CALIFORNIA
AIR RESOURCES BOARD

Update on Indoor Air Quality: Successes, Continuing Concerns, and Challenges

November 19, 2020

Thank You to Kirk Smith

Rule of 1,000

"Pollutants released indoors are about 1000 times more likely to reach someone's lungs than if released outdoors." – Kirk Smith

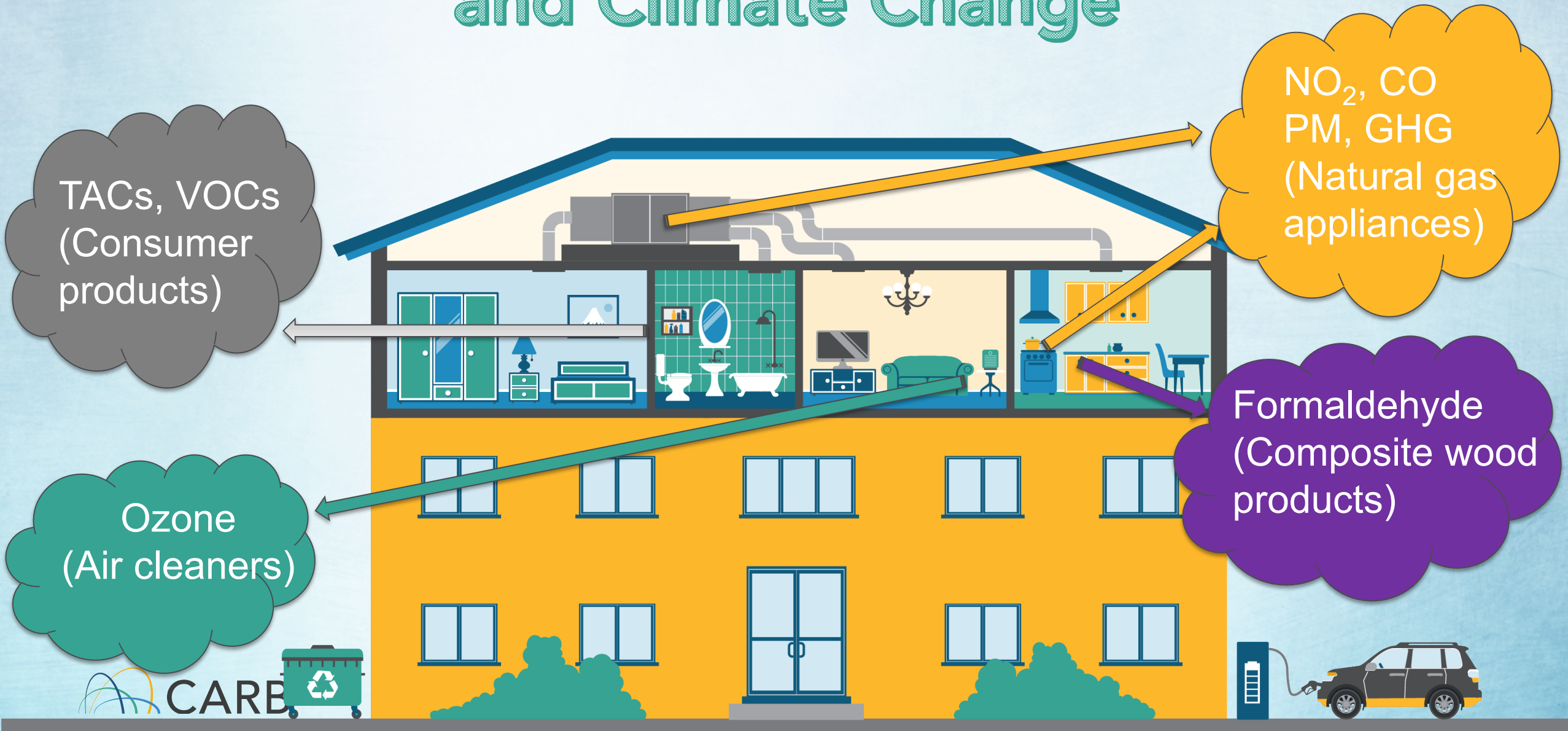
In memory of Professor Smith, Nobel Prize recipient and environmental health giant (1947 - 2020)

Why Is Indoor Air Pollution Important?

- Californians spend **87%** of their time indoors
- Appliances, consumer products, cooking, building materials, and other sources impact public health and the environment
- Health impacts: cardiovascular, respiratory, cancer

Exposure mitigation (e.g., increased ventilation) can help but does not solve the problem – need to reduce or eliminate the emission sources

Impacts Indoor and Outdoor Air Pollution and Climate Change



Poses Serious Health Risks

- Asthma, allergies (NO_x, PM2.5, TACs, formaldehyde)
- Cancer (TACs, formaldehyde)
- Premature death (PM 2.5)
- Increased respiratory and heart disease (PM 2.5, NO_x, CO, TACs, formaldehyde)
- Neurological Effects (PM 2.5, TACs)
- Irritant and other effects (TACs, formaldehyde)

Image Source: SEHAC / CDPH

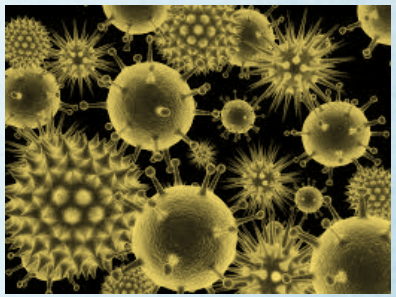
Progress On Some Sources, But Not All

Air cleaners

Building Materials & Furnishings

Consumer & Personal Care Products

Household & Office Equipment & Appliances



Biological Contaminants

Architectural Coatings

Environmental Tobacco Smoke

Lead

Combustion Appliances

√ Controls implemented that improve IAQ

CARB

(CARB, 2005)

What Are We Doing?

- Indoor Air Cleaner Regulation
- Regulations on Composite Wood, Consumer Products, and Coatings
- Wildfire Guidance and Support
- Building Code Support
- Communication and Outreach

Limiting Health Risks in Products

Air Cleaner Regulation

- CA requires air cleaner certification to enforce ozone limits
- Decreases health risks from ozone exposures indoors

Composite Wood Regulation

- CARB limits formaldehyde – new home levels decreased by 44%
- Federal standards identical to Phase II CARB standards

Consumer Products Regulation

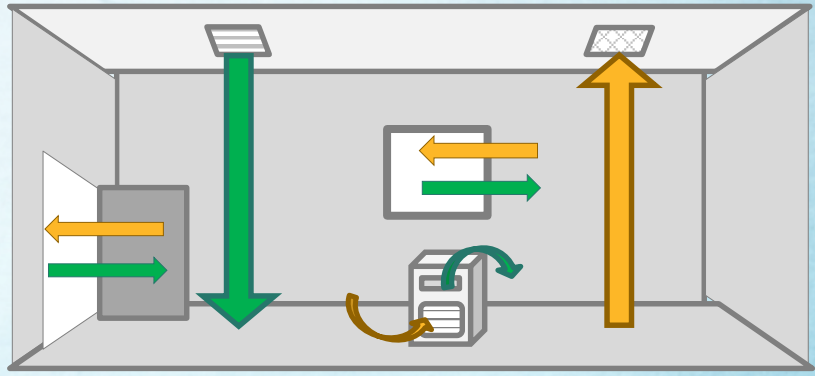
- VOCs and TACs from consumer products (e.g., deodorants, hair spray, cleaning products, spray paint, and insecticides) limited in CA

(Singer, 2019)

Reducing Indoor Pollutant Exposures by Ventilation and Filtration

- Clean Air Shelters and Wildfire Best Practices
- Fund School Air Filtration Upgrades
- Address COVID-19 Health Risks
- Support Building Standard Updates

But more work is needed for healthy indoor air



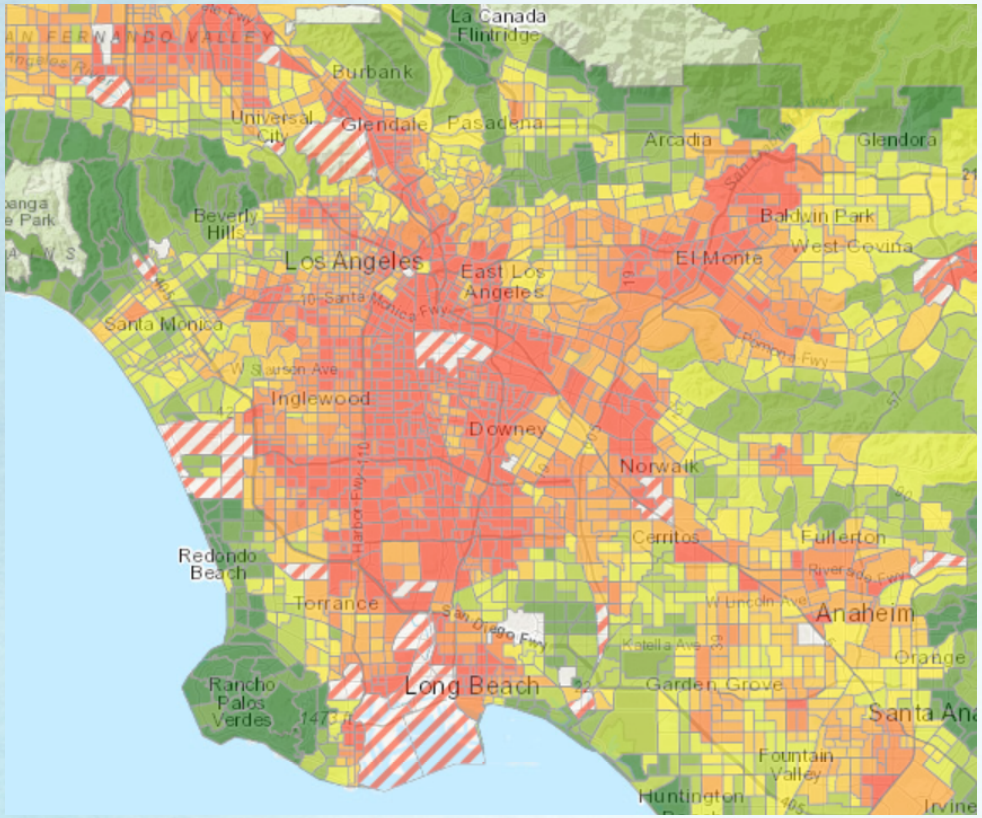
CARB

What do we need to do next?

- Update CARB's Indoor Air Quality Guidance and Increase Communication Efforts
- Better Understand and Address Equity Issues
- Support Building Electrification Efforts Statewide
- Use Authority and Incentives to Improve and Expand IAQ Protections

Update Indoor Air Guidelines

Address Equity Issues in Vulnerable and Disadvantaged Communities



Map from CalEnviroScreen showing the DACs in the South Coast Air Basin

- Air pollution adds to existing health risks
  - **Higher levels of outdoor air pollutants:** close proximity to sources, e.g. traffic, freight operations
  - **Higher levels of indoor air pollutants:** limited access to low emitting materials and appliances; limited control over maintenance and repair in rental units

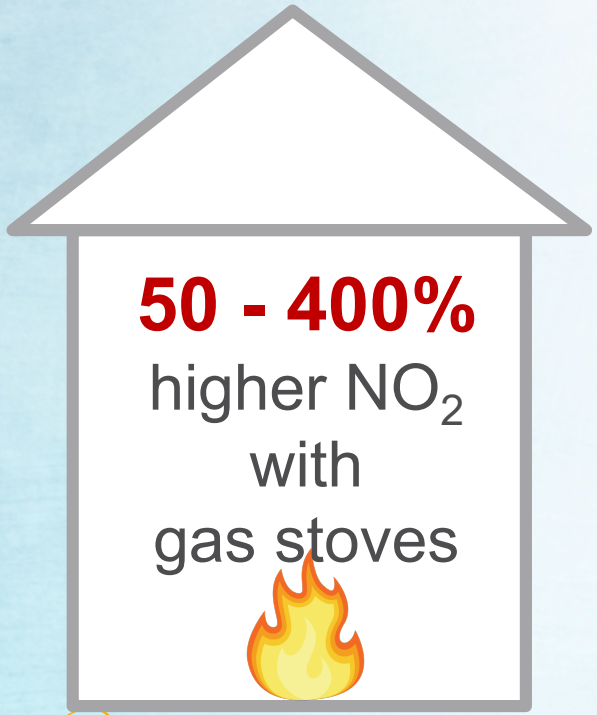
CARB

Understand Equity Concerns Through Research

- Total Exposures in Disadvantaged Communities (Spring 2021)
  - Identify localized sources and personal activities linked to elevated air pollutant exposures in disadvantaged communities
  - Includes review of electric and gas appliances
  - 4 disadvantaged communities (2 in the East Bay and 2 in Fresno/Bakersfield area)
- Multi-family Unit Study (March 2020 – August 2022)
  - Assess impacts of building air tightness on IAQ, GHG and energy in mid- or high-rise multifamily buildings in CA
  - Will compare mixed-fuel (gas & electric) and all-electric impacts on IAQ and GHG in buildings

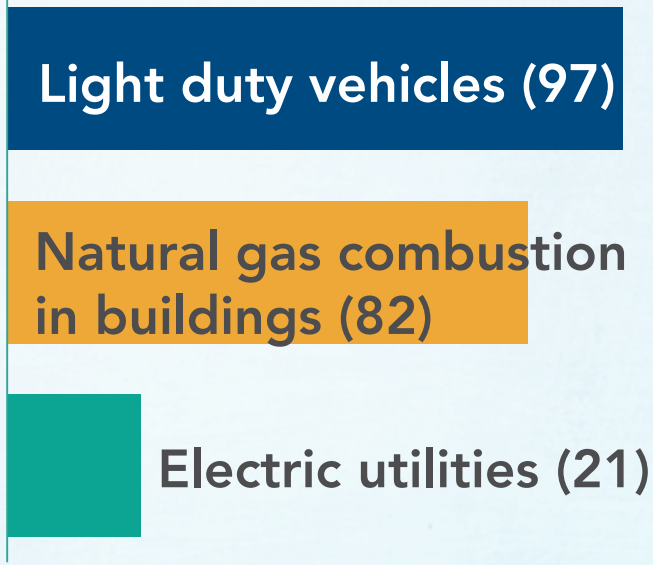
Address Health and Air Quality Risks from Combustion Appliances

Indoor Air



Outdoor Air

2019 NOx emissions (tons/day)



Climate Change

- ~ 25% of GHG emissions in CA from residential & commercial buildings
- ~ 10% due to fuel combustion in buildings

CARB

Support Health and Climate Goals With Electric Appliances

Protects Public Health

- 100% electrification of residential natural gas appliances in California:
  - 354 fewer deaths
  - 596 fewer cases of acute bronchitis

Supports Climate Goals

- Carbon neutrality requires phasing out of gas combustion, including home appliances.

CARB

(Zhu, 2020; Mahone et al., 2019; Mahone et al., 2020)

Work with State and Local Partners On Building Decarbonization

Cities

- 39 cities adopted local clean building codes*

Air Districts

- 5 air districts limit NO_2 from water heaters and furnaces

State

- CEC: Energy Code
- BSC: CalGreen Code
- CARB:
  - AB 32 Scoping plan
  - Model rules/best practices
  - Incentives

* https://www.sierraclub.org/articles/2020/09/californias-cities-lead-way-gas-free-future

Actions needed now

Work with CEC, BSC and HCD on the 2022 building code update:

- Support all electric appliances (such as space and water heaters, stoves and ovens) for all new buildings
- Support stronger kitchen ventilation requirements

CARB Authority for IAQ Actions

Sustainable Communities Require Clean Indoor and Outdoor Air

Next steps

- Accelerate conversion to all-electric buildings
- Model rules/best practices for combustion appliances
- Address IAQ disparities in vulnerable communities
- Update and expand efforts on IAQ guidelines and communication
- Continue partnerships with key state agencies and local air districts

Questions and Discussion

Thank you!