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8 kilometers
Camp Fire, Butte County, California, USA
November 8th, 2018 - Natural colors with IR highlights
Landsat 8 data courtesy of the U.S. Geological Survey
Processed by Pierre Markuse

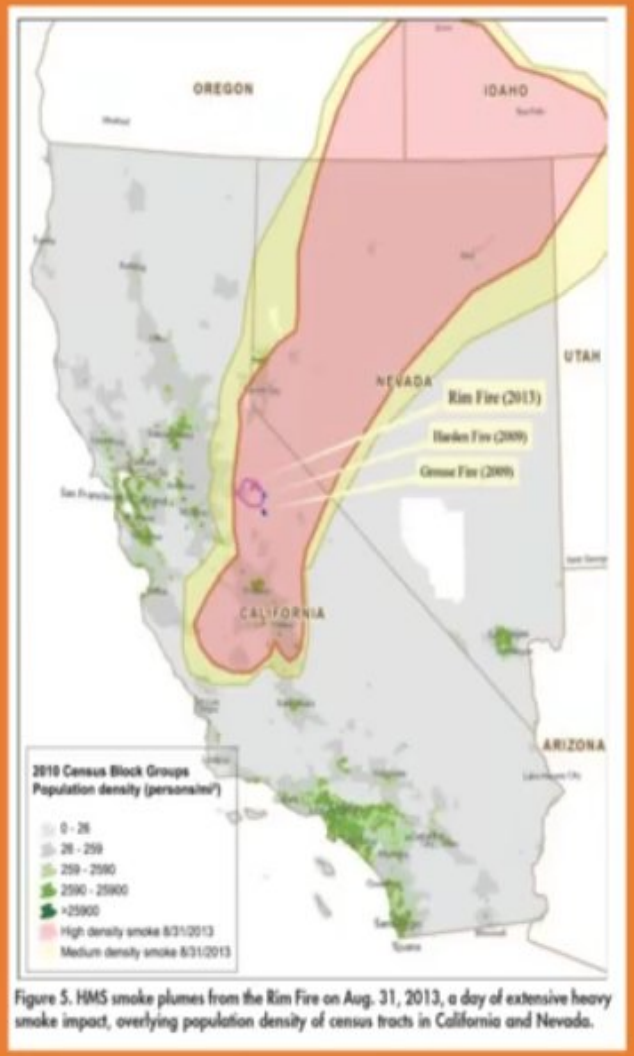


Figure 5. HMS smoke plumes from the Rim Fire on Aug. 31, 2013, a day of extensive heavy smoke impact, overlying population density of census tracts in California and Nevada.

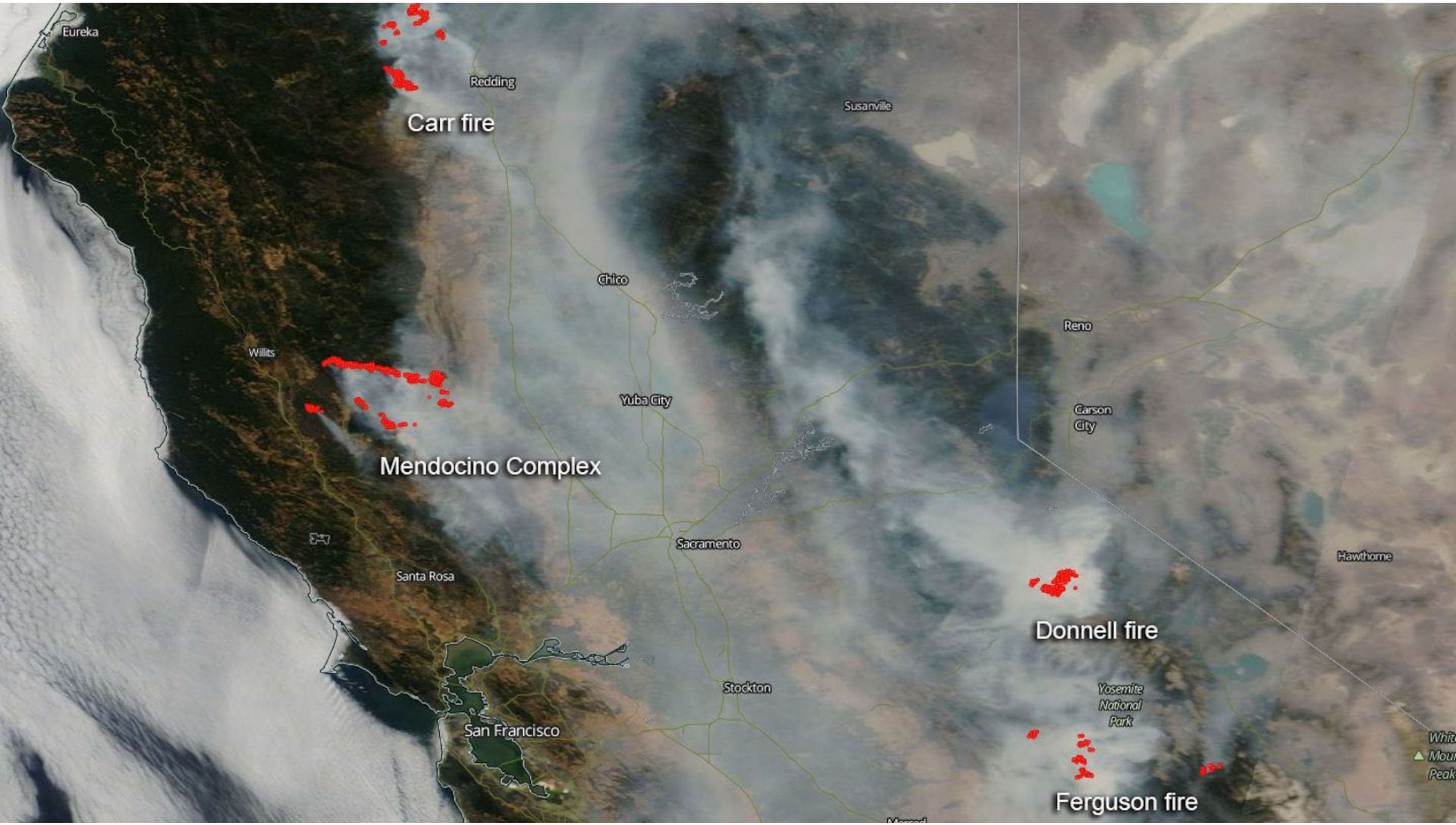
7 Million total person-days of exposure to higher than normal levels of PM 2.5 from the Rim Fire between August 22nd and September 10th.

Values that exceed 35 $\mu g/m^3$ are considered unhealthy for sensitive groups.

Large smoke plumes occurring on August 23-25 and August 28-29 when PM values exceeded 55.5 $\mu g/m^3$ which is unhealthy for all populations.

Studies suggest the costs of the Rim smoke impacts approximate $600 million dollars.

Long et al. 2017. Aligning Smoke Management with Ecological and Public Health Goals.


Eureka
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Yosemite National Park
San Francisco
Ferguson fire

Wildfire smoke from California has reached New York City, 3,000 miles away

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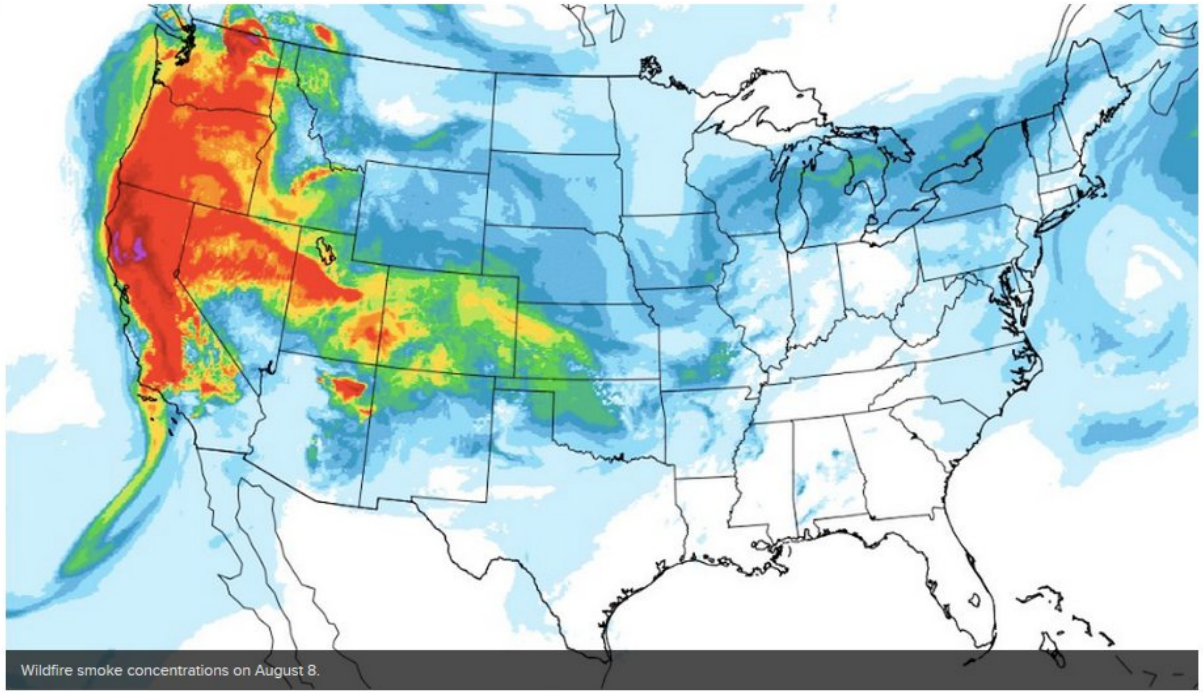
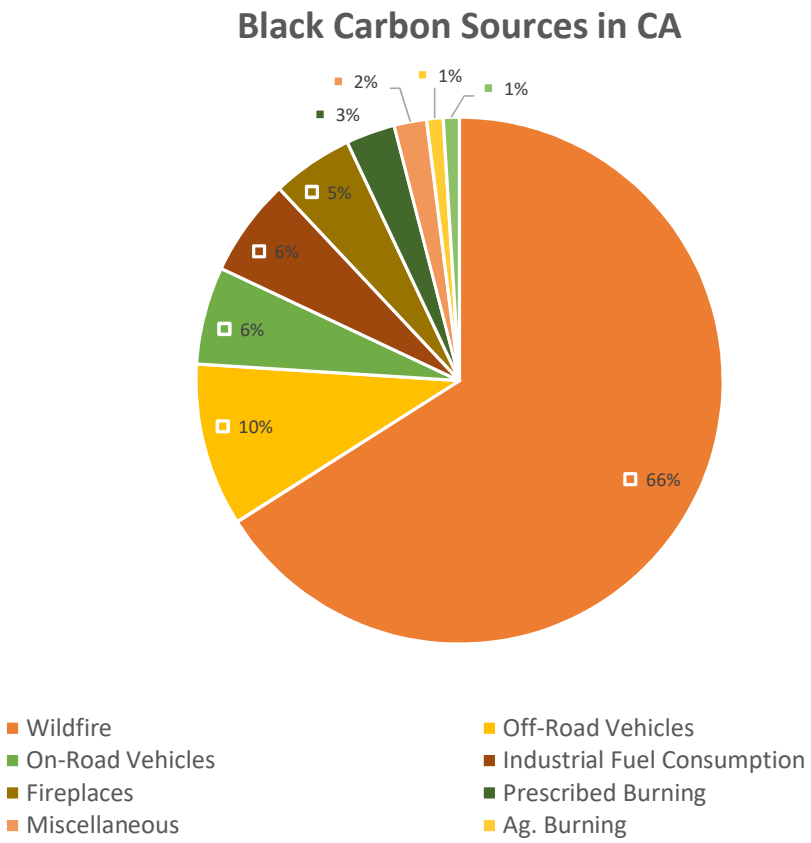


Wildfire smoke concentrations on August 8.

IMAGE: NATIONAL WEATHER SERVICE

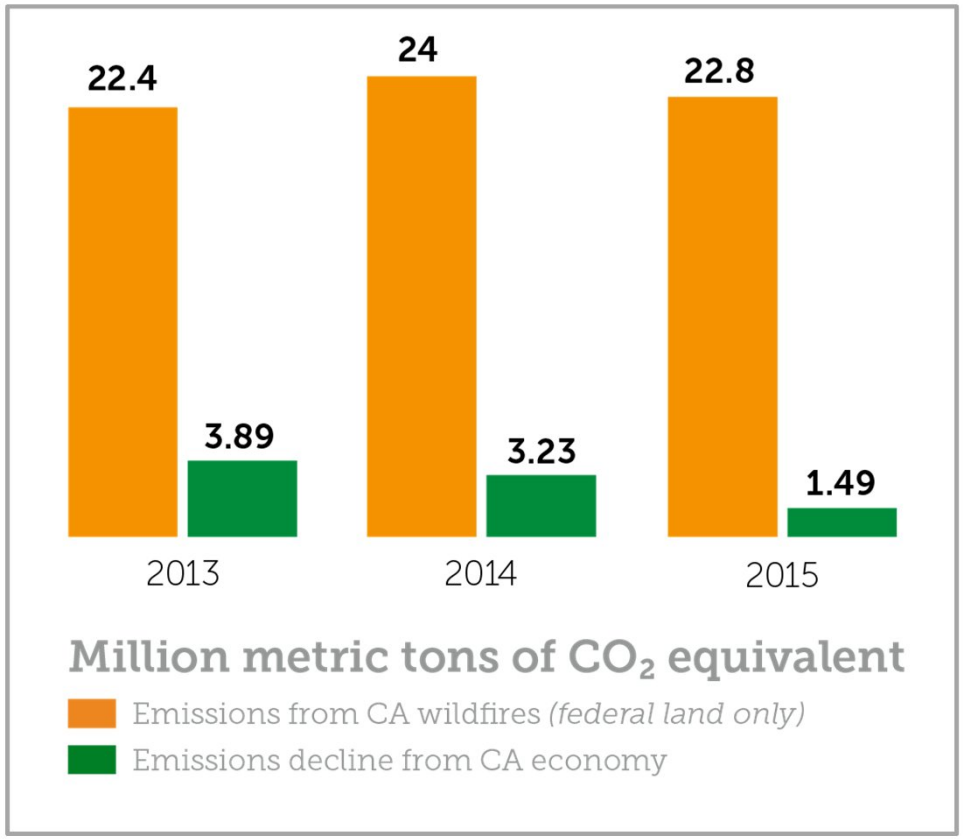
Wildfire and Black Carbon Emissions in CA



- BC = 900 – 3,200 x more damaging than CO_2
- > 2/3 comes from wildfire
- BC also causes air pollution, crop damage, rainfall disruption

Source: California Air Resources Board

Wildfire Emissions > All CA GHG Reductions



Source: Sierra Nevada Conservancy

State Policies on Forest Biomass – Part 1

- Bioenergy Action Plan (2012)
- SB 1122 (Rubio, 2012) – Calls for 250 MW of small-scale bioenergy, including 50 MW from forest waste from sustainable forestry
- Governor's Emergency Order on Tree Mortality (2015) – accelerate forest fuel removal and development of new bioenergy facilities

California Forest Carbon Plan - Findings

- Reducing carbon losses from forests, especially from extreme wildfires, is essential to meet the state's climate goals.
- Forest fuel reduction involves some immediate loss of forest carbon, but can increase long-term carbon sequestration.
- Lack of biomass infrastructure is a major impediment to forest restoration and management

CalEPA
California Environmental Protection Agency

CALIFORNIA natural resources AGENCY

CALIFORNIA DEPARTMENT OF FORESTRY & FIRE PROTECTION
CAL FIRE
SINCE 1885

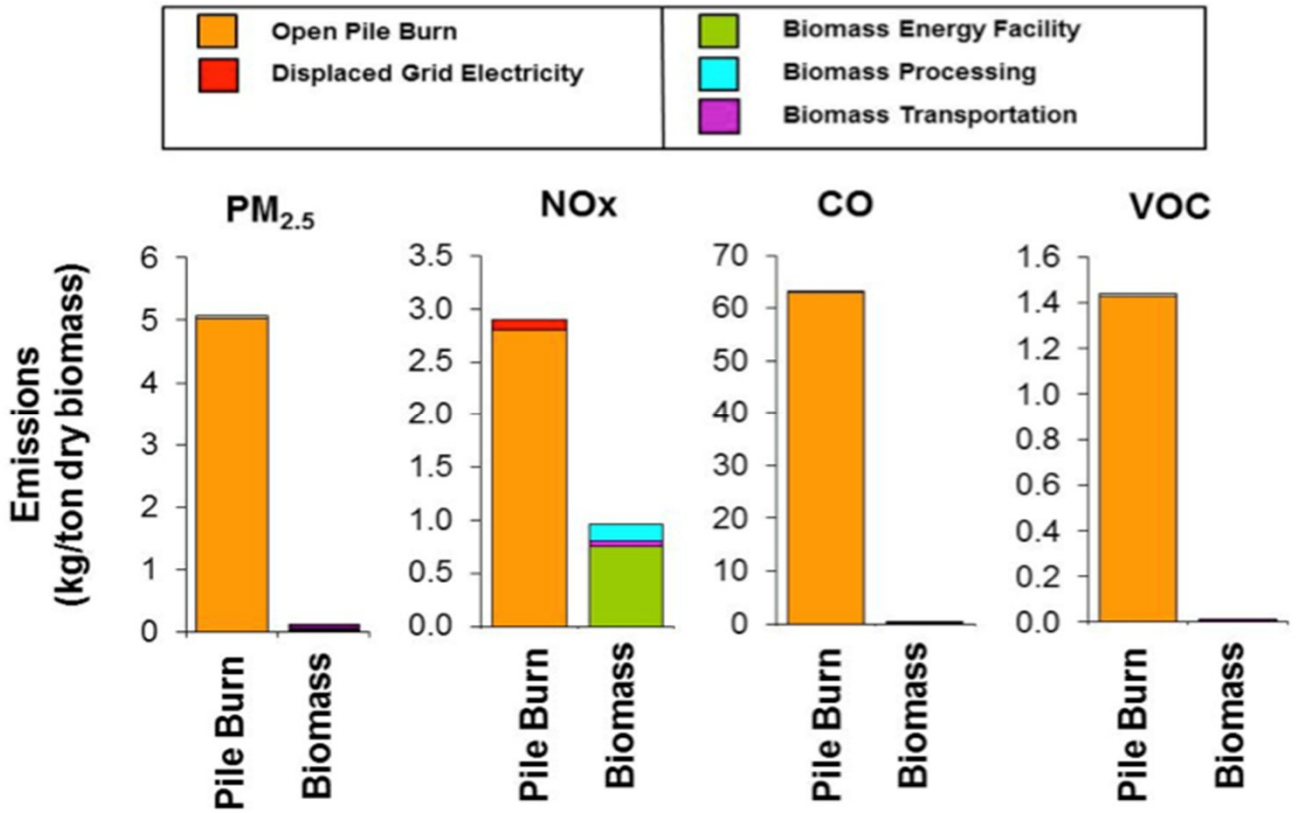
Forest Carbon Plan - Recommendations:

- Triple forest restoration and forest fuel removal by 2030
- Quickly expand new, small-scale bioenergy facilities
- Invest in biochar to provide long-term carbon sequestration

Prescribed Fire:
Good for: steep slopes, remote areas
Not Good For: Near infrastructure, homes, air pollution

Mechanical Thinning:
Good for: near homes, communities, infrastructure, impacted air districts
Not good for: Steep slopes, remote areas


BEFORE
AFTER



Biomass Reduces:

- PM2.5 and black carbon by 99%
- Methane and other VOC's by 95-99%
- NOx by 40-70%.

Source: Placer County Air Pollution Control District and California Air Pollution Control Officers Association

Forest Conservation Experts on Forest Biomass

Pacific Forest Trust:

- Done right, biomass can complement responsible forest management and be part of a sustainable energy future.

The Nature Conservancy:

- Supports the use of appropriately sized, sited and operated forest biomass facilities to support forest health and reduce climate emissions.

World Resources Institute:

- Bioenergy + Carbon Capture and Storage are essential to achieve climate neutrality

Doing Biomass Right

- Use only vegetation removed for other purposes
  - ✓Agricultural residues (rice straw, orchard prunings, etc.)
  - ✓Forest biomass removed for wildfire prevention or forest restoration
  - ✓Other vegetation removed for defensible space (PRC § 4291)
- New facilities should be small-scale
  - ✓ Avoid long transport distances
  - ✓ Ensure sustainable feedstock
- Require BACT, no direct combustion
  - ✓Gasification and pyrolysis have much lower emissions
  - ✓ Produce biochar, which provides carbon sequestration and water filtration
- Require net benefit for air quality and GHG emissions

State Policies on Forest Biomass – Part 2

- SB 100 – Renewable Electricity Requirements
- Governor's Ex. Order B-55-18 - Carbon Neutrality by 2045
- SB 1260 – Programmatic EIR for fuels removal
- SB 901 – Wildfire reduction
  - ➢ Requires increased fuels removal
  - ➢ Increases defensible space req't
  - ➢ Allocates $200M annually to forest restoration and fuels removal

What Else?

- Accelerate BioMAT and increase MW
- Require a portion of RPS to come from bioenergy and other base load renewables
- Allocate Cap & Trade funds, EPIC and AB 118 $$ to biomass
- Link fuel removal subsidies with bioenergy facilities
- Accelerate and subsidize interconnection
- Hold utilities and others responsible for climate and air pollution from fires
- Adopt carbon protocol for avoided fire emissions
- Allow biogas from gasification in utility pipelines

THANK YOU

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