product procurement, and research and development.

Rank	State	Utility Spending on EE	EE Resource Standards	Combined Heat & Power	Building Codes	Transportation Policies	Appliance Standards	Tax Incentives	State Lead by Example
Possible Points		15	5	5	5	5	3	3	3
41	Alaska	0.0	0	2	2	1	0	0	0.0
21	Montana	5.5	0	0	4	0	0	3	0.5
6	Washington	9.5	3	3	4	4	2	1	0.5
1	Vermont	15.0	5	3	3	4	2	0	1.0
1	California	7.0	5	5	5	5	3	3	3.0

Failing to address the demand side of the energy equation fails to consider the cheapest, cleanest way to meet Alaska's energy needs.

It is important to note that using energy more efficiently does not necessarily mean seeing a decreased level of service. With advances in technology and simple changes in behavior, significant savings can be realized without compromising level of service. Alaskans will continue to need warm rooms, cold freezers and well-lit classrooms. End-use management aims to meet energy demand by looking at opportunities for reducing that demand. The way to reduce energy demand without reducing end-use services is through energy efficiency. Put simply, improving energy efficiency does not mean "freezing in the dark," but providing "hot showers and cold beer" with minimum expenditure of energy.

Energy efficiency and conservation first entered into the larger public consciousness in 1973, propelled by an oil embargo that created an energy crisis in America. Federal energy regulations followed in 1975, 1976 and 1978. When Iran and Iraq ended their

outward conflict and flooded the world market with cheap oil, the light that had been shining on energy efficiency dimmed considerably. The next major piece of federal energy efficiency legislation to move was the National Appliance Energy Conservation Act of 1987, followed by the Clean Air Act in 1990 and the Energy Policy Act of 1992.

The 1992 energy act required public service commissions to "consider" standards that would direct utilities to employ Integrated Resource Planning (IRP). A number of states both considered and implemented standards requiring IRP and from this planning came many of today's end-use management programs. The Regulatory Commission of Alaska (RCA) gave no such mandate.

In Alaska, particularly in northern parts of the state, people are keenly aware of energy efficiency as it relates to home heating. Weatherization programs, started in 1976, have made significant impact and have refined the science of building in cold climates over the last 30 years.

The 1978 Alaska legislature formed an Energy Policy Committee and the 1980 legislature passed an omnibus bill that had significant energy efficiency/energy conservation provisions. The first Alaska-specific energy policy adopted into regulation was the building energy code, Building Energy Efficiency Standard (BEES), introduced in 1985 and finally adopted and implemented January 1, 1992.

BEES certification is required on all residential and community owned buildings financed with Alaska Housing Finance Corporation underwriting, covering more than 40 percent of home mortgages made in the state. Very little has happened at the policy level in Alaska regarding energy efficiency since these early efforts. Today, as we face a new energy crisis, there is an opportunity to implement lasting programs and policies to use energy efficiently and help create a sustainable energy future.

Methodology

This project is being conducted in two phases, as detailed below:

Phase I tasks:

Literature review: Alaska energy programs
Information Insights conducted a literature review and market inventory of energy efficiency programs currently operating in Alaska. In addition to presently funded programs, staff reviewed past efforts that are no longer funded.

Key informant interviews: Alaska energy programs
Following a literature review and market inventory Information Insights staff gathered additional information through key informant interviews with energy program staff and representatives. A list of all key informants will be provided in the bibliography of the final report. These interviews provided an in-depth history of efficiency projects in the state as well as expert perspective on the reasons for the success and failure of different efforts.

Literature review: best practices
Information Insights conducted a literature review of best practices from around the United States, Canada and other northern countries. Many states and provinces have been involved in energy efficiency and end-use management and there is much that can be learned from their experience. The Rocky Mountain Institute, a leading U.S. energy policy think-tank, guided Information Insights staff in identifying best practices that could be easily adapted to fit Alaska.

Energy efficiency work session
On January 16, 2008 Information Insights and the Rocky Mountain Institute hosted a two-day work session at the Alaska Housing Finance Corporation. More than 30 energy professionals from Anchorage and Fairbanks participated, drawing on combined experience of more than 350 years of energy work in Alaska. These stakeholders offered their collective wisdom in developing and prioritizing recommendations.

One outcome of the work session was a clear understanding of the importance of evaluation and measurement in demonstrating the success of end-use programs and policies.

Data collection and cleaning
There is limited data on end-use energy consumption in Alaska. Information Insights staff collected data from a variety of places; major sources include:

- Local/state - the Alaska Energy Authority, the Alaska Housing Finance Corporation, the State of Alaska, the Municipality of Anchorage, Regulatory Commission of Alaska, Institute of Social and Economic Research, and area utility generators and distributors
- National/international - the Department of Energy, U.S. Census Bureau, Oregon Trust, California Department of Energy, the American Council for an Energy Efficient Economy, Energy Star and the Canadian Office of Energy Efficiency

Development of interim recommendations
The project team evaluated possible recommendations based, when appropriate, on:

- Return On Investment (ROI) –Estimated over the life of the energy conservation measure. Where there is no defined life, a ten-year time horizon is used. Calculations assume three percent interest rate.
- Benefit Cost Analysis (B/C) – Assumptions: three percent fixed rate interest rate, estimated over the life of the energy conservation measure or ten years.
- Carbon Reduction – Carbon reduction was not assigned a dollar value for the purposes of initial evaluation of benefit/cost but is considered on its own merit.
- Present Value of Savings (PVS) – Estimated over the life of the energy conservation measures. Where there is no defined life, a ten-year time horizon is used. Calculations assume three percent interest rate and utilize market rates for energy.
- Ease of Implementation – Determined in large part by whether or not there is an existing infrastructure. The infrastructure necessary for a program to move forward can include: regulatory approval, funding mechanism, and established delivery method – (an organization that already does this kind of work). If there is a clear path to implementation, success is more likely. Finally, the level of public interest in and support for the policy or program affects ease of implementation.

Where Alaska specific data was available, we used it. Where it was not, we used regional climate zone 1 data. The Energy Information Administration gives the following explanation for climate zones. "...climate zones are groups of climate divisions, as defined by the National Oceanic and Atmospheric Administration (NOAA), which are regions within a state that are as climatically homogeneous as possible.

Alaska specific ranges for heating degree days are utilized:

- Southeast – 7,000 to 9,500
- Southcentral – 9,000 to 11,000
- Interior – 13,000 to 14,500
- North Slope and North West – 16,000 to 20,000

Interim Recommendations

The interim report, delivered in February 2008, incorporated research, analysis and the results of the January 16, 2008 Energy Efficiency work session. It presented a set of recommendations, policies and programs, highlighting those ready for adoption in the 2008 legislative session.

Final Report
This final report incorporates the Phase I research with information gathered in meetings with CCHRC, AHFC and AEA, and is updated to incorporate the actions of the 2008 legislative session. Implementation specifics will include budget, any necessary regulatory changes, changes to local codes and ordinances, responsible parties, and timelines.

Summary of Costs and Benefits

The tables below summarize three distinct types of recommendations: State programs and initiatives, state programs with immediate measurable returns and state goals. The grand total presented at the bottom reflects estimated costs and benefits associated with ALL recommendations. Estimates are made with imperfect data and further analysis of recommendations will likely lead to some adjustments in both costs and benefits.

	Program	Implementing cost – one time cost	Implementing cost – annual cost	Notes
State programs and initiatives	Establish Baseline Data	$ 225,000		Sunk cost necessary to evaluate effectiveness of programs and policies.
	Public Outreach Campaign		$ 500,000	Long term measurement of benefits is possible but costly.
	Energy Training and Certification Program	$150,000		This cost could be absorbed into estimates for cost of weatherization but was left separate because it is a workforce development issue.
	Energy audits households over 100 percent median income		$500,000	Benefits depend on the percentage of homeowners who choose to implement energy conservation measures as well as on the measures they choose.
	Residential building inspection and Quality Assurance		$210,000	Costs associated with this program can be absorbed in property transaction fees. Data is not available to measure benefits.
	Subsidize commercial energy audits		$80,000	Benefits depend on the percentage of commercial properties that choose to implement energy conservation measures as well as on the measures they choose.
	K-12 Institutional Conservation Program		$2,000,000	Benefit cost ratios for school districts that have received energy conservation grants vary too widely (between 1 and 27) to project savings. It is however, safe to say that all approved measures will be cost effective
	Subtotal	$375,000	$3,790,000	

	Program	Implementing cost - one time cost	Implementing cost - annual cost	Electricity saved (kWh)	Space heating saved (Mbtu)	[3]PV energy cost savings	Carbon reduction (tons)	Ben /cost ratio	Notes
State Programs with immediate measurable returns	K-12 Energy Audit and Education Program	$1,738,000	$234,500	18,418,602		$2,364,948	12,350	1.36	10% reduction in electric cons.
	Smart Meters	$ 1,875,000		2,664,000/yr		$7,832,610 /5 yrs	8,798 / 5 yrs	4.18	
	Building Code	$100,000				$123,000	1,750	1.23	Change from 4 star plus to 5 star, 1,000 houses/year
	Low Income Weatherization	$686,100,000				$796,296,923	786,648	1.58	45,000 Houses
	Relamping state facilities	$ 6,564,975		33,536,455		$36,931,994	56,343	5.63	44% kWh reduction
	Subtotal							1.70	one year
State goals [4]	State Facilities	-	-	21,024,316	79,267,986		23,637		Per year
	UA Buildings	-	-	9,650,149	48,956,854		12,388		Per year
	State Energy Star Procurement Policy	-	-	782,742	5,341,431	$322,626	569	34.2	kWh per year, PV over 5 years
	Grand Total	**$706,655,950**	**$234,500**	**86,076,264**	**133,566,271**	**$843,872,101**	**902,483**	**1.59**	

[3] The present value of energy cost savings is a moving target based on energy prices in a given region at a given point in time.
[4] Costs associated with achieving a 20 percent reduction in energy consumption in state facilities will be determined on a facility by facility basis. The methods we recommend to achieve the goal are outlined in greater detail in the body of the report.

Recommendations

Circumstances present Alaska with a challenge – and a unique opportunity in 2008. Higher energy prices cost residents more for heating and electricity, while the state coffers grow with oil taxes and royalties.

A downturn in the housing market appears likely to make a lean summer for Alaska's homebuilders. The situation presents an opportunity to use state funding to spur home and commercial energy efficiency improvements.

As described in the introduction, efficiency improvements start paying back immediately and provide long-term cost savings. They also reduce greenhouse gas emissions, mitigating Alaska's impact on the climate.

A wide variety of actions can impact Alaska's energy use. For purposes of this interim report, we have focused on those that:

- The State of Alaska can influence through incentives or requirements
- Provide cost savings to Alaska residents and businesses
- Have experienced measurable results in Alaska or elsewhere
- Provide a financial return on investment

Our recommendations are broken out into nine categories:

- State Leadership
- Funding Energy Efficiency
- Public Education and Outreach
- Baseline Data
- Existing Residential Buildings
- New Residential Construction
- Existing Commercial Buildings
- New Commercial Construction
- Public Buildings.

Within each of these categories, we recommend actions that can be taken in 2008; many require a long-term commitment in order to achieve the best results.

State Leadership

1. The Governor should articulate an energy efficiency vision for Alaska.

2. The Governor should designate a sub-cabinet for State end-use efficiency programs.

Funding Energy Efficiency

3. The state should fund energy efficiency programs through legislative appropriation.

4. The RCA should implement a System Benefit Charge to support end-use efficiency programs, or

5. The state should capitalize an end-use efficiency endowment to support end-use efficiency programs.

6. The state should offer matching grants to local governments interested in creating a local energy plan that incorporates energy efficiency and conservation.

Public Education and Outreach

7. The Legislature should fund a comprehensive public awareness campaign with at least $1,000,000 per year.

Baseline Data

8. The Alaska Housing Finance Corporation and Alaska Energy Authority should conduct an end-use survey of residential and commercial energy consumers.

9. The Alaska Energy Authority should establish and report an Energy Use Index (EUI) for all public buildings.

Existing Residential Buildings

10. The Legislature should significantly increase funding for Low-Income Weatherization.

11. AHFC should create a certification and training program for energy retrofit and energy efficient new construction.

11. AHFC should subsidize up to 100 percent of costs for home energy audits for households not eligible for low-income weatherization, and offer low-interest loans for energy conservation improvements.

12. The Legislature should fund a pilot Smart Meter program through AHFC/AEA.

New Residential Construction

13. The Legislature should adopt BEES as the new state residential energy efficiency building code.

14. The State Division of Corporations, Businesses, and Professional Licensing should enforce regulations on building codes and contractor licensing to ensure quality and energy efficiency.

Existing Commercial Buildings

15. The AEA should subsidize energy audits for commercial facilities and offer loans for energy efficiency improvements.

16. The RCA should require utilities to implement Pay As You Save loan programs.

New Commercial Construction

17. AEA should contract for a stakeholder process to develop a commercial energy efficiency building code.

Public Buildings

18. The Governor should direct each state agency to reduce energy consumption in its facilities by 20 percent from 2000 levels by 2020.

19. The Board of Regents should direct the university to reduce energy consumption in its facilities by 20 percent from 2000 levels by 2020.

20. The Legislature should fund an energy audit for every school in the state.

22. The state should fund AEA to revive the Institutional Conservation Program to offer public K-12 schools energy conservation matching grants.

22. The Alaska Energy Authority should establish a low- interest loan program for public facilities to make energy efficiency improvements, with payments geared to projected savings.

State Leadership

1. The Governor should articulate an energy efficiency vision for Alaska.

Alaska's route to energy efficiency must begin with a clear vision communicated by the state leadership. The Governor has partially addressed the issue in her Administrative Order 238, establishing the Climate Change sub-Cabinet. That group will develop recommendations for:

> "...the opportunities to reduce greenhouse gas emissions from Alaska sources, including the expanded use of alternative fuels, energy conservation, energy efficiency, renewable energy, land use management, and transportation planning; and
>
> "...the opportunities to reduce greenhouse gas emissions from the operations of Alaska state government."[5]

Other states' governors have been more explicit about energy efficiency goals. California Governor Arnold Schwarzenegger, for example, set a goal for California of reducing energy consumption in buildings 20 percent by 2015 from 2003 levels. Far from stopping there, California has an overall goal of reducing greenhouse gas emissions by 80 percent from 1990 levels by 2050.

We recommend Governor Palin adopt similar goals, expressed in clearly measurable terms, such as:

- Alaska shall have a policy to reduce energy consumption in buildings 20 percent by 2020 from 2000 levels.
- The State of Alaska and its political subdivisions shall set an example by reducing energy consumption in state-owned facilities by the same amount – reducing consumption 20 percent by 2020 from 2000 levels.
- The State of Alaska shall implement energy conservation measures wherever they are cost-effective – in facilities, purchasing, transportation, etc.

The political climate is ripe for leadership in energy conservation. Citizens of the state face an uncertain economic future and rising utility costs; people are looking for relief and the state can provide a path to reduced monthly bills and long-term energy security.

2. The Governor should designate a sub-cabinet for State end-use efficiency programs.

It is important to maintain a distinction between energy supply-side planning and energy demand-side planning. Too often they are lumped together and the supply side becomes dominant. Even though energy efficiency efforts usually bring significant cost savings, with a lack of focus on these demand side efforts, little action occurs.

[5] Governor Sarah Palin's Administrative Order #238, sections 10 and 12.

Alaska's existing energy efficiency policies and programs are spread through a variety of state entities, as shown in the report appendices listing the statutory and regulatory basis of existing programs. The most significant roles include:

- AHFC – The Alaska Housing Finance Corporation has a broad range of residential housing energy efficiency programs and services, including low-income weatherization, energy efficient home mortgages, outreach and education.
- AEA – Alaska Energy Authority can issue bonds for energy conservation projects, provides energy efficiency technical assistance and is funding a variety of end use efficiency projects in villages, focusing on public facilities.
- DEC – The Department of Environmental Conservation has statutory responsibility for thermal and lighting efficiency standards and for training public building maintenance officials.
- DOT/PF – The Department of Transportation and Public Facilities is responsible for capital construction and maintenance of state facilities, and has statutory responsibility for energy conservation programs in state facilities.
- OMB – The Governor's Office of Management and Budget reviews and approves state agency budget submittals, and prepares the Governor's budget request for all programs, including energy efficiency programs.
- RCA – The Regulatory Commission of Alaska regulates electric utilities and authorizes spending for utility energy efficiency programs.
- UA – The University of Alaska Board of Regents is responsible for university capital construction and facility maintenance.

With efforts spread through state government, it is easy to lose focus on the overall state effort. We recommend the Governor designate a sub-cabinet for state end use efficiency programs in order to achieve the recommended goals. We see the sub-cabinet in a coordinating and coaching role, and not necessarily as the implementer of state energy efficiency policies.

The sub-cabinet on energy efficiency should include representatives of AHFC, AEA, DOT/PF, DOLWD the Regulatory Commission of Alaska (RCA) and the University of Alaska, and should be charged with developing coordinated approaches toward meeting the Governor's goals, promoting and coordinating cost-saving energy efficiency measures in state agencies, developing common performance measures for accountability, and developing policy, program and budget proposals. The energy efficiency sub-cabinet should coordinate closely with the Governor's sub-cabinet on climate change.

Funding Energy Efficiency Programs

It is easy to see similarities between the political and economic climate now and in the early 1980s. That was the last time the state made significant headway in energy conservation. Then, like now, state coffers are flush with cash resulting from high fuel prices. Last time, there was generally no long-term financing method attached to legislated programs and policies, resulting in many unfunded mandates and short-lived programs.

3. The state should fund energy efficiency programs through legislative appropriation.

The 2008 building season provides an opportunity to jump-start energy efficiency programs in Alaska. While we advocate a long-term funding source in recommendation 4, below, that approach does not provide funding to take advantage of the immediate opportunity – or the immediate need for energy efficiency relief for Alaska residents.

We therefore recommend legislative funding of the energy efficiency programs as shown in the budget section above. Current state funding is inadequate for energy efficiency programs; the only way by which significant progress can be made is through an infusion of state funds. The housing programs can be paid for with portions of the AHFC dividend, but other programs will need general fund appropriation, or funds borrowed by AHFC and AEA for the recommended loan programs.

In the long term, the System Benefit Charge and bond funds from AHFC and AEA can address most of the recommendations, but state funding is appropriate and will be required for certain energy efficiency projects as noted in the budget.

The options outlined in the next two recommendations are means through which certain energy efficiency programs might be funded in Alaska indefinitely.

Creating and implementing energy efficiency programs and policies is not a short-term project, just as high energy prices are not a short-term problem.

4. The RCA should implement a System Benefit Charge to support end-use efficiency programs, or

Twenty-seven states in the U.S. and three provinces, representing more than one-third of Canada's population, spent roughly $2.6 billion in energy-efficiency programming in 2006. Implementation of a system benefit charge raised the great majority of this money. The two other most common sources of funds are: procurement funding where utilities apply to the state for funding to support their efficiency programs as part of Integrated Resource Planning; and Cap and Trade – a method by which polluters pay for the right to produce emissions.

Utilities in Alaska are significantly under-investing in end-use efficiency programs compared to national norms. Only Alabama, Oklahoma, Arkansas, Louisiana and Maryland utilities spend less per capita. Montana utilities spend nearly 54 times as much

per person on end-use efficiency programs as Alaska utilities, $8.63 versus $0.16 respectively. [6]

Energy Efficiency Spending – Select States

State	2004 Total Spending ($000)	Per Capita Spending	Ranking by Spending Per Capita	Score
Alaska	103	0.16	40	0.0
Montana	8,002	8.63	14	5.5
Washington	88,522	14.26	5	9.5
Vermont	14,000	22.54	1	15.0
California	380,009	10.68	10	7.0

The Regulatory Commission of Alaska (RCA) should exercise its authority to implement a system benefit charge of $0.002 per kWh for residential, commercial and industrial users with a set cap for industrial users. This is the option we prefer over the legislative funding approach listed below. It would generate approximately $3.2 million for energy efficiency programs through charges only to residential users, but that could rise to more than $12 million per year if the charge applied to all users.

Benefits:

- Long term and consistent funding source
- Low cost per ratepayer, averaging $1 per month for residential users, $2 for small commercial
- Not dependent on price of oil
- Dedicated resource
- Increases with use, both moving with population and reinforcing the idea that increased use increases cost

Challenges:

- Alaska utilities have historically operated in a weak regulatory environment; it is unlikely the RCA will exercise its authority to implement a systems benefit charge without a mandate from the Governor or from the Legislature.

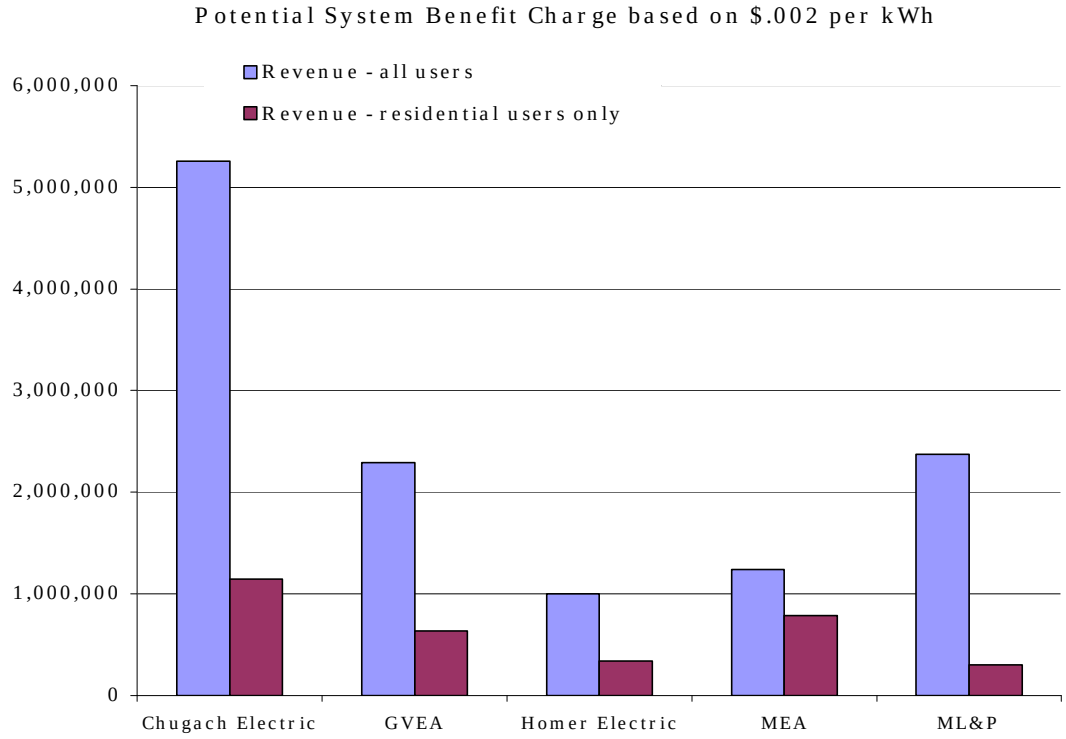
In 2003, the Alaska Governor's Energy Advisor prepared an interim report on energy policy and strategy. The report notes "Energy conservation must be encouraged for all Alaskans." The recommendation at the time was for a public benefits program within energy utilities to create incentives to reduce energy consumption. This is essentially a System Benefit Charge with program implementation responsibilities placed with utilities.

Policy makers of all political stripes have been trying for years to get a System Benefit Charge in Alaska. Resistance from utility companies is usually attributed to a desire not to put any additional charges onto customer bills. Golden Valley Electric Association

[6] State Energy Scorecard for 2007

(GVEA) staff and board noticed little, if any, public disapproval from the additional charge to cover energy efficiency programs[7].

The charts below demonstrate potential income from a system benefit charge of $0.002 per kWh. The potential growth revenue from a system benefit charge can be tied to projected population and electricity consumption in the Railbelt.



5. The state should capitalize an end-use efficiency endowment to support end-use efficiency programs.

The state could capitalize an endowment with $200 million, with a five percent annual payout. Such an endowment would provide approximately the same amount of funding as the Systems Benefit Charge listed above. We believe the Systems Benefit Charge is the preferable option, but the current state budget surplus provides an opportunity to consider the endowment approach.

Benefits:

- Long term and consistent funding source
- Committed money

[7] GVEA Energy Specialist Todd Hoener

Public Education and Outreach

6. The Legislature should fund a comprehensive public awareness campaign with at least $1,000,000 per year.

Every end-use management and energy efficiency program researched by Information Insights staff for this study included public education and awareness as an important component of the overall effort. Every key informant interviewed for the project also stressed the importance of including public education and awareness.

We recommend a campaign modeled after successful public awareness efforts, such as: seatbelt use for children and adults; fire alarms in every home; tobacco control; and dangers of drinking while pregnant. Lessons learned from these campaigns indicate that to be successful a campaign must:

- Be sustained
- Be truthful
- Deliver the message through a variety of media
- Focus on what people care about—in the case of energy efficiency, this means cost and impacts of inaction

The public awareness campaign needs to recognize the different needs and approaches for differing segments of the Alaska public, encouraging lower income residents to apply for low-income weatherization, while higher income residents can use the new rebate program, low interest loan options, or fund energy efficiency improvements themselves.

We recommend that this campaign ramp up in subsequent years to $800,000 annually, funded by the System Benefit Charge, earnings from the energy efficiency endowment, or by legislative appropriation.

$800,000 per year

- Workshops for commercial and residential
- Public speakers
- Media campaign – radio, TV, print
- Labeling buildings with energy information – commercial and residential

$200,000 per year

- Outreach

Collect Baseline Data

Cost of Recommendations:
Year one = $225,000. Cost over 10 years including year one = $425,000.

The most recent comprehensive survey of energy end-use in the Railbelt was conducted two decades ago in 1988. Both energy efficiency technology and awareness have progressed considerably in that time. Understanding how people use energy will help policy makers and program managers better target their efforts. The European Union residential end-use survey found the majority of household electricity consumption came from lighting and six basic appliances; all end-use efficiency actions were targeted to those uses. While in Europe 29 percent of household electricity consumption goes to lighting[8], in the United States the breakdown of residential energy consumptions looks quite different:[9]

- 49 % Heating/air conditioning
- 13 % Water heater
- 10 % Lighting
- 8 % Other
- 7 % Electronics
- 6 % Clothes washer and dryer
- 5 % Refrigerator
- 2 % Dishwasher

More significantly, energy conservation program and policy effectiveness cannot be measured without establishing a current baseline. Collecting baseline data is the first step in launching a meaningful energy efficiency program. Energy users and policy makers will be encouraged if they have evidence that energy efficiency measures are working and will have the opportunity to change course if they are not.

The passage of a significant boost to low-income weatherization programs and the creation of the home energy rebate program by the 2008 legislature presents an opportunity to improve the understanding of these programs' effects. A portion of AHFC's baseline data collection should include a survey of homes that have been weatherized, measuring energy use to determine the reliability of estimates and actual results achieved. AEA should determine an effective method to gather energy savings data for commercial and industrial users.

[8] European Commission Joint Research Centre http://ec.europa.eu/dgs/jrc/index.cfm
[9] US Department of Energy Office of Energy Efficiency and Renewable Energy http://www.eere.energy.gov/

7. The Alaska Housing Finance Corporation and Alaska Energy Authority should conduct an end-use survey of residential and commercial energy consumers.

AHFC and AEA should conduct a household survey to collect information about energy end-use and user behavior. Overall analysis should include survey data, AKWarm[10] data and utility data. The purpose of an end-use survey is to determine the specifics of residential energy consumption – how many people use electric hot water heaters versus gas; average age of refrigerators and industrial walk-in freezers in Alaska; the number of people and businesses that have switched to efficient lighting; and so on.

Baselines should be established by facility type and type of user.

- Quantify current energy use by
    - Residential – per household and type of user, i.e. multi-family versus single family
    - Commercial/public – square footage and type of user, i.e. hours per year of facility use; number of daily users

AHFC and AEA need to establish mechanisms for updating energy user data on an annual or biennial basis. Costs associated with these recommendations should be included in overall program administration.

The effect on homeowners and business owners of the recent run-up in energy prices (and in Juneau, the effect of temporary electrical transmission problems), has resulted in a variety of responses by state and local policy-makers. Additional information on end uses, updated periodically, would assist state and local policy-makers in choosing among policy options.

8. The Alaska Energy Authority should establish and report an Energy Use Index (EUI) for all public buildings.

The AEA should establish an energy use index for all public buildings, employing user and utility information. AEA should act as clearinghouse for EUIs, collecting and standardizing end-use information specific to Alaska. Energy use is usually then reported out in relation to square footage, type and hours of use, number of users, etc.

The Oregon Energy Trust has developed a simple and easy-to-use tool utilized by public schools in Oregon and Northern California based on the following ideas.

- A simple EUI can be established with 12 months energy use data (utility bills) and basic information about buildings use
- EUIs will help guide energy efficiency program funding to the highest users
- The EUI will serve the function of supplying basic baseline energy use information for public facilities

[10] AKWarm database housed at AHFC includes energy ratings on more than 25,000 households in Alaska. Information on energy used for home heating can be found for homes in parts of state the fuel source used for home heating is not used for other purposes.

We recommend the state contract for coordination and consolidation of EUI data; an estimated one-time cost of $50,000 would cover this effort. Set-up for such an endeavor would include choosing or developing a data gathering tool; working with Alaska DOT/PF to identify the contact person at each facility; contact and assistance to collect information; and consolidation of data. The state could choose to keep this project in-house but it is unlikely that costs would be reduced, they would just be less apparent.

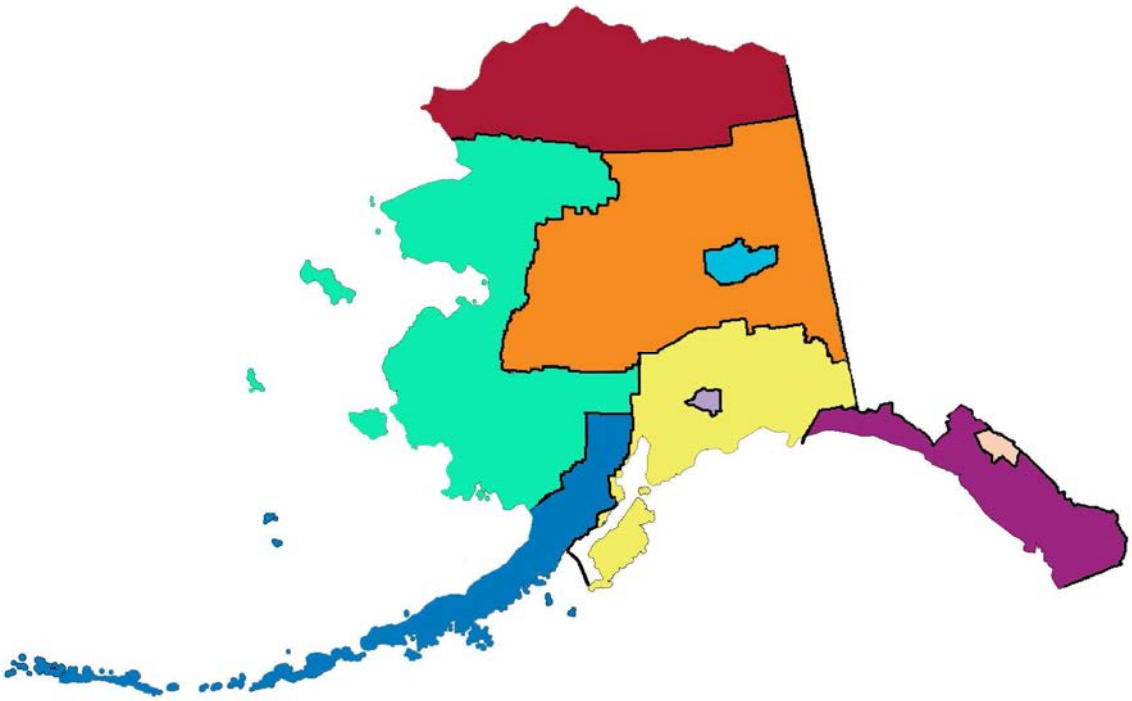
Existing Residential Buildings

High energy prices impact existing homeowner energy bills, while increasing state general fund revenues. This combination of circumstances argues for a special effort in 2008 to create new programs for residential energy efficiency – and expand existing ones – to help Alaska residents reduce energy bills, and to help Alaska's builders and their construction workers weather the market downturn.

In 2005 the estimated statewide housing stock was 278,118 units. These units represent a broad range in both quality and age. More than half of the housing stock statewide is more than 21 years old. According the 2005 Statewide Housing Needs Assessment survey of households, there are an estimated 20,741 units in need of major repair in 2005. Survey findings included:

- Of the more than 1,500 survey respondents, roughly 7.5 percent, indicated their housing was in need of repair that they were unable to make.
- Five percent of people who live in homes with 300 square feet per resident or fewer also report living in a dwelling that is falling apart and in need of replacement.
- Sixty-eight percent of households with less than $10,000 annual income report having homes that are drafty.

AHFC Weatherization Regions

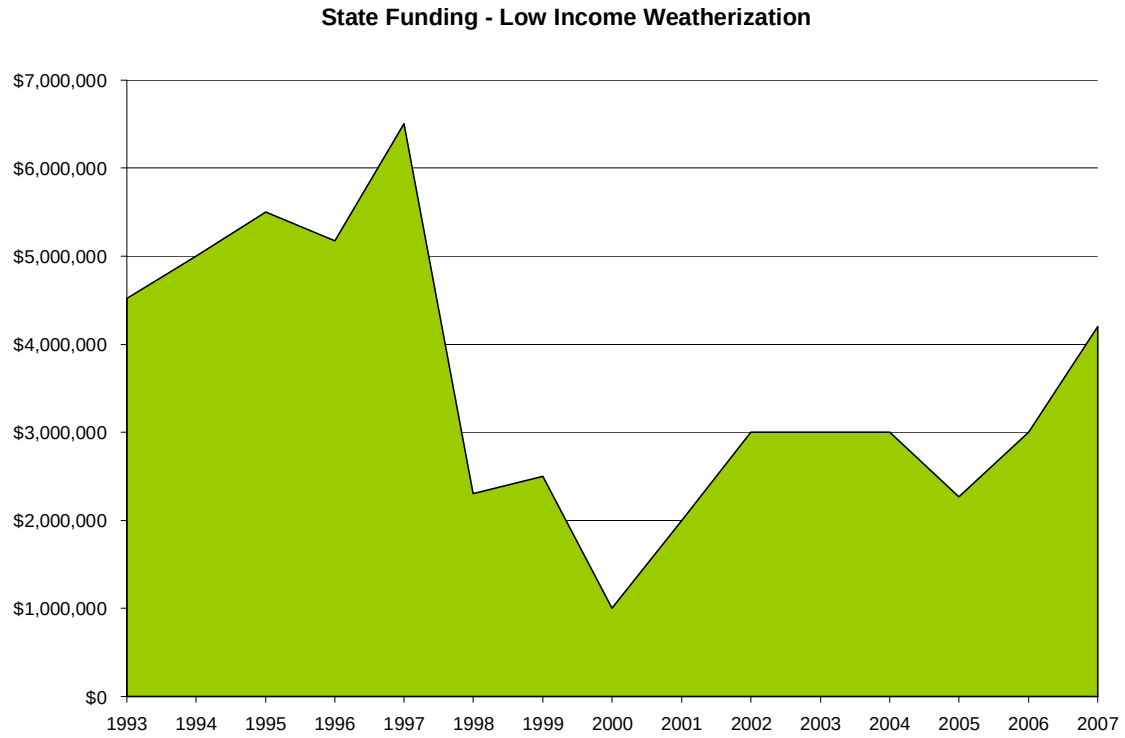


In addition to variability in condition and age of housing stock the climate in Alaska plays a significant role in home heating. The mean heating degree days for Anchorage from 1991 to 2000 was 10,470 while in Fairbanks it was nearly 14,000 for the same period. Factors such as temperature and wind are factored into the estimates of annual savings for weatherization energy conservation measures.

9. The Legislature should significantly increase funding for Low-Income Weatherization.

The low-income weatherization program was created in the 1970s in response to the energy crisis of the day. The program offers weatherization services to eligible low-income households in Alaska. In 2007 just over 600 homes received weatherization services and more than 500 were waitlisted. According to the 2005 Alaska Housing Assessment there are more than 45,000 eligible homes throughout the state with an estimated 24,445 low-income households unable to maintain a comfortable room temperature. Those 24,445 homes should be the highest priority for low-income weatherization, but it is likely that all 45,000 would see net energy savings benefits from the program.

State funding of weatherization has increased since 2000 but has a long history of significant changes in funding from year to year. The graph below illustrates the volatile nature of state funding for weatherization programs.



Current funding allocated for each home is $6,000 for urban homes and $15,000 for rural home. Allocations per home have been held down for several years and are no longer sufficient. Due to funding limitations the number of homes served has decreased and those homes receiving services are not provided with all cost effective measures. AHFC

weatherization staff recommends a rate of $10,000 per urban home and $25,000 per rural home. This new funding level recognizes erosion to services that have resulted from the increased cost of labor and materials not being met with an increase in funding.

The budget for weatherization until this year was $6.4 million, annually, including both state and federal funding. Addressing the needs of all 45,000 eligible homes would cost $486 million, in addition to this year's $200 million capital appropriation. Weatherizing two-thirds of the homes to get an average 20 percent energy reduction would cost $257 million, including the current appropriation.

Low income weatherization annual budget breakdown

	Distribution of homes	Number of homes	Cost per home	Cost for all eligible homes
Urban	65 %	29,250	$10,000	$292.5 million
Rural	35 %	15,750	$25,000	$393.6 million
TOTAL	**100 %**	**45,000**		**$686.1 million**
New $				**$486.1 million**

According to a 2006 study conducted by the Oak Ridge National Laboratory (ORNL) the average natural gas heated house that participates in the low income weatherization program sees a 32.3 percent decrease in energy consumption for space heating.

Recent legislation has increased the income limit for participation in the low income weatherization program to 100 percent of median household income, making eligible tens of thousands of additional households. Increasing income limits brings services to a population of people who are traditionally ineligible for services but often lack the financial capacity to pay for household efficiency improvements themselves.

The interim report that was presented prior to the passage of this legislation argued for increasing the limit to 80 percent of median household income. Households earning 60 to 80 percent of median income - $35,636 to $47,514 in 2006 dollars – are often not able to save the money necessary to pay for home weatherization themselves. Approximately 26,454 households in Alaska have incomes at 60 to 80 percent of median income. Weatherizing these homes would cost just over $400 million; weatherizing two-thirds would cost $267 million.

However monies are ultimately distributed we recommend that priority be given to lower income households who are as yet, underserved by current weatherization programs and have the greatest need for financial relief.

Data from the low-income weatherization program stored in the AKWarm database was used to develop the table below, showing historic costs and savings of weatherization efforts statewide and regionally.

Historic average costs and annual savings per house
low income weatherization program

Region	Install cost	Savings annual	Present value of savings	B/C[11]	Energy rating points	CO2 reduction (lbs)	Rating Point increase
Statewide	**$6,518**	**$526**	**$7,565**	**1.58**	**77.48**	**34,962**	**15.0**
Southcentral	$7,777	$427	$6,270	1.07	82.96	34,280	14.1
Interior	$4,303	$518	$6,838	2.00	72.55	49,458	12.5
Four Dam Pool	$3,274	$356	$5,280	1.91	65.05	21,822	18.7
Other AK	$6,910	$696	$10,700	2.00	73.52	23,245	17.7

Notes on Quantitative Analysis
There have been no controlled experiments to determine the savings received from incremental versus comprehensive weatherization services. Energy savings estimates are based on an average of homes that received a wide variety of services, from simple caulking to comprehensive heating system and insulation retrofits.

AHFC maintains the AKWarm database with more than 25,000 records of homes that have received energy audits. Several thousand of these homes are recipients of low-income weatherization program services.

The AKWarm software takes household information entered by an energy auditor and estimates the most cost effective energy conservation measure. The software then estimates energy consumption for the house before and after applying the measure; this function is repeated until several energy conservation measures are included for each house. The AKWarm database offers invaluable and plentiful data on actual houses in Alaska; the software also offers a model by which to estimate potential savings. Unfortunately there are few "actual" data points taken after weatherization services have been provided to measure real reductions in energy use.

Ease of Implementation
AHFC already has contracts with existing weatherization programs statewide:

- Municipality of Anchorage serves the Municipality of Anchorage.
- Interior Weatherization serves Fairbanks North Star Borough and the road system south to Cantwell and east to Delta junction.
- Tanana Chiefs Conference serves interior Alaska.

[11] The benefit cost ratio is the present value of all benefits from a project divided by cost of implementing the program. In benefit cost analysis values should be estimated for all impacts (costs and benefits) future and present.

- Alaska Community Development Corporation serves the Matanuska-Susitna Borough, Kenai Peninsula Borough, Copper River Valley, Southeast Alaska (except Juneau), Prince William Sound and Aleutians.
- RurAL CAP serves western Alaska, northern Alaska and Juneau.

The biggest challenge to implementation is lack of skilled workers. CCHRC estimates a need for 30 or more additional qualified energy raters, and for a concerted effort to train-up the current workforce to do energy conservation work, and is working with AHFC to begin the training necessary for both raters and construction workers. Workforce development is addressed in more detail in the following recommendation.

Timeline
Immediate implementation once money is appropriated

Assumptions
Three percent discount rate
The workforce needed to implement the recommendation will be available.

10. AHFC should create a certification and training program for energy retrofit and energy efficient new construction.

We recommend that AHFC fund a collaborative effort between AHFC, CCHRC and the Alaska Works Partnership to create a certification and training program to develop the workforce necessary to implement energy efficiency retrofits and new construction.

Include energy retrofit and energy efficient new construction curricula at AVTEC and six new construction academies. An Alaska energy conservation building curriculum should be included in the general construction curriculum in Alaska. One model of builder education has been to teach the code – the minimum acceptable level. A better model is to teach best practices in building science; this is the model Alaska should employ.

Energy contracting is a growing industry in the lower 48 states. Homeowners are beginning to understand that home energy use is not a fixed amount. Many homeowners are making energy conservation investments in their properties because they see immediate results in lower utility bills, extending the life of the house, and increasing the market value of the house.

Weatherization programs around the state, AHFC, Alaska Building Science Network (ABSN), CCHRC, Green Star and others all report a consistently increasing number of inquiries from homeowners looking to reduce their energy consumption and reduce their monthly bills. These consumers are willing to pay for energy improvements to their homes but the market lacks enough qualified people to do energy conservation work.

This is workforce development that could employ a number of people consistently and indefinitely.

11. AHFC should subsidize up to 100 percent of costs for home energy audits for households not eligible for low-income

weatherization, and offer low-interest loans for energy conservation improvements.

The U.S. slowdown in housing sales is hitting Alaska, affecting the prospects for Alaska's builders this summer. Many observers predict a very slow season for new housing starts, as builders sit on unsold inventory from 2007.

At the same time, high energy prices are affecting existing homeowner's energy bills, and increasing the state general fund revenues.

This combination of circumstances argues for a special effort in 2008 to create new programs – and expand existing ones – for residential energy efficiency. Taking advantage of this opportunity will help Alaska residents reduce energy bills, and will help Alaska's builders and construction workers weather the market downturn.

AHFC should offer low-interest loans to medium and upper income households - those not covered by other programs[12] - to implement energy conservation measures. AHFC should provide an automatic offer to add an efficiency loan at time of purchase and should send mail-outs to AHFC mortgage holders already in their homes. Efficiency loans would include an energy audit and recommendations for improvements. AHFC should offer a list of certified auditors and contractors proficient in residential energy conservation retrofits.

Key to the success of this loan program will be advertising its existence. Existing energy efficiency mortgage and interest rate reduction programs nationwide are underutilized in large part because no one knows about them. Lenders have no incentive to inform their clients about these programs because they create additional work with no additional income.

Lender incentives, extensive awareness campaigns, or some combination of the two are necessary for full implementation. Once up and running, delinquency rates should be minimal - people will have reduced utility bills and the relative increase in monthly bills will be small. Most existing energy efficiency loan programs require a lien be placed on the property as insurance for the loan; we recommend AHFC follow suit. Loans should target homeowners with homes built prior to 1992 when BEES was implemented.

AHFC has as much experience with loans as anyone in the state and will exercise sound judgment in determining the specific terms of the loan. One item that ought to be weighed carefully is whether or not setting a minimum will act as a deterrent to potential customers.

There are many examples of energy efficiency loan programs and most of them have several energy conservation measures in common. We recommend that AHFC adopt those measures that have demonstrated success in other places as well as in Alaska, including:

- Shell – insulation/sealing/caulking
- HVAC – right-sizing/upgrading to more efficient system

[12] Note that if the legislature chooses to fund a weatherization program for HH 60 to 80 percent of median income the 100 percent energy audit subsidy will only apply to households whose income is above 80 percent of median.

- Lighting – residential retrofit
- Water heaters – right-sizing/upgrading to more efficient system

The Oregon Trust offers 11 residential and commercial energy loan programs. The programs loan $20,000 to $20 million with no maximum amount. Terms generally run five to 15 years, the only requirement being payback within the life of the project – so if the loan were for a lighting retrofit with a three-year payback the terms of the loan would include a three-year payback period.

Eligible energy efficiency measures include: water heaters, lighting, chillers, boilers, heat pumps, air conditioners, CHP/cogeneration, heat recovery, programmable thermostats, energy management systems/building controls, caulking/weather-stripping, duct/air sealing, building insulation, windows, motors, irrigation, and wastewater treatment.

Program costs:

Funding weatherization agencies to perform 100 percent subsidized energy audits on 500 eligible homes has a total cost of $500,000 per year. Homeowners realize all savings after they implement energy conservation measures; if they choose not to weatherize their homes, the energy audit is a sunk cost. As long as half of the homes audited choose to weatherize their homes, absorbing the audit cost of those who did not, the benefit cost ratio would still be above 1.

Ease of Implementation

AHFC has extensive experience with residential loan programs in Alaska. Creating and rolling out a new loan program should be relatively straightforward.

Workforce: Existing weatherization programs would have to hire 2.8 FTE new auditors, assuming four audits per week per auditor. The success of this effort relies on the availability of skilled energy auditors. Existing weatherization programs are the ideal setting for on-the-job training for energy auditing.

Timeline

Implement as soon as funds are appropriated

12. The Legislature should fund a pilot Smart Meter program through AHFC/AEA.

Smart meters tell consumers how much energy they are using at the moment they are using it. The meters also will detail how much that energy is costing. A recent study by the Department of Energy found that the more information energy consumers had about their consumption the more likely they were to behave in a more efficient way – reducing energy consumption by around 10 percent. Some of the reduction is attributable to consistent energy use behavior outside of peak-shaving times – if you turn off your lights during peak times you don't then leave them on for longer at a different time.

Smart meters have generally been deployed to reduce demand load during peak times. Alaska does not face peaks in electricity demand that challenge the capacity of our utility system. In practice what has been found is an overall reduction in energy consumption when smart meters are introduced.

Potential pilot size and budget

- 1,250 meters in Anchorage
- 500 meters in Wasilla/Palmer
- 500 meters in Fairbanks
- 250 meters in Juneau
- 2,500 meters into five villages

Program costs total $1,875,000, comprised of $875,000 in the four urban communities and the remaining $1,000,000 in five rural villages. We assume a cost of $300 per meter, with $50 installation costs in urban Alaska and $100 in rural villages; we also assume participation of utilities. Smart meters run from $100 to $500 per unit and have varying levels of "smarts" - $300 is a mid-range unit.

In-kind administrative support should be offered by participating utilities in the form of project monitoring and reporting monthly results for one year.

Projected savings – smart meters

# HH	Average kWh/HH	5 percent reduction	Total kWh savings	B/C[13]	Total carbon reduction (tons)
5,000	10,656	532.8	13,320,000	4.18	8,798

If the pilot proves successful we recommend expanding the program. The province of Ontario and the United Kingdom are both currently in the process of replacing all meters with smart meters. California also has an extensive smart metering program. Advocates of smart meters claim a ten percent reduction in energy consumption; we have used a more conservative figure of five percent based on the assumption that high levels of savings cannot be achieved without implementing a variable rate structure for energy.

In addition to state and utility funding for smart meters we recommend that AHFC add smart meters as an allowable efficiency measure for Housing Authority supplemental grants and the low-income weatherization assistance program.

[13] The benefit cost ratio is the present value of all benefits from a project divided by cost of implementing the program. In benefit cost analysis values should be estimated for all impacts (costs and benefits) future and present.

New Residential Construction

Residential new construction in Alaska boomed from 2001 through 2006, with between 4,179 and 4,709 new units being added each season. Following the recent burst in the housing bubble, the sub-prime mortgage crisis, the credit crunch and uncertainty about the economy, it is likely that the industry should prepare for slower years in the foreseeable future.

However, even in slow years new homes are constructed. Members of the building community and Alaskans who work in the energy conservation field know that the biggest impacts on residential energy consumption are through improving the efficiency of housing stock. The science needed to build these homes is readily available and the majority of builders utilize energy conservation techniques to some degree.

13. The Legislature should adopt BEES as the new state residential energy efficiency building code.

It is difficult to quantify the impact of creating a residential energy efficiency building code because there is so little information about homes that are built below that standard. The AKWarm database maintained at AHFC holds more than 25,000 records; the majority of them are energy audits conducted on homes for the purpose of financing the sale through AHFC, which will lend on homes that meet BEES.

New homes built without AHFC financing in mind do not get audited. Some of these homes would surely pass an energy audit and meet the standard; others would not. The majority of the homes in AKWarm that do not meet BEES receive low-income weatherization services, and the majority of them are not new homes. Comparing old inefficient homes to new standards is not realistic.

Anecdotally, there is evidence that AHFC has been successful in influencing the housing market. Members of the building community in the Anchorage report that Four Star Plus homes are the norm. Large contractors build to BEES in order to stay competitive and reach the market of buyers who have AHFC loans. Outside of the Anchorage builders report that standard building practices generally meet Five Star standards.

Ivan Moore Research (IMR) conducted a survey of Four Star Plus and Five Star plus homes to evaluate satisfaction level and understanding of the homeowners in February 2001. Moore randomly selected 1,520 energy efficient housing units from within three energy rated classifications – Four Star Plus, Five Star and Five Star Plus. Results indicate that people have a high level of satisfaction with energy efficient housing.

Key findings include:

- Mean purchase date May 1999
- Mean purchase price of just over $200,000
- Just over 63 percent of respondents purchased an energy efficient home to enjoy lower utility rates
- Nearly 50 percent indicated they were motivated by a reduction in interest rates

- Only 4.5 percent of respondents reported being dissatisfied with their homes
- More than 60 percent of respondents actually received an interest rate reduction when purchasing their home
- Reasons for dissatisfaction included anticipated savings, durability and efficiency of homes falling short of expectation.
- Most respondents – 81.2 percent – indicated they would be very likely to purchase an energy efficient home again.

The tables below show the marginal change in energy consumption when moving from one energy rating level to the next. All homes sampled were built between 2000 and 2007. Unfortunately there were only 14 Four Star homes in AKWarm, making analysis of the change between Four Star and Four Star Plus impossible.

We do not know how many newly built homes do not meet BEES standards, and because they are not rated we also do not know their real energy consumption. We do know that major builders are constructing to BEES standards to remain competitive and that there are demonstrated and real energy savings in efficient building practices.

Even if impacts are not immediately evident, raising the bar on residential construction is an important piece of consumer protection policy. Tying the state Railbelt/Four Dam Pool residential energy efficiency building code to AHFC standards ensures that the code will be a living document, receiving a critical eye and regular review.

Energy use per year – by BEES energy ratings

Stars	# of houses	Average floor area	Average energy cost (2007 dollars)	Average energy cost per sq ft	Average C02 (tons annually)
5 Star Plus	92	2,203	$1,369	$0.62	11.4
5 Star	1,428	1,873	$1,495	$0.73	12.0
4 Star Plus	5,435	1,842	$1,495	$0.81	13.7

Ease of Implementation

AHFC recently adopted changes to BEES, recommended by CCHRC, with almost no negative feedback. The ease of that change results from a positive working relationship with the building community. Establishing this same standard for the Railbelt and Four Dam Pool should receive relatively little resistance since the majority of the people it will impact have already bought in.

AHFC should enlist CCHRC to work with the Alaska State Homebuilders Association and state policy-makers to develop a consensus proposal for introduction in the next legislature.

Timeline

Recommend adoption spring of 2009

14. The State Division of Corporations, Businesses, and Professional Licensing should enforce regulations on building codes and contractor licensing to ensure quality and energy efficiency.

Building inspection quality assurance is an important piece of consumer protection, particularly for residential properties. A consumer who purchases a home based on the belief that it passed energy efficiency inspection has little recourse upon learning that the inspector did not do their job. There is currently no state government employee whose sole function is to do periodic check-ups and site inspections to assure that building inspections are of sufficient quality to ensure results; contracted building inspectors operate with limited oversight.

When a statewide residential building code is adopted it will be important to enforce the code, which will require inspectors or oversight of private inspectors. We recommend three new positions within the state Division of Corporations, Businesses, and Professional Licensing.

The state should add provisions to existing contractor licensure for an energy efficiency endorsement, requiring the contractor to demonstrate education and experience with energy efficient technologies and building retrofits.

Ease of Implementation
It has been challenging to obtain support for adding new positions in state government, but achieving the state energy efficiency goals without state enforcement would be difficult.

Timeline
Implement as soon as funds are appropriated for new positions.

Assumptions
The salary for building inspectors would be an average of $50,000 per year, plus 40 percent overhead costs for benefits.

Three positions: one headquartered in Fairbanks and two in Anchorage. The positions will require sufficient travel and training funds.

Home purchasers and sellers at the point of sale would absorb a portion of the added cost of quality assurance.

Existing Commercial Buildings

The Alaska Energy Authority previously provided energy audits with no- and low-cost energy savings recommendations. When the program was active, fuel prices were considerably lower; there is little evidence on which, if any, of the recommendations were implemented. Recent high fuel prices have piqued interest in this old program; AEA has received a number of inquiries from businesses looking for copies of their energy audits. Providing energy audits detailing low- and no-cost energy conservation measures gives businesses something they can implement with little or no assistance. Energy conservation measures that require some capital investment can be addressed through implementation of a Pay As You Save loan program.

15. The AEA should subsidize energy audits for commercial facilities and offer loans for energy efficiency improvements.

Alaska does not have a state energy efficiency program for commercial facilities, but AEA has the statutory authority to lend to some organizations for energy efficiency and energy conservation purposes; AIDEA has statutory authority to lend for all commercial purposes.

We recommend AEA renew its program of commercial energy audits, and expand to offer an energy efficiency audit/loan program for commercial buildings that mirrors the AHFC program for residential housing in recommendation 11. AEA would develop a list of certified auditors and contractors proficient in commercial energy conservation retrofits and would pay 50 percent of the cost of the energy efficiency audit. AEA would then offer low-interest loans for improvements suggested by the audit, with repayment periods based on anticipated savings from the audit.

A simplified energy efficiency loan program, without an energy audit, could be based on those items that have a reasonably quick payback, including

- Building envelope – insulation/sealing/caulking
- HVAC – right-sizing/upgrading to more efficient system
- Lighting – relamping and fixture retrofits
- Water heaters – right-sizing/upgrading to more efficient system
- Programmable thermostats

As is the case for other energy efficiency programs, advertising its existence is key to the success of this loan program. Existing energy efficiency and interest rate reduction programs nationwide are underutilized in large part because businesses do not know about them. Lender incentives, extensive awareness campaigns, or some combination of the two are necessary for full implementation.

AEA has shown its ability to move rapidly to meet commercial energy needs, so there should be few institutional impediments to creating an energy efficiency loan program. AEA's bonding capacity gives it the ability to borrow at favorable market rates, which can be passed on to commercial borrowers in the program.

16. The RCA should require utilities to implement Pay As You Save loan programs.

PAYS programs are offered by utilities all over the United States, Canada and the United Kingdom. A utility creates the parameters within which its program will offer low interest loans to commercial vendors for energy conservation measures (ECM). The business continues to pay its pre-ECM utility bill while using less energy until the loan is repaid. Most utilities require that businesses have work done by a list of approved contractors.

We recommend that Alaska electric utilities offer a limited list of eligible improvements to their commercial customers including lighting retrofit and purchase of Energy Star approved commercial appliances.

Fuel providers should be encouraged to offer programs to cover weatherization including shell/HVAC and Duct/Air sealing.

Ease of Implementation
The accounting function for a PAYS program is relatively simple if the program is run through a utility. Energy providers have established accounting departments and access to customer accounts. There would be some additional cost associated with administering a new program but those costs could be folded into the overall loan.

Timeline
Program start is dependent on availability of funds to capitalize the loan program. Funds could come from AEA and/or from a System Benefit Charge.

Assumptions
Mandate by RCA, incentive for utilities, or cooperation of utilities

Availability of seed money to start the loan program

New Commercial Construction

17. AEA should contract for a stakeholder process to develop a commercial energy efficiency building code.

There is currently no mandatory energy building code for commercial properties in Alaska. It is in the best interest of businesses to conserve energy, thus reducing costs. Many of the large box stores and chains operating in Alaska are headquartered in the lower 48; they have a template building that they construct in all markets allowing standardization in stocking, inventory control and workflow.

The economic benefits of constructing an efficient building have yet to overcome the benefits of standardization. However, these companies operate in markets with commercial building standards and they meet them. Implementing a commercial building code will have little if any serious negative impact on businesses operating in Alaska.

Once the code is adopted, the state should condition provision of state loans and other financial assistance upon compliance with the code.

Ease of Implementation
Once an appropriate code is decided upon implementing is a matter of the state codifying the change.

There is often resistance from the building community to changes in building code and there is nearly always resistance from the business community if there is the perception that a change might increase the cost of doing business. It will be important to the success of this recommendation that buy-in is obtained from the business and building communities.

Timeline
AEA should issue an RFP to perform work as soon as funding is available - 2008

Public Buildings

There are three main categories of public building in Alaska: state, university, and public K-12 school buildings. Recommendations are provided for each of these distinct groups of buildings. Although the process for application of energy conservation measures is similar, the financing mechanisms and incentives are different.

18. The Governor should direct each state agency to reduce energy consumption in its facilities by 20 percent from 2000 levels by 2020.

- 19.1: Conduct Energy Life Cycle Analysis on all proposed capital projects
- 19.2: Require all new publicly constructed buildings to meet LEED or equivalent standards
- 19.3 Expand ESCO contracts to retrofit state facilities
- 19.4: Relamp state facilities
- 19.5: Participate in Energy Star procurement

Energy service companies (ESCO) develop, install, and arrange financing for projects designed to improve the energy efficiency and maintenance costs for facilities. Typically an ESCO will:

- Develop the design and arrange financing
- Install and maintain the energy efficiency equipment (for an agreed period)
- Measure, monitor and verify the project's energy savings
- Assume the risk that the project will save the amount guaranteed at the start of project

Because ESCOs front the cost of energy improvements there is an interest rate charged on that loan which is wrapped into the overall payback timeframe – usually seven to ten years. Project financing is generally tied to projected and actual savings that result from energy efficiency measures. Measurement and monitoring costs are folded into total project cost.

Large organizations with the internal capacity to implement energy saving retrofits often do not use ESCOs in an effort to avoid the added cost associated with their services. However, many organizations that have the capacity in terms of expertise, lack the staff resources or time to make large scale energy projects happen.

State Facilities:

The State of Alaska owns more than 15 million square feet of facility space. Analysis and recommendations apply to 9.537 million square feet of this space including nearly 35,000 square feet located on military bases around the state. The other 5.63 million square feet were removed from analysis.

The 2007 State facilities data set lists more than 2,200 records and includes facility types ranging from latrines and covered walkways to office buildings and airport terminals. An inconsistent naming convention in the database created challenges in determining the

type and/or use of each facility. For the purposes of estimating the impact of end-use efficiency recommendations the following changes were made to the original data set:

- "Storage" is unheated space and not included in analysis
- "Warehouse" is heated and is included in analysis
- Latrines and outhouses were removed
- Public use cabins and volunteer cabins were removed
- Boat sheds and other "sheds" were removed
- Covered outdoor space was removed
- Greenhouses were removed
- Parking garages were removed
- Utility, generator and electrical buildings were removed
- Snow removal equipment buildings were removed

Even with the above facilities removed from analysis there is significant variability in use of state owned facilities. Several facilities are fully operational 24/7, i.e. prisons, youth facilities, and psychiatric hospital. Others have specific HVAC requirements. It is outside the scope of this project to assess energy conservation measures specific to each type of state facility. That said, opportunities exist for significant energy-use reduction by accepting some basic recommendations. Developing specific energy conservation measures for state facilities will require significant up-front data collection. The most realistic, or implementable, method to reduce energy use is to:

- Apply a few tried and true general ECMs to all facilities
- Solicit the services of ESCOs to improve the energy efficiency of all state-owned facilities, starting with highest energy-use facilities and moving down the list.

Realizing 20 percent savings is achievable through expanded state contracting with ESCOs to cover more facilities. The up-front cost to the state is mostly administrative and negligible. Arranging performance contracting through an ESCO that "fronts" the money for energy conservation measures means there is no need for legislative appropriation.

The tables that follow show estimated energy use in state facilities and the benefits of 20 percent energy savings.

Annual potential savings – 20 percent reduction in electric energy consumption/state-owned facilities

Region /Fuel Source	sq ft	kWh/sq ft	Total kWh (000)	Total MBtu	20% kWh	Net redu CO2
Southcentral /Natural Gas	3,668,072	12.1	44,384	151,437,085	8,876,734	5,8
Mat-Su & Denali Borough /Natural Gas	552,471	12.1	6,685	22,808,875	1,336,980	88
Kenai Peninsula /Natural Gas	718,805	12.1	8,698	29,676,010	1,739,508	1,1
Interior /Coal	839,669	12.1	10,160	34,665,882	2,,031,998	2,1
Interior /Oil	279,890	12.1	3,387	11,555,294	677,333	66
4 Dam Pool /Hydro	804,000	12.1	9,728	33,193,301	1,945,680	0
Other Alaska /Oil	2,630,221	12.1	31,826	108,589,200	6,365,135	6,2
Military /Coal	34,275	12.1	415	1,415,052	82,946	8
TOTAL	**9,527,403**		**115,282**		**21,024,316**	**17,0**

Annual potential savings - 20 percent reduction in space heating energy consumption/state-owned facilities

Region/Fuel	sq ft	Mbtu/sq ft	Total Mbtu	20% Mbtu	Net reduction in CO2 (tons)
Southcentral /Natural Gas	3,668,072	41.6	152,591,795	30,518,359	1,785
Mat-Su & Denali Borough /Natural Gas	552,471	41.6	22,982,793	4,596,559	269
Kenai Peninsula	718,805	41.6	29,902,288	5,980,458	350
Interior	1,119,558	41.6	46,573,612	9,314,723	1,785
4 Dam Pool	804,000	41.6	33,446,400	6,689,280	269
Other Alaska	2,630,221	41.6	109,417,193	21,883,439	350
Military	34,275	41.6	1,425,840	285,168	1,785

TOTAL	**9,527,402**		**396,339,921**	**79,267,986**	**6,593**

Recognizing that a whole building energy retrofit – as with an ESCO – for every state facility will take several years, we recommend immediate utilization of two energy conservation measures.

- Re-lamping
- Energy Star Procurement

Relamping

Retrofitting the lighting for state, and other public, facilities will likely be part of any ESCO contract. However, we recommend that relamping be done on a shorter timeframe than whole-building retrofits can be achieved. We also recommend whole building group relamping rather than on a per unit basis. The labor costs associated with changing out light fixtures is significantly reduced with group relamping. The 44 percent energy savings on lighting energy conservation measures are based on pre and post measurements taken at eight state-owned facilities by Siemens as part of their performance contract with the state. Findings are in line with industry average savings going from T-12 to T-8 lighting.

One third of the program should be funded through legislative appropriation with the other two-thirds picked up by a longer-term funding mechanism such as a system benefit charge or endowment.

Costs and benefits of relamping state facilities

Region	Sq ft median est	# of lamps	Total cost	total kWh / year	44% kWh reduction per year	PV Savings	Ben/cost ratio
Southcentral	2,310,885	36,108	$2,527,531	29,344,576	12,911,613	$14,141,807	5.60
Mat-Su & Denali Borough	348,057	5,438	$380,687	4,419,768	1,944,698	$2,141,597	5.63
Kenai Peninsula	452,847	7,076	$495,302	5,750,440	2,530,194	$2,786,374	5.63
Interior	705,322	11,021	$771,445	8,956,464	3,940,844	$4,339,851	5.63
4 Dam Pool	506,520	7,914	$554,006	6,432,000	2,830,080	$3,116,623	5.63
Other Alaska	1,657,039	25,891	$1,812,387	21,041,768	9,258,378	$10,195,781	5.63
Military	21,593	337	$23,618	274,200	120,648	$132,864	5.63

Total program costs are just under $6.6 million. Total present value of savings is almost $37 million dollars and the benefit cost ratio is 5.63. Lighting retrofits are the low-hanging fruit of commercial energy savings.

Estimates in tables above are based the following assumptions:

- Median estimate of 63 percent of state buildings utilizing outdated and inefficient lighting
- National average of 64 square feet per lamp for commercial office space
- $70 for 4-lamp T-12 to 2-lamp T-8 change[14]
- 8 kWh per square foot for pre-retrofit lighting
- 44 percent lighting energy savings
- Three percent discount rate

Timeline

2008 to 2011 assuming funds are made available in 2008

Energy Star Procurement

Energy Star is a project of the US Department of Energy and the US Environmental Protection Agency. Energy Star continually updates a list of approved efficient appliances. Establishing a policy to use Energy Star procurement removes the information barrier to efficient procurement by providing the research necessary to make an informed decision. The rationale for energy efficient procurement practices is clear.

- Good stewardship of taxpayer dollars
- Good stewardship of the earth

The state should participate in energy efficient procurement practices. Anecdotal evidence suggests a certain amount of efficient purchasing is already happening.[15] Creating a policy of energy efficient procurement practices would ensure that all departments are participating.

The State of Alaska does not track purchases in a central location but was able to supply Information Insights with its last 12 months' purchases from Dell computers. The vast majority of computers purchased for state use come through this contract. Additionally, several municipalities and school districts use state purchasing contracts. The information in the table below represents only computers purchased for state use.

[14] Green Star staff estimates
[15] Interviews with state personnel in State of Alaska Department of Administration

Projected savings – Energy Star procurement

Category	qty	diff energy usage kWh per item	Energy saved kWh	Energy Cost Savings	Present Value of Savings	Ben/ Cost
Computers Notebook	2,402	24	57,648	$ 5,188	$ 23,761	9.9
Computers Desktop	6,984	103	719,352	$ 64,742	$ 296,498	42.5
Monitors	58	99	5,742	$ 517	$ 2,367	40.8
Totals			**$ 782,742**	**$ 70,447**	**$ 322,626**	**34.2**

One of the benefits of Energy Star procurement practices is that no one within the state will be responsible for tracking advances in energy efficiency technology because Energy Star is constantly monitoring and adjusting the items on its approved list of goods. The benefit/cost ratio shown on the chart above assumes a five-year computer life, and three percent discount rate, with costs similar between Energy Star and other computers.

Ease of Implementation
The Consortium for Energy Efficiency published a guide for implementing an energy efficient procurement program titled "State and Local Government Purchasing Model Program Plan: A Guide for Energy Efficiency Program Administrators." The plan supplies a roadmap to implementation that could be easily adopted to meet the State of Alaska's needs.

Timeline
Relamping of state facilities and procurement changes can begin in 2008. The process for reaching the Governor's goal for state facility energy reduction and cost savings is already underway with ESCOs, but will need to be accelerated.

19. The Board of Regents should direct the university to reduce energy consumption in its facilities by 20 percent from 2000 levels by 2020.

- 20.1: Conduct Energy Life Cycle Analysis on all proposed University of Alaska capital projects
- 20.2: Require all new University buildings to meet LEED or equivalent standards
- 20.3 Use state ESCO contracts to improve energy efficiency of University of Alaska facilities
- 20.4 Relamp University of Alaska facilities
- 20.5: Participate in Energy Star procurement

Like the State of Alaska, the University of Alaska is a major public facility owner, with over six million square feet of classroom, office, research and student housing buildings.[16]

The issues and arguments for university facilities are nearly identical to those for the State of Alaska, except that the UA is responsible for its own facilities and has its own bonding capacity. Savings to the UA system over the long run are considerable, as shown in the next charts. The primary challenge is that energy efficiency improvements must compete with deferred maintenance and facilities required for new programmatic initiatives for both capital project appropriations and university bonded projects. The university can achieve some of the savings by using the state's ESCO contract, but will ultimately have to balance energy efficiency priorities with other deferred and major maintenance issues.

The tables that follow show the potential benefits and savings from a 20 percent reduction in energy consumption in University of Alaska properties.

Annual potential savings – 20 percent reduction in electric energy use/university facilities

Region/Fuel Source	Sq ft UA facilities	Annual kWh/sq ft[17]	Total UA facility annual kWh (000)	Total UA facility annual Mbtu	20% savings annual kWh (000)	Net reductio in CO tons
Southcentral /Natural Gas	2,168,703	8.2	17,783	60,676	3,557	2,3
Interior /Coal	2,206,790	8.2	18,095	61,740	3,619	3,7
Interior /Oil	735,597	8.2	6,032	20,581	1,206	1,1
Four dam pool area /Hydro	166,769	8.2	1,367	4,664	274	
Other AK /Oil	606,378	8.2	4,972	16,964	994	9
UA System Totals	**5,884,237**		**48,251**		**9,650**	**8,3**

[16] For analysis on University of Alaska properties the following types of buildings were removed from calculation of total square footage:

- Animal related facilities such as barns and feed storage
- Parking garages
- "Sheds" and "storage" (assumed to be cold)
- Utility and generator buildings
- Transmitter stations

[17] Note that average kwh/sq foot for education facilities is considerably lower than for most other types of commercial facilities.

Annual potential savings – 20 percent reduction in space heating energy consumption/university facilities

Region/Fuel	Sq ft UA facilities	Annual Mbtu/sq ft	Total UA facility annual Mbtu	20% savings annual Mbtu	Net reduction in CO2 (tons)
Southcentral /Natural Gas	2,168,703	41.6	90,218	18,043,611	1,040
Interior /Coal	2,206,790	41.6	91,802	18,360,495	1,953
Interior /Oil	735,597	41.6	30,600	6,120,165	494
Four dam pool area /Oil	166,769	41.6	6,938	1,387,518	12
Other AK /Oil	606,378	41.6	25,225	5,045,065	407
UA System	**5,884,237**	**41.6**	**244,784**	**48,956,854**	**4,005**

A relamping program at the University of Alaska for its 5.9 million square feet of space would cost roughly the same as the cost to the State of Alaska for its 6.0 million square feet of space, or roughly $6.6 million with a benefit/cost ratio of 5.6.

20. The Legislature should fund an energy audit for every school in the state.

Alaska has 469 elementary and secondary schools statewide. There are 199 K-12 public schools on in the Railbelt utility area, 38 in the Four Dam Pool utility area, and 232 schools in the rest of Alaska. Simple behavior changes could reduce energy consumption as much as ten percent in public schools.

Annual electric potential savings in Public K-12

Region/Fuel Source	Sq ft	kWh/ sq ft	Total kWh	Total Mbtu	10% kWh savings	Net CO2 reduction (tons)
Southcentral /Natural Gas	11,490,003	8.2	94,218,025	321,471,901	9,421,803	6,443
Interior /Coal	2,011,604	8.2	16,495,149	56,281,448	1,649,514	1,728
Interior /Oil	670,535	8.2	5,498,383	18,760,483	549,838	275
4 Dam Pool /Hydro	2,156,650	8.2	17,684,530	60,339,616	1,768,453	0
Other Alaska	6,132,919		50,289,936	171,589,262	5,028,994	4,951

/Oil		8.2				
Total	**22,461,710**		**184,186,022**	628,442,710	**18,418,602**	**13,477**

As is the case for state and university facilities, Alaska has a substantial inventory of school district facilities. The opportunity for energy efficiency cost savings is also significant, as shown on the tables above.

Through audits and user education, electricity energy savings of ten percent are readily achievable. A ten percent decrease in electric usage would save 18 million kWh per year, for additional annual savings of $2 million.

Assumptions

- One fixture per 64 square feet
- An average 80 watts of savings per fixture
- Average use of eight hours per day
- 252 days per year total
- 30 percent of schools are utilizing efficient lighting

In addition to energy audits we recommend supplemental user education in the form of a four-hour education session during a school in-service to help teachers and other staff understand how user behavior can save energy. Educators in public schools can then demonstrate energy conserving behaviors to their pupils, developing and instilling conservation behavior early.

We do not have data on lighting uses in public schools in Alaska, but if the lighting use per square foot of space is approximately equal to that of the State of Alaska, it would cost $24.7 million to relamp all public schools in the state, with a net present value savings of $138.5 million.

Ease of Implementation

The expertise and equipment exists in the state to accommodate easy implementation of this recommendation. School holidays and scheduled in-service days offer easy opportunity to perform audits and education without significant disruption. School district administration must be convinced of the potential benefits before they are likely to give teacher training time to an energy saving effort. Training could also be tied to a school's ability to apply for the institutional conservation program grants described in the following recommendation.

The biggest challenge is likely to be finding the trained workforce to accomplish the task in a timely manner.

Timeline

Funding for energy audits should go to AEA as soon as appropriated with a goal of completing 100 audits per year. Assuming 20 percent of schools have already received audits, the remaining 375 school audits should be complete in just under four years.

21. The state should fund AEA to offer Institutional Conservation Program grants up to incentivize energy conservation in public K-12 schools.

An institutional conservation program would offer matching grants to school districts interested in implementing energy conservation measures. The program could offer a 50 percent buy down on costs up to $100,000 per school building up to $2 million per year.

This program would offer at least 20 schools per year the opportunity to receive matching funds for energy conservation work. Working closely with energy specialists and AEA program staff would ensure all measures taken were cost effective.

Ease of Implementation
Federal USDOE funds used to be available for an institutional conservation program in Alaska, run through AEA. The program ran successfully for 15 years starting in the mid 1980's and ending in 2000.

Timeline
Implement as soon as funds are available

22. The Alaska Energy Authority should establish a low- interest loan program for public facilities to make energy efficiency improvements, with payments geared to projected savings.

The previous two recommendations addressed opportunities for energy efficiency savings for the University of Alaska and Alaska school district facilities. There are similar opportunities in Alaska's municipal and other public facilities.

The Alaska Energy Authority should establish a loan program for energy efficiency improvements to public facilities, with repayment terms geared to the life of anticipated savings. The legislature could allow Alaska school districts to borrow from AEA for audited energy efficiency improvements, secured by future state payments to the school districts under the public school foundation formula. Based on the audit recommendations, the program could split anticipated savings, with a major portion going to AEA, and the rest remaining in the school district for educational programs. The AEA program could also work for the University of Alaska, Alaska municipalities, or facilities owned by other public entities in Alaska.

AEA's experience in loans for energy production facilities would allow rapid deployment of a new loan program for energy efficiency improvements. As with commercial facilities, the biggest challenge would be ensuring awareness of the program and its benefits for public facility managers. Pegging the repayment schedule to a portion of anticipated savings is a key to success of the program, as any faster repayment requirement would put energy efficiency facility changes in competition with other facility needs.

Budget

The budget on the following page provides preliminary numbers for costs of implementing recommended energy efficiency programs and policies.

Column one of the budget captures the year one costs to implement all program recommendations. Policy recommendations do not have a budget line item. For example it is our recommendation that the state set a goal of reducing energy consumption by 20 percent in all state owned facilities. The budget associated with the execution of this policy recommendation will be found on a facility-by-facility basis.

The second two columns show future annual funding levels and funding source for recommendations that are require ongoing support. Recommendations that are tied to a utility funding mechanism, such as the Pay As You Save program, are not included in the budget. If the state chooses to implement a system benefit charge then the utility would simply use some of that revenue to capitalize a revolving loan fund for eligible energy conservation measures.

As a long-term funding mechanism for energy efficiency programs we recommend a system benefit charge. However, if an endowment is chosen as the method for funding energy efficiency programs long-term, the state should capitalize the fund with at least $200,000,000 to generate roughly $10 million in available funds per year.

Energy Efficiency program implementation and maintenance budgets – costs per year in 2007 dollars -			
	2008 legislative appropriation	Future legislative appropriation after 2008 (* = one-time)	Annual budget System Benefit Charge or Endowment after 2008
Public Education / Outreach			
Campaign		$400,000	$800,000
Outreach		$100,000	$200,000
Baseline Data			
Survey		$150,000	
Utility data		$25,000	
Update survey			$20,000
Energy use index		$50,000	
Existing Residential			
Low-income weatherization program	$200,000,000+ $200,000,000	$286,000,000*	
Training & certification program	$150,000		
Energy audits for households above 80% median income		$500,000	$500,000
Smart Meter pilot program	$1,875,000		Unknown
Three new positions for residential building inspection and quality assurance		$210,000[18]	
Existing Commercial			
Energy Audit - 80% subsidy		$80,000	$80,000
New Commercial			
Commercial building code development		$100,000	
Public Buildings			
School energy audits & education	$7,000,000		234,500[19]
Public K-12 Institutional Conservation Program	$2,000,000	$2,000,000	
Relamping state facilities	$6,600,000		
Relamping university facilities	$6,600,000		
Relamping school district facilities	$24,700,000		
Public facility retrofit fund	$500,000,000		
TOTAL	**$948,925,000**	**$289,615,000**	**$1,834,500**

[18] Note that the cost of quality assurance for building inspection can be wrapped up in the price that consumers pay for building inspection so the actual cost to the state is zero.

[19] After all school energy audits are complete, the remaining annual cost will be $100,000 for user support and $134,500 for ongoing user education

Appendices