Increasing Heating Efficiency in Rural Alaska

The Facts About Pellet Stoves

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Alutiiq Tribe of Old Harbor - Tribal Administrator/Environmental Director
Make it easier to change the pictures: Use the Selection Pane to temporarily hide a Picture Placeholder. Click the eye icon to hide or show an object. To change the sample images, select a picture and delete it. Now click the Pictures icon in the placeholder to insert your own image. If you don't see the Pictures icon, click the Reset button (Home tab, Slides, Reset). The animation is already done for you; just copy and paste the slide into your existing presentation. Sample pictures courtesy of Bill Staples.
The Thinking Cap

There are many factors needed to make a decision.

- Thinking what you want.
- Types of homes.
- Finances.
- Personnel
- Time Available
- Variables
- Other factors

How do I turn this idea into a benefit to my community?
Wood Pellet Stoves:
- Are generally small
- Pellets are easy to store
- Easy to install and operate
- Use a hopper to load pellets
- Only loaded once a day - thermostat controlled
The truth about Pellet Stoves

- **The Fire Factor:**
  - Fire is contained in a heat box inside unit.
  - Creates minimum smoke.
  - Outside of unit does not heat up as much.
  - Create less ash than firewood.
  - Gives off less creosote – pollutants, burns clean
  - Less potential for fires.
Wood pellets can be made from recycled materials – bio mass fuel.

Have lower moisture content due to higher compression of pellets.
- Dry fuel creates more heat.
- They burn hotter and cleaner.

They emit fewer pollutants.

They are carbon neutral.
The truth about Pellet Stoves

- Their **DOWN** Side

- Initial Cost – Between $1,700 to $3,000 plus installation cost.

- Need storage space for pellets.

- Pre-made pellets may not be available nearby.

- The stoves run on electricity.
Important Considerations

- Initial Cost of Pellet Stove
- Electrical Power Supply Reliability
- Availability of Pellets

Considerations:
- Private expense or Grants?
- Can I make enough pellets locally?
- How much do they cost to import?
- Do I need a backup Battery source for power outages?
How Do They Work?

- The pellet stoves run with electricity.
- The pellets are loaded into a hopper.
- A motorized auger (big screw) delivers the pellets into the burn pot.
- The auger’s speed determines the temperature of the stove.
  - The faster it turns, the more pellets that are fed into the burn pot.
How Do They Work?

- The burn pot is ignited.
- The pellets are compressed.
- The higher density and lower moisture creates a hotter flame.
- The ashes created are captured by an ash pot.
How They Work

[Diagram of a wood-burning stove with labels for Fuel Gas Outlet, Storage Hopper, Combustion Chamber, Fan, Worm Screw, and Ash Bin.]
How do they heat the room?

- They heat a room through convection.
- A blower pulls clean room air in.
- Passes it through a heat exchanger.
- And blows the clean heated air back into the room.
- An exhaust blower blows the burned gases out a narrow pipe in the back of the stove and out the chimney.
Controlling the Heat

- It has a thermostat:
- It controls the auger which controls the number of pellets fed into the combustion chamber.
- More pellets equal more heat!
Types of Pellet Stoves

- **Top Feed:**
  - Pellets are fed from the top.
  - Have better heat efficiency
  - Mat clog up with ashes if not cleaned regularly

- **Bottom Feed:**
  - They deliver pellets horizontally
  - Can use lower grade pellets
  - Produce less ash
  - Less efficiency than top fed
Types of Pellet Stoves

- They range in heating range from 8,000 to 90,000 BTU’s.
- The majority of models are between 40,000 to 60,000 BTU’s.
Manual Versus Automatic?

- **Manual** stoves require a starter liquid or gel starter material to light the flame.
  - Similar to starting a fire in a wood burning fireplace.
- **Automatic** stoves have start buttons with a self-igniter.
  - When you push the button it feeds the pellets into the burn box.
Doing the Math

- To determine the capacity of the stove you need:
  - 5,000 BTU’s will keep a 200 square foot of space warm.
  - Check the square footage of the room you want to install it in.
Other Factors:

- Wood pellet stoves are only safe to sit on certain flooring materials.
- Decide the size of the pellet hopper for less frequent re-filling.
- If power outages are common, may need a battery backup...specially during winters.
- Stoves with large viewing glasses or ceramic logs are also available.
Our Project.
Our Project.
Our Project.
Project Planning:

- Grants and what they cover?
- What type of training do we need?
- What type of equipment do we need to purchase?

Money

Funding

Pellet makers

Staff

Personnel Training

Equipment
Funding

- IGAP
- ANTHC Community Demonstration Grant
- American Native Association – ERE
- Collection Fees
- Sale of Pellets
Equipment & Supplies

- Wood Chipper
- Pellet Milling Machine
- Hammer Mill
- Paper Shredder
- Pellet Stoves
- Drill
- Three Phase Power Source
- Storage Containers
- Storage Facility
Budget

- Personnel
- Equipment
- Fuel
- Storage Facility
- Storage Containers
- Electricity
The Process

- Chip wood/shred paper and cardboard
- Put through hammer mill to get $\frac{1}{4}$” particle with 15% moisture
- Send through pellet mill
- Cool
Production Rate

- 20 lbs. per horsepower /hr.

- 7.5 hp. pellet mill
  120 lbs. /hr.
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Issues

- Shipping to Rural AK
- Location
- 3 phase power
- Shredding Materials
- Communication
Contact:

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Questions?