

Wood smoke programs: regulatory and voluntary



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**EPA/WESTAR Residential Wood Smoke
Workshop, Salt Lake City**

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Wood smoke reduction efforts

- **Burn bans/curtailments called during air quality episodes**
- **Wood smoke complaints taken year-round (mostly fall and winter)**
- **Voluntary incentives – wood stove replacement program in PM_{2.5} nonattainment program for last four years**
- **Education and outreach (2:45pm panel discussion)**

Burn Ban Process

- **Motivation**
- **History**
- **Forecasting**
- **Communication**
- **Compliance**

Motivation – Health Effects

**Even at ‘safe’ levels of particulate matter
(10-35 micrograms per cubic meter [ug/m³]):**

- 200 million to 2 trillion particles/day
- Increased acute asthma attacks and chronic asthma
- Vasoconstriction
- Reduced blood flow to heart
- Increased blood pressure
- Increased arrhythmias
- Acceleration of atherosclerosis and vascular inflammation
- Increased risk of deep vein thrombosis
- Exaggerates adipose inflammation and insulin resistance in mice

American Heart Association Scientific Statement:

“ The overall evidence is consistent with a causal relationship between PM 2.5 exposure and cardiovascular morbidity and mortality.”

(Brook RD, et al. Circulation 2010; 121: 2331-78)

History - Burn Ban Program Evolution

- **Since the late 1980s, the Puget Sound area has had a two-stage program to limit residential burning during periods of poor air quality.**
- **During a Stage 1, only EPA Certified Wood Stoves can be used. During a Stage 2, no wood burning (solid fuel) is allowed. The only exception is if wood is the only adequate source of heat.**
- **Over the years, the Burn Ban program has evolved to reflect updates in health information and mandated air quality standards.**

History – Burn Ban Protocol

Burn bans can have two stages:

- **Stage 1:**

- based on forecast meteorology
- expectation of PM > 35 ug/m³* within 48 hours

- **Stage 2, two routes:**

- A) already in Stage 1 and not expected to drop to < 25 ug/m³* for at least 24 hours, or
- B) have already reached 25 ug/m³* and meteorological conditions will likely cause PM to reach > 35 ug/m³*, within 24 hours

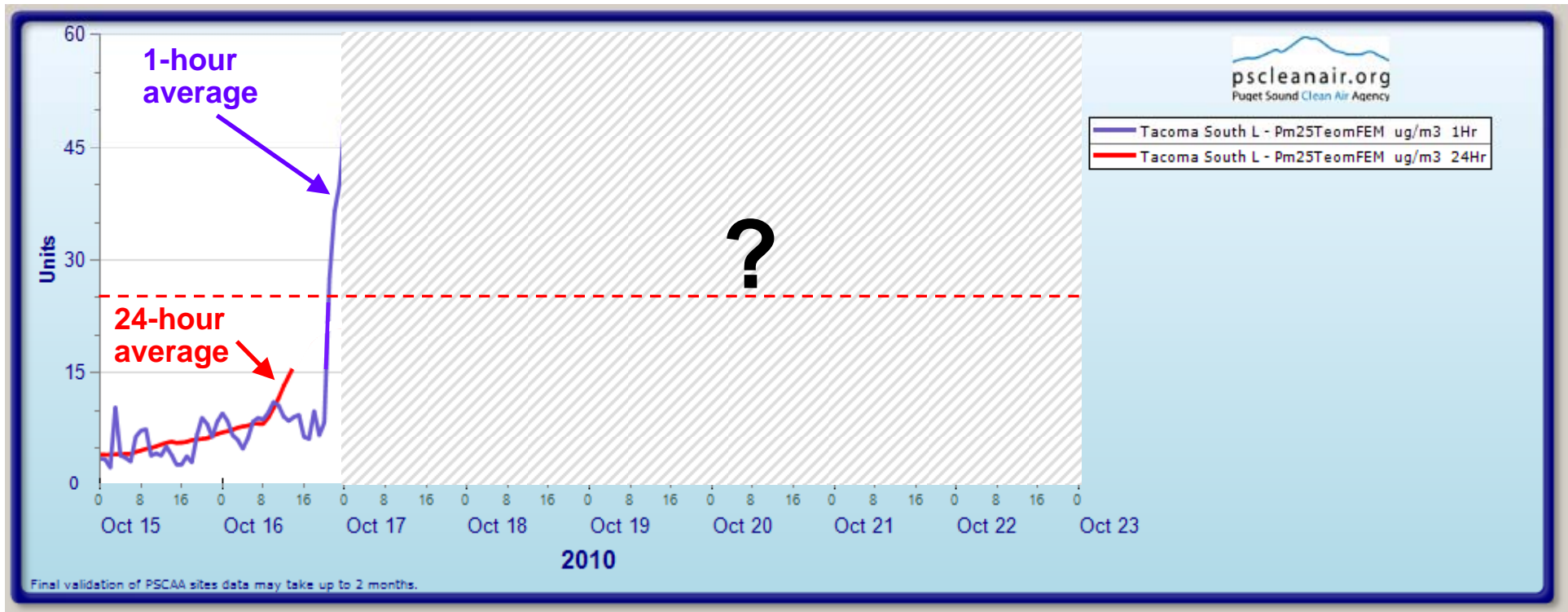
Burn bans remain in effect until:

- **Meteorology improves and PM expected to fall to < 25 ug/m³* within the next 6-12 hours.**
- **Concentrations are expected remain < 35 ug/m³* for the next 48-72 hours**

Forecasting Burns Bans

- **Monitoring provides direct indication of AQ issue**
- **Meteorological tools from National Weather Service and U.W. Atmospheric Sciences are critical:**
 - Long-range forecasts of winds, temperatures and precipitation
- **Also guidance from NWAIRQUEST air quality model products from U.W. and W.S.U.**
- **A number of challenges:**
 - Low wind speeds are critical, and they are very, very hard to accurately forecast
 - Localized meteorology (e.g. Darrington)
 - Practical aspects of communication, credibility, unusual circumstances (e.g. wind storm and power outages)

Forecasting – Example of Challenge



- A large PM spike occurred on a Sunday evening. On Monday morning we faced a dilemma ...
- Forecast suggested sufficient winds to disperse during day, temps not quite low for wide-scale burning, but how good is the forecast?

Should we call a burn ban?

Communication Impact

Getting the word out

- **Traditional Media**

- ▲ Newspapers (print and online): dailies Seattle Times, Seattle P-I, Everett Herald, The (Tacoma) News Tribune, Kitsap Sun; weeklies throughout region
- ▲ Television: KING5, KOMO, KIRO, Q13, NWCN
 - ◆ Local news and weather coverage
- ▲ Radio: primarily KOMO, KIRO, KUOW, KPLU
- ▲ Other: various community and neighborhood blogs

- **Phone**

- ▲ Agency's 1-800-595-4341 burn ban hotline (recorded message)
- ▲ Calls to agency main line
- ▲ Calls to specific staff (i.e., Communications, Complaints, Compliance)

Communication Impact

Getting the word out

- **www.pscleanair.org**

- ▲ Home page prominently features burn ban status, AQ forecast, links to wood-smoke related content
- ▲ Typically see web visits jump from average of 500-800 weekday to 5,000-10,000+ a day during a burn ban

- **E-mail networks**

- ▲ Agency's e-subscriber network currently at over 12,000
- ▲ Partner e-networks (i.e., Port of Seattle, The Boeing Co., cities and counties)
- ▲ Agency e-mail inquiries/responses (via web site's "Ask a clean air expert")

- **Social Media**

- ▲ Agency's Twitter and Facebook accounts
- ▲ Multipliers: i.e., reTweets by followers, including local media and partners

Enforcement - 2009-10 Burn Bans

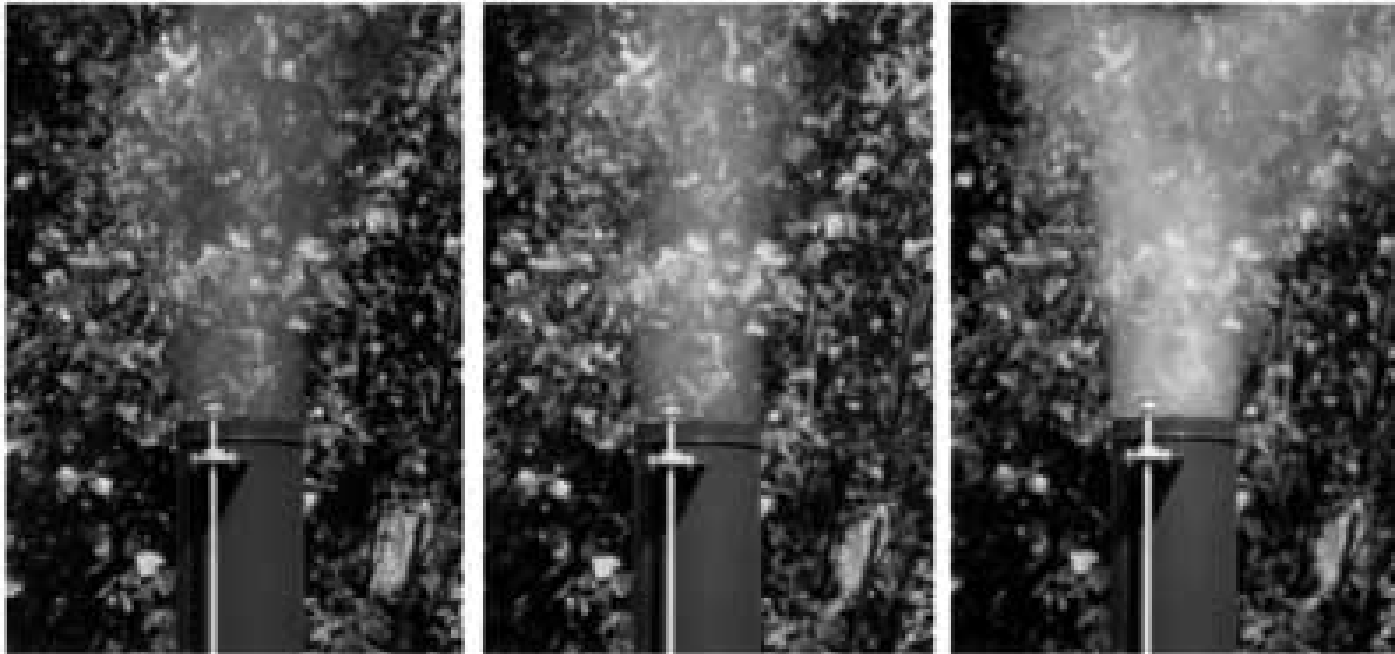
For the three burn bans called December 2009 - January 2010:

- **Agency received 307 complaints**
- **Agency issued 35 notices of violation**
- **Agency collected 28 civil penalties**

Enforcement – Lessons Learned

- **Many challenges to properly read opacity and document opacity violations**
- **Enforcement actions are very effective for individuals involved because of personal contact**
- **Enforcement actions are only one tool to educate people about burn bans and air quality**

Washington State Opacity Standards



20%
(legal)

40%

80%

Under state regulations, smoke from a solid fuel burning device cannot exceed 20 percent opacity for six consecutive minutes. When a burn ban is in effect, it is illegal to generate any visible smoke at all (excluding the first 20 minutes of start-up).

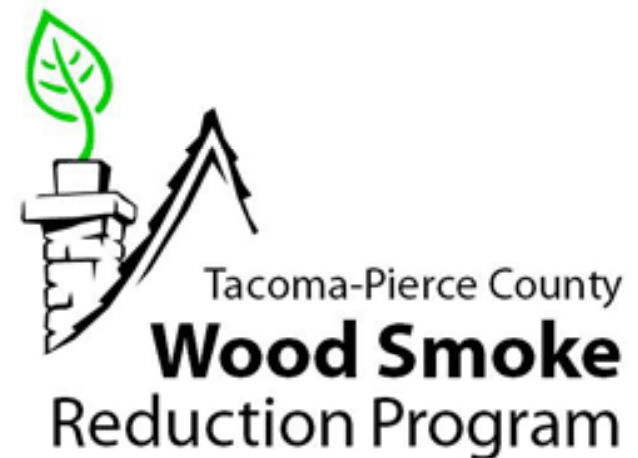
Wood smoke complaints & enforcement

Formal complaint process

- **Citizen files formal complaint**
- **Agency sends notice, educational material to neighbor, requests they tell us in writing what they plan to do to address the complaint**
- **If problem continues, complainant re-contacts agency, inspector make contact with complainant and the neighbor.**
- **If our inspector finds evidence that neighbor is violating the state wood-burning laws, the agency will take enforcement action. If, however, we are unable to verify that neighbor has violated the state wood-burning laws, we will close the case. We inform complainant of any action we take.**

Wood stove change-out program

- **Into fourth year of a change-out program in Tacoma-Pierce County PM2.5 nonattainment area**
- **~1,100 stoves replaced to date, with additional 200 anticipated by end of this year's program**
- **With an estimated 35,000+ wood stoves and fireplace inserts, as well as ~35,000 fireplaces, this is just the tip of the iceberg**



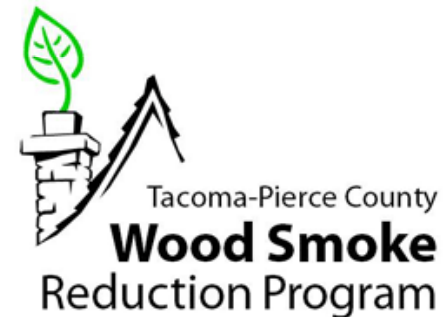
Wood stove change-out program

- **Program initially focused on replacing only with hearth products (gas, pellet, EPA certified stoves/inserts)**
- **Emphasis today is zonal or whole-house heating by changing to a non-wood fueled device**
 - Gas stove/fireplace insert
 - Gas furnace
 - Ductless electric heat pump
 - Whole-house electric heat pump
 - Upgrade home's insulation to current standards



Leveraging partnerships and funding

- **Current program brings together state funding along with federal stimulus funding (\$1.7 million)**
- **Boosts incentives from \$1,500 to \$5,500**
 - And for income-qualified households, from \$3,000 to \$8,000
- **More collaboration means more coordination – and more administration**



What's next?

- **May – November 2011: PM2.5 nonattainment stakeholder process to determine best emission-reduction strategies to recommend for State Implementation Plan**
- **Research next wood smoke reduction program(s)**
- **Identify and seek funding**
- **Continue and escalate wood smoke awareness efforts**

http://www.youtube.com/watch?feature=player_embedded&v=IEQV89jN2Qs

Questions?

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