



Oregon Residential Wood Combustion Emissions Inventory, 2020

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NW AIRQUEST MEETING

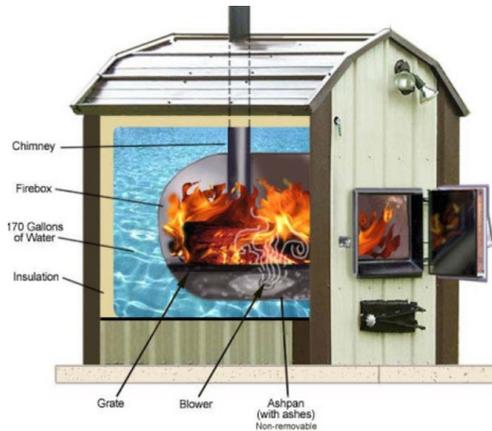
Residential Wood Combustion EI

- ▶ National Emissions Inventory, NEI
- ▶ Residential Wood Combustion, RWC
- ▶ Magnitude of RWC Emissions
- ▶ Methodology
- ▶ Results
- ▶ Conclusions

NEI

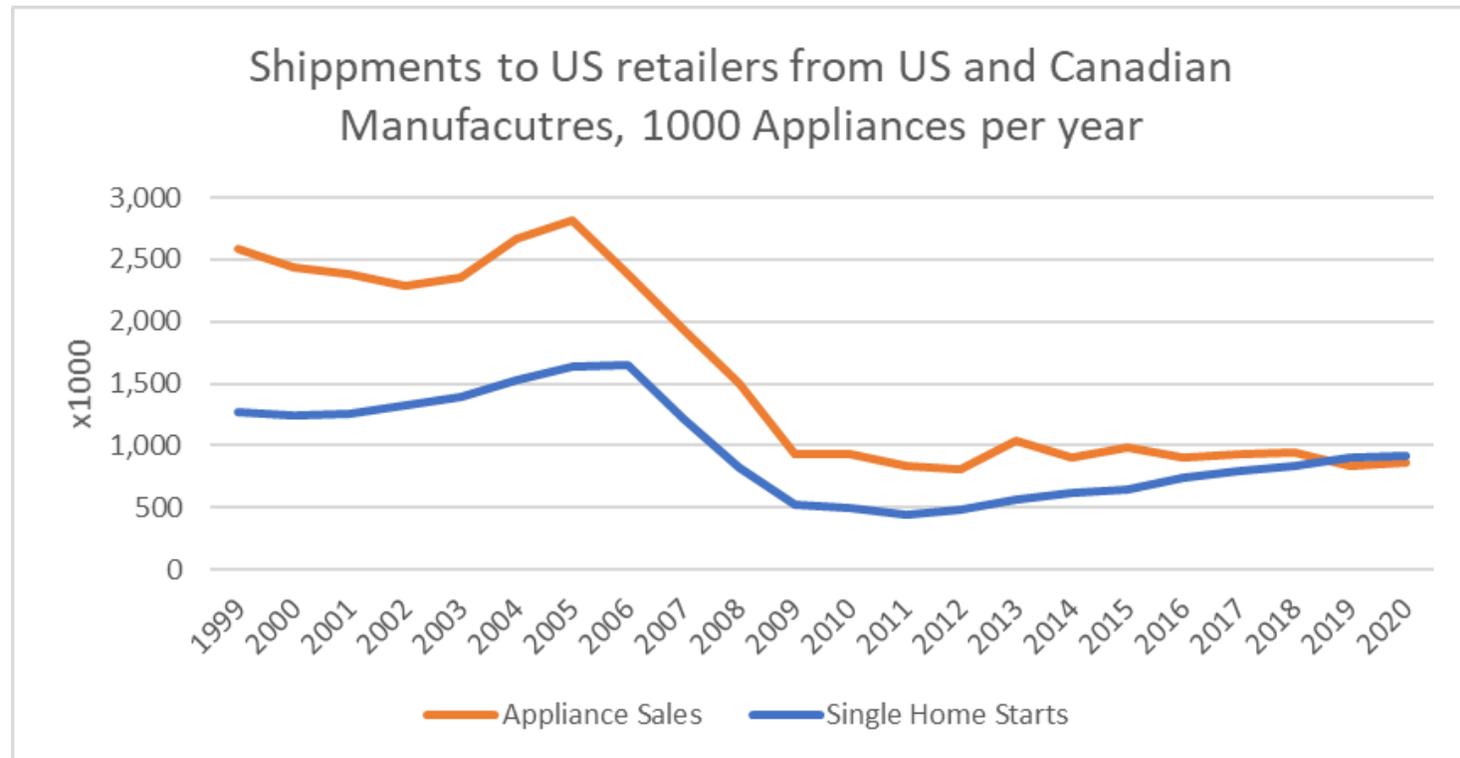
- ▶ National Emissions Inventory
 - ▶ Three-year accounting of all emission sources
 - ▶ Not monitoring data or measured emissions
 - ▶ State-wide, county-based data
 - ▶ Moving to more “automated” or EPA based assumptions, trying to standardize across states
 - ▶ Which is great unless your state is an outlier
 - ▶ “30,000-foot” snapshot once every three years

Source Classification Codes, SCCs



Wood Stove Industry

- ▶ State of Wood stove sales
 - ▶ COVID
- ▶ Regulatory Environment

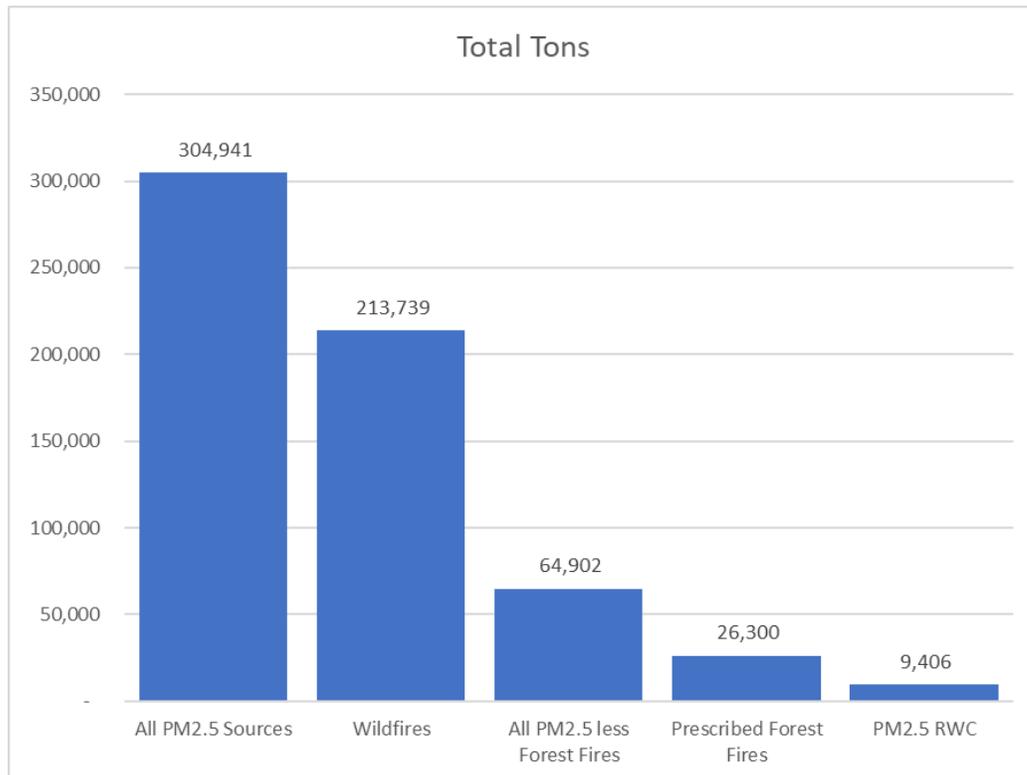


Housing data: https://www.census.gov/construction/nrc/historical_data/index.html

Sales data: <https://www.hpba.org/Resources/Annual-Historical-Hearth-Shipments>

Magnitude of RWC Emissions

- ▶ Why do people attribute high PM2.5 (in non attainment areas) to RWC if it only accounts for a small percent of our total PM2.5?



- ▶ We bias our monitoring results, by our sampling locations, giving RWC PM more impact
- ▶ It isn't the magnitude of RWC emissions, it is the proximity of the emission sources, low stack velocity and height, and when emissions are created (night, winter, inversions)

2017 NEI Tons PM2.5

Forest Fires = Wildfires + Prescribed Fires

EPA's Preferred Methodology

- ▶ Preferred Methodology

- ▶ State surveys

- ▶ Default EPA data based on study that is fine for some states, but not others

- ▶ Default EPA data based on no Oregon homes and very few from western US.

- ▶ Oregon is an outlier for RWC

- ▶ Cold winter, but not too cold or long

- ▶ Easy access to trees, lots of public lands

- ▶ How it's been done

EPA's Preferred Methodology

- ▶ State vs EPA emissions
 - ▶ 2014 NEI data
 - ▶ States that self reported emissions that were much more than default:
 - ▶ Vermont, Minnesota, Wisconsin, Oregon
 - ▶ States that self reported emissions that were much less than defaults:
 - ▶ New York, Michigan, Ohio
 - ▶ I'll do this again for 2020 when other state's data comes available

Methodology History

- ▶ NEI methodology has changed a lot for each of the last 3 or 4 NEIs
 - ▶ New data set (single data set, Black Carbon survey)
 - ▶ New tool (Wagon Wheel)
 - ▶ SEDS data correction
 - ▶ Wood Density (increase of 27% from 2017)
 - ▶ Emission Factors (more change to come)
 - ▶ DEQ used PATS for data source for 2014 and 2017

2020 Methodology

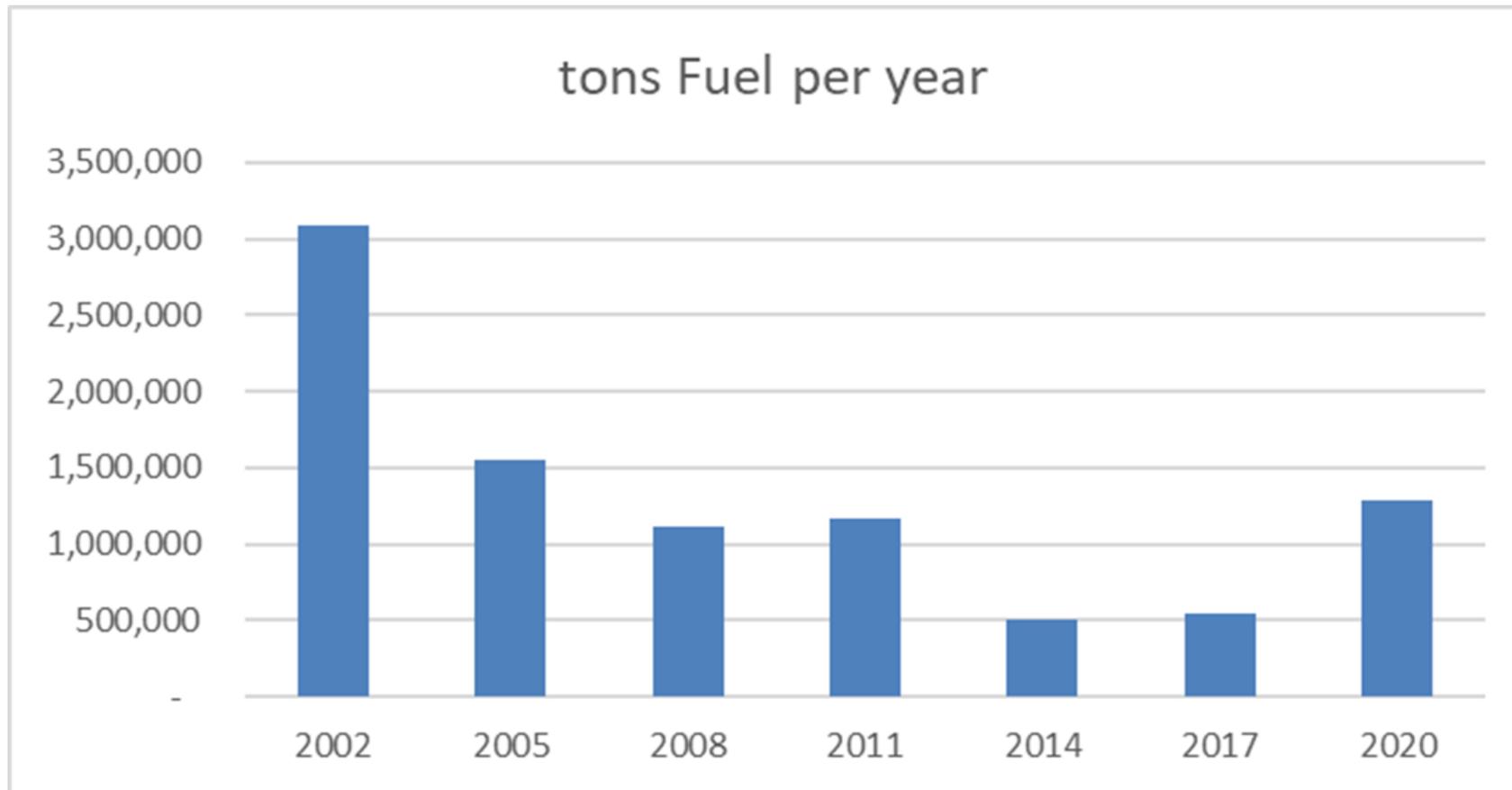
- ▶ OSU conducted survey; Center for Marketing & Consumer Insight, Dr. Chen
 - ▶ Voluntary Web-based survey
- ▶ Categorized responses
- ▶ Extrapolated Survey results based on categories to Census Block Groups
- ▶ Rolled up Block Groups to County



2020 Survey Results

- ▶ Total number of surveys used for analysis= 2921 (CI +/- 2.4%)
 - ▶ % from East Side of State= 11
 - ▶ % of population from East Side= 13
 - ▶ % from West Side of State= 89
 - ▶ % of population from West Side= 87
 - ▶ Population from PSU Population Research Center Report, 7/1/2021
 - ▶ % self reported as Rural= 24
 - ▶ % of population living in Rural Block Groups= 30
 - ▶ Grant County only county not represented, but only 0.2% of Oregon Population
 - ▶ Lane, Wasco, and Multnomah Counties over sampled
 - ▶ Clackamas, Deschutes, Umatilla, Washington, and Yamhill under sampled

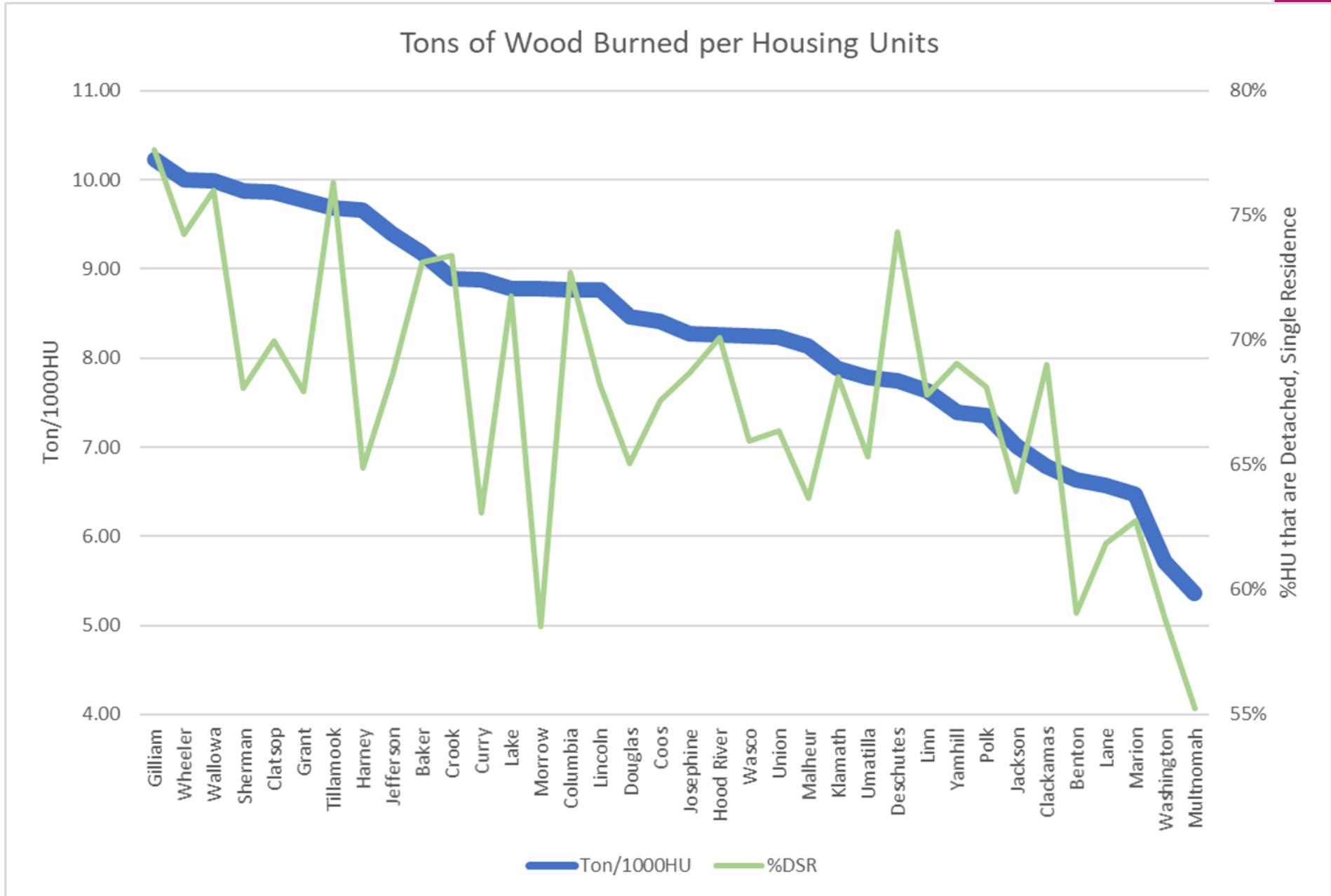
2020 RWC Results



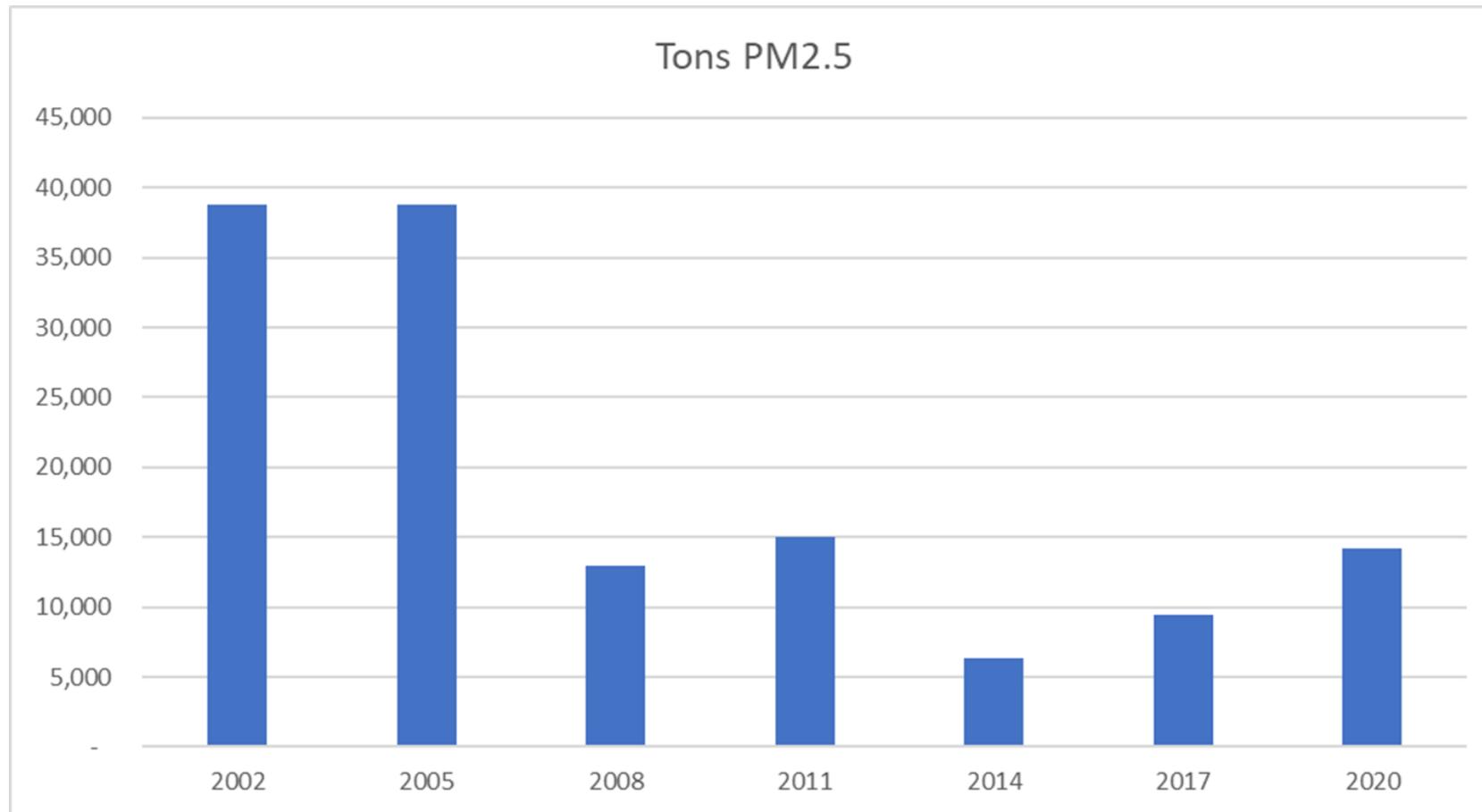
year	tons per year
2002	3,082,147
2005	1,550,941
2008	1,109,810
2011	1,173,686
2014	507,382
2017	545,454
2020	1,288,475

*Oregon Population increased 20% from 2002-2020

2020 RWC NEI data



2020 RWC Results



RWC NEI data

Appliance Type	PM2.5 (tons)	2017	2020
Fireplace		811	1350
Certified Woodstoves/Inserts		2,693	2,286
Insert certified, non-catalytic	361		308
Insert certified, catalytic	666		352
Woodstove certified, non-catalytic	427		759
Woodstove certified, catalytic	1,239		868
Noncertified Woodstoves/Inserts		2,823	2,152
Insert noncertified	602		621
Woodstove noncertified	2,220		1532
Pelletstove		35	32
Furnaces		449	501
Furnace noncertified	404		501
Furnace Pellet-fired	45		0
Boiler/Hydrionic		1,495	436
Outdoor Boiler	912		436
Indoor Boiler	582		0
Boiler Pellet-fired	1		0
Outdoor Fire-pit		1,066	7413.7
Firelogs all appliances		34	8.4
Total		9,406	14,179

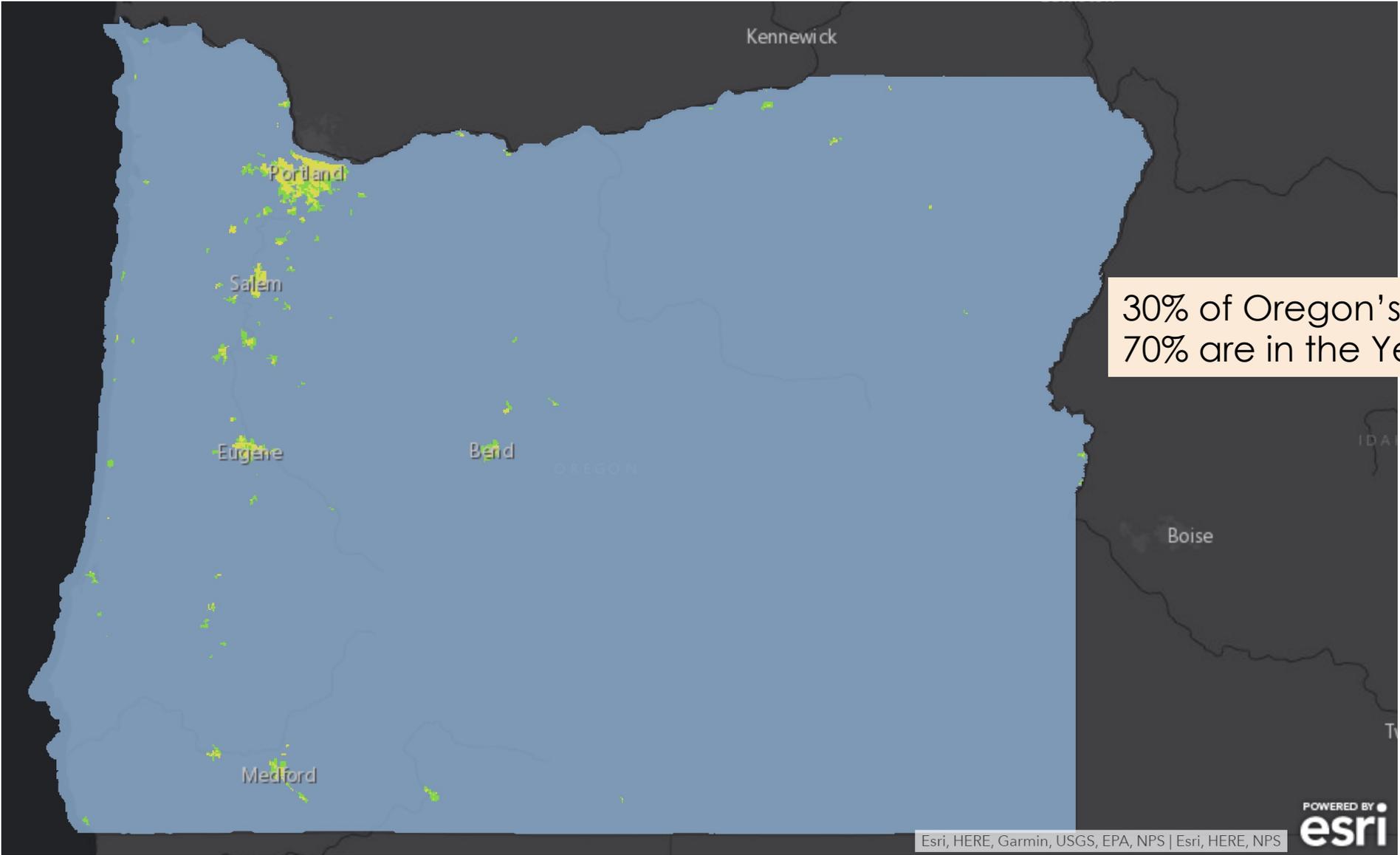
2020 RWC PM2.5 vs 2017:

Biggest change is Outdoor Residential Burning

"Do you have any Outdoor wood-burning fireplaces, chimeneas, or fire rings?"

What affect was COVID-19 on Outdoor Recreational burning? On 9/24/21 John Crouch (HPBA) said:

"Over the last 2 years, many of our stores shut down due to the pandemic. But the consumers that stayed home and had jobs started spending money on their homes, on things like firepits."



30% of Oregon's population is in the Blue
70% are in the Yellow and Green

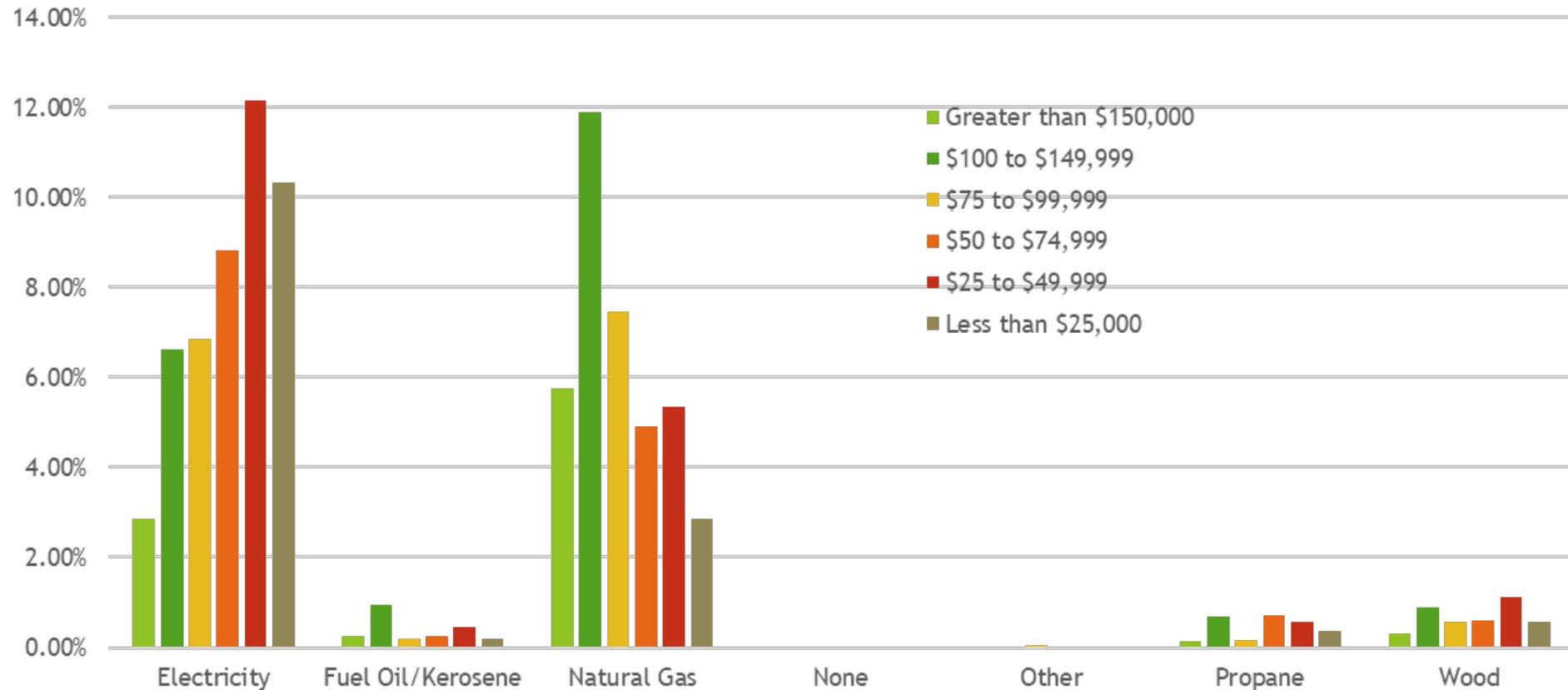
Population Density:
Blue less than 1000/mi²
Green between 1-3000/mi²
Yellow more than 3000/mi²



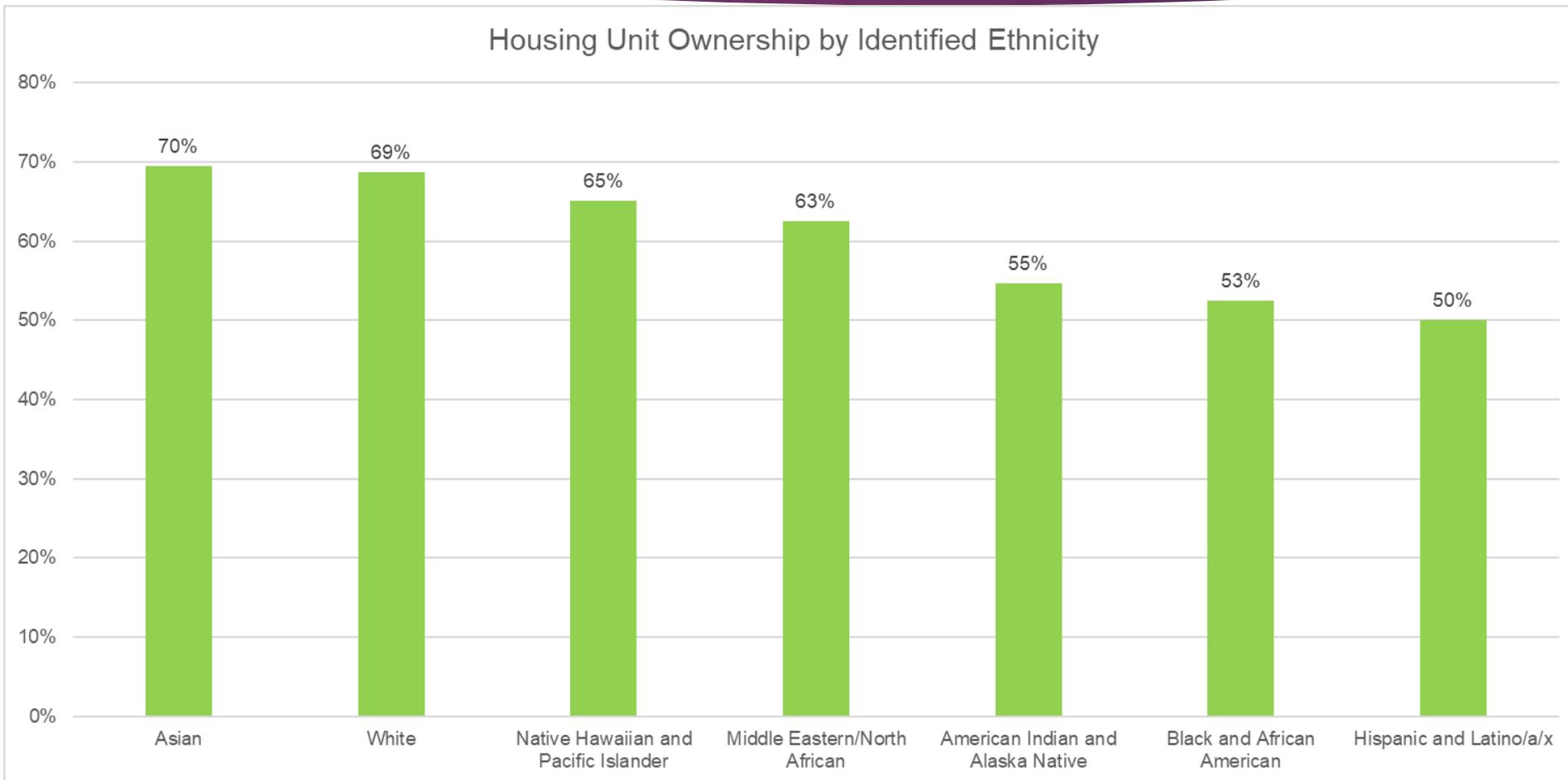
2020 Cords RWC/area
OSU Survey

Other Results, Home Heating

Primary Heat Source by Income Group



Other Results, Home Ownership



Other Results, Outdoor Burners

Outdoor Burners by Income Group



Conclusions

- ▶ Yardstick
- ▶ State-Wide; Don't use this as Kfalls SIP data
- ▶ Population and Housing starts are outpacing appliance sales
- ▶ Regulatory landscape (on a US state level) doesn't look to favor RWC
- ▶ A LOT of 'other' data in survey