



Health considerations for home energy strategies in Vermont

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Key points about health considerations for home energy strategies

1. Equitable and affordable resource access to stay sufficiently warm (or cool) is paramount
2. Home weatherization is a win-win-win-win-win...
3. Reducing home heating emissions (especially from biomass) is good for health
4. Vermont homes need to adapt to increasingly hot weather

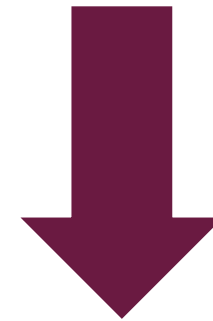
Home weatherization is a win-win-win-win-win...

- reduces greenhouse gas emissions
- improves fuel affordability
- improves occupant health
- improves air quality
- helps Vermont homes adapt to a warming climate

Reduced energy costs contribute to better health

Average energy costs after weatherization

(State weatherization program data)



20-30%

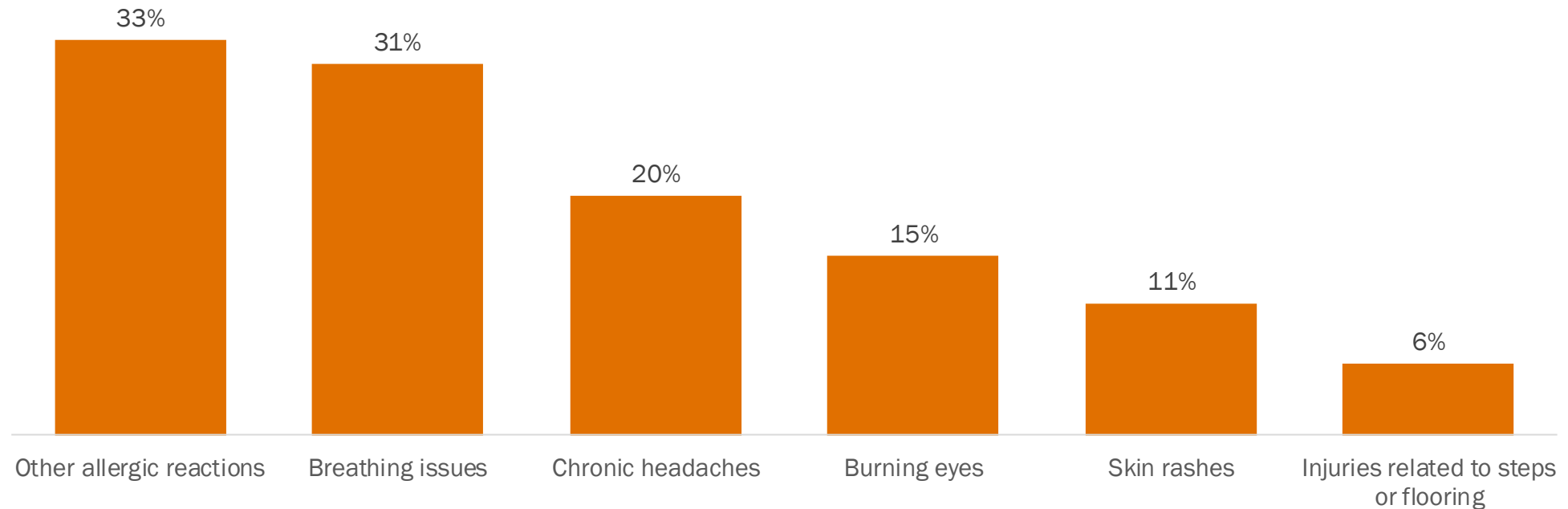
Surveyed NeighborWorks customers have reported spending some of their energy savings to:

- Buy health insurance could not previously afford
- Make a doctor's appointment could not do before
- Pay off existing medical expenses
- Purchase healthy foods could not afford before

Many Vermont homes are inefficient, uncomfortable, and unhealthy








NeighborWorks of Western Vermont surveyed customers in 2017:

A third of respondents reported breathing issues by household members.
(n=109)















Weatherization also improves home conditions that affect health

Wx improves the home

-  Reduced energy bills
-  Improved temperature control
-  Improved indoor air quality
-  Enhanced safety
-  Reduced humidity
-  Reduced mold
-  Reduced pest intrusion

**Published evidence about the indoor environmental quality and health impacts of Wx was reviewed to identify the expected effects. The strength of evidence for each finding was based on the quality and amount of evidence available.*

Health benefits...	...are associated with these improvements to home conditions.	Strength of evidence*
General Health		High
Productivity		High
Social Health		High
Upper Respiratory		High
Asthma		Medium
Cardiovascular		Medium
Financial Stress		Medium
Mental Health		Medium
Health Care Utilization & Costs		Medium
Accidental Injury		Low
Infectious Disease		Low
Neurological		Low

What weatherization can do for Vermonters' health

The estimated 10-year economic benefit per household is nearly three times greater than the initial expense.

Benefit category	Primary beneficiary	First-year benefit	10-year benefit
Thermal and electric energy cost savings	Household	\$1,174	\$11,740
Reduced impacts of asthma, cold, and heat*	Household	\$276	\$2,762
Reduced fine particulate emissions	Public	\$1,026	\$10,255
Total	Household + public	\$2,476	\$24,757

**More benefits are expected but could not be quantified, such as better mental and social health, fewer accidental injuries, and increased productivity.*

Weatherization + Health approaches provide further health benefits

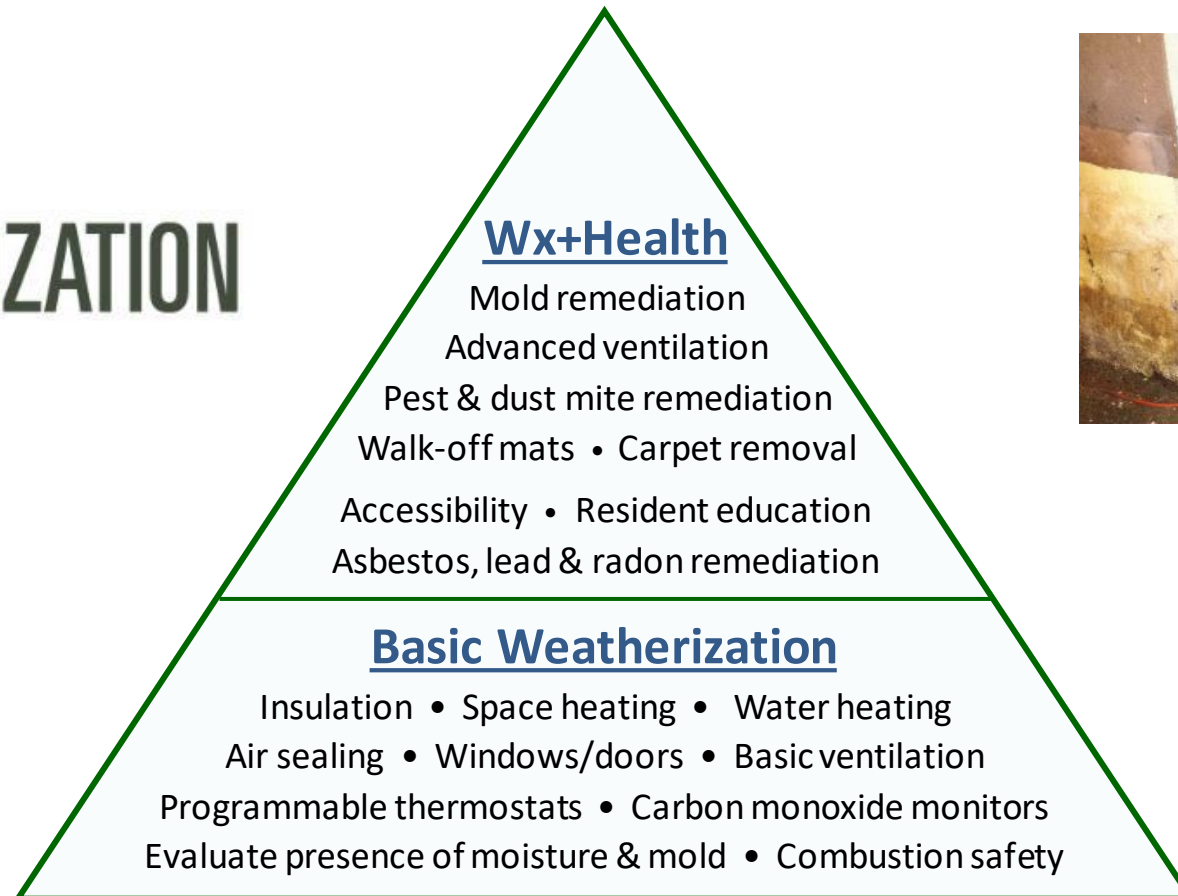


Photo source: NeighborWorks

Reducing home heating emissions (especially from biomass) is good for health

Emissions of health concern from fuel combustion

- **Particulate matter** – tiny solid & liquid particles
- Gases
 - Carbon monoxide
 - Sulfur oxides
 - Nitrogen oxides
- Hazardous air contaminants
 - Volatile organic compounds (ex., Benzene, Formaldehyde)
 - Polycyclic aromatic hydrocarbons (ex. Naphthalene)
 - Heavy metals (ex., Arsenic, Lead)
- Greenhouse gases (ex. Carbon dioxide, Methane)



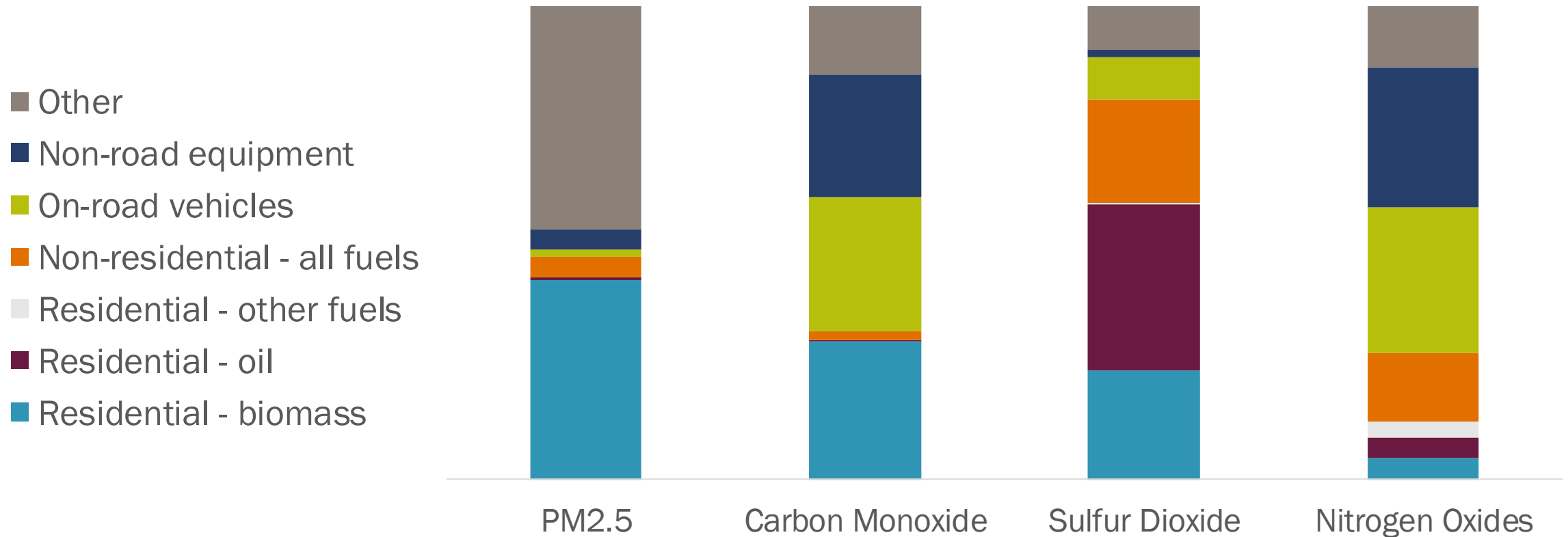
There is no “safe level” of air pollution

References:

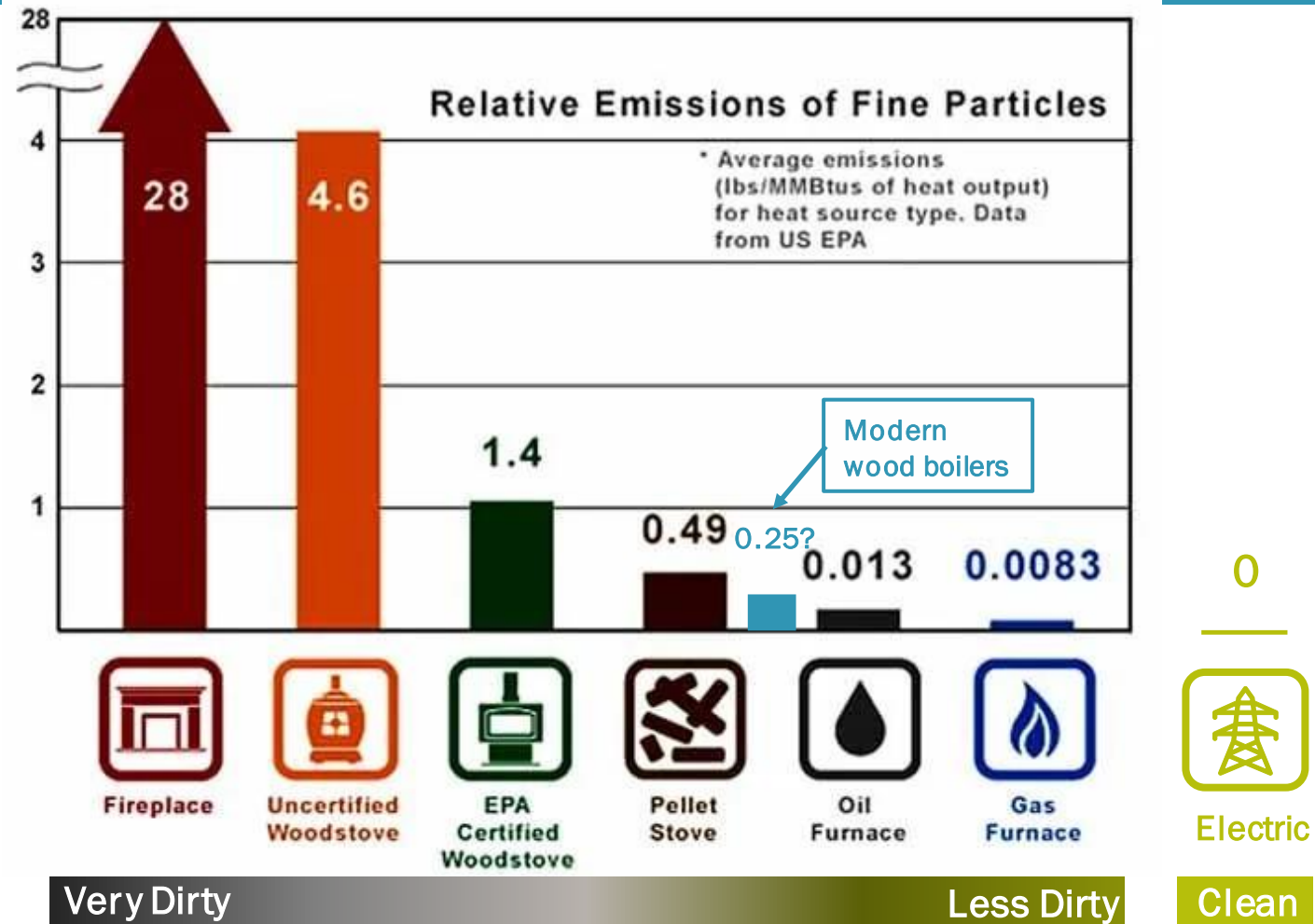
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Major pollutant emissions sources in Vermont

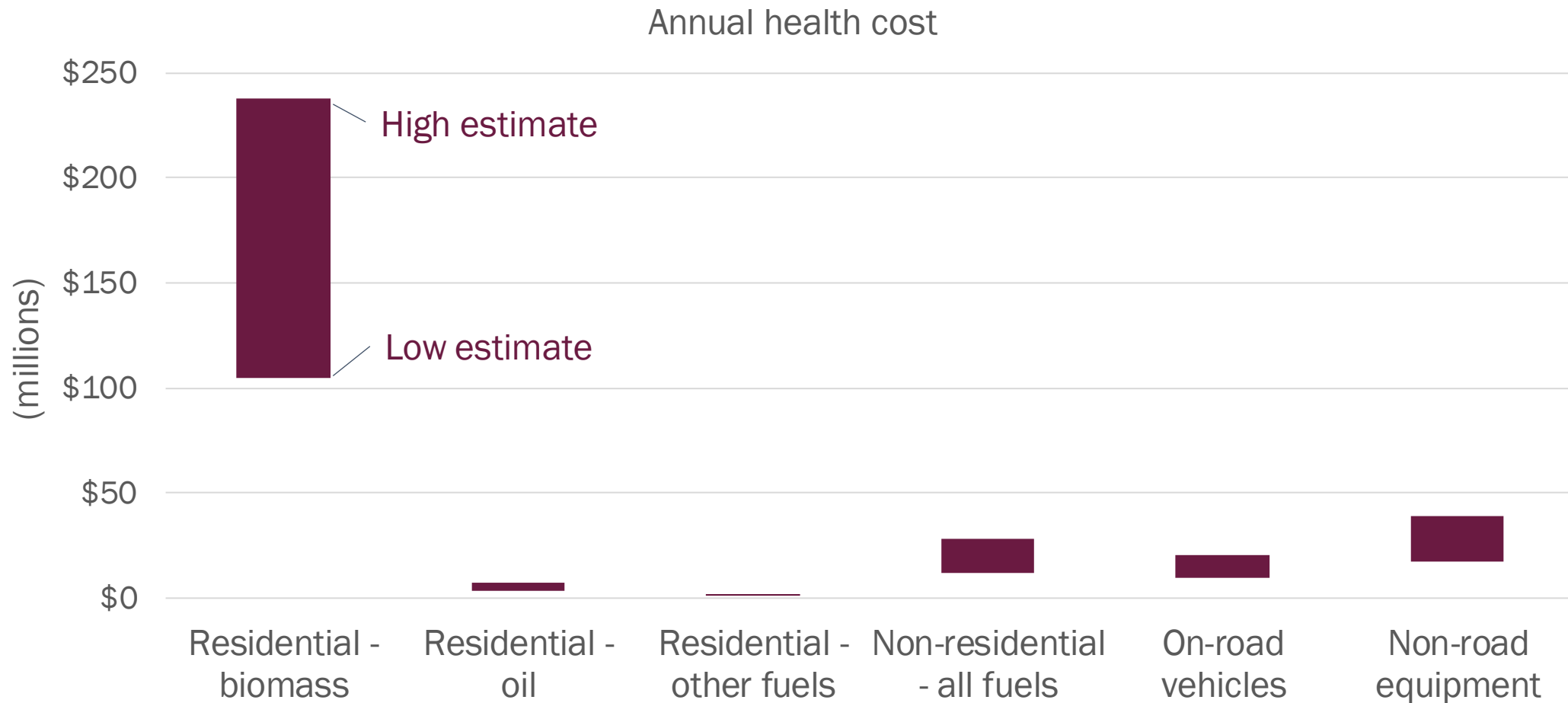
Contribution to total emissions in Vermont, by pollutant



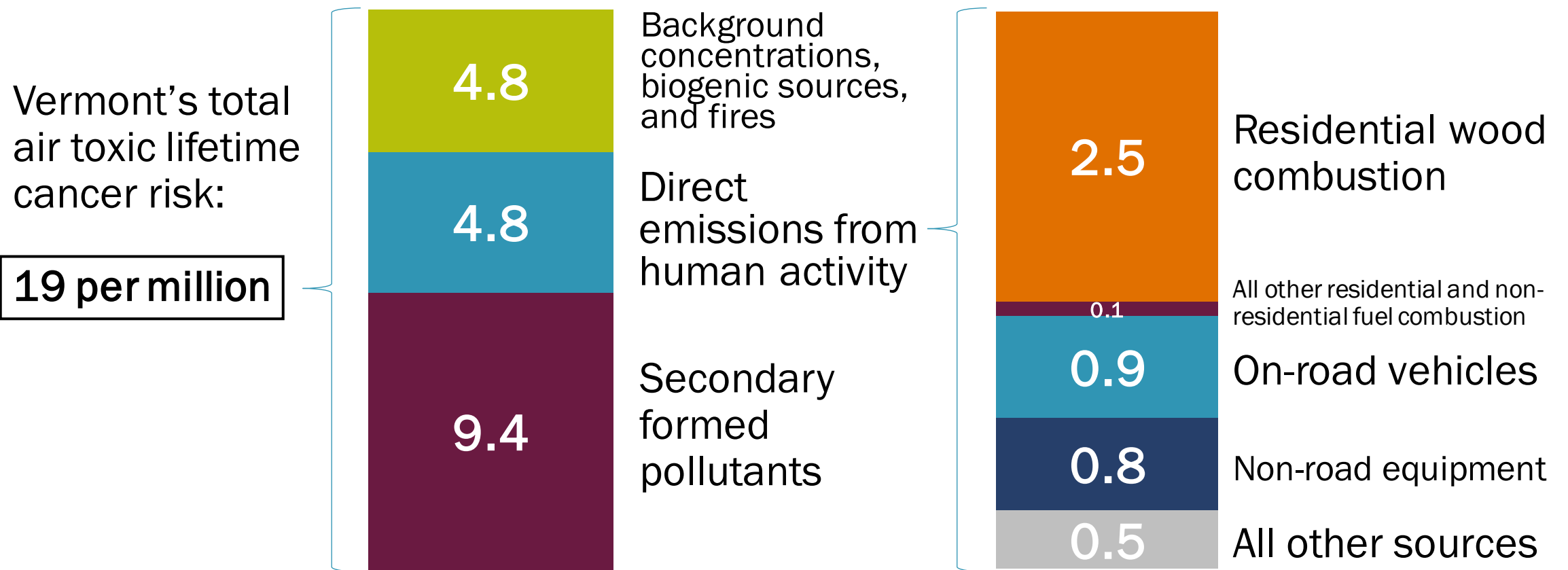
Residential fine particle emissions by type of heating equipment



Estimated direct health impacts associated with current emissions

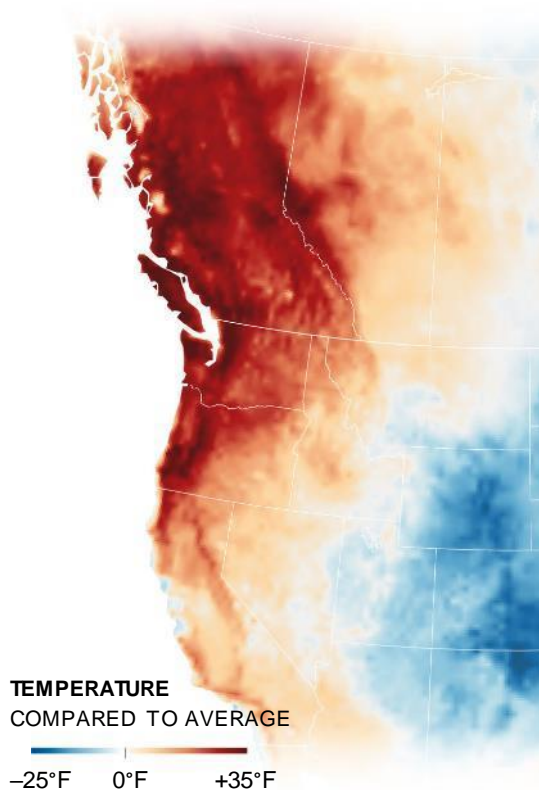


Cancer risk from toxic emissions in Vermont



Vermont homes need to adapt to increasingly hot weather

2021 “Heat Dome” in Northwestern USA & Western Canada

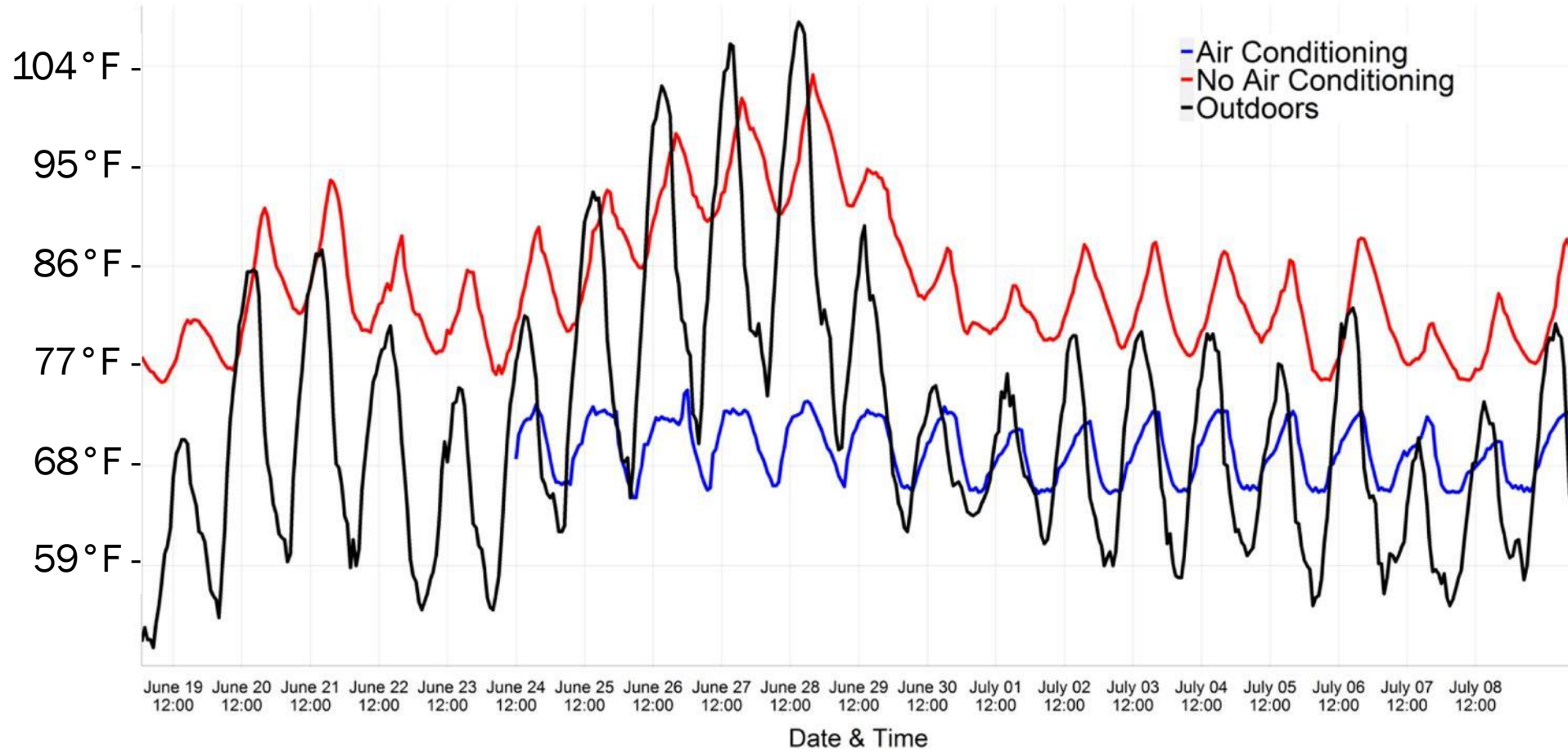


SOURCE: GODDARD EARTH OBSERVING SYSTEM MODEL, NASA, JUNE 27, 2021.

City	Average high (May-June)	Average low (May-June)	Record high (before Heat Dome)
Seattle, WA	65	48	103
Portland, OR	68	49	107
Victoria, BC	64	46	98
Burlington, VT	67	46	101

City	June 26, 2021	June 27, 2021	June 28, 2021
Seattle, WA	102	104	108
Portland, OR	108	112	116
Victoria, BC	96	99	103

Average temperatures in Greater Vancouver, BC, 2021 “Heat Dome”



Nearly all (98%) Heat Dome deaths in B.C. occurred in a residence

Table 7: Heat-Related Deaths by Place of Injury

Place of Injury	Count	Percent
Private Residence - Multi-unit	242	39.1%
Private Residence - Detached	210	33.9%
SRO/Social Housing/Supportive Housing	62	10.0%
Trailer Home/Mobile Home/RV/Camper	40	6.5%
Senior/Long-Term Care Home	40	6.5%
Outside	13	2.1%
Other Residential	12	1.9%
Total	619	

About 1,400 people died as a result of the 2021 Heat Dome

	Estimated excess deaths
Washington	450
Oregon	160
British Columbia	740

A similar extreme heat wave in Vermont would result in about

50 deaths

...assuming a similar mortality rate as the 2021 Heat Dome

4 Vermont adults died at home during June-July 2018 heat wave

LOCAL

Vt. heat wave: Essex Junction woman died in home where temperature reached 115 degrees

Elizabeth Murray and Will DiGravio Burlington Free Press

Published 4:16 p.m. ET July 6, 2018 | Updated 5:32 p.m. ET July 10, 2018

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Vermont's death toll from last week's extreme heat wave has risen to four, state Department of Health Spokesman Ben Truman said Monday.

Among the deceased is Mary Myott, 79, of Essex Junction, who died in a home where the temperature had risen to 115 degrees.

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Thank you!

Let's stay in touch.

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