Woodstove Changeout Programs

John Crouch
Director of Public Affairs
Hearth, Patio & Barbeque Association
September 27, 2016
Fairbanks, Ak
Goal for Today

• Changeouts – understand the
  – Strengths
  – Limitations

• EPA Certified Woodstoves –
  – Strengths
  – Limitations
WHY changeouts?

- Heat
- Most stoves pre-date 1988 rule
- Old stoves don’t wear out
- Incentivizes consumers to act
  - Brings emission reductions forward
  - Similar to Diesel changeout programs
- Opportunity for education
- No cookbook, each program unique
Changeout Fundamentals

Fundamentals of Wood Stove changeouts: (HPBA version)

1. Fuel neutral: wood, pellet, or gas – *anything* is better!
2. No fuel bias: let the consumer decide
3. Careful installation: NFI
4. Education benefit: leverage
   - 5. Old stove **must** be destroyed:
   - 6. Government incentives critical to “harvest the old stove”
History of Changeouts

- 1989, Medford, Oregon – 10%
- 1990-91, Seattle, WA
- 2000-2001, Great Lakes
- 2005, Pittsburg & Libby,
- 2010 - 1st settlement changeout
- Since then 17 major settlements
- Targeted Airshed Grants
Other Changeouts

- Washington State – every 2 years,
- Oregon, stimulus funds,
- California, local funds, very different programs in different areas,
- San Joaquin Valley – Serious NAA,
- Powertrain – Mobil Source
- Harley Davidson - $3 Million
- California Cap and Trade
Typical aspects of all changeouts

• Old woodstove is surrendered and Destroyed.
• Replacement may be anything cleaner: EPA-certified woodstove, pellet stove, gas hearth product, electric or oil heater
• Programs have 2 categories:
  – General
  – Low income
Changeout Issues

- Tension between replacing the most stoves, and decreasing smoke
- Where to set the incentive levels?
2 Whole Town Changeouts

- Crested Butte - 1989-1990
- Libby, Mt - 2005 – 2007
- Both collaborative efforts -- Government & Industry,
- Neither had natural gas and wood heat was common in most homes
- Both communities had back-stop regulation
- Both already had some cert. stoves
Crested Butte 1989-1990

- Voluntary Program,
- Change by date certain, OR,
  - Pay $30/month polluters fee – 3 years,
- New homes, more insulation, 1 stove
- Real Estate Changeout
- City inspected every home & installation, industry brought discounts on few models.
- 11,500 DD, Softwood Pine only
Crested Butte Results

- 516 Solid fuel appliances,
- 81 already certified,
- (29 exempt elderly coal burners)
- After changeout –
  - 195 replaced to certified stove
  - 135 removed
  - 76 no action
- Before/After results – 59% improved
Libby, Mt Changeout  2005-07

- **Annual** non-attainment
- No Nat Gas
- Asbestosis
- App 1800 stoves, 1/3 cert
  - (real estate transfer rule)
- Target = 1200 Homes
  - 900 ‘middle’, 300 ‘low’
- 7200 DD
- Fuel, Larch, Fir, Pine
Libby Vouchers

- Low income – complete woodstove, chimney, and hearth pad,
- Middle income,
  - $700 for any heater,
  - $200 for professional installation
  - $1400 for wood furnace
  - $100 for early birds, 1st 250
  - $350 for cat replacement/stove repair
- Our Big “Miss”
  - Should have had chimney voucher
<table>
<thead>
<tr>
<th>Item</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pellet Insert/Stove</td>
<td>121</td>
</tr>
<tr>
<td>Pellet Furnace</td>
<td>46</td>
</tr>
<tr>
<td>Gas Stove/Heater</td>
<td>50</td>
</tr>
<tr>
<td>Oil Stove/Furnace</td>
<td>19</td>
</tr>
<tr>
<td>Electric Heat Pump</td>
<td>14</td>
</tr>
<tr>
<td>Wood Furnace</td>
<td>11</td>
</tr>
<tr>
<td>Wood Stove/Insert</td>
<td>510</td>
</tr>
<tr>
<td>Surrendered Old Stove</td>
<td>9</td>
</tr>
<tr>
<td>Stoves Rebuilt/Cats</td>
<td>79</td>
</tr>
</tbody>
</table>
Backstop

• Both City of Libby, & Lincoln county adopted ordinances that made it illegal to continue to use an uncertified stove, unless registered and issued a sole source exemption.

• Tough vote, but essential to move holdouts to act.

• Easier in light of changeout.
10 years ago,

~ 1200 stoves,

- ~1,000,000 from industry,
- ~1,100,000 from EPA “earmark”
- ~1,000,000+ local residents

No Hydronic Heaters,

Most changeouts now use,

- $3500 - $4,000 for total costs
  - (lower 48 costs)
Lower PM 2.5

**PM$_{2.5}$ 24 HOUR STANDARD**

- 2005: 50 PM$_{2.5}$ in ug/m$^3$
- 2006: 40 PM$_{2.5}$ in ug/m$^3$
- 2007: 30 PM$_{2.5}$ in ug/m$^3$
- 2008: 30 PM$_{2.5}$ in ug/m$^3$
- 2009: 30 PM$_{2.5}$ in ug/m$^3$
INDOOR AIR QUALITY

• 20 homes - U of Montana study of indoor air quality
• Indoor PM$_{2.5}$ levels measured for 24 hour periods pre- & post-changeout
• Homeowners kept logs during the testing for unusual events
• Average reduction in indoor PM$_{2.5}$ levels to be approximately 72%
Harvest Time
Lesson’s learned from Libby

• Hidden wood heat
• Communication challenges
  – “Really, a free stove?”
  – Just getting by families
• Wood vs. more expensive options
• Rental & landlords were tricky
• Limited number of good installers
• Fixed many potential fire hazards
• Dedicated “Champion” was key
Operators – Not Numbers

• Stove Fair
• Burn Smart Fair
• Local Coordinator followed up & intervened to re-teach
• Hammered away at moisture
• Emphasized tall Chimneys
• Did Not – worry about stoves g/h
EPA test Method – 30 years old

• Based on Douglas Fir Lumber
Lab Conditions

• Smoke diluted by ‘ambient air’
  – From Laboratory ~ 70 degrees
• Single story stack
• Light load, 7 lb/ cu ft
• 4 burns, averaged, low to high
• More surface area than cordwood
• Lower the passing grade, the closer it is tuned
Numbers only go so far

• Not that grams/hour have no value,
  – 3.5 g/h stove is certainly cleaner than a 7.4 g/h stove.
  – Variability in method 2-3 g/h

• Method provides guide to:
  – “Good, Better, Best”

• Operator makes big difference
We’re Stuck with this Test

- Areas that understand limitations of method can mitigate them
- Good chimneys err on taller side
- Wood moisture – obvious
- Piece size - smaller is better
- Details in new EPA rule such that industry must use cribs
- Someday, a real world cordwood method – but it won’t be 2.5 g/h
Summary

• Changeouts can work,
  – Change appliances, and help change wood burning culture
  – Not a panacea

• Grams per hour are indicator, but only that
  – Laboratory numbers only
  – Operators are the real key