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Hello! What brings you here today?

To learn about biomass projects in the region!

To meet new people who work in this space

To learn how non-profits can be involved in bioenergy promotion

Connecting with others in the field

To learn more about biomass and how adult education programs can be in involved in education and training.

Getting a fuller sense of the biomass processing "landscape" in this region and finding possible partners for workforce development.

What's new in biomass

Biomass

2

10

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Hello! What brings you here today?

I am on the CRCRC steering committee

To get the latest updates on how methods of recycling are acheived in more detail along with new funding to build new facilities. Forestation eco systems and more streamlined methods that exist.

More knowledge to digest.

Looking for solutions to implement

2

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Biomass & Beyond:

Growing A Resilient Regional Bioeconomy

11.05.2025

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Community Inspired Solutions

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CAPITAL REGION
CLIMATE READINESS
COLLABORATIVE

Cleaner Air
Partnership

PCWA

Placer County
AIR POLLUTION CONTROL DISTRICT

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Evan Schmidt
Chief Executive Officer

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Community Inspired Solutions

Kate Gordon
Chief Executive Officer

CAFWD

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BIOMASS & BEYOND: *GROWING A RESILIENT REGIONAL BIOECONOMY*

Agenda

- Welcome Remarks
- Making the Case for Biomass
- Biomass & the Bioeconomy
- Stories from the Field
- Lunch & Interactive Activity
- Table Report-Outs & Discussion
- Moving the Needle: Policy
- Special Announcement & Adjourn

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Eric Guerra

Mayor Pro Tem - City of Sacramento / CARB Board of Director, Sacramento Region Air Districts

CALIFORNIA AIR RESOURCES BOARD

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Dr. Cindy Chen

Woody Biomass & Forest Products Advisor

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The Future of Biomass and Bioproducts in California

Cindy Chen, PhD
Woody Biomass and Forest Products Advisor

November 2025

UNIVERSITY OF CALIFORNIA
Agriculture and Natural Resources

1

What is biomass?

- In general, biomass refers to renewable organic material that comes from plant and animals and usually have no or little commercial value.
- Types of biomass:
  - Forestry – harvest residuals, shrubs, forest thinnings, sawmill dust, etc.
  - Agriculture – Crop parts, almond shells, livestock waste, orchard tree trimmings, etc.
  - Municipal Solid Waste (MSW) – leftover food, packaging, yard waste, etc.
- California has ~47million bone-dry tons (BDT) of biomass potential - the weight of 24 million cars

Why do we care?

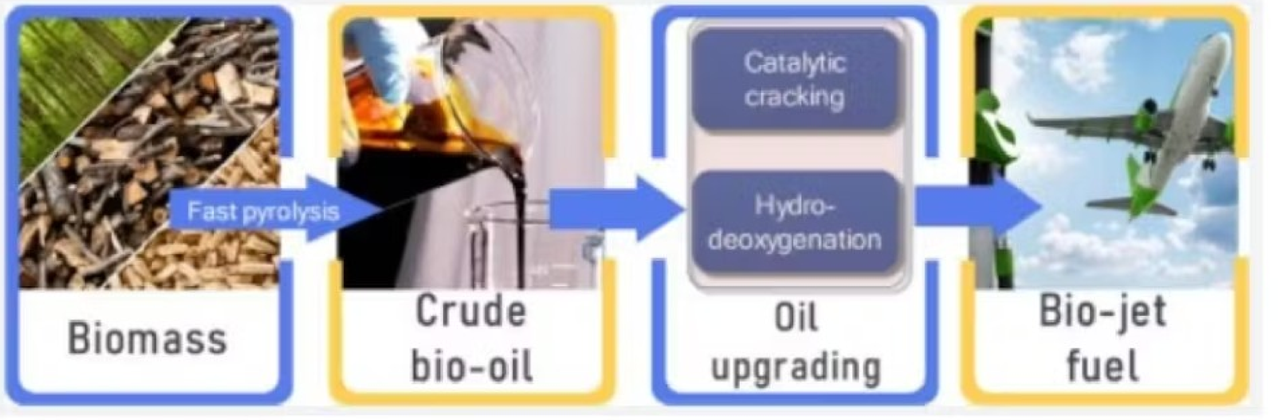
- California to achieve carbon neutrality by 2045
- CPUC estimated that wildfire related costs for San Diego Gas & Electric (SDG&E) increased by 62% between 2023 and 2024, and 117% increase for PG&E.
- The California Air Resources Board (CARB) cited that a recent report estimated that wildfire smoke in California costs the state around $2.3 billion annually in health-related expenses (e.g., hospitalizations, emergency room visits, and lost workdays).
- Recent study from UC Berkeley shows that wildfire smoke is significantly associated with higher borrowing costs for hospitals and nursing homes, increasing interest for hospitals by about $175 million and $95 million for nursing homes.

Examples of Biomass and Bio-based Products

Biomass Products

Advanced Wood Products

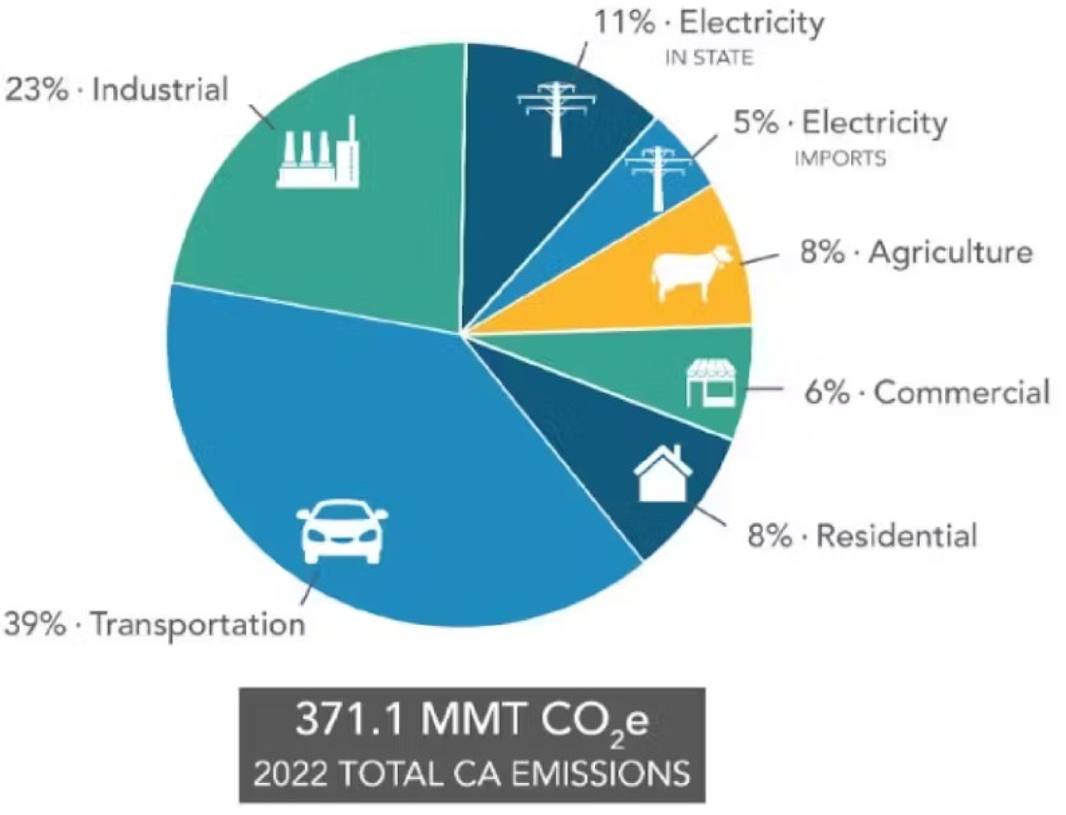
Renewable energy share in California by source, 2021



Bioenergy and Biofuel

- **Heat Energy** – Through the exothermic combustion process, biomass is converted into the primary products of carbon dioxide, water, inorganic ash, and various gaseous and particulate emissions while giving off about 8,000 BTU's of heat for every pound of dry wood burned.
- **Electrical Energy** – Coupling the combustion process with a steam boiler and using the produced steam to drive an electrical turbine is a well proven method of producing electricity from biomass.
- **Biofuels** – Common types:
  - **Solid or milled Wood** – wood in any size or shape can be directly combusted to produce heat and as such is a biofuel
  - **Densified wood** – wood particles are compressed into a smaller volume of a specific size and shape (pellets, logs, bricks, etc.) to increase the fuel density (Btu's per unit volume)
  - **Charcoal** – Produced by subjecting wood to a slow pyrolysis process (heating at 700 - 900°F in the absence of oxygen for many hours)
  - **Bio-diesel** – catalytic conditioning of syngas that was derived from the gasification of biomass can be directed towards the production of synthetic bio-diesel

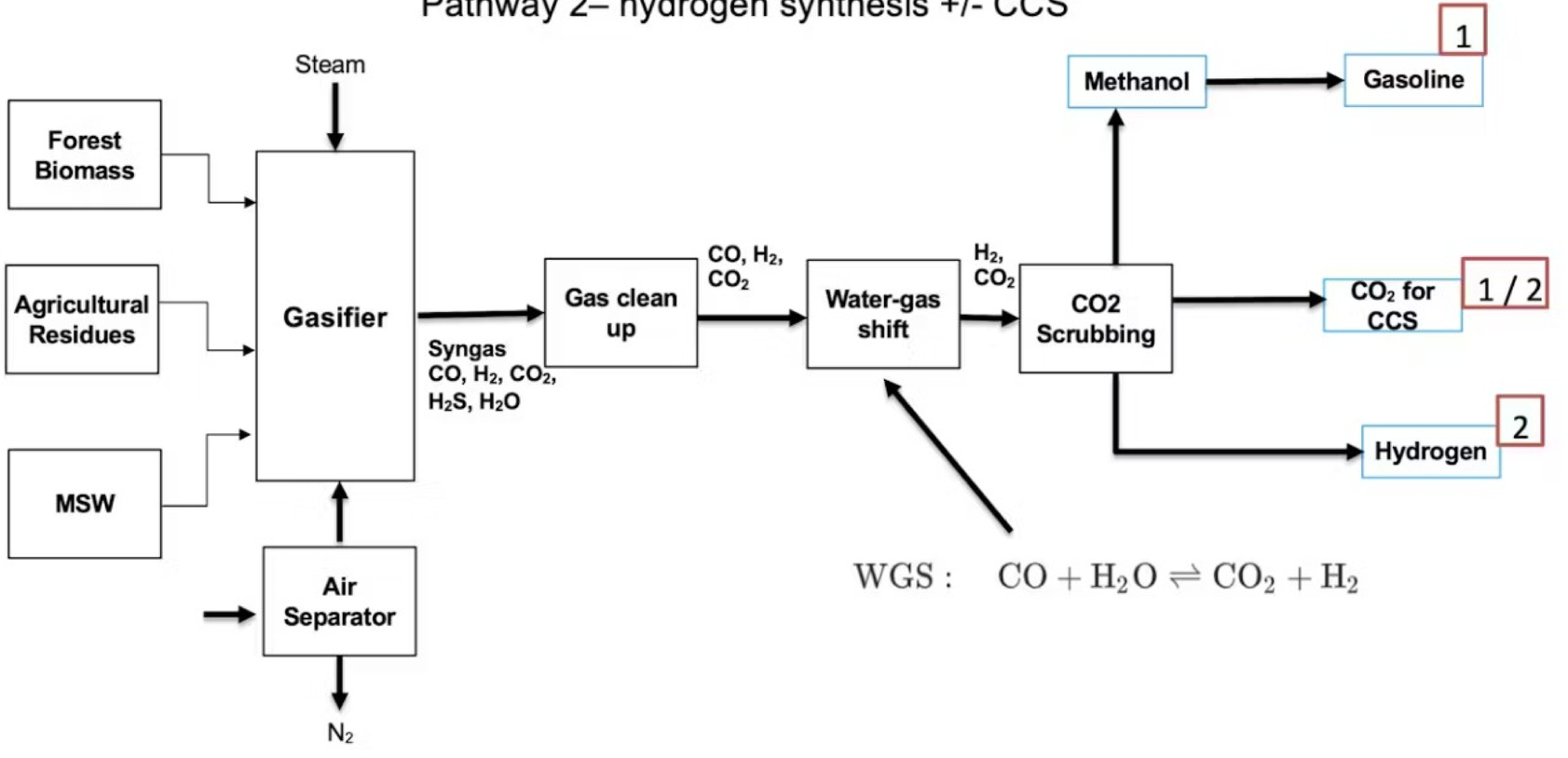
California GHG Inventory (2024 Edition)



Source: California Air Resources Board (CARB)

Biomass-to-fuels pathways

Pathway 1 – gasoline synthesis +/- CCS
Pathway 2– hydrogen synthesis +/- CCS



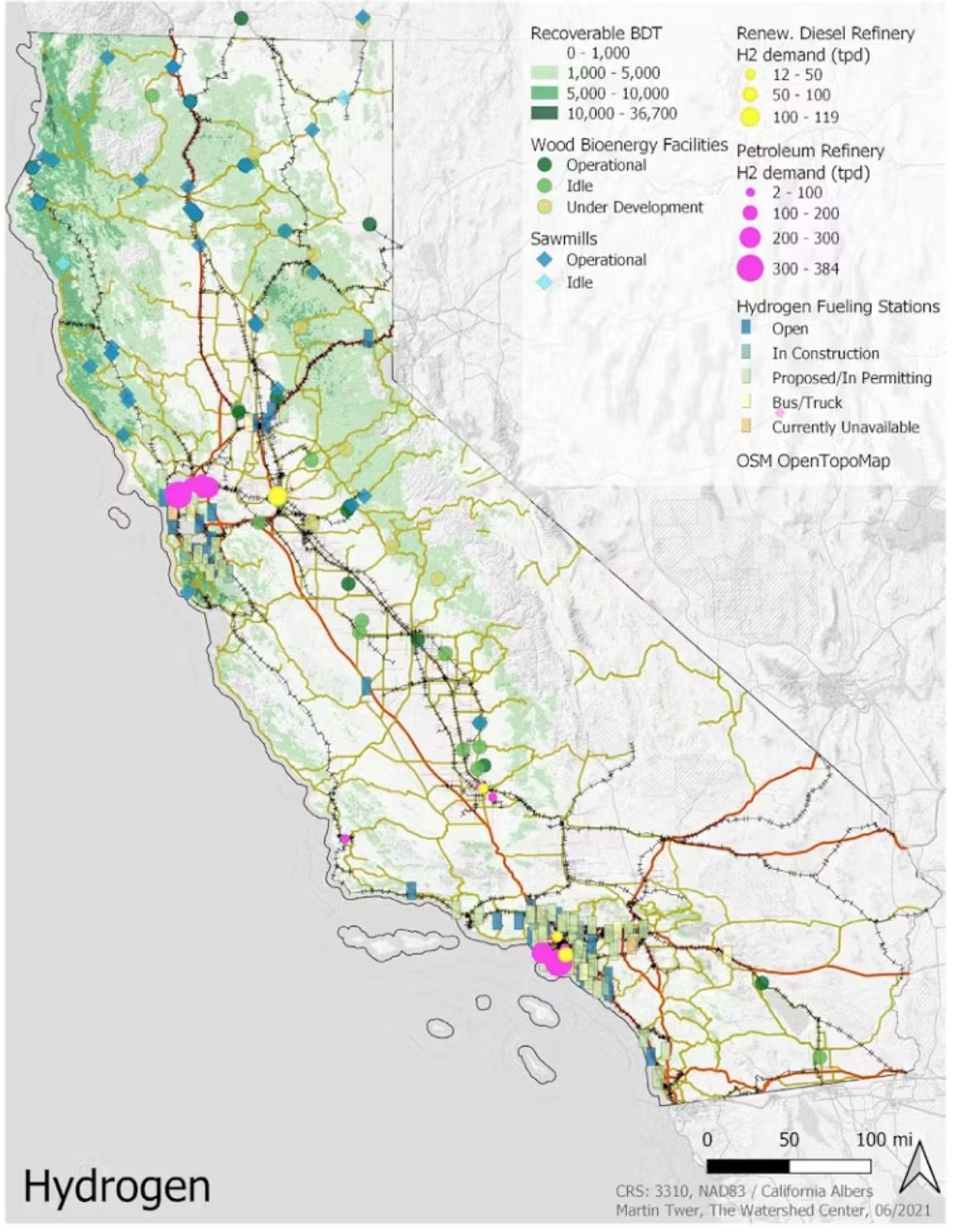
$$\text{WGS}: \quad CO + H_2O \rightleftharpoons CO_2 + H_2$$

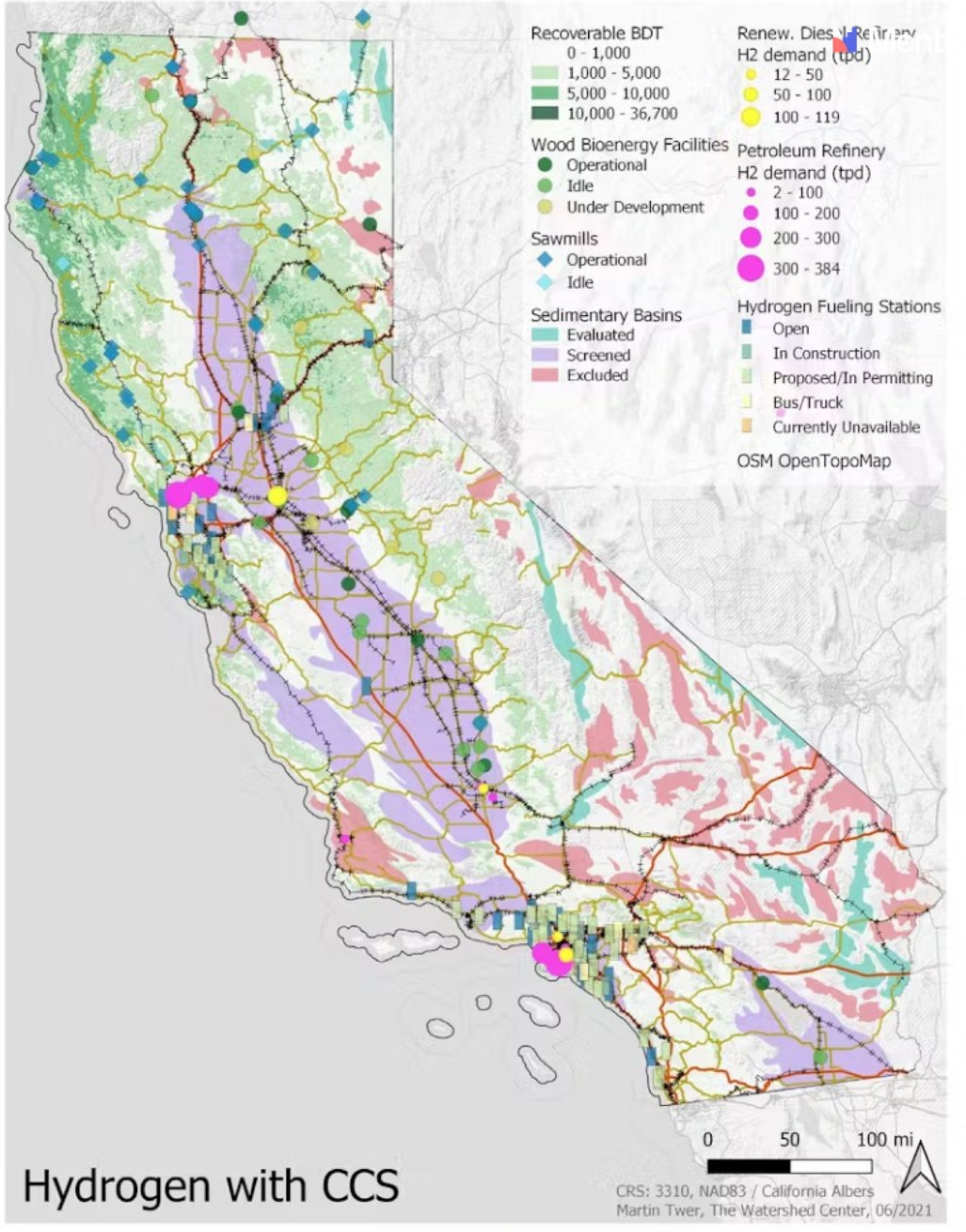
California is the largest consumer of both motor gasoline and jet fuel in the U.S. In 2020, California consumed over 11 billion gallons of gasoline and 5 billion gasoline gallon equivalent (GGE) of jet fuel.

Sanchez, D. & Gilani, H. 2021. *Advancing Collaborative Action on Forest Biofuels in California.*

Potential Biofuel and hydrogen market for California:

- Transportation Fuels
- Cleaner fertilizer industry
- Benefits: Air pollution reduction; self-reliance





Credit: Martin Twer, The Watershed Center

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Key Takeaways

Key Benefits of Biomass Utilization

- Energy Security: Converts waste into biofuels (RNG, ethanol, biodiesel) and electricity, lessening reliance on fossil fuels.
- Waste Reduction: Repurposes agricultural and forestry waste, cutting landfill use and methane emissions (CH_4).
- Economic Growth: Creates jobs and stimulates investment in rural communities.

Innovation in Bio-Based Materials

- Breakthroughs: Bioplastics for packaging, bio-Composites for construction/vehicles, biochar for carbon sequestration and soil health, engineered wood products for the building sector.

Vision for CA's Bio-Economy

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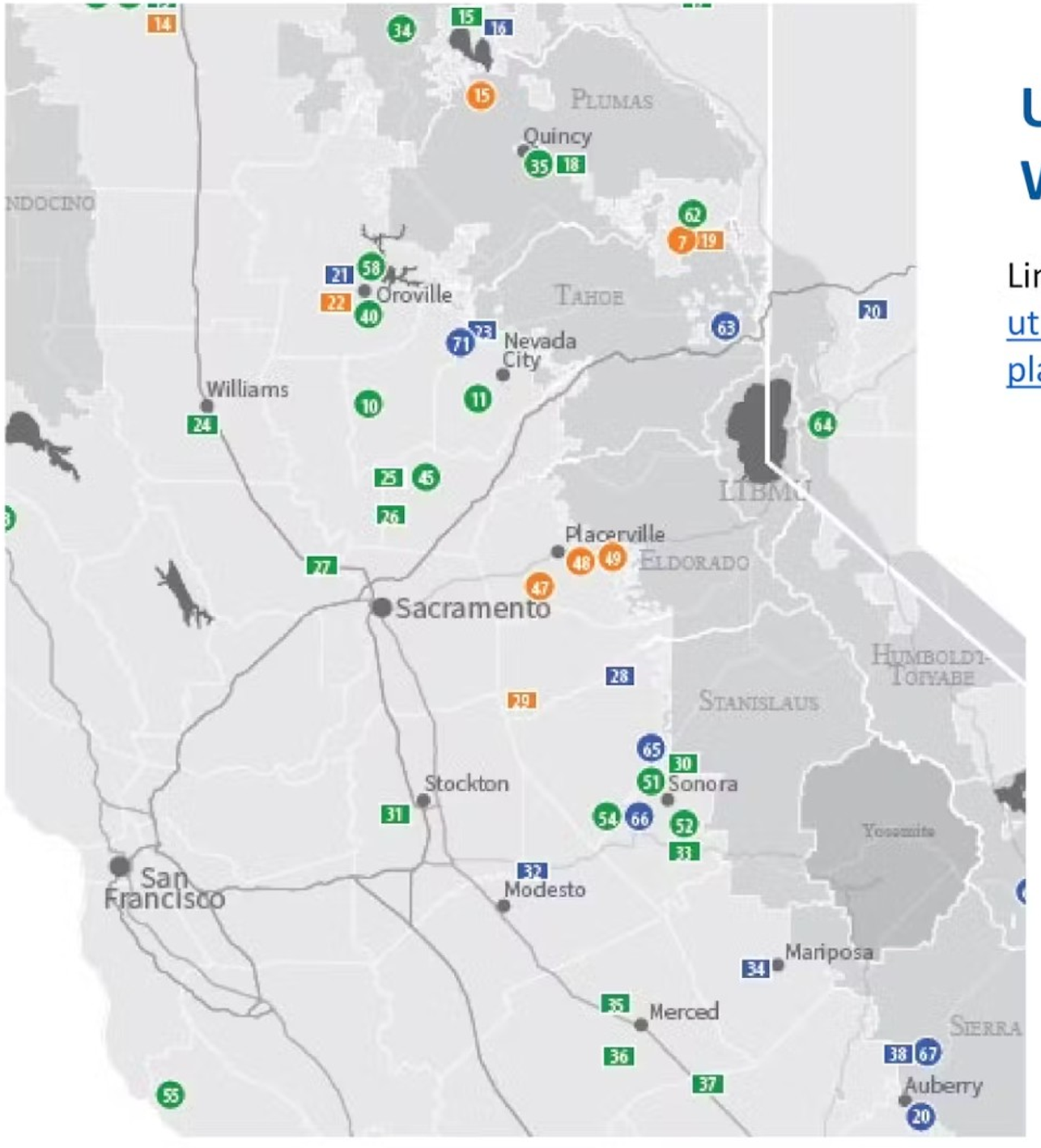
THRIVING MARKET FOR LOW-CARBON FUELS

INTEGRATED WILDFIRE AND BIOMASS MANAGEMENT STRATEGY

STRONG CIRCULAR ECONOMY FOR BIOPRODUCTS AND BIO-BASED MATERIALS

STREAMLINED POLICY AND REGULATORY ENVIRONMENT

RESILIENT WORKFORCE AND INDUSTRY SUPPORT NETWOK



UC ANR Woody Biomass Utilization Workgroup Facility Map

Link: https://ucanr.edu/site/woody-biomass-utilization/california-forest-products-and-biomass-power-plant-map

Primary Wood Processing Facilities

- Open / Operational
- Closed or Idle
- Active Development

Biomass Energy Facilities

- Open / Operational
- Closed or Idle
- Active Development

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Thank you!

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Phone: (209) 533-6989

Haris Gilani, PhD
Biomass and Bioenergy Advisor
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Scan the QR Code to Access Mentimeter Activity

What resonated with you?

24

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What resonated with you?

I'd love to see that map!

Dr Chen's presentation. Want to learn and be a part of the solution more

The job creation and the cost

The variety of potential in biomass!

47MM BDT!

Clear overview

The low number of biomass to energy facilities remaining in Northern California.

Curious about how the city of Sacramento is or can be a part of this effort more

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What resonated with you?

Opportunities for improving financial viability of agriculture while improving air quality and reducing emissions.

Maps & graphics

Possibility to divert waste from urban forestry activities to biofuel/bioplastics

I want to know more about the workforce needs, specifically how community colleges can help build pathways to jobs.

Transportation fueling opportunities

Biomass “residue” vs. “waste”

Concept of Economic development that is not likely to be offshored + air quality benefits

How to get access to funding to implement projects on this topic

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What resonated with you?

Variety of potential solutions.

How reliant CA is currently on gasoline and aerospace fuel.

An opportunity to have a state wide circulated economy!

The role of training of people into this industry

The potential benefits are very expansive. However, it requires bringing a lot of diverse interests together.

Curious to learn more about the workforce needs and training pathways in this growing industry / set of industries

The potential for economic benefits of biomass utilization sooner rather than later

What torch me was job creation and to rethink the cost of the biomass management

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What resonated with you?

More info on wood utilization hubs

Can we get a biomass to energy facility similar to one near Eureka?

Multiple benefits and opportunities for biomass utilization - energy, waste reduction, economic development. Also the need and opportunity for rural-urban coordination and benefit-sharing

How to increase biomass product market demand and increase awareness of the bioeconomy to the public, especially farmers and landowners.

We have been having these conversations for decades, yet haven't made much progress. What are we missing to catalyze action?

Need for centralized state effort - pick a state agency with responsibility and funding.

Be consistent with replacing the term "waste" with "residuals" or similar, if we are serious about it being known as an input for industrial processes.

We need less research and more implementation of known technologies. They exist, in other countries.

26

Northstar Community Services District

Water, Sewer, Solid Waste/Recycling

Fire Protection, Advanced Life Support, Forest Fuels Management

Road Maintenance and Snow Removal

Trails and Lighting

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STORIES FROM THE FIELD

Eric Martin

Director of Public Works

João Mario Soares

Chief Executive Officer

ENGEMAN

Matt Summers

Chief Operating Officer

WestBiofuels

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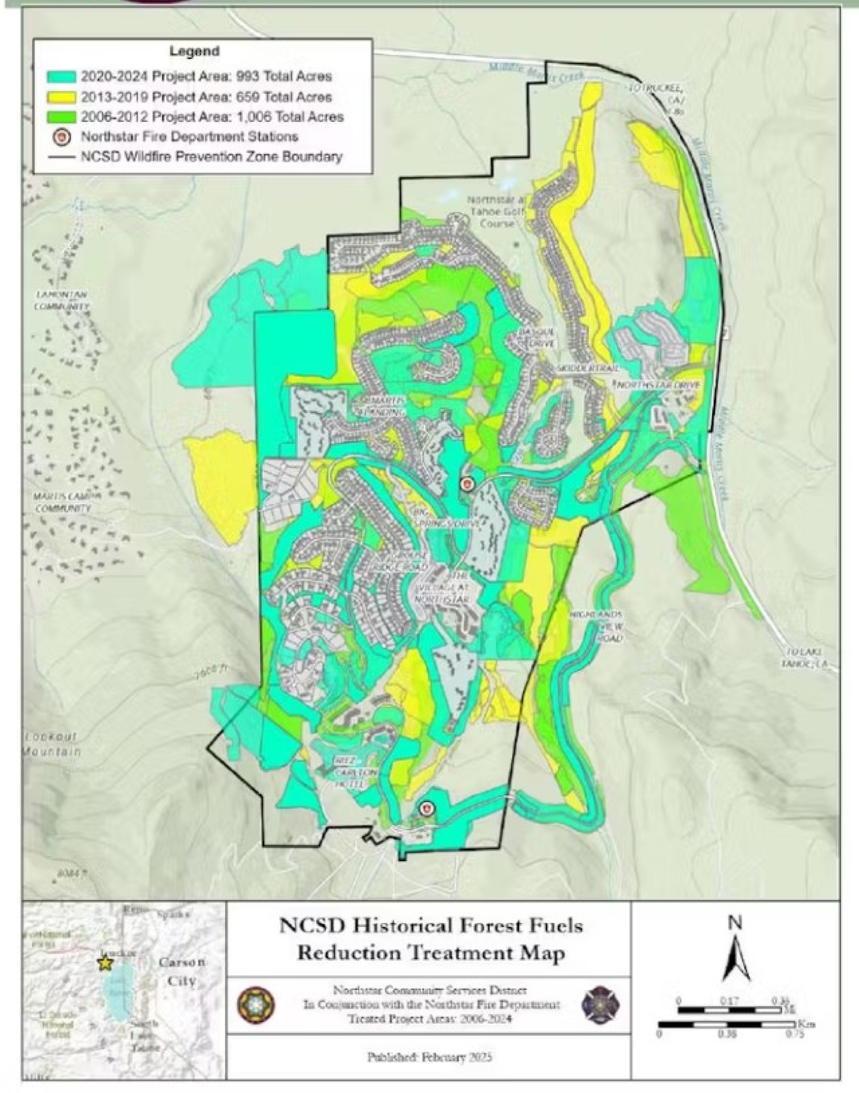
Northstar Community Services District



Fuels Management since 2006

~2700 acres treated

$4.3 million grants received

$2.6 million in grants in just the last 5-ye ars

2024 Measure U Parcel Tax $236/yr

Annual Revenue $493k

Increase Scope and Scale

Northstar Community Services District

Caldor Fire 2021, 221k acres,
> 1,000 structures, $1.2 billion

Camp Fire 2019
153k acres
18,804 structures
85 fatalities
$16.5 billion

Palisades and Eaton Fires 2025, 37k acres, > 18,000 structures
30 fatalities, ~$164 billion

Dixie Fire 2021, ~1MM acres
> 1,300 structures, ~$1.75 billion

Northstar Community Services District

Northstar Community Services District

Before

After

Northstar Community Services District

Northstar Community Services District

Diminishing and Costly Outlets For Forest Residuals

Estimated 100,000 BDT Needing Disposal Annually

Northstar Community Services District

Wood Energy Facility
2MW District Heating System

3800 BDT/YR
Hazardous Fuels

Northstar Community Services District

1 million sq.ft. and multiple pools/spas

>$500k NG

21/ 22

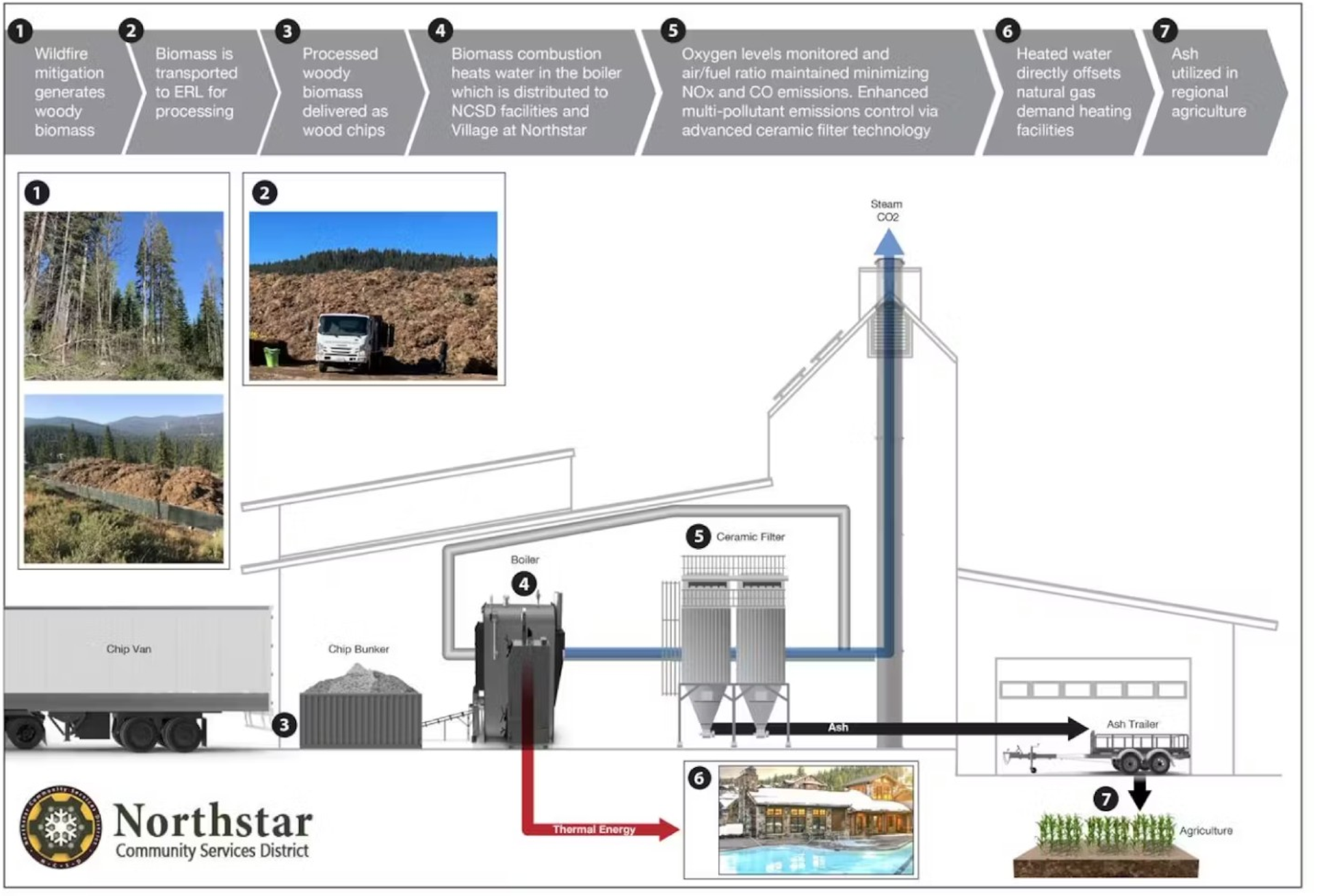


FIGURE 8

NCSD Biomass Energy System Overview

Northstar Community Services District

Messersmith Boiler

Boiler system ties into existing naturalgas/fuel oil boilers to meet heating loads.

Northstar Community Services District

Insulated piping for heat distribution

Heat Exchanger

Northstar Community Services District

Advanced Emissions Equipment

Ceramic filtration emissions control equipment will be incorporated to reduce pollutants to the lowest achievable levels.

Net Air Pollutant Reduction of 180+ tons/year, approximately equal to 1,200 passenger vehicles

Net Greenhouse Gas Reduction of 1,775+ Metric Tons of Carbon Dioxide per year, approximately equal to 2,400 passenger vehicles

Power Generators

In order to maximize fuel throughput throughout the year, power generation is being proposed via two 75kW Organic Rankin Cycle (ORC) Generators.

Northstar Community Services District

Funders	~Amount
Northstar CSD	$ 3,500,000
Inflation Reduction Act's Investment Tax Credit (from IRS)	$ 3,300,000
CalFire	$ 2,000,000
USDA Forest Service	$ 1,250,000
Sierra Nevada Conservancy	$ 1,000,000
Tahoe Fund / Vail Resorts	$ 300,000
Placer County Water Agency	$ 250,000
TTCF / Martis Fund / Martis Camp Foundation	$ 150,000
Tahoe Mountain Resort Foundation	$ 150,000
Climate Transformation Alliance	$ 20,000
	$ 11,920,000

Financing (NCSD)	$ 3,500,000
Grants	$ 8,420,000
	$ 11,920,000

25-Year Program Revenue = $8.5M - $10M

Payback $3.5M Loan in 8-11 years

Additional Revenue To Be Spent on More Fuels Reduction Work

ENGEMAN ENERGY®

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ENGEMAN

Transforming Biomass into Opportunity

Biomass & Beyond |
November 2025

Introduction to ENGEMAN and Biomass Opportunity in California

ENGEMAN Energy USA, led by CEO João Mário Soares, targets California's agricultural biomass.

Their 5MW Sun Valley Rice Bioenergy plant converts rice hulls into renewable energy, reducing 3,500 truck trips annually and cutting emissions significantly. The project supports EVTRUCKS adoption, local jobs, and community energy resilience.

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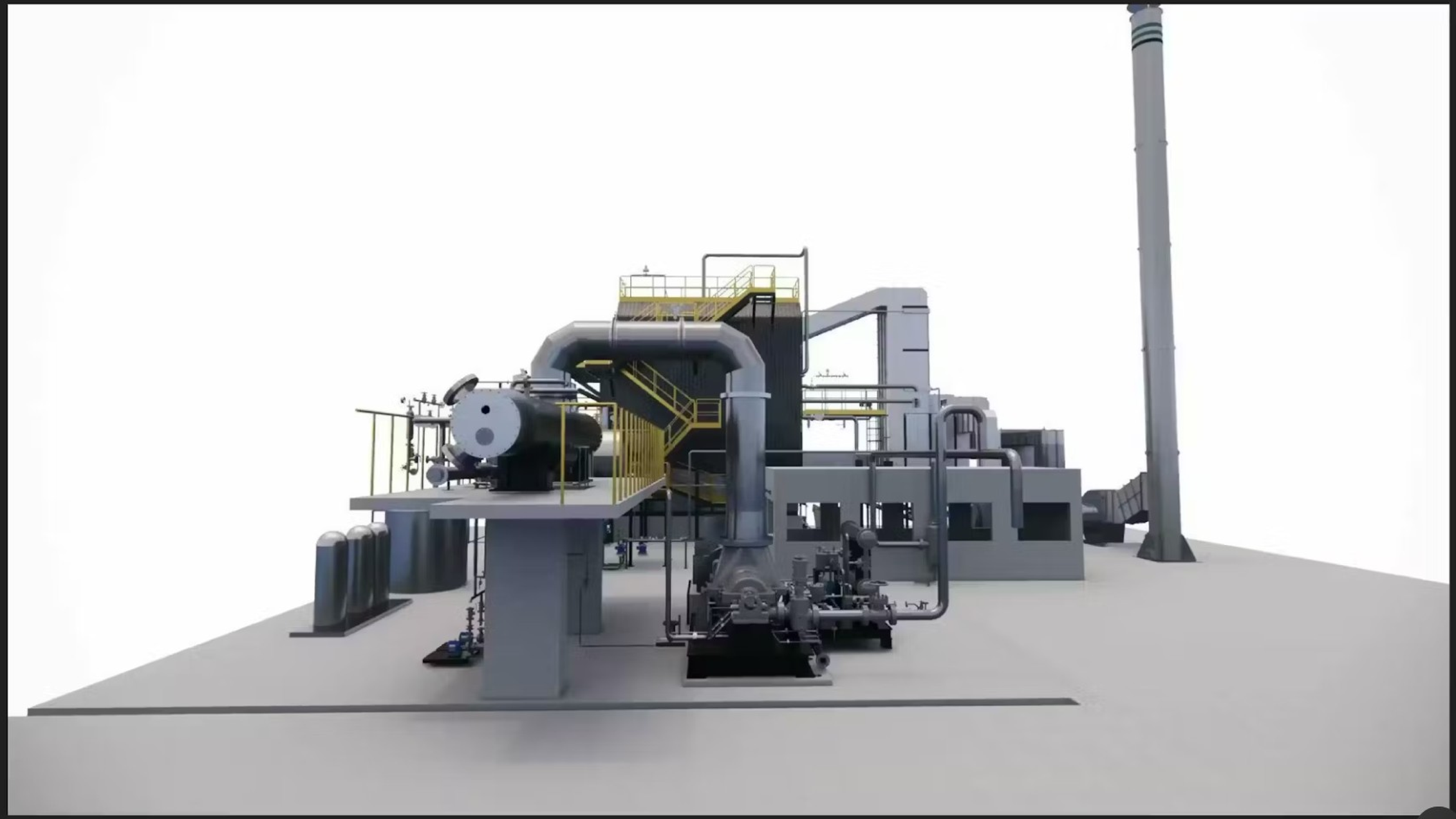

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Economic and Environmental Impact

The Sun Valley Rice Bioenergy project creates local jobs and cuts CO_2 and particulate emissions by over 90% and avoid the open burns.
The ash is reused in agriculture.
Its baseload nature supports the grid reliably 24/7.

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Why Biomass Matters

- Ensures California's energy transition reaches rural and agricultural regions — where waste becomes value and farmers become clean-energy partners.
- Converts rice hulls, almond shells, and other byproducts into renewable power — reducing open-field burning, diesel emissions, and keeping value in the Valley.
- Projects like Sun Valley Rice Bioenergy prove rural innovation can drive decarbonization while creating reliable, year-round jobs and improving air quality.
- It's not just about power generation — it's about building resilience across the state.

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Our Vision for the Future

-California's energy transition must reach the Valley —
where farmers turn waste into clean power and local jobs.
-To scale this vision, we need fair, efficient interconnection
and a new policy framework to replace BioMAT.
-With that support, biomass can become
a permanent pillar of California's clean-energy future.

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BIOMASS & BEYOND: *GROWING A RESILIENT REGIONAL BIOECONOMY*

West Biofuels Video

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BIOMASS & BEYOND: GROWING A RESILIENT REGIONAL BIOECONOMY

Lunch catered by Buddha Bowls & Rolls

Scan QR Code to access lunch activity!

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BIOMASS & BEYOND: GROWING A RESILIENT REGIONAL BIOECONOMY

Lunch & Interactive Activity

1. Has your jurisdiction, district, or region considered biomass utilization? If so, please share what you are doing.
2. Please describe some of the barriers that you are facing?

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BIOMASS & BEYOND: GROWING A RESILIENT REGIONAL BIOECONOMY

Table Report-Outs & Open Discussion

1. Has your jurisdiction, district, or region considered biomass utilization? If so, please share what you are doing.
2. Please describe some of the barriers that you are facing?

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Has your jurisdiction, district, or region considered biomass utilization? If so, please share what you are doing.

Yes we (CCP) are in process of building a 5 MW bio energy facility . Currently our hold up is only interconnection! We have the funds and the feedstock. Let's work together to make this happen!

1

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Please describe any barriers that you are facing?

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MOVING THE NEEDLE: SB 88, AB 1207, PROP 4

Lisa Lien-Mager

Deputy Secretary for Forest and Wildfire Resilience

CALIFORNIA NATURAL RESOURCES AGENCY

Elizabeth Betancourt

Natural and Working Lands Policy Advisor

California Department of Conservation

Julia Levin

Executive Director

Bioenergy Association of California

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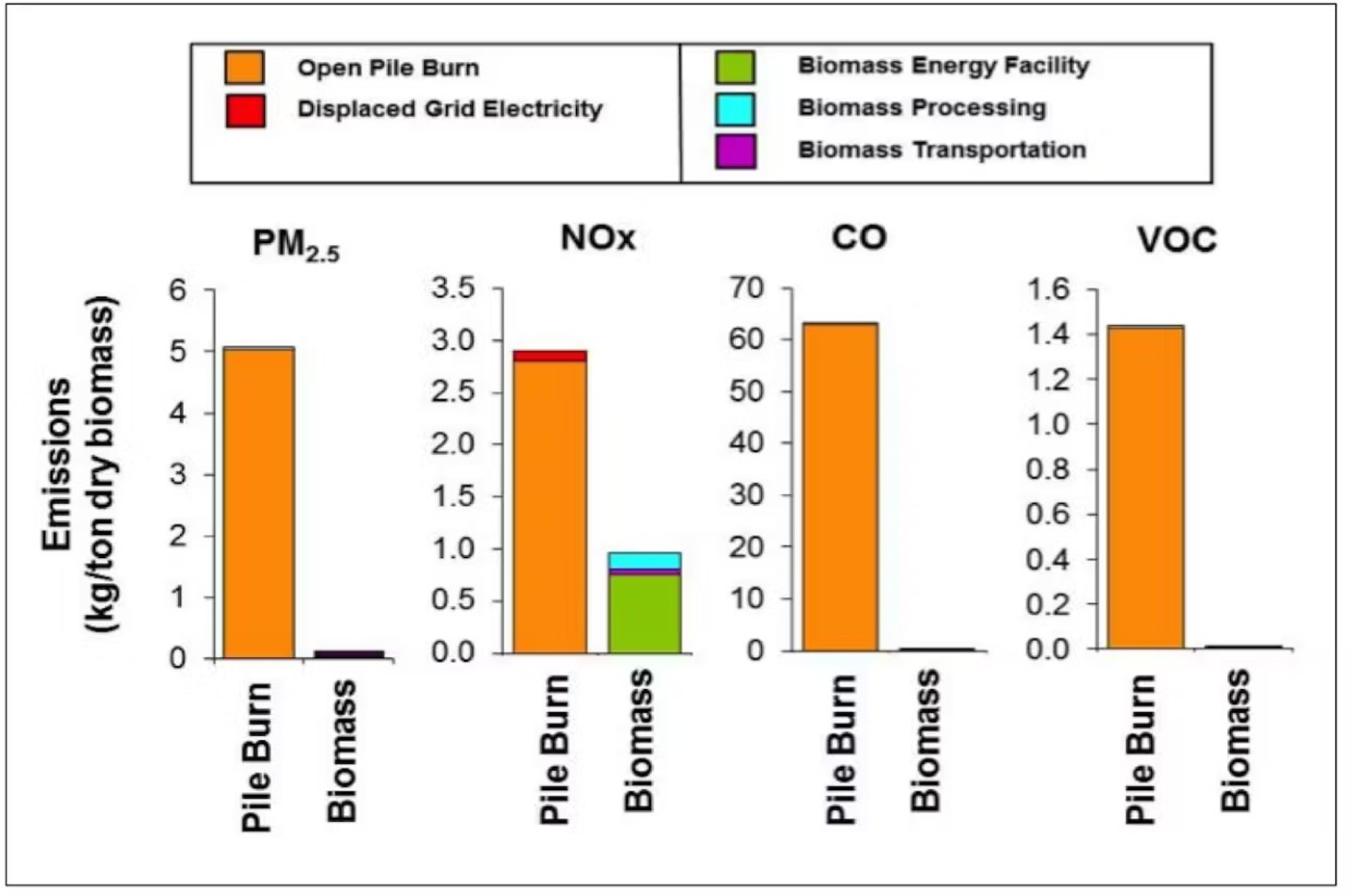
California's Bioenergy Potential from Organic Waste

Feedstock	Amount Technically Available	Billion Cubic Feet Biomethane	Million Gasoline Gallon Equivalents	Tons of Hydrogen (assuming 85% conversion efficiency)
Landfill Gas	106 BCF	53	457	
Animal Manure	3.4 M BDT	19.5	168	
Wastewater Treatment Gas	11.8 BCF	7.7	66	
Fats, Oils and Greases	207,000 tons	1.9	16	
Municipal Solid Waste (food, leaves, grass)	1.2 M BDT	12.7	109	
Municipal Solid Waste lignocellulosic fraction)	6.7 M BDT	65.9	568	
Agricultural Residue (Lignocellulosic)	5.3 M BDT	51.8	446	
Forest, Sawmill, Shrub & Chaparral Residues	26.2 M BDT	256	2,214	
BIOGAS POTENTIAL		**468.5**	**4,044**	**4,038,793**

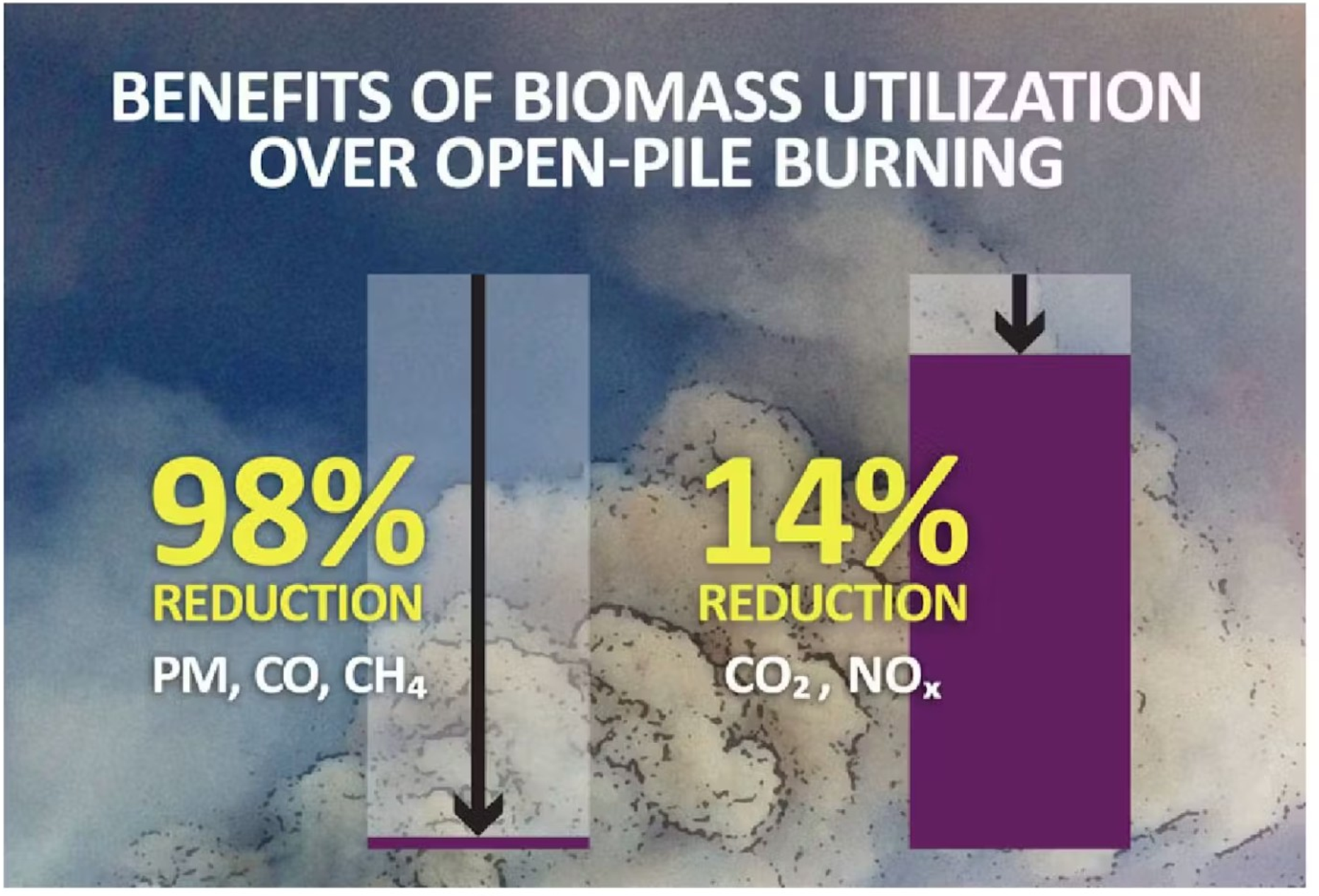
Source: Rob Williams and Stephen Kaffka, UC Davis, presentation to the California Energy Commission on 1/30/17; Lawrence Livermore National Lab assessment of forest, sawmill, shrub & chaparral residues, Jan 2020



Biomass Power Reduces:

- PM2.5 by 99%
- Methane, other VOCs by 95-99%
- NOx by 40-70%

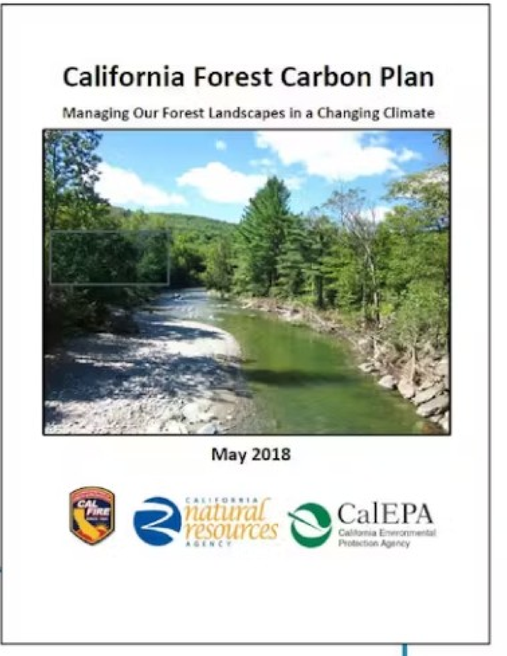
Source: Placer County Air Pollution Control District and the California Association of Air Pollution Control Officers

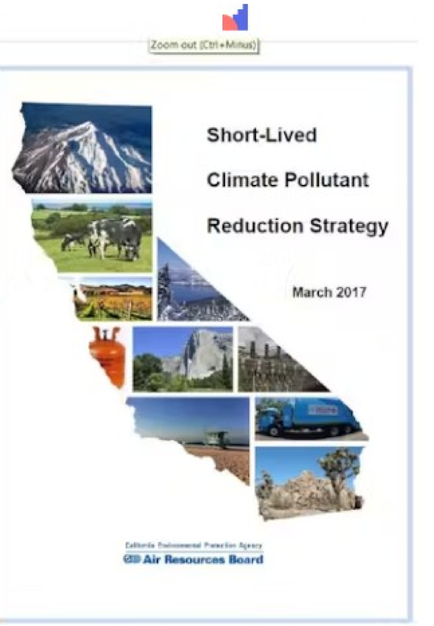


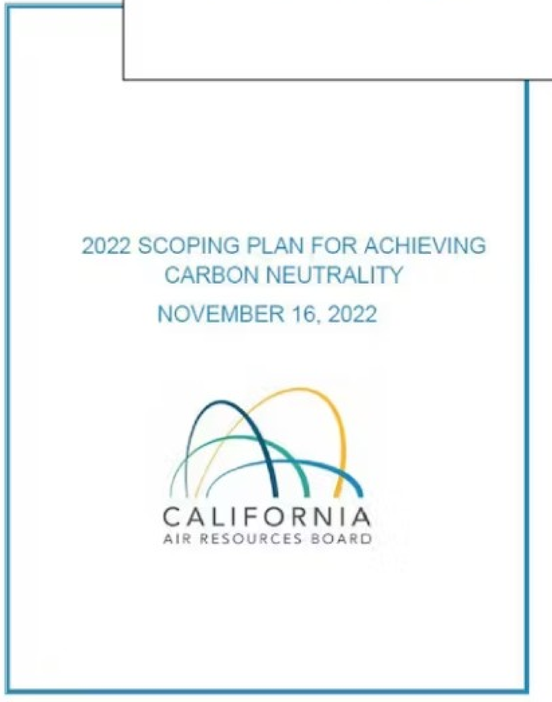
Source: *California Forest Carbon Plan,* adopted by CalEPA, CNRA, and CalFire in 2017

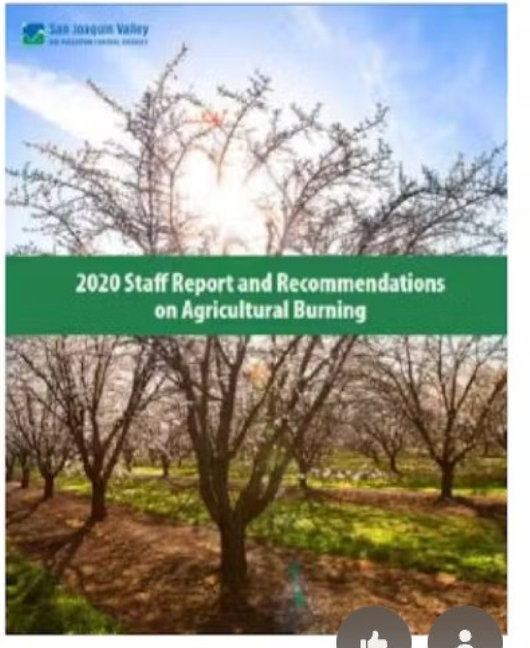
State Plans Calling for Bioenergy

- Short-Lived Climate Pollutant Reduction Strategy – CARB
- 2022 Climate Change Scoping Plan - CARB
- Forest Carbon Plan / 2020 Wood Utilization Plan - CNRA, CalEPA, BOF
- Plan to phase out open burning of ag waste – CARB
- Plans to achieve carbon neutrality









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BIOMASS & BEYOND: GROWING A RESILIENT REGIONAL BIOECONOMY

Special Announcement

Thank you for attending the 2025 Biomass Symposium!

Attendees will receive information on Valley Vision's growing focus on Biomass, including:

- Technical assistance for those ready to start a project including personalized one-on-one support.
- A webinar series designed to turn great ideas into financeable, actionable projects.
- And a new advisory committee to help guide policy recommendations, build the ecosystem, and identify emerging opportunities for collaboration and investment.

***For more information, please contact: Lindsey Nitta lindsey.nitta@valleyvision.org**

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Contact Us

Cleaner Air Partnership

Cleaner Air Partnership

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CAPITAL REGION CLIMATE READINESS COLLABORATIVE

Capital Region Climate Readiness Collaborative

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WE PROSPER TOGETHER

We Prosper Together

Gretchen James - gretchen.james@valleyvision.org

3 minute Post-Event Survey

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Thank You To Our Partners!

CAPITAL REGION CLIMATE READINESS COLLABORATIVE

PCWA

Placer County AIR POLLUTION CONTROL DISTRICT

Cleaner Air Partnership

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