

# **Alaska Fuel Change Procedure**

## **DOE Weatherization Assistance Program Funds**

### **6/22/22 Version 1.1**

#### **Overview**

Presented here is a process using the DOE approved energy modeling software Akwarm for Alaska to calculate a Savings to Investment Ratio (SIR) when an existing heating system or a domestic water heater is upgraded with a replacement that utilizes a different fuel source.

#### **Background**

WAP recipient dwellings in Alaska at times contain heating systems or domestic water heaters that would be more cost efficient to operate by utilizing a more cost efficient fuel source. Examples include electric water heaters that could be replaced by an on-demand natural gas or oil system, or dwelling that now have access to natural gas that was originally only had oil or electric for a fuel source. In the past, these fuel change upgrades were not allowed by DOE, so these were missed opportunities for fuel savings and less energy burden on the households.

#### **Current Capability of Energy Modeling Software *AkWarm***

Akwarm is able to produce as-is and post energy efficiency reports as well as an Improvement option report with SIR's and payback estimates. It refers to data tables of fuel costs, weather data, lifespan of measures and estimated installation cost as well as other data to create these reports. We are able to select improvements but only for one fuel source. Akwarm is not capable of creating a SIR comparison on the IOR of a measure that has equipment that utilizes a different fuel.

#### **Work Around**

What Akwarm does contain in the calculations report screens is a Base Case comparison where one can compare existing (base case) with another scenario. By changing your equipment and fuel source you are then able to see a calculation of the cost comparison and possible savings of the new scenario.

#### **Calculating SIR**

The next step involves taking the annual savings along with cost of installed improvement and its life span to calculate a simple payback of investment. See attached Table 9.2 **Allowable Default ECM Lifetimes**.

#### **Excel Worksheet**

This is a worksheet to calculate estimated payback.  
(See attached)

## **Procedure for using Akwarm and Fuel Change Spreadsheet**

**Step 1:** Conduct energy modeling using AKwarm, input existing appliance fuel and type. Modeling should be conducted using post shell improvement conditions. This will give a more accurate base case for equipment sizing and fuel savings based on equipment load.

(Make sure current library for AKwarm is used along with most current unit fuel cost for client location.)

**Step 2:** Complete Akwarm and push *Calculate* button for reports.

**Step 3:** Select *Cost by Component Graph* tab.

**Step 4:** Select *Make Current Run the Base Case*.

**Step 5:** Go back to Appliance entry page and change the Fuel source and Type of Appliance.

**Step 6:** Push calculate button again, and select the *Cost by Component Graph* tab.

**Step 7:** Select *Compare against Base Case*.

**Step 8:** Copy *Savings compared to Base Case*, this is the annual savings of installed measure.

**Step 9:** Paste amount in annual savings cell on the Fuel Change excel spreadsheet.

*The next steps will be on the supplemental excel spreadsheet*

**Step 10:** Fill in *Date, Name, Job Number and Location*.

**Step 11:** Select *existing system, replacement system, fuel types* for both, as well as DOE life expectancy for equipment type .

**Step 12:** Input *estimated cost of replacement*

*Payback in Years, Savings to Investment (SIR) Total Return for Investment (TRI)* will auto calculate.

**Step 13:** Submit the proposed change documentation to AHFC WAP Program Manager for approval. Include an estimate of cost for the upgrade, Akwarm and Fuel Change worksheet.

## Screen Shots of Sample Akwarm

Client | General | Shell | Air | Heater | DHW/Design Load | Co

### Hot Water Heater

Fuel Type: Electricity

Equip. Type: Standard Electric Tank [Choose...]

Energy Factor from AHRI, if Available: [ ]

Details: Old standard water heater located in a semi conditioned space

Insulating Water Heater Blanket?

#### Location of Water Heater

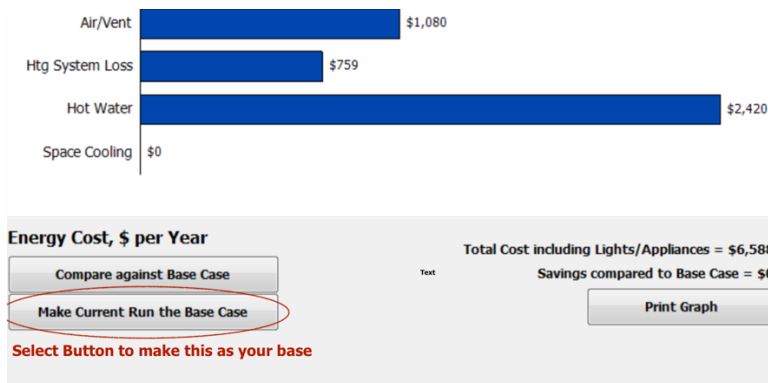
Conditioned Space, > 60 deg F

Semi-Conditioned Space, 50-60 deg F

Un-Conditioned Space, < 50 deg F

Input existing system

Push Calculate button to get to reports, select cost by component screen



Push button to make this your base case

Client | General | Shell | Air | Heater | DHW/Design Load | Co

### Hot Water Heater

Fuel Type: #1 Fuel Oil

Equip. Type: Oil:On Demand Choose...

Energy Factor from AHRI, if Available:

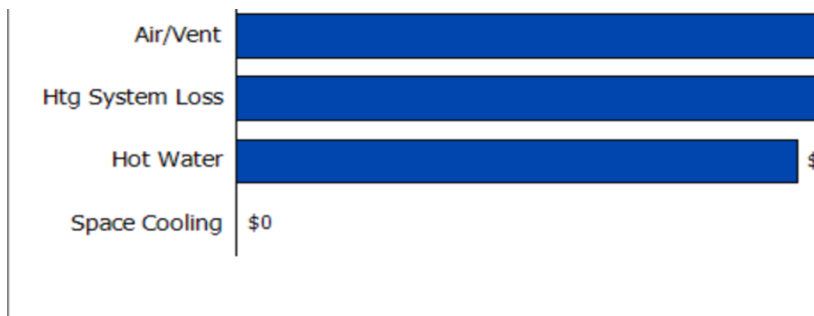
Details: Proposed fuel change improvement

Insulating Water Heater Blanket?

#### Location of Water Heater

Conditioned Space, > 60 deg F  
 Semi-Conditioned Space, 50-60 deg F  
 Un-Conditioned Space, < 50 deg F

Return to appliance input screen and select possible replacement *Equipment Type* and *Fuel Type*



### Energy Cost, \$ per Year

Compare against Base Case ← Select Compare against base case button

Make Current Run the Base Case

Push Calculate button again to get to reports, select cost by component screen, push *Compare against Base Case* button.

