



Washington County, Oregon
**WOOD STOVE
EXCHANGE**
Let's clear the air.

Year One Report

July 1, 2016 – June 30, 2017

Introduction

A major source of particulate matter pollution in Washington County are older and uncertified wood stoves. Many residents throughout Washington County have older wood stoves that produce an excessive amount of residential wood smoke, which negatively affects air quality, the local environment and residents' health.

Wood stove change-out programs have proven to be an effective approach to reducing particulate matter pollution, especially in winter months. Washington County Department of Health and Human Services and the Office of Community Development partnered to develop the Washington County Wood Stove Exchange program (WSE) to provide grants (full-cost) and rebates (between \$1,500–\$3,500) to households that change to a cleaner heating source.



Visible smoke and pollution in Washington County

The Wood Stove Exchange program was designed to:

- Reduce particulate matter pollution, resulting in better air quality and a healthier community.
- Potentially improve indoor air quality in homes with older wood stoves, reducing the symptoms of asthma and other respiratory conditions.
- Avoid public health and economic consequences of violating the federal Clean Air Act (i.e., nonattainment designation in Washington County).

The pilot year goal was to replace 50 older wood stoves between July 2016 and June 2017. The WSE program launched on August 24, 2016, with a website (www.WoodStoveExchange.com) including an overview of the program, income eligibility, new device options and an application. The pilot year served several purposes:

- Develop the infrastructure (e.g., vendor contracts, intake and exchange process) to ramp up the program, and quickly adjust to an appropriate scale as additional funds became available.
- Identify the most cost-effective and efficient methods of outreach and to raise awareness of the program.
- Monitor the effectiveness of the marketing and outreach strategy and make enhancements to the strategy when necessary.

Pilot Year Outcomes

The first year of the program saw great success. Highlights are below.

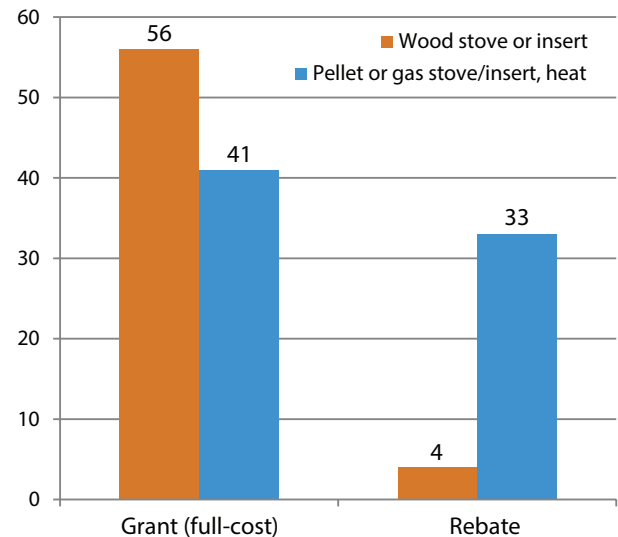
Results and efforts from the first year

- Received 322 applications
- Released 170 projects
 - ◆ Of the 227 homes and stoves assessed during the first year, 170 were deemed eligible, and participants were sent letters to proceed with their exchanges.
- **Completed 134 exchanges (projects), including 97 grants and 37 rebates**
 - ◆ The average payout of the completed projects was \$3,927.12.

- Leveraged \$32,972 utilizing other incentives and tax credits
 - ◆ Average leveraged dollars per first year replacement = \$246 per project
 - ◆ Sources include Energy Trust incentives, Oregon and federal tax credits, and contractor and manufacturer discounts
- Replacement options mix
 - ◆ Overall – 74 Pellet/Gas/Electric devices, 60 Wood stoves/inserts
 - ◆ Grant – 41 Pellet/Gas/Electric, 56 Wood stoves/inserts
 - ◆ Rebate - 33 Pellet/Gas/Electric, 4 Wood stoves/inserts
- Reduced particulate matter emissions from replacements (using EPA emissions calculator)
 - ◆ Over 9.5 tons of PM2.5 & PM10 emissions prevented
 - ◆ Over 40 tons of other pollutants prevented
 - » 34.90 tons of Carbon Monoxide (CO)
 - » 8.6 tons of Volatile Organic Compounds (VOCs)
 - » 1.25 tons of hazardous Air Pollutants (HAPs)

NOTE: See Appendix for EPA emissions calculator chart.

Wood versus non-wood devices installed



Community outreach and education

- Conducted 53 community presentations that reached over 500 residents
- Attended and conducted outreach at large community events including the Washington County Fair, Energy Resource Conservation Fair, and the Latino Cultural Festival
- Distributed over 2,000 fliers, 15,500 door hangers and 21,500 direct mailers
- Reached an estimated 22,000 local residents with posts and ads on Facebook
- Wood Stove Exchange website at WoodStoveExchange.com had 11,324 visits

NOTE: See Appendix for sample of website metrics from first three months.

Long-term outcomes

- This program's goal is to serve up to 700 households.
- Wintertime occurrences of exceeding the national particulate matter standard will be reduced.
- Annual average particulate matter concentrations will be reduced.

These long-term outcomes require monitoring of particulates and pollutants over the next four to five years to assess the effectiveness of the Wood Stove Exchange program.

A diverse mix of supporters and partners are essential to meet the long-term outcomes and program goals. Some of the other project partners that have been instrumental in the program's progress so far include: City of Hillsboro (project funder), Intel (project funder), City of Cornelius, Community Action, Centro Cultural of Washington County and the American Lung Association.

Successful partnerships provided additional specific support:

- Government partners provide technical support and data
- City partners implement policies and provide community education

- Community organizations provide education and outreach
- Business partnerships to replace wood stoves

NOTE: A comprehensive partner list is included in the Appendix of this report.

Best Practices

Program staff researched and studied nearly a dozen wood stove change-out programs and communicated with several wood stove program managers to glean the best practices, strategies and lessons learned to design the most effective countywide program. Other resources for best practices included wood stove change-out implementation plans from the U.S. EPA, the Hearth Patio & Barbecue Association and the Alliance for Green Heat. Here are some of the best practices used to develop processes and implement the program.

- Begin the program in the fall or winter.
- Program should last two to three years (or more).
- Include education that supports the change-outs.
- In a public information campaign, while occasionally addressing specific issues can be effective, presenting all potential issues meets the needs of the larger audience.
- Engage the public by speaking with individuals and groups about their questions, concerns and needs. Speak positively about wood burning to residents, and shine the light on wood-to-wood replacements with other fuel sources as options.
- Emphasize one point of contact to answer questions about stove exchanges and conduct one-on-one follow-up and proactive outreach. This local presence provides technical assistance and provides participants all the information they need to make a change.
- Focus initially on economic savings, efficiency, ease of use, less maintenance/cleaning, and safety, rather than health. Once people are engaged in the program, then emphasize the potential for local impacts.
- Utilize partners and resources to raise awareness and increase program efficiency.
- After the early adopters, target specific audiences to reach potential participants with messages such as exchanging the old stove could save money, provide easier operation and less maintenance, protect your home, improve indoor air and your health, and improve air quality.
- Data-mine using data gathered from multiple sources as a guide, review data to locate the most likely participants, homes that may have a stove, people who are likely to exchange stove.
- Track and evaluate all potential and in-process installations to ensure that processes are working smoothly and the program is meeting the needs of the household.
- Conduct exit surveys or evaluations to facilitate getting post change-out data.



Mac approves of the new stove insert.

Using Best Practices Resulted in These Outcomes in the Pilot Year

- Community organizations and industry and business partners were key to the overall outreach effort. Industry and cities provided funding, materials and announcements through their networks and local media.
- Fliers, rack cards, postcards, posters, doorhangers were all used; the rack cards and post cards proved most effective. Articles in the media, videos on local cable network TVCTV, Facebook posts, and community events and presentations were also effective.
- Presentations to community groups, community participation organizations, neighborhood associations and city council meetings, proved effective when speaking to each person/group's questions, concerns and needs. In many instances, applications were completed on the spot.



An episode of "Community Matters" on TVCTV featured the WSE.

- The public information campaign aligned with education on air quality, clean burning, and non-wood burning devices may have influenced the installation of more non-wood burning devices than wood stoves or inserts.
- Focusing on the needs of the participant and their home — economic savings, efficiency, ease of use, less maintenance/cleaning, safety — during the initial in-home assessment and reiterated at the post-assessment, is an inroad and almost always leads to understanding by the resident of air quality issues and in some cases a realization the exchange has provided a health benefit in their own home.
- The initial in-home assessment and the post-assessment are utilized to continuously solicit participants on their experience in the program and then use the anecdotal information to enhance processes and improve. The post-assessment is also used to best promote the program, asking the resident to spread the word and leaving rack cards for them to hand out to neighbors, co-workers, friends, etc.
- Data mining proved very beneficial for targeting outreach. The program began with the DEQ survey, requested and disseminated County Assessment and Taxation data on all residential lots in Washington County, and collaborated with large utilities and municipal services. The tax data was most effective, finding that most homes in population centers (Hillsboro, Beaverton, Aloha) built before 1978 only had electric heat and were more likely to have stoves. Postcard mailings were directed to these homes with good response and proved very cost-effective.
- Staff from the Department of Health and Human Services and Office of Community Development continue to meet bi-weekly to discuss the progress of the program and monitor the effectiveness of the marketing and outreach strategy.
- A participant survey was distributed to over 120 participants on June 22, 2017. Staff will evaluate the results in August and September to gauge post-exchange satisfaction levels and use information to fine-tune the program and refine communications.

Lessons Used in Developing and Implementing the Program

The points listed below were gleaned from the research of successful wood stove change-out programs and the resources previously noted in "Best Practices." These lessons learned were used in developing the processes for the first year and for informing the program outreach, education, presentations and materials.

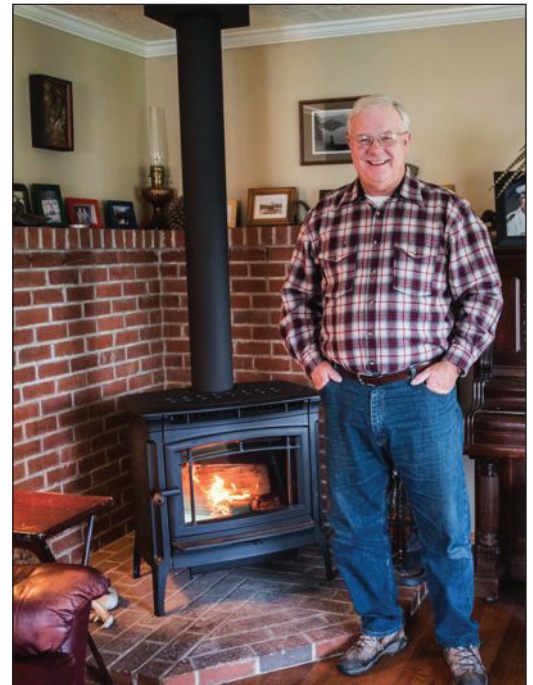
- Unlike other demographic breakdowns, wood stove users do not break down easily into demographic pools.

- Eliminating the use of wood is not an effective message because many wood burners are passionate about the enjoyment and benefit of having a fire.
- For long-time woodburning residents hesitant to change, messaging that upgrading to a new, certified stove will likely use less wood, lessen maintenance, provide the same amount of heat, increase safety and may lower insurance rates, is often well-received.
- Messages that highlight the health benefits of stove exchanges is typically not well-received because they are not deemed credible, except when visibility is an issue in a community.
- Provide information on how old stoves will be recycled and communicate it in the program.
- Education about the overall economic and health impacts is essential and helps behavior change, but it also takes years of effort.
- Create a rebate system that gives participants the ability to “shop” at program contractors for the best device for them. The rebate should be deadline-driven to help motivate the participant.
- People often do not know that using wet wood, burning garbage, or using chemically-treated paper, mail including plastic, or color-printed items for starter material are incorrect burning methods.
- Use visual tools in presentations to demonstrate the benefits of new wood burning and clean heating technology,
- People like program representatives to come out and give them advice on installation, heating options and program specifics.

Overall Lessons Learned in the Pilot Year

Below are the specific lessons learned from the first year of the program, solutions and the results.

- The extensive outreach in the late summer of 2016 helped drive a high level of interest leading to a large influx of applications in October. This led to a waitlist longer than anticipated. A lengthy waitlist could be thought of as a “good problem to have.” In response, and with additional funding allowing the program to increase the original goal for exchanges, staff increased the number of assessments performed per week, and the contract amounts were increased for each contractor. Lead times for assessments and exchanges shrank. Going forward, outreach efforts will be more uniform, resulting in shorter lead times and a more uniform work flow.
- The moisture meters handed out to each resident getting a new wood stove/insert provides a starting point of educating the long-time wood burning residents. Most participants used good burn practices, but the majority of those were not aware of the effect of moisture content on start-up, smoke levels and efficient fires. Many were bringing wood in directly from outdoor storage piles and burning immediately, and not aware that the moisture content in that wood is likely to be over 20 percent. Providing the free moisture meter to the participants to include in their process should reduce the smoke emitted from their new device even further.
- A large portion of residents are burning using incorrect methods, such as using unseasoned wet wood, using mostly softwoods or scrap and treated wood, and some regularly burn garbage. Education from presentations and information on the website provide a message on good burning methods and help highlight personal benefits, but the in-home assessment by staff and additional education from the contractors drives home the message, even for those hesitant to change.



Ray of Beaverton loves his new wood stove.

- Completion timelines for rebate projects were longer than expected. The rebate portion of the program gives those participants the ability to shop at program contractors. The rebate can be used when the family is ready to make a change, but needs to be dependent on a deadline. Notice to Proceed letters sent to participants include a deadline of 90 days from the date of the letter to complete their exchange.
- Responses at early presentations and feedback at in-home assessments showed there is confusion among residents in understanding the removal or resale of old stoves and the Oregon law requiring the removal of uncertified stoves when selling a home. Some people have contacted the program and stated they haven't used their stove for a few years because they were told their old stove is "illegal" to use. Other callers, obviously not aware of the law, have stated they sold their "illegal" stove in anticipation of selling the home. Presentations have been revised to focus on informing residents of the current Oregon law and the importance removing old wood stoves from the marketplace.
- In an effort to use the application to determine what types of devices residents have in their homes, the initial application included check boxes for Open Hearth Fireplace and Wood Burning Firebox (although these devices do not qualify for the program). Applicants were confused, thus the program initially had several ineligible applications. The application was revised, eliminating these two choices, and all subsequent applications are qualifying.

Pilot Year Report Summary

The education component and program participation progressed in the first year through building on program elements, enhancing best practices, and refining processes and strategies from lessons learned.

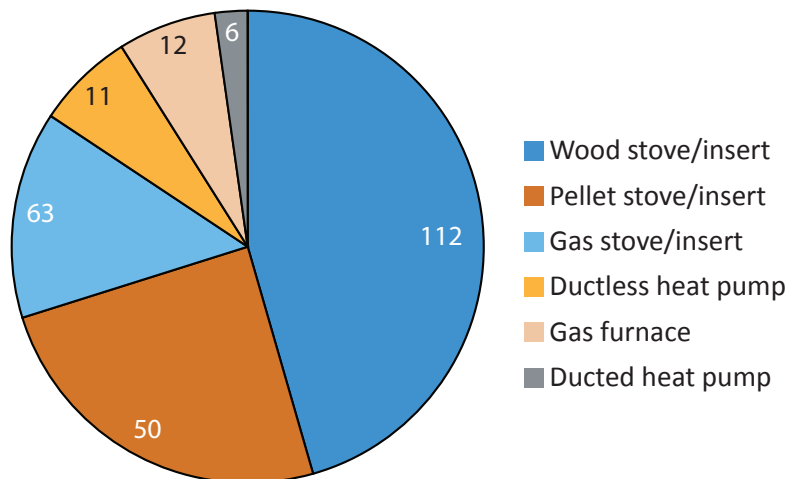
The major successes of the Wood Stove Exchange program pilot year include:

- Nearly tripled the initial first year goal of 50 exchanges
- Expanding partnerships to provide additional support and raise awareness
- Growing word-of-mouth about the program, increasing awareness of the program and informing residents on cleaner burning methods and devices, and awareness of air quality issues
- Cost-effective, data-driven targeted outreach reaching over 72,000 people

The commitment of community organizations, business, industry, utilities and funders has been critical to the success of developing and implementing the program in this first year.

Preferred new heat source

More than half of the eligible participants selected new devices that use electric, gas or pellets (a lumber by-product).



Appendix

EPA Emissions Calculator Chart

Pollutant Emissions Prevented	Tons
PM2.5 + PM 10	9.52
Carbon Monoxide (CO)	34.9
Volatile Organic Compounds (VOCs)	8.6
Total HAPS (Hazardous Air Pollutants)	.81
Nitrogen Oxides (NOX)	.38
Sulfur Dioxide (SO2)	.05

Partnering Organizations

- American Lung Association
- Boy Scouts of America
- Centro Cultural
- City of Beaverton
- City of Cornelius
- City of Hillsboro
- Community Action of Washington County
- Energy Trust of Oregon
- Enhabit
- Environmental Protection Agency
- Fireside Home Solutions
- Hillsboro Police Department
- Intel
- National Hearth, Patio and Barbecue Association
- NW Natural
- Oregon Department of Energy
- Oregon Department of Environmental Quality
- Oregon Department of Forestry
- Oregon Health Authority
- Oregon Hearth, Patio and Barbecue Association
- Portland General Electric
- Washington County Community Participation Organization Program
- Washington County Solid Waste & Recycling
- WCCCA 911
- Westside Economic Alliance

Website Traffic

The graphic below shows the first three months of website views and timing of outreach.





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