Accelerating adoption of energy-efficient technology with the Thermalize model

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Abstract

The accelerating impacts of climate change destabilize food systems and ecosystems alongside the communities that rely on them. Thus, climate resilience is a health equity issue at both a physical (relating to biological impacts of pollution and environmental degradation) and a cultural level (loss of subsistence lifestyles, languages, etc). With roughly 20% of US energy-related greenhouse gas emissions stemming from heating, cooling, and powering households, accessible energy-efficient home retrofits are a critical element of climate change mitigation strategies. For communities already producing electricity from renewable sources, like Juneau, incentivizing ductless heat pump upgrades and energy efficiency retrofits provides an accessible pathway to transition households away from oil heating and drastically reduce emissions. Thermalize Juneau is a pilot program that will explore a repeatable framework for accelerating the adoption of energy-efficient technology in Alaska communities. This poster will describe Thermalize Juneau's goals and framework, progress through spring 2021, and future plans.

Developed by **Alaska Heat Smart, Renewable Juneau**, and **AEL&P** and the first of its kind in Alaska, the **THERMALIZE JUNEAU** pilot program seeks to:

- **INSTALL** ductless heat pumps in participating Juneau homes and businesses
- **IMPROVE** energy efficiency of participating Juneau homes and businesses
- **GROW** and support local clean energy jobs
- **PIONEER** a repeatable framework for other communities to try!

Introduction

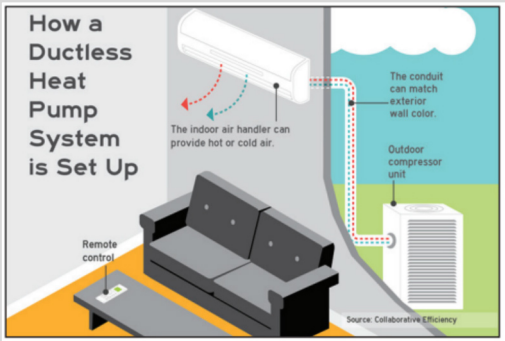
The City and Borough of Juneau, Alaska has set an ambitious goal to reach 80% renewable energy deployment for heating and transportation by 2045. To help reach this goal, the local nonprofit Alaska Heat Smart formed in 2019 to inform Juneau residents about heat pumps, provide one-on-one residential assessments, and help homeowners learn how a heat pump could work in their home. Because heat pumps of all types rely on the local hydropower electricity grid to operate, they can play a large part in reaching the City and Borough of Juneau's renewable energy goals (Information Insights, et. al, 2020).

In 2020, Alaska Heat Smart partnered with a larger team to plan Thermalize Juneau, a campaign that combines Alaska Heat Smart's energy advising with Ductless Heat Pump (DHP) and energy efficiency measure installation assistance and bulk discounts.

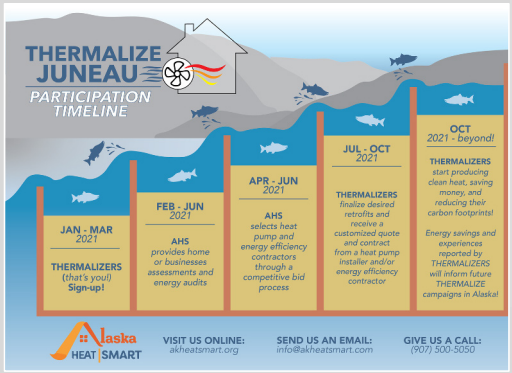
Juneau Market Research

Juneau Ductless Heat Pump (DHP) Market Survey

From September – October 2020, a market survey was conducted to inform Thermalize Juneau participant recruitment strategies. The survey identified current DHP user experiences, the reasons behind the DHP installations, occupant satisfaction, perceived energy savings, and usage patterns (Information Insights, et. al, 2020).



Timeline



Program Structure

After receiving a home assessment, 150 Juneau households and businesses will be able to choose between:

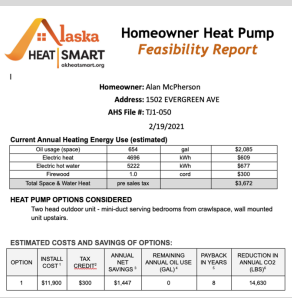
Assessment Only	Assessment + Heat Pump Installation	Assessment+ Installation+Upgrades
No changes to resident's home/business*	Resident installs heat pump*	Resident installs heat pump and energy efficiency upgrades*

Lower Prices

- Negotiating as a group (prices go down as more sign-up)
- Reducing soft costs & realizing bulk purchasing discounts

Eliminating Complexity & Providing Support

- Competitive installer selection
- Experts on heat pump options & financing
- Free, customized heat pump quote
- Contract directly with installers (Gallagher et al. 2020)



Alaska HEAT SMART akheatsmart.org

Homeowner Heat Pump Feasibility Report

Homeowner: Alan McPherson
Address: 1502 EVERGREEN AVE
AHS File #: TJ1-050
2/19/2021

Current Annual Heating Energy Use (estimated)

Oil usage (space)	654	gal	$2,085
Electric heat	4696	kWh	$609
Electric hot water	5222	kWh	$677
Firewood	1.0	cord	$300
Total Space & Water Heat	pre sales tax		$3,672

HEAT PUMP OPTIONS CONSIDERED
Two head outdoor unit - mini-duct serving bedrooms from crawlspace, wall mounted unit upstairs.

ESTIMATED COSTS AND SAVINGS OF OPTIONS:

OPTION	INSTALL COST	TAX CREDIT	ANNUAL NET SAVINGS	REMAINING ANNUAL OIL USE (GAL)	PAYBACK IN YEARS	REDUCTION IN ANNUAL CO2 (LBS)
1	$11,900	$300	$1,447	0	8	14,830

- Capital cost: ~$5,000 (single-head system)
- Simple payback: About 8.5 years
- $750 per year savings
- 40% reduction in heating costs
- 9,000 lbs CO2 reduction

Results to Date

Key DHP User Survey Results

- Reducing fossil fuel usage and reducing energy costs were top factors in deciding or considering to purchase a DHP (Information Insights, et. al, 2020).
- Less expensive installation costs are at the top of the list for making the decision easier, followed by low interest financing options (2020).
- 93% of DHP owners expressed satisfaction with their decision overall (2020).
- The majority of the potential DHP owners are in the research stage. This suggests that the creation of standardized, trustworthy introductory information, would be beneficial to those considering an installation. There is a significant opportunity for Alaska Heat Smart to fill this need (2020).

Campaign Progress

- 142 sign ups so far. Currently reframing marketing and outreach efforts to focus on communities typically underrepresented in thermalize efforts (Mesdag, et. al., 2021).
- AHS team is currently working through heat pump assessments (2021).
- Participants are beginning to receive energy audits as part of the campaign to help inform their retrofit decisions.

Financing & Incentives

Juneau Carbon Offset · TRUE NORTH FEDERAL CREDIT UNION · IRS · USDA Rural Development · Alaska Housing Finance Corporation · Regional Housing Authority · RurAL CAP

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Image Credit: Keegan, Brad Thiessen, Patrick. 2017. "Ductless Heat Pumps." Www.Scliving.Coop. Retrieved March 30, 2021 (https://scliving.coop/api/content/7c34aef0-a387-11e7-978e-121bebc5777e/).

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This work was authored in part by the National Renewable Energy Laboratory, operated by Alliance for Sustainable Energy, LLC, for the U.S. Department of Energy (DOE) under Contract No. DE-AC36-08GO28308. Funding provided by the U.S. Department of Energy. The views expressed in the article do not necessarily represent the views of the DOE or the U.S. Government. The U.S. Government retains and the publisher, by accepting the article for publication, acknowledges that the U.S. Government retains a nonexclusive, paid-up, irrevocable, worldwide license to publish or reproduce the published form of this work, or allow others to do so, for U.S. Government purposes.

One Health One Future Conference
Fairbanks, Alaska
April 2021
NREL/PO-5600-79669