





Energy Efficiency

Doing More
with Less

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Alaska Association of School
Business Officials
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Good afternoon.

School district budgets are being stretched again this year. Energy efficiency is one of the tools that you can use to cut operating costs while improving building durability and occupant comfort. We will discuss how schools can use financing to complete efficiency retrofits and avoid the cost of delay of waiting for appropriations.

When I talk about “energy efficiency” I am typically talking about a technological fix to your facility to help you reduce unnecessary energy use. I also include behavioral changes, but I am not talking about making great sacrifices – I am talking about being smarter with the energy we **do** use so we can use less of it to get the same level of service.



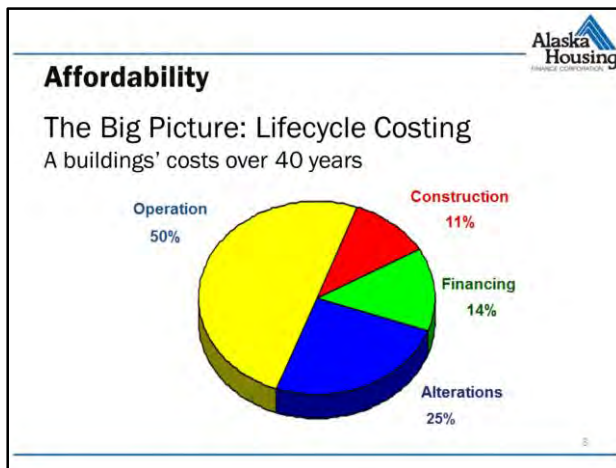
Energy efficiency retrofits tune your buildings to provide a more comfortable and a healthy environment for the occupants at lower operating cost.

Energy efficiency projects generate savings you can spend on other things.

Energy efficiency has an almost unbeatable return on investment.
Investing in EE is smart.

It's important to think about energy efficiency as an investment, especially as we start talking about the different energy project funding options out there.

AHFC has determined that if energy efficiency measures are implemented across the public facilities in Alaska, the public could save \$125 million annually. Energy efficiency is a smart investment and provides a high rate of return, increased occupant comfort, health and safety, and increased durability to your building.



Construction is only 11% of the entire cost of owning a building over its life time.

50% of a buildings costs over it's lifetime are accounted to operations.


What is your role in minimizing that amount?

Do you see your selves as stewards of public funds?

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Energy Efficiency Potential

- Public buildings - 5,000 in AK
- Average age - 33 yrs.
- Annual energy expenditure - \$640 million
- AK has some of the highest energy costs in the US



Through ARRA funds in 2010-2012 AHFC and Alaska Department of Transportation and Public Facilities received federal funds to conduct energy audits and to complete some of the upgrades. With the audits from these two departments almost 450 energy audits were completed.

AHFC produced a White Paper in 2012 summarizing the findings of the energy audits.

The public facilities that we manage in Alaska present an excellent opportunity for us to save energy and save money.


There are approximately 5,000 public buildings in AK.

With an average age of 33 years, many of our public buildings are in need of a retrofit. This provides the perfect opportunity to introduce more efficient building materials, techniques and mechanical systems.


Public facilities spend more than \$640 million per year on energy.

AK has some of the highest energy costs in the US, with electric costs that vary from \$.08/kWh to more than a dollar per kWh.

Note: ARRA audits were conducted on buildings from a non-random sample



Energy Efficiency Works



The take away:

- Assuming average savings of 20%, potential **annual savings of \$125 million** in our public facilities
- EE can help reduce costs and focus limited public dollars on core activities

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AHFC has been working with building owners and studying their energy use for years. Under the ARRA stimulus funds AHFC led an effort to benchmark more than 1,200 and audit 327 buildings. In 2012, we published a white paper on Energy Use in Alaska's Public Facilities summarizing the findings and recommendations from the effort.

More than half the buildings audited were schools.


The biggest take home from the study is Alaska could be saving **a lot of money** if it implemented the cost effective energy efficiency upgrades in our public facilities. At the time of the study, an estimated \$125 million could be saved annually.

The white paper and the subsequent outcomes papers, one of which focuses on school energy use, can be found on the AHFC website.

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Recommendations: Policy

1. Develop an energy policy
 - Set goals



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Develop an energy policy: Some larger facility owners and school districts have adopted an energy policy to encourage reduced energy consumption. When a policy exists, such as required thermostat setback temperatures and times for turning off lights and fans during unoccupied periods, the maintenance people can refer complaints to the policy. An energy policy can also establish goals that raise energy awareness for both larger and smaller scale buildings.

Set goals: Building owners who set energy consumption goals and reward achievement of lower energy consumption are finding that their savings are considerable and their managers are more aware of energy consumption reduction. This also enhances accountability of energy use throughout all people using the building.

I brought with me copies of a guide that AHFC put together called the Introduction to Energy Efficiency for public facilities. As decision makers encourage for staff to realize they can have an impact on energy cost savings which can be used on other expenditures.

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Recommendations: Policy

1. Develop an energy policy
 - Set goals
2. Establish an Energy Conservation Coordinator/Manager



Establish an Energy Conservation Coordinator/Manager: Larger school districts have benefitted from having a dedicated Energy Coordinator or Conservation Manager. This position manages the energy costs from operating all of the schools, and prioritizes improvements to reduce energy consumption in the worst performers. This has reportedly worked well in Anchorage, Fairbanks, and Juneau. Smaller sets of building owners could pool resources and hire an energy coordinator to serve several smaller communities or school districts.

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THINKING OUTSIDE THE BOX

Recommendations: Policy

1. **Develop an energy policy**
 - Set goals
2. **Establish an Energy Conservation Coordinator/Manager**
3. **Develop an energy management plan**
 - Establish a level of accountability

A photograph showing two individuals, a man and a woman, in a technical or industrial environment. They are both wearing safety glasses and are looking down at a tablet computer held by the woman. The background features large white pipes and some equipment, suggesting a utility or maintenance setting.

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Develop an energy management plan. An energy management plan maps out internal maintenance schedules, equipment logs, and keeps equipment manuals and building drawings on hand for reference. Unlike the energy policy, the energy management plan is regularly updated, typically on an annual basis. It is used to document recent achievements, changes in performance, and shifting priorities.

Establish a level of accountability: There seems to be a disconnect between the building owners and operators and those who pay the energy bills, as well as the absence of accountability in both remote villages and large communities. Require building owners and operators to assume more responsibility for the operating costs and potentially reward those who prove to be good stewards of the energy budget.



Recommendations: Policy

1. Develop an energy policy
 - Set goals
2. Establish an Energy Conservation Coordinator/Manager
3. Develop an energy management plan
 - Establish a level of accountability
4. Provide Operator Training



Provide maintenance and technician training for staff: One of the largest challenges observed in many buildings was the lack of training provided. The DDC systems are indeed complex, and persons who do not work on them routinely find themselves overwhelmed. Auditors found controls bypassed and operating in the “hand” and manual mode to make them operational. This occurs simply because the technician has not been trained in building operations or the trained technician has moved on and his replacement does not know how to operate the systems. Examples include finding back up pumps, intended to only operate if the primary pump fails, to be turned on so both pumps are always running in “hand” mode and lighting contactors that have bypassed the daylight sensors and time clocks to leave the lights on continuously.




Recommendations: Policy

1. Develop an energy policy
 - Set goals
2. Establish an Energy Conservation Coordinator/Manager
3. Develop an energy management plan
 - Establish a level of accountability
4. Provide Operator Training
5. Prioritize efficiency retrofits



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Prioritize funding for energy upgrades in buildings: Fund Preventive maintenance efforts to ensure existing infrastructure and past investments are properly maintained and operated in the most energy efficient manner possible. This will help them realize their full anticipated life and usefulness. **Reference upcoming case study on cost of delay in a local government building.**



Impact of Priorities – Cost of Delay

Cash Flow Calculator

INPUTS & OUTPUTS

Pre-Retrofit Annual Energy Expenditure	\$460,000	Cost for Improvements	\$ 563,000	Loan Term (yrs.)	6
Post-Retrofit Annual Energy Expenditure	\$317,000	Design/Engineering	\$ 84,450	Interest Rate	2.500%
Post-Retrofit Annual Energy Cost Savings	\$143,000	Project Management	\$ 16,890	Number of Payments per year	12
Post-Retrofit Annual Energy Savings %	31%	Contingency	\$ 56,300	Down Payment	\$ -
Energy Cost Annual Escalation Rate	2.0%	Project Costs - Down Payment	\$ 720,640	Discount Rate	8.0%
Assumed Project Life	15				

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This is a screenshot from the cash flow calculator we developed. The scenario demonstrated here uses real energy audit data from 2012.


The estimated cost of the project is \$720,640 and annual savings are projected to be \$143,000.

A 6 year loan at 2.5% will result in monthly payments that total \$130,561 each year and allow for the annual utility cost savings to pay back the loan.

The economic metrics indicate the project has the potential to save significant amounts of public dollars over the life of the project; cost savings associated with the lower energy consumption can be used to offset loan payments. After payments are complete the increased cash flow can be redirected to other priorities.

Impact of Priorities – Cost of Delay

INVESTMENT ANALYSIS		
Project Cost	\$ 720,640	Includes applicable incentives or down payment of \$0
Internal Rate of Return (IRR)	21%	Assumes 2.0% annual utility cost increase
Simple Payback	5.04	Only applicable if using internal funds
Cost of Delay (6 Months)	\$ 84,081	Lost incremental cash flow from waiting to implement project
Life Cycle Savings	\$1,739,051	Assumes loan and immediate action, with 15 year equipment life
Annual Savings		
With loan payment	\$ 22,789	Represents average energy cost savings - loan payments
No loan payment	\$ 168,161	Represents increased cash flow from energy cost savings, in scenarios where no loan is taken, or where loan is paid off



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Alaska Energy Efficiency Revolving Loan Program (AEERLP)

Open to public facilities including:

School, City and Borough buildings

State Agency and University of Alaska buildings

Loans can be repaid by energy savings



AHFC has a loan program, but we are here to encourage you to take action, however you choose to fund your project.

Here is some information about AHFC's, or the State's, \$250M revolving loan fund.

It is open to all State Agencies, Cities, Boroughs, Schools Districts including City, Borough and REAAs and the University of Alaska.

Energy Efficiency Kickstarter Grant

Planning Grant - up to
\$10,000

Open to public facilities
including:

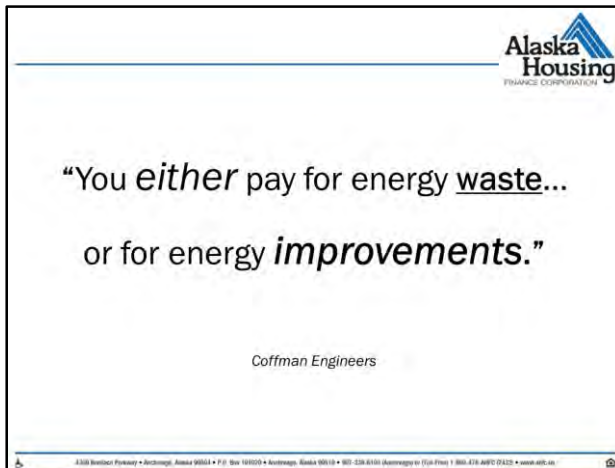
Cities, Schools, Tribes

Prepare for construction /
financing



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For more information: <https://www.ahfc.us/pros/notices/funding-availability/>



This was part of commissioning presentation I saw by Coffman engineers and it is really true. There is currently extra money going to the utility companies and we can either continue to send them that money, or we can use the money to further the goals of our individual departments.

Thank You



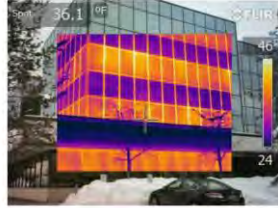
Alaska Housing Finance Corporation

<https://www.ahfc.us/efficiency/>

Energy Efficiency Technical Assistance Center

eetac@ahfc.us

1-877-257-3228



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AHFC offers technical assistance to public facilities.

Please contact us and we can help move your energy efficiency project forward.