

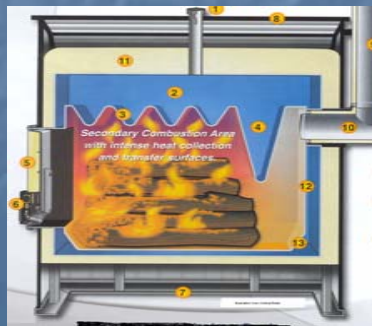
Outdoor Wood Boilers

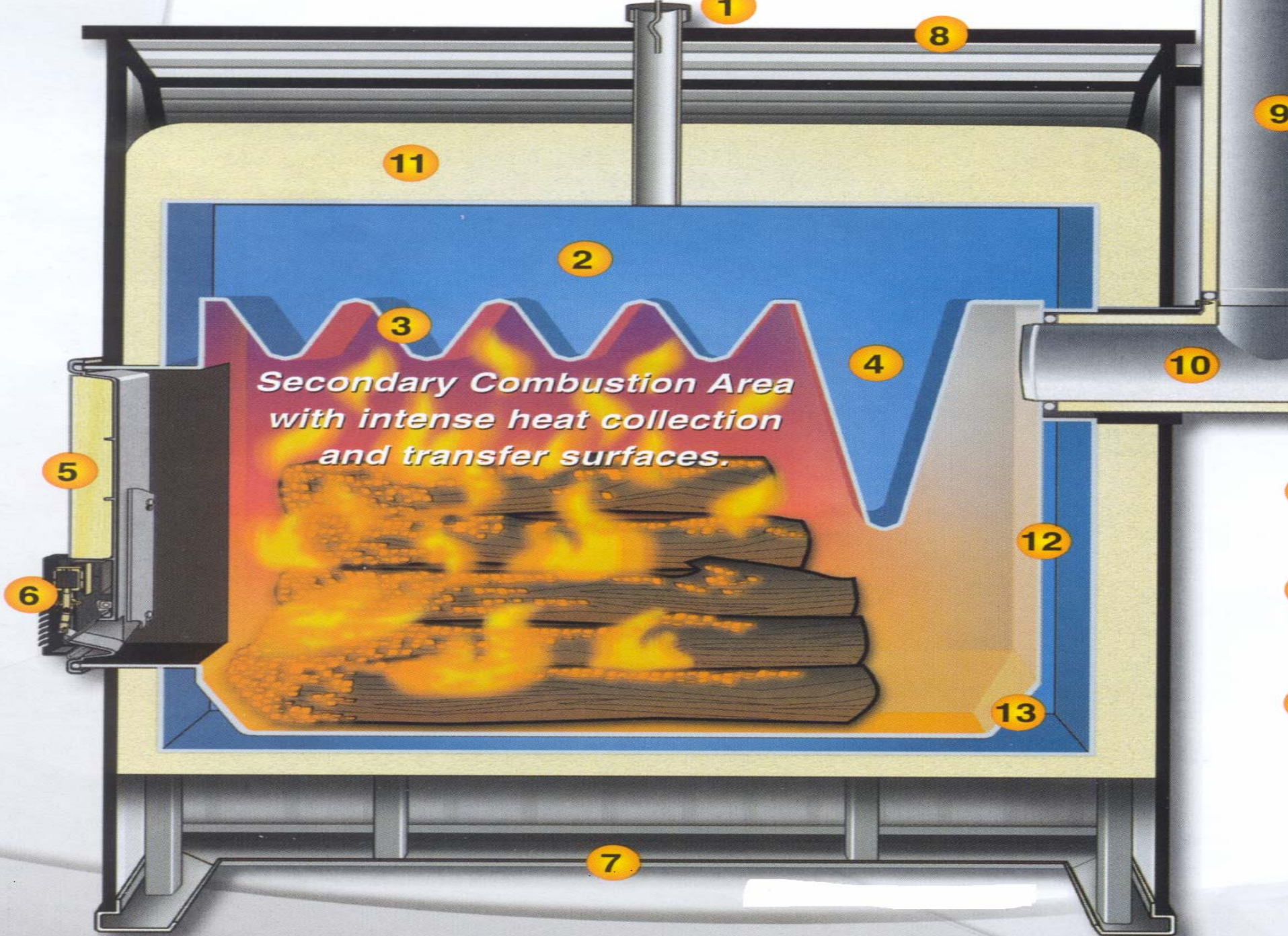
The Northern Michigan Experience



What Are They

- Basically a wood stove with a water jacket, housed within a shed
- Located outside the structure being heated
- Utilize a liquid media to transfer heat energy from the stove to the structure







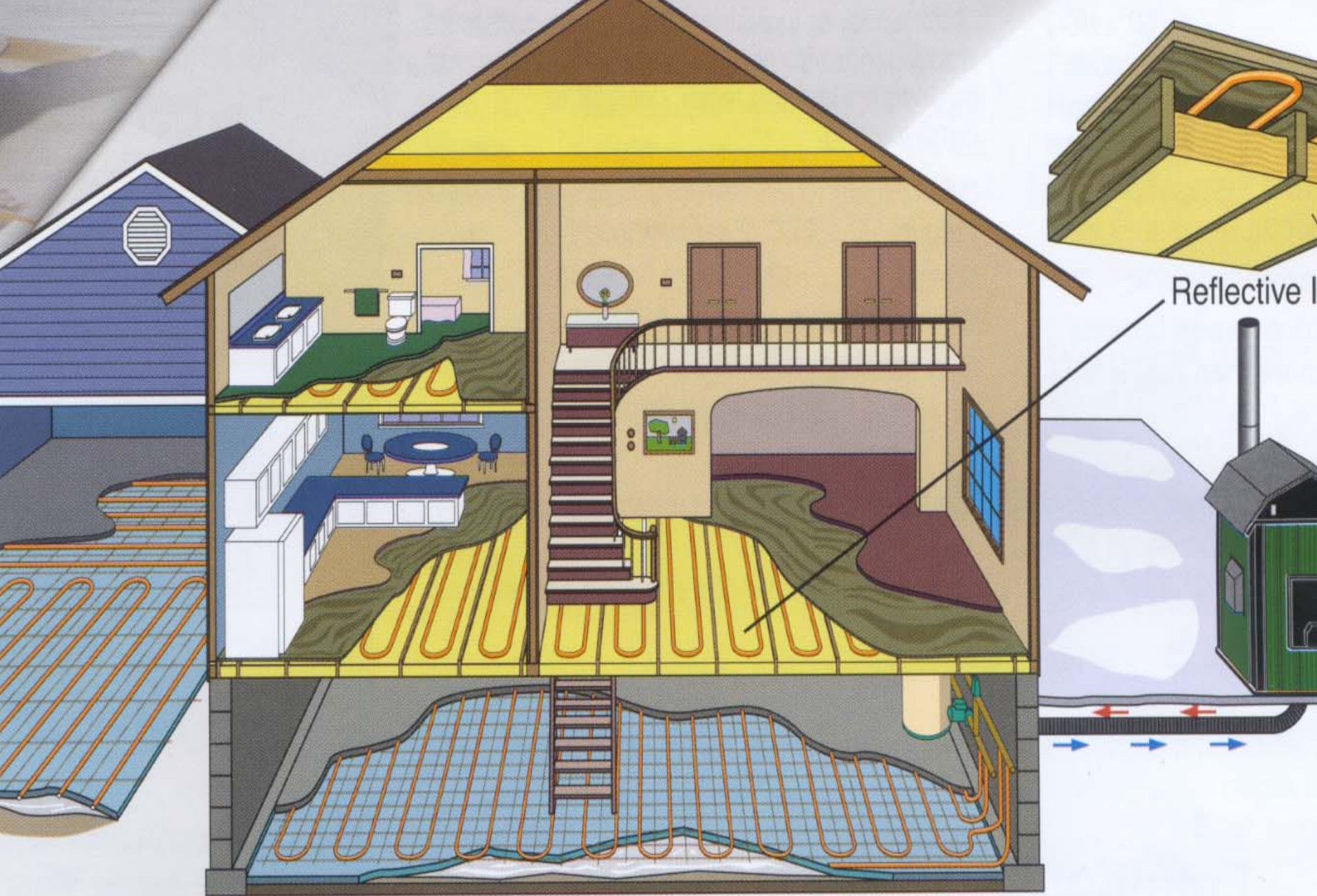
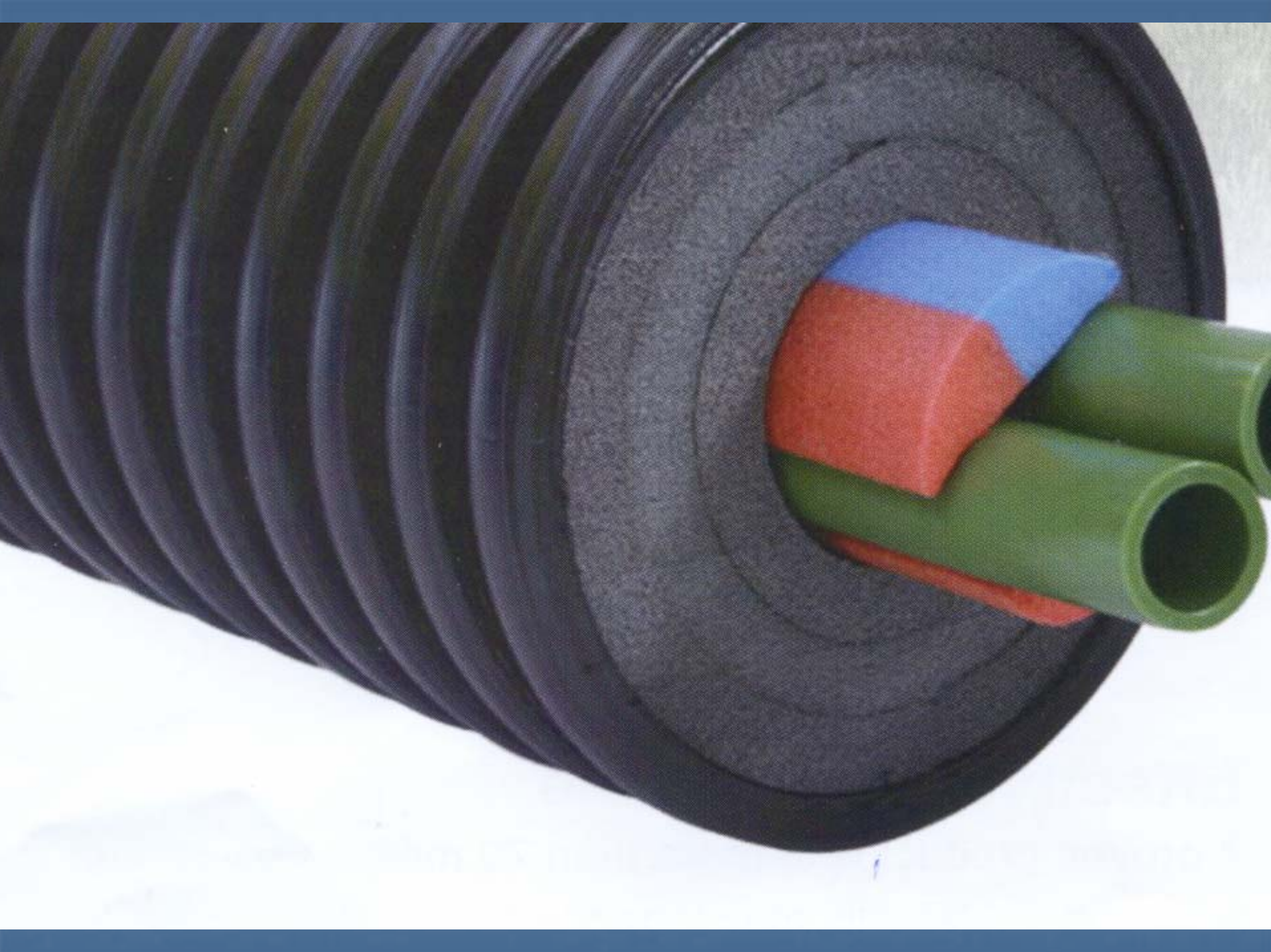


Illustration from Central Boiler



What They Are Not

- Not a true boiler, technically they are Outdoor Wood-Fired Hydronic Heaters
- Not designed to heat water under pressure, or above the boiling point
- Not inexpensive

Why Are They So Popular?

The price of carbon fuels and
electricity

Other Advantages

- Lower Insurance Rates
- Fuel stored outside
- Reduces smoke and soot inside home

Environmental Effects

- Burning Wood Fuel Does not Increase Greenhouse Gasses
- Improperly sited or operated units generate numerous smoke and odor complaints
- Significant number of units constitute an area source of PM 2.5

What Can Be Burned?

- They should burn only clean, seasoned wood.
- Unfortunately we also find people burning:
 - Garbage
 - Tires
 - Railroad Ties
 - Dead animals
- About any combustible substance that will fit through the doors.

What the Dealers and Manufacturers Claim

- Efficiencies up to 95%
- No need to split or season wood
- Burn times up to 96 hours on one fuel load
- Accepts fuel up to 30" diameter and 72" long
- Can supply all hot water needs

Problems

- 2 speed operation – on and off
- Firebox is surrounded by a water tank
- Large fireboxes encourage overloading
- In cool weather the units tend to smolder continuously rather than burn
- Short stacks/poor dispersion
- Put it all together, and.....





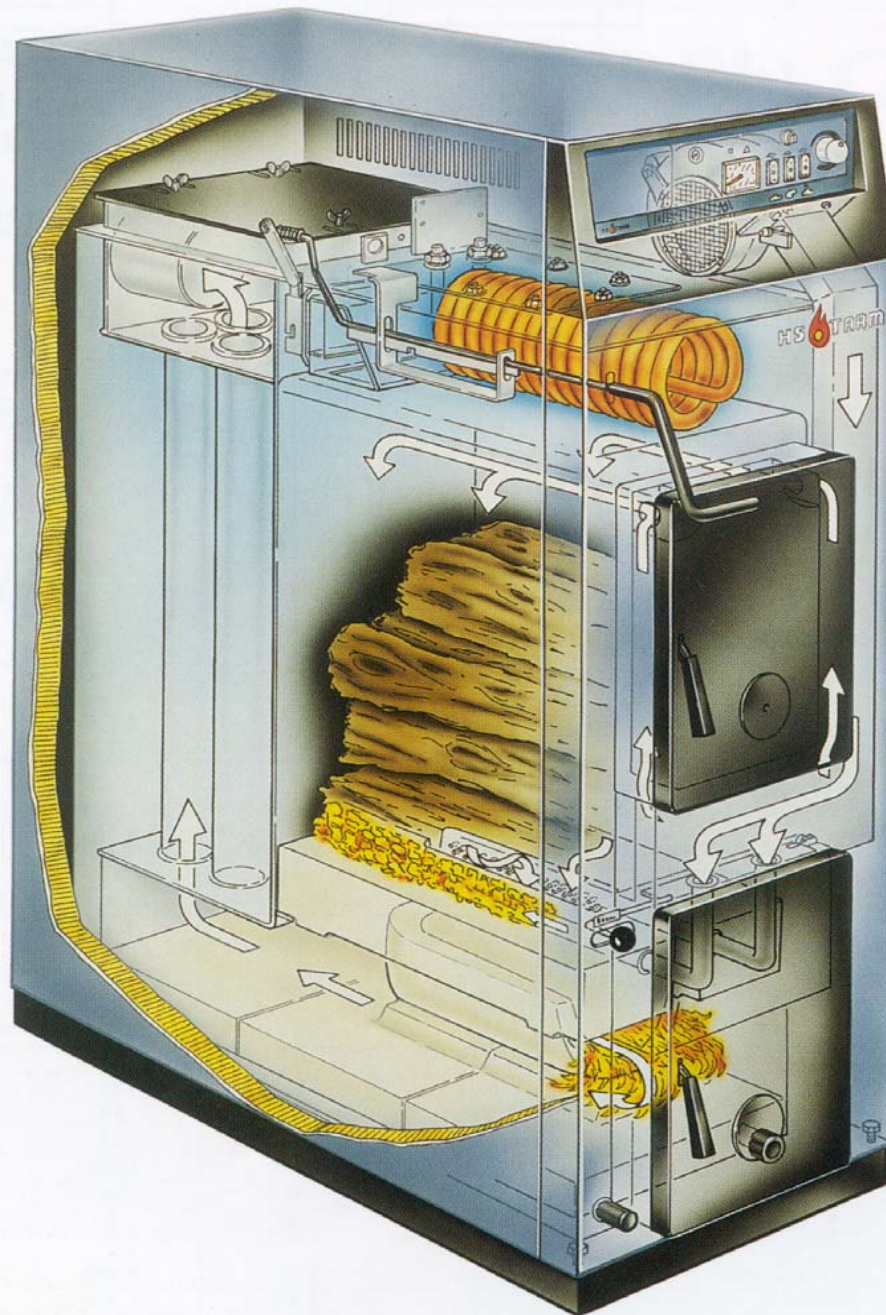


Getting a Cleaner Burn

- Secondary combustion is key
- Run in one mode – hot
- Use the heater like a big battery charger and
- Store the energy for later use

How Do You Do That?

BAXI/HS-Tarm Solo Plus-MKII



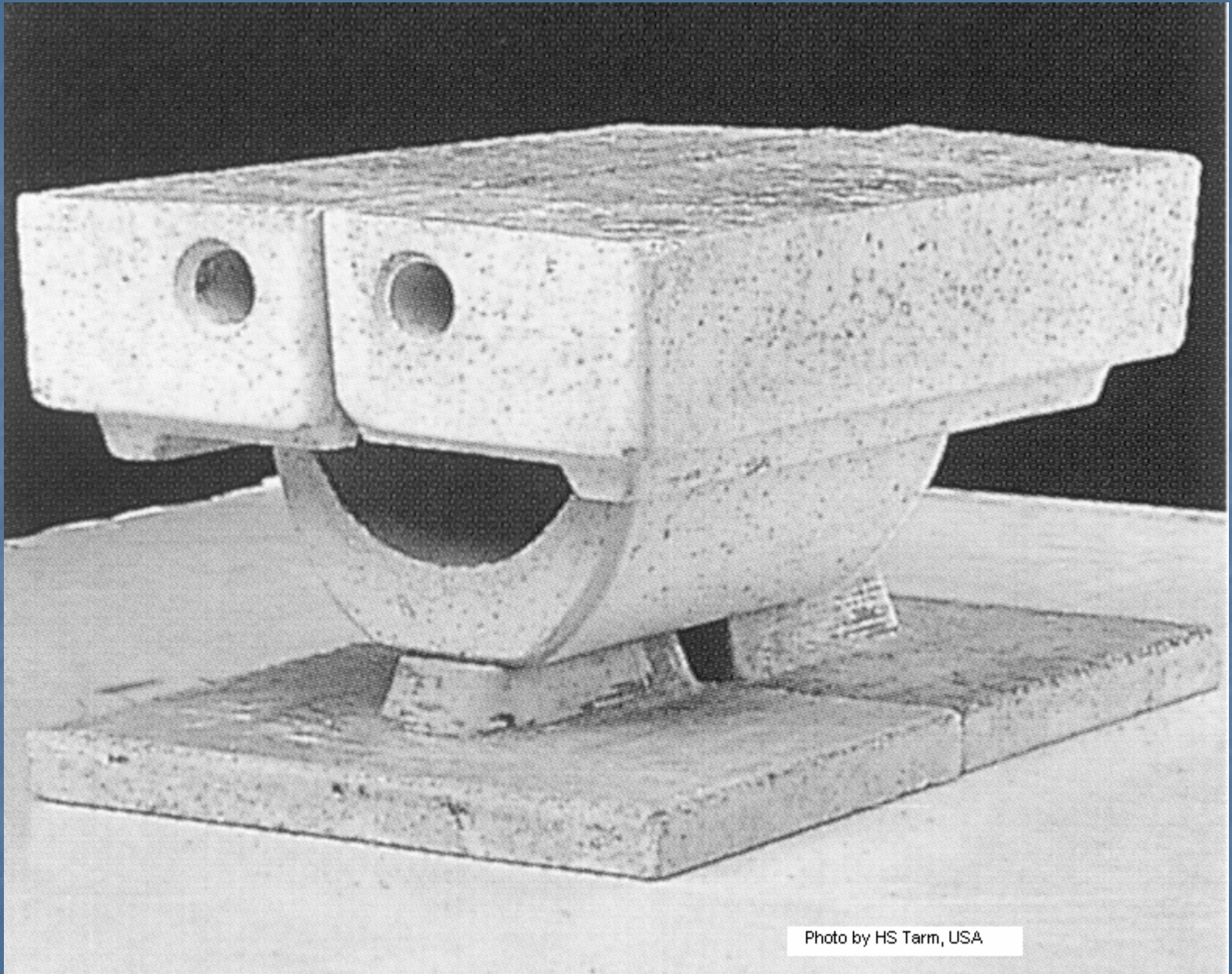


Photo by HS Tarm, USA

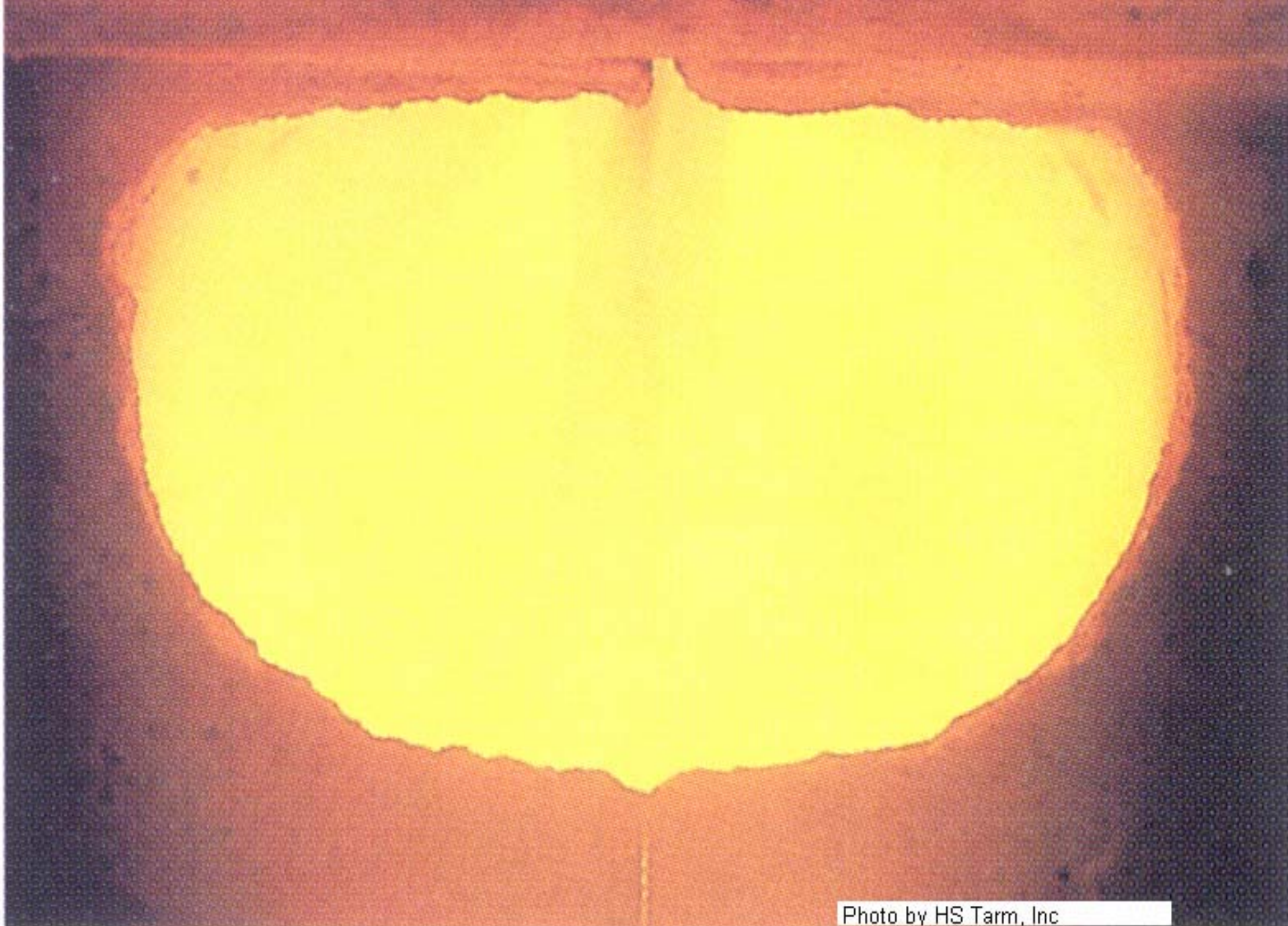


Photo by HS Tarm, Inc



BAXI/HS-TARM boiler with Heat Storage System.

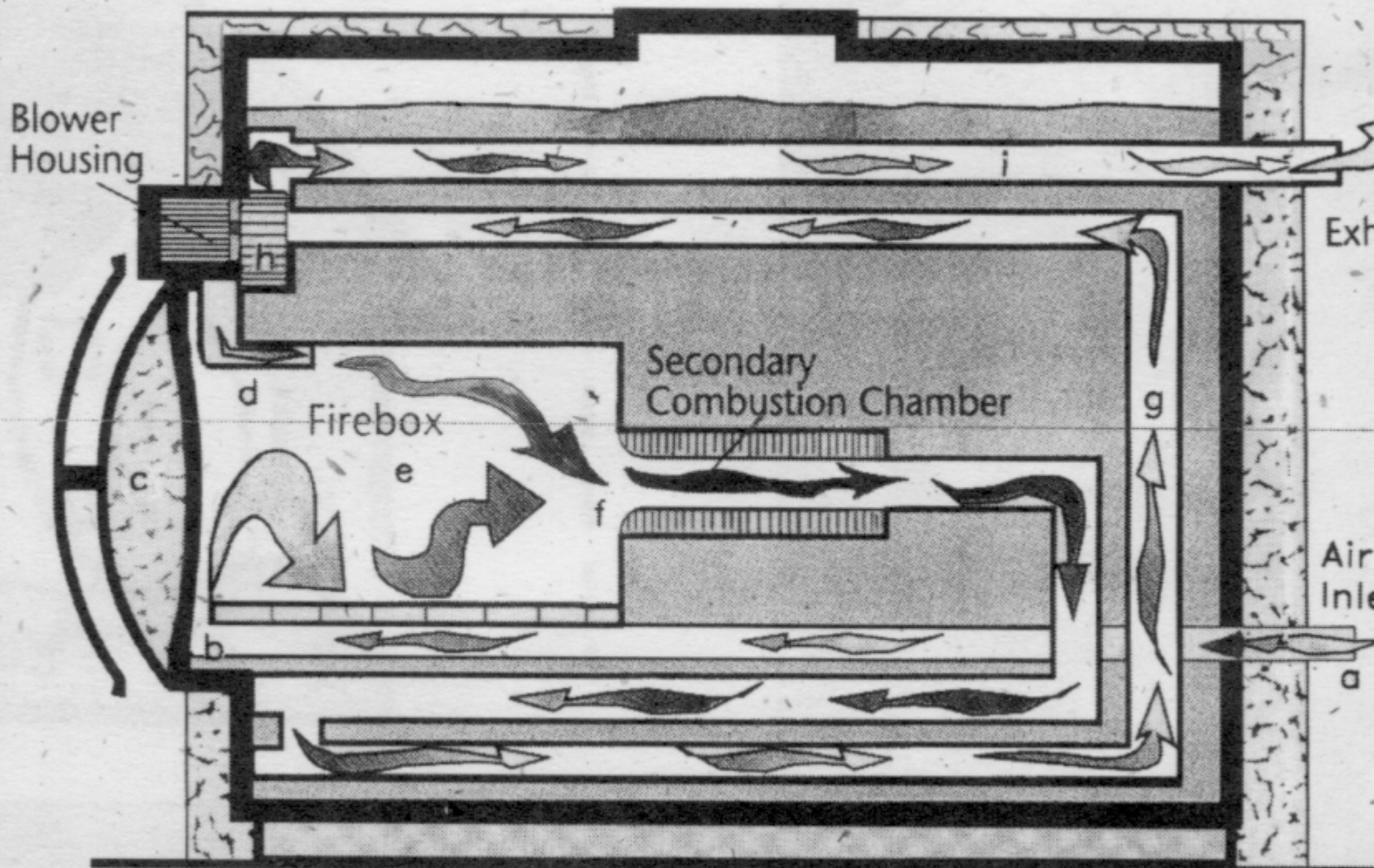


Illustration from Dectra Corporation









What Are We Doing?

- ASTM Workgroup E06.54.08
- Developing a test method specific to the outdoor units. Three units are undergoing bench scale testing.
- Could lead to a certification program similar to the Wood Stove Standard
- Individual states are moving forward with regulations specific to smaller units

- Encouraging responsible use of wood as a fuel
- Working with municipalities to draft local ordinances
- Working with owners to reduce smoke and odor
- Taking enforcement actions