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Clean Heat for Clearer Air: A Wood Stove Transition Strategy

Breathe Easy, Ellensburg



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Clean Heat for Clearer Air: A Wood Stove Transition Strategy

BREATHE EASY, ELLENSBURG

Providing Solutions to Reduce Criteria Air Pollutants and Improve Community Health by Replacing Residential Wood Stoves in Ellensburg

Location: Ellensburg, Washington

Overview

Program Goal: Clean Heat for Clearer Air is a targeted initiative designed to improve air quality, protect public health, advance environmental justice, and accelerate decarbonization across high-impact communities in Ellensburg. This strategy advances environmental justice by addressing the disproportionate environmental and health impacts faced by overburdened communities, ensuring equitable solutions for all.

Through coordinated outreach, technical support, and financial assistance, the program will make cleaner heating options accessible to all residents with priority given to low-income and historically overburdened communities

The program's primary goal is to reduce emissions of fine particulate matter (PM_{2.5}), carbon monoxide (CO), black carbon, and other harmful pollutants from uncertified wood stoves. These pollutants contribute to wintertime inversions and degraded air quality across Kittitas Valley.

By supporting the transition to EPA-certified wood stoves, pellet stoves, electric heat pumps, and other clean alternatives, the program will deliver measurable emissions reductions and help Ellensburg meet Washington State's air-quality and climate goals.

Problem: In Ellensburg, older, uncertified wood stoves remain a common heating source, as shown in Figure 1, many census tracts rely heavily on wood for residential heating.

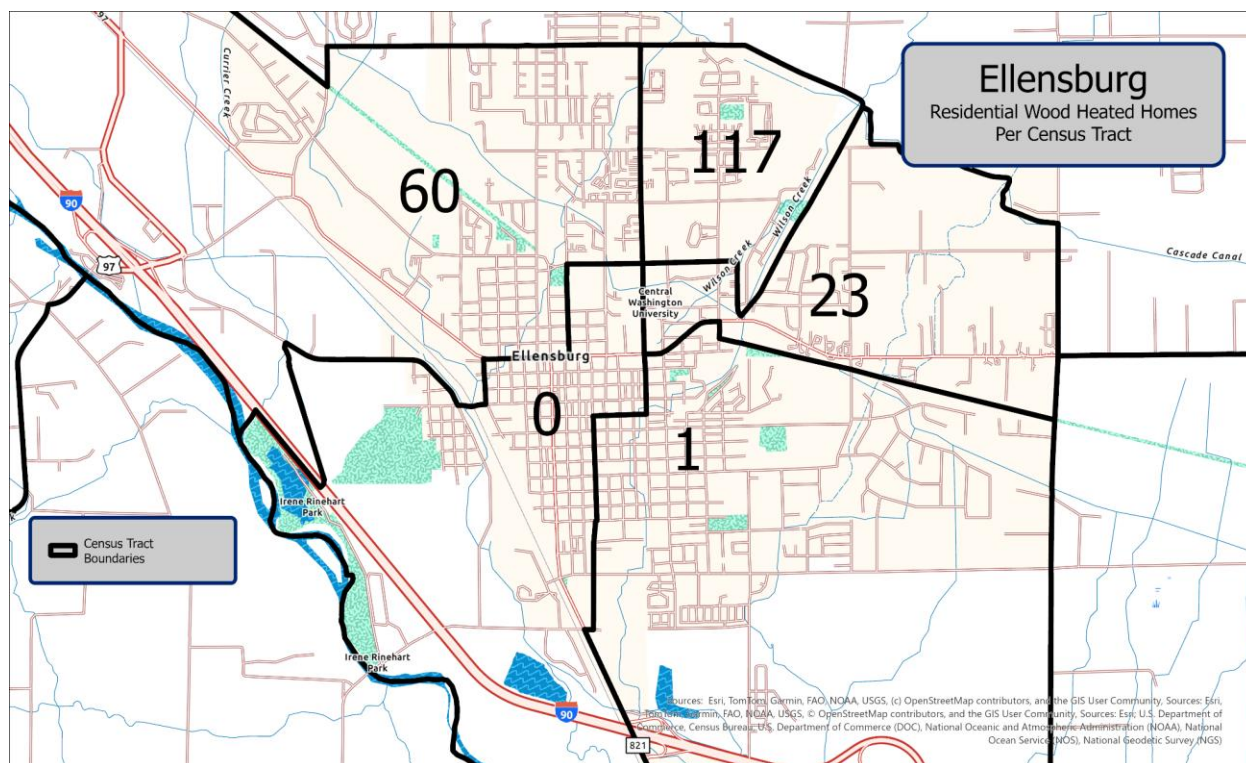


Figure 1. Ellensburg | Residential Wood Heated Homes Per Census Tract. Map created by Community System Solutions – 2025. A dynamic version of this map is available at <https://arcg.is/0WTm540>

These devices emit harmful pollutants such as delicate particulate matter (PM_{2.5}), CO, and volatile organic compounds (VOCs) that degrade both indoor and ambient air quality, increasing risks of respiratory and cardiovascular health issues. During the winter months, the city's bowl-shaped geography traps pollution, causing visible haze and unhealthy air-quality episodes.

Community input confirmed that wood smoke is a leading local concern. As detailed in the Incorporation of Community Input section, the community identified winter home-heating smoke as one of the most pressing air-quality issues. Figure 2, below, maps areas where residents most frequently reported poor air quality, with denser clusters of reports shown in yellow, and sparser reports in purple.

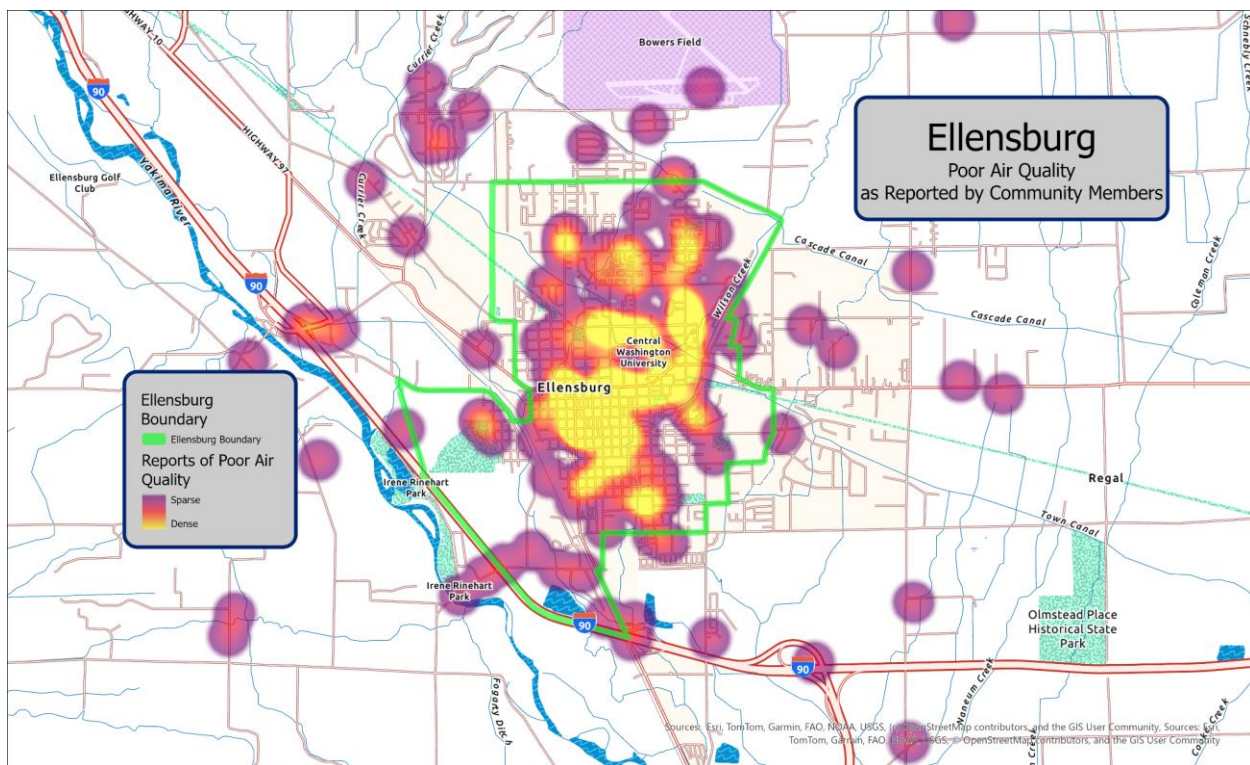


Figure 2. Ellensburg | Poor Air Quality Reported by Community Members. Map created by Community System Solutions - 2025. A dynamic version of this map is available at <https://arcg.is/0WTm540>

Solution: Replacing uncertified stoves with EPA-certified models, pellet stoves, or electric heating systems can dramatically reduce harmful emissions and improve air quality in Ellensburg. These upgrades are especially impactful in communities where wood burning is a primary source of home heating.

Ellensburg has implemented smaller-scale change-out programs in the past, which proved successful. The proposed strategy builds on those efforts, combining lessons learned with expanded incentives, bilingual community outreach, and new training components for both homeowners and local installers.

Key Project Components

This strategy combines technical solutions with inclusive community engagements to ensure that cleaner heating systems reach those who need them most. The following components outline how the program will be implemented:

- **Community Education and Engagement:** Outreach will focus on inclusive participation through community listening sessions, collaborations with local nonprofits, and transparent communication tools such as ArcGIS Hubs. Public engagement will be held at wheelchair accessible venues, include bilingual (English and Spanish) materials, interpreters at meetings, and hybrid in-person and virtual options to remove participation barriers.
- **Financial Incentives:** Rebates or vouchers will help offset the cost of replacing uncertified stoves, with priority given to low-income, medically vulnerable, and

historically overburdened communities. Landlords participating in upgrade for rental properties will also be eligible.

- **Professional Installation and Training:** Certified installers will ensure that replacement systems are properly installed and compliant with safety standards. Each installation will include hands-on user training for safe and efficient operation. Installers will also complete specialized instruction on installation and maintenance best practices, ensuring consistent quality across all installations.
- **Chimney Replacement (if applicable):** Where structural issues are identified, chimney replacements or repairs will be included to ensure safety and optimal performance of new heating systems.
- **Safe Disposal of Outdated Stoves:** All replaced wood stoves will be safely decommissioned and rendered inoperable to prevent resale or reuse, in accordance with Ecology and local air quality regulations.

Criteria Air Pollution Reductions

Criteria Air Pollutants to Be Reduced

This project focuses on the reduction of the following criteria air pollutants emitted in significant quantities by uncertified wood stoves, commonly used for residential heating in Ellensburg, all of which are identified under the Clean Air Act and targeted by the Washington Department of Ecology:

- Particulate Matter (PM_{2.5} and PM₁₀)
- Carbon Monoxide (CO)
- Nitrogen Dioxide (NO₂)
- Ozone (O₃) - indirectly reduced through the decrease in volatile organic compounds (VOCs) that contribute to its formation.

Methods for Reducing Criteria Air Pollutants

The Clean Heat for Clear Air program will facilitate the voluntary removal and replacement of uncertified, high-emission wood stoves with cleaner, more efficient alternatives, shown in Figure 3. Each replacement directly reduces emissions of fine particulate matter (PM_{2.5}), carbon monoxide (CO), and other harmful pollutants associated with residential wood burning.



Figure 3. Examples of EPA-certified stoves that can provide clean, efficient home heating.

EPA-certified stoves have up to 90% fewer particulates than uncertified models, while electric or gas heating systems virtually eliminate wood smoke emissions. To achieve these reductions, the program will:

- Provide financial incentives—historically ranging from \$350–\$1,500 per household—and increased under this strategy to \$1,500–\$3,000 for homeowners and \$2,000–\$3,000 for landlords—for residents and landlords to replace uncertified wood stoves with:
 - EPA-certified wood or pellet stoves
 - Natural gas appliances
 - Ductless mini-split electric heat pumps
- Prioritize participation from low-income, medically vulnerable, and historically overburdened residents.
- Ensure safe disposal by decommissioning all removed stoves (Figure 4, below) rendering them inoperable to prevent resale or reuse.



Figure 4. Example of an uncertified, traditional wood stove, targeted for removal and decommissioning.

Estimated Impacts

This project is expected to yield significant health and environmental benefits, including:

- Reducing fine particle pollution (PM_{2.5}) improves air quality both indoors and outdoors.
- Health co-benefits:
 - Fewer asthma attacks and respiratory flare-ups
 - Reduced cardiovascular stress
 - Lower exposure to air toxics like formaldehyde and benzene
 - Decreased hospital and emergency room visits during winter inversion events
- Improved energy efficiency and cost savings for residents using new heating systems. This is especially true for homes transitioning to electric or air source heat pumps, as natural gas rates continue to rise under carbon pricing.
- Enhanced indoor air quality, particularly for homes near neighbors who still rely on wood heat.

As shown in Figure 5 (below), EPA certified stoves emit far fewer particulates than uncertified models, demonstrating the potential for significant air-quality improvements through replacement programs. Although exact reductions vary, statewide data show that similar change-out programs have reduced PM_{2.5} emissions by up to 77 tons per year.

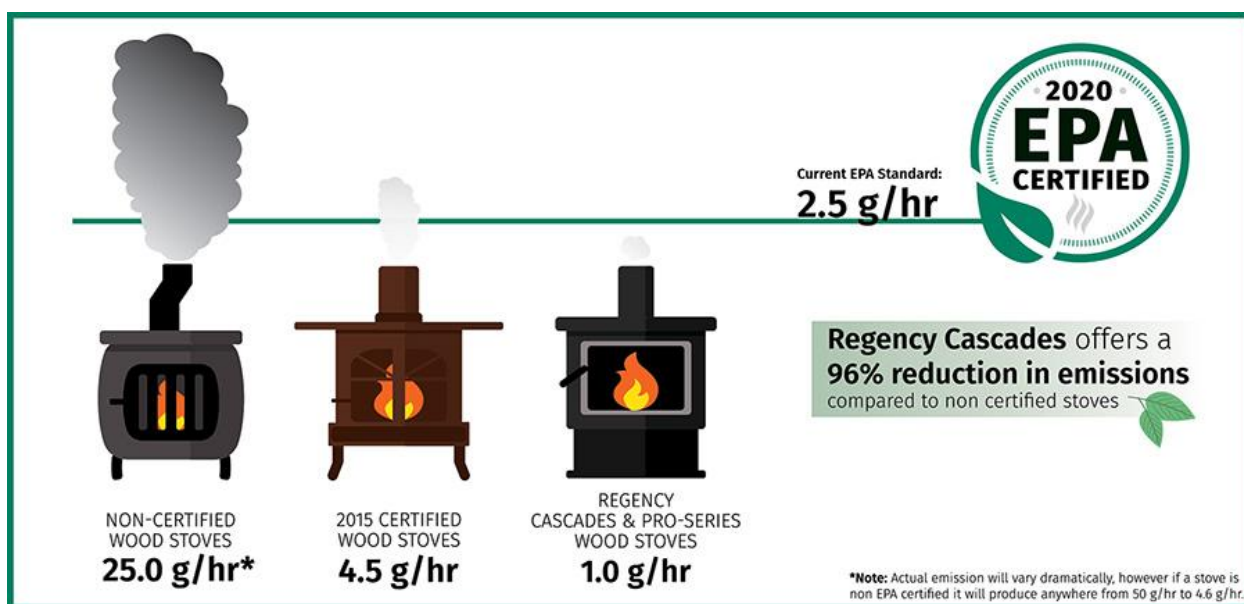


Figure 5. EPA-certified versus uncertified wood stoves: comparison of emissions and performance.

Thousands of households across Washington have benefited from this program model.

Source: [Ecology Blog – April 19, 2024](#)

Impact vs Cost: High impact / Moderate cost

Impact: Replacing uncertified wood stoves with clean heating systems offers one of the highest health and air quality returns relative to program cost. The project directly reduces PM_{2.5}, CO, and VOCs, pollutants strongly associated with respiratory illness, asthma and cardiovascular disease. Residents will experience cleaner indoor air, improved neighborhood air quality, and reduced hospital visits during winter inversion events.

These benefits extend beyond public health. Replacing outdated wood stoves increases home safety, improves heating efficiency, and reduces long-term energy costs, especially for those transitioning to modern systems like heat pumps or EPA-certified pellet stoves. The strategy also builds local workforce capacity by employing trained installers and strengthening partnerships with regional stove retailers.

Cost: The cost per household is moderate, depending on the chosen replacement system. Typical incentives range from \$1,500-\$3,000 for homeowners and \$2,000-\$3,000 for landlords who replace uncertified wood stoves in rental units. Additional funding may be layered from state and utility incentive programs for electric heat pump installations.

Program-wide, investments in clean heat technologies yield lasting returns through lower medical costs, reduced fuel consumption, and decreased emissions over each stove's lifespan, providing measurable economic and environmental value to the Ellensburg community.

Geographic Area of Air Quality Impact

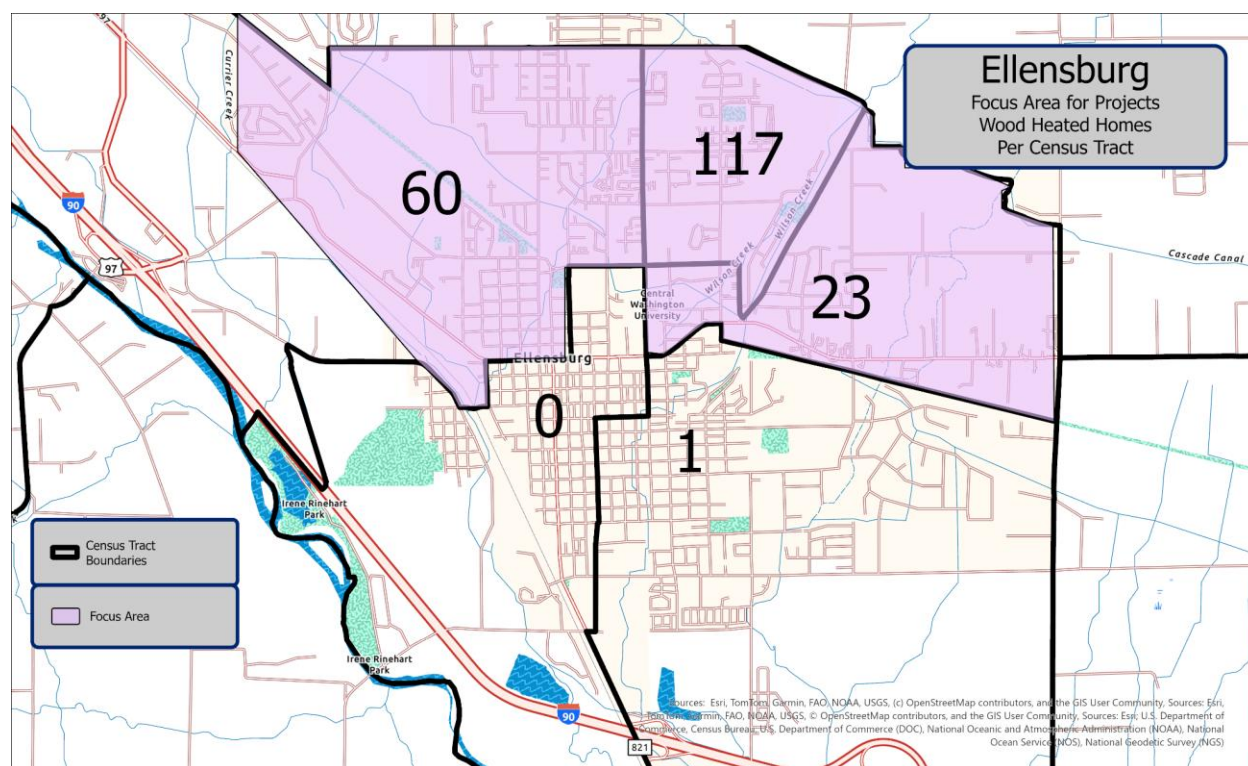


Figure 6. Ellensburg | Focus Areas for Projects | Wood Heated Homes Per Census Tract. Potential projects to be focused in the highlighted areas. Map created by Community System Solutions – 2025 A dynamic version of this map is available at <https://arcg.is/0WTm540>

The focus area is within the overburdened community of Ellensburg, identified by the Washington State Department of Ecology as a region facing disproportionate air-pollution burdens and vulnerable populations. Shown above in Figure 6, The target areas for this strategy are highlighted, informed by the distribution of poor air quality reports along with census tracts with high number of homes who rely on wood heat.

Incorporation of Community Input

Clean Heat for Clean Air is built on direct community feedback gathered through listening sessions, school-based outreach, tabling and canvassing events, and city surveys. Engagement efforts prioritized accessibility by offering wheelchair-accessible venues and simultaneous Zoom participation for those unable to attend in person. To ensure full inclusion, all materials and presentations were available in both English and Spanish, with interpreters available at every event.

Community System Solutions used a combination of outreach methods to collect meaningful, locally informed data about air quality in Ellensburg. Two community surveys were conducted to understand both perceptions and potential solutions. The first survey, completed by 106 respondents, explored how residents view local air quality, which pollution sources they find most concerning, and who in the community is

being affected. The second survey, with 16 participants, focused on residents' awareness of and support for proposed air quality improvement projects, while also gathering additional insights on housing and health factors.

Community feedback from multiple engagement events in Ellensburg highlights ongoing concerns about wintertime air quality due to wood stove smoke. Participants noted significant improvements in air quality since the 1980s, recalling the heavy smoke of past decades—"as thick as fog," as one resident described—but acknowledged that continued emissions from wood stoves remain an issue. On multiple occasions, participants described seeing visible smoke trapped below the inversion layer in winter, underscoring the impact of residential wood stove use. While some participants mentioned seasonal burn bans, they noted that enforcement is perceived as minimal, inconsistent, or ineffective.

Community members repeatedly suggested wood stove replacement as a viable project idea, which was echoed at several tabling events and community meetings. Supporting this, 17% of survey respondents listed residential home heating among their top air quality concerns, and 9.71% identified winter as the most problematic season for air quality, second only to wildfire season.

A second survey found that 81.25% of respondents supported wood stove replacement efforts, though roughly one-quarter of that group expressed uncertainty, mainly due to potential cost burdens. This indicates the importance of designing replacement programs that are both accessible and affordable.

Wood stove replacement is also identified in the Kittitas County PM Advance: Path Forward Plan, published in March 2017. That plan resulted in a third grant-funded replacement program led by HopeSource in partnership with the Washington State Department of Ecology. The effort was also supported by the Kittitas County Air Quality Advisory Committee, under an interagency agreement between the Kittitas County Public Health Department and Ecology to strengthen local partnerships and reduce PM_{2.5} air pollution in Kittitas County.

Execution Plan

Wood stoves remain one of the most affordable heating options in Ellensburg. Replacing them will require a coordinated education campaign, robust financial incentives, and strategic partnerships. This strategy builds on past program successes while incorporating new community-driven recommendations.

- ◆ **Community Education and Engagement:**

- Host community listening sessions and neighborhood walks to identify areas of need and interest.

- Ensure Spanish-language access and culturally responsive engagement to meaningfully include the community.
 - Partner with local schools for student-led research, hands-on learning, and stewardship projects connected to the strategy.
- ◆ **Incentives:**
- Incentive vouchers for certified wood stoves have traditionally been in the \$500-\$1,500 range per household. Landlords previously qualified for \$2,000 incentives to change out wood stoves in rentals.
 - This strategy recommends increasing the incentives to reflect current equipment costs: \$1,500-\$3,000 for homeowners and \$2,000-\$3,000 for landlords
 - Incentives may be combined with state or utility programs offering additional rebates for efficient electric systems such as ductless mini-split heat pumps.
- ◆ **Eligibility:**
- Low-income households
 - Landlords
 - Homes burning one cord or more of wood per heating season
 - Devices used for primary heat and professionally replaced
 - The outdated stove must be functional and surrendered at replacement
- ◆ **Stove Types:**
- Certified wood, pellet, or catalytic/non-catalytic stoves that meet EPA emission standards
 - Uncertified woodstoves cannot be sold, installed, or relocated and must be rendered inoperable if removed.
 - Local retailers will partner with the program to provide certified stoves and participate in incentive coordination.
- **Professional installation:**
- Partner with local certified installers.
 - Provide homeowner training on safe and efficient stove operation.
 - Develop installer training modules covering installation, maintenance and user education requirements.
 - Ensure safe disposal and destruction of all outdated stoves.
- ◆ **Priority Groups:**
- Low-income residents, individuals with health conditions, seniors (65+), and households with children under 6.

◆ **Process:**

- Applicants submit photos of their existing stoves with program applications
- A participating vendor conducts the replacement and installation.

◆ **Outreach and Education Campaign:**

The education and outreach program should ensure solutions reflect local lived experience, environmental justice goals, and community-driven priorities.

Education on clean-burning practices—like proper wood drying and storage—is essential to ensuring that even the most advanced, certified wood-burning devices operate efficiently and cleanly. When users understand and apply these practices, they can significantly reduce harmful smoke emissions and improve air quality for their communities.

- Launch social media outreach with regular posts, videos, partnerships with local groups to extend the program's reach.
- Emphasize key educational points:
 - ◆ **Save Money:**
 - Certified stoves heat more efficiently, burning less wood and reducing fuel costs.
 - Uncertified wood stoves Pollute more, use 30- 60% more fuel, and require more frequent chimney cleaning.
 - ◆ **Improve Health**
 - Breathing wood smoke during high pollution days can be as harmful as chronic exposure to secondhand cigarette smoke.
 - Wood smoke can:
 1. Reduce lung functionality, especially in children
 2. Worsen conditions such as asthma, emphysema, pneumonia and bronchitis.
 3. Exacerbate heart disease.
 4. Cause irritation of the eyes, lungs, throat, and sinuses; trigger headaches and allergies
 - Long-term exposure to wood smoke may lead to: Chronic bronchitis, COPD, increased cancer risk, and even genetic mutations (based on animal studies).
 - Infants and young children are especially at risk; wood smoke exposure can impair lung development and increase susceptibility to respiratory infections, a leading cause of early childhood illness and mortality. (*Source: Washington State Department of Ecology.*)

Budget

25-30 Clean Heat Replacements

Activities Performed	Budget
Program launch and outreach- Staff time	\$ 5,000
Education Campaign	\$ 5,000
Initial applicant intake - Staff time	\$ 5,000
Stove inspections and verifications	\$ 5,000
Installer coordination-	\$ 5,000
Rebates	\$ 50,000
New Stoves installation	\$ 10,000
Destruction of outdated stoves	\$ 10,000
PM _{2.5} impact tracking and reporting	\$ 5,000
TOTAL	\$ 100,000

Timeline

Month	Milestones/Events
M1-M36:	Community Education and Engagement
	Host community listening sessions and neighborhood walks to identify community needs and priorities.
	Offer all outreach materials and campaign resources in English and Spanish, with interpreters available for events.
	Engagement efforts offer wheelchair-accessible venues and simultaneous Zoom options for inclusive participation.
	Partner with local schools at all levels, including for student-led research, hands-on learning, and education projects.
M1-M3:	Digital Tools
	Launch an ArcGIS Hub platform dedicated to the Wood Stove Replacement Strategy.
	Use interactive maps, surveys and event calendars to share community feedback.
	Highlight stories from community members and showcase project impacts.
M1-M2:	Partnership Development
	Connect and partner with local wood stove retailers interested in this Strategy.
	Find and secure local installers familiar with installation of wood stoves.
	Coordinate with vendors to determine stove availability and installation timelines.

M3-M5	Program Launch
	Begin outreach and education on air-quality risks from outdated wood stoves
	Open the application process for interested residents
M4-M5	Complete initial installations of certified stoves and share success stories to encourage participation.
M6 - M24:	Ongoing Implementation
	Continue outreach and applicant support
	Verify installations and issue rebates once replacements are complete
	Maintain coordination with installers and inspectors to ensure quality and compliance.
M25-M36:	Program Completion and Reporting
	Conduct final installations and confirm destruction of surrendered stoves
	Measure PM _{2.5} reductions and prepare a final air-quality impact report.
	Share results with the community and partners to highlight program benefits.

Project Partners

City of Ellensburg, Sustainability Office

- Purpose of the partnership: The Sustainability Office can provide resources to enhance the reach of the educational/marketing campaign
- Key contact: Nichole Baker, Sustainability Coordinator

WA Dept. of Ecology - Central Regional Office

- Purpose of the partnership: The Department of Ecology can provide resources to enhance the reach of the educational/marketing campaign. The office could also provide expertise regarding all of the project elements.
- Key contact: Will Strand, Section Manager

Kittitas County, Public Health Department

- Purpose of the partnership: The Kittitas County Public Health Department can provide resources to enhance the reach of the educational/marketing campaign. The office could also provide expertise regarding all the project elements.
- Key contact: Lucy Garcia, Environmental Health Coordinator

Wood Stove Replacement Retailers – Various

- Purpose of the partnership: Supply replacement equipment, provide installation, and train residents on use.
- Key contacts: Various

The partner network will be expanded throughout implementation to strengthen outreach and impact.