OUT OF THE WILD

An energy retrofit prospective from the remote communities of Alaska

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Introduction

This is a brief study of what has been learned from 30 years of applying energy efficiency to existing residential buildings in Alaska. The building stock in Alaska, especially in its remote areas, is often of low thermal standards and in need of renovation.

Alaska is the largest state in the United States in land area at 586,412 square miles (1,518,800 km2). It is 1/5 the landmass of the continental US. 75% of the state is accessible only by boat or airplane and it has the most airplanes per capita. The United States is the world's second largest consumer of energy, and Alaska as a state has the second highest per capita energy use in the nation at 946 Mmbtu per person annually.

Subsistence Lifestyle

The majority of the residents in rural Alaska are Alaska Natives who live in villages with populations ranging between 25 and 5,000. Alaska Native people who live in rural areas maintain a distinct and unique lifestyle.
Many Native residents continue to practice a subsistence lifestyle and depend heavily on moose, caribou, seal, walrus, whale, fish and berries for their supply of food.

Alaska Weatherization Assistance Program

Addresses existing residential structures. Services are provided at no cost to income-qualified applicants by designated Weatherization agencies and housing authorities. Since its inception in the late 1970's, it has served almost 40,000 residential structures. It is based on the application of weatherization measures that have a cost effective payback (essentially a simple savings to investment ratio of one based on net present value.). Along with the energy measures, other rehabilitation issues are addressed such as health and safety, building durability and accessibility.

Success and Retraints

WAP has produced an average home energy efficiency savings of 28% for single family homes.

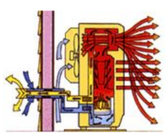
The effectiveness of upgrade measures depends on proper installation of appropriately selected materials.

There are budget restraints so there is a need to prioritize what actual retrofit measures get applied.

The single largest variable of a successful weatherization program is occupant behavior.

Milestones

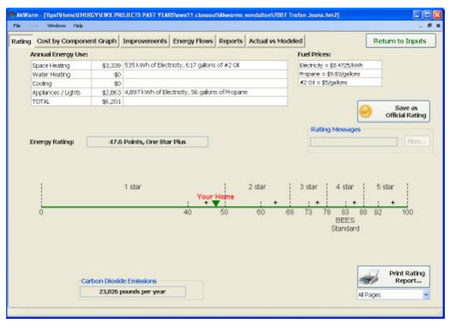
High efficiency heating system replacement



60% efficient fuel oil pot burner spaceheater

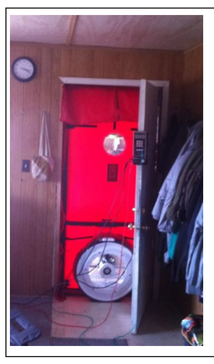
86% efficient toyotomi direct vent spaceheater

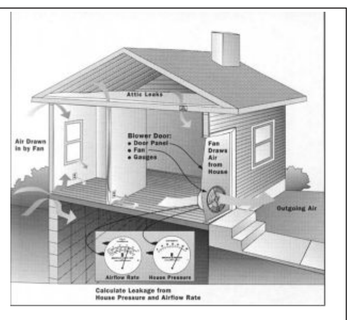
Energy modeling



Almost 100% of all dwellings worked on in the WAP program now have a computer modeled energy analysis performed before and after to determine cost effectiveness of improvement measures and a determination of overall energy efficiency of the retrofitted dwelling.

Building Airtightness

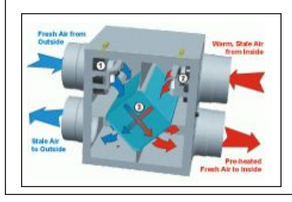




The blower door revolutionized energy rehabilitation and weatherization by providing a way to test building air tightness and target leakage paths.

ControlledVentilation

Air tightening of the building shell can have detrimental effect on air quality, so the use of controlled ventilation is now required in the program.



Heat Recovery Ventilation (HRV) is an effective system but is often under utilized because of cost of installation and operation.

Exhaust only ventilation is often used because of cost and ease of installation.

Energy Retrofit Program Success

Implement a systems approach that considers cause and effect.
Develop specifications and critical details that help the process of meeting or succeeding the standards.
The technicians need to be trained in applied physics and have the recipe for each retrofit upgrade.
Client education should include a basic understanding of building science and encourage behavior changes.

Conclusion

The Alaska state subsidized weatherization program has proven to have a large impact on local communities; it has saved resources, preserved limited housing stock, created local employment, and made for a healthier environment.
Energy efficiency consistently proves to be a cost effective investment towards a more sustainable future.

Alaska Housing Finance Corporation

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