California
Department of Conservation

Carbon-Negative Bioenergy and Climate Resilience

California Climate Policy Conference

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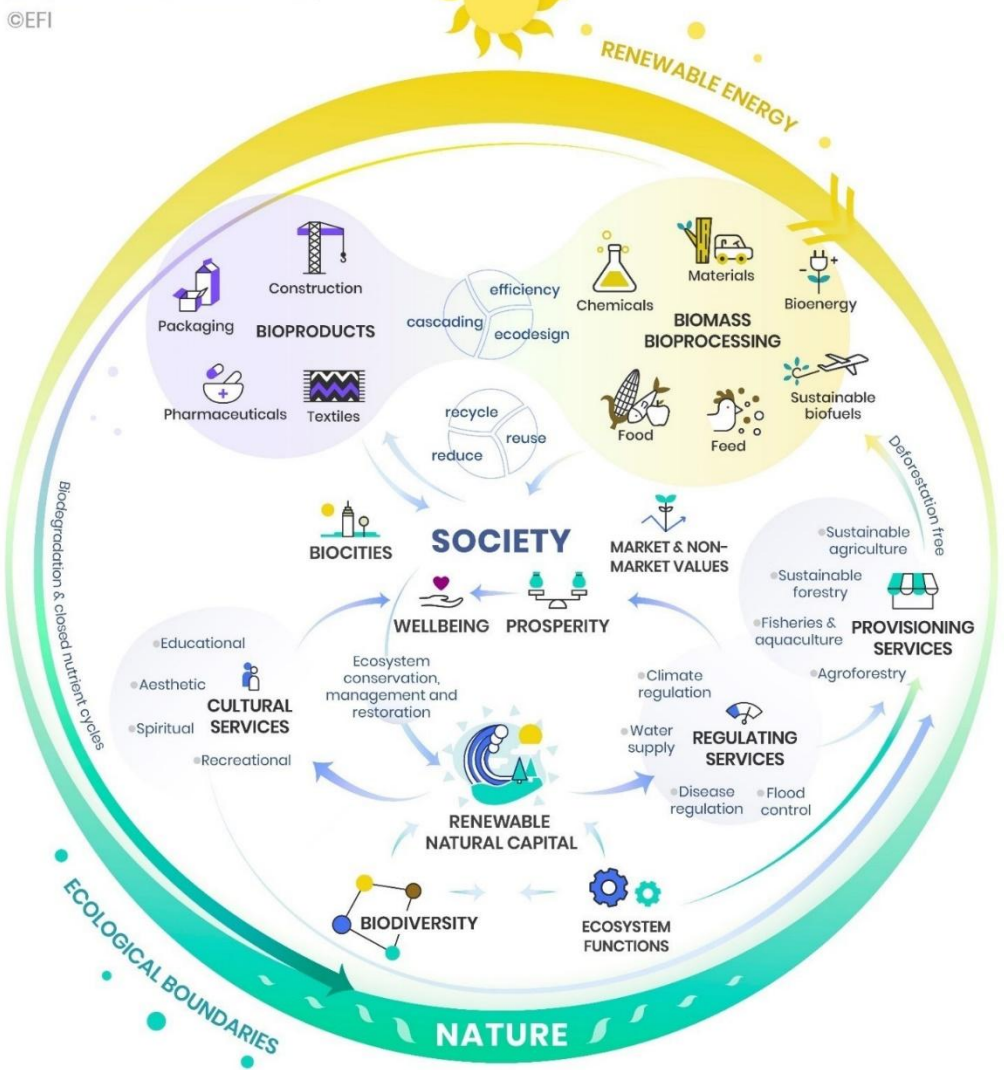
Elizabeth Betancourt
Natural and Working Lands Policy Advisor
State Co-Chair, Wood Utilization Work Group, Governor's Wildfire and Forest Resilience Task Force



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Quantifying Biomass in California

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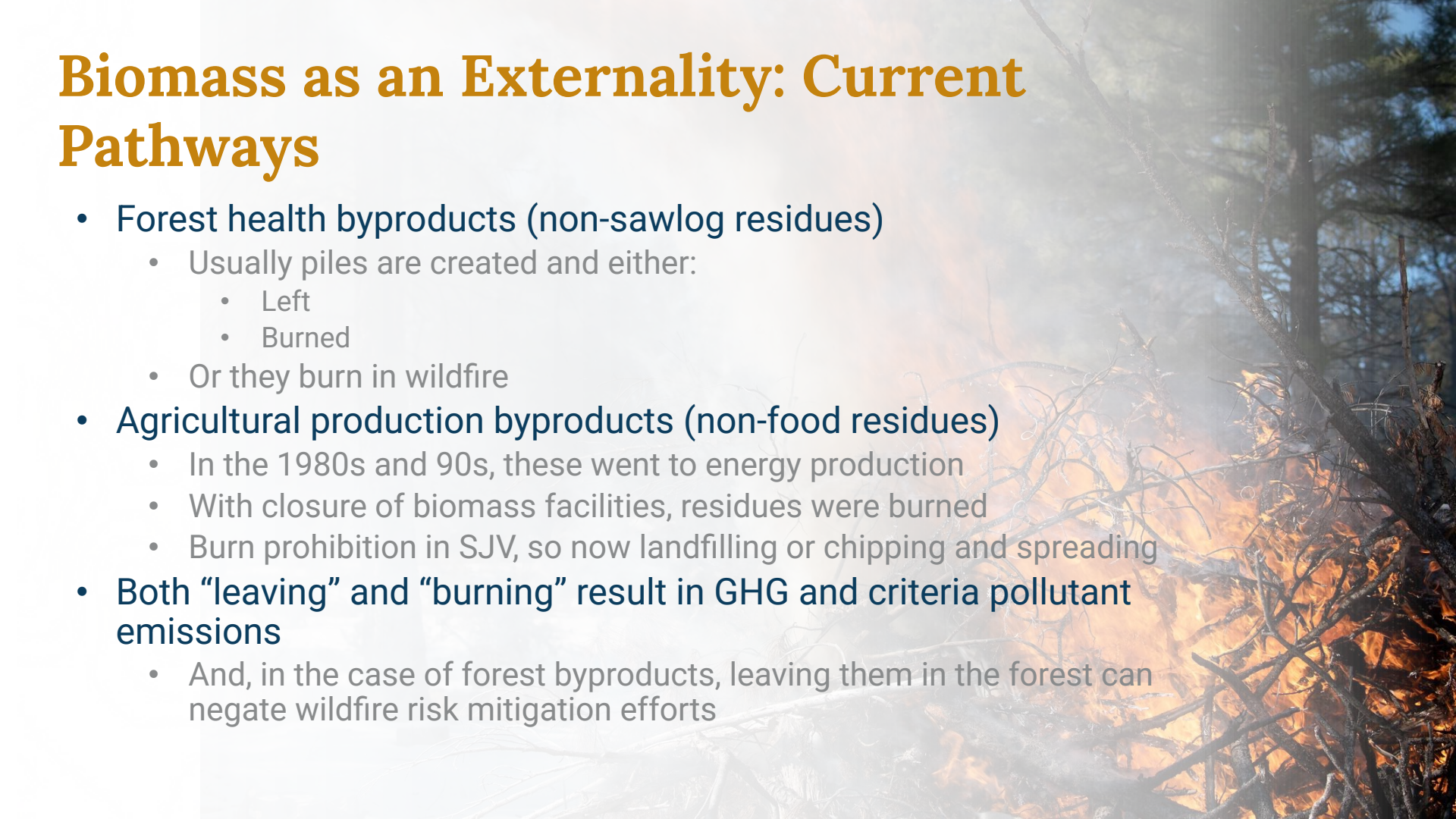
- Orchard waste in 2024, San Joaquin Valley = > 1 MT

- Forest Health:
  - Million Acre Strategy (2025): 333,333 acres of hand treatment =~ **3.3 million BDT of biomass**
  - Scoping Plan Goal: 2.3 million forest acres treated *annually* by 2045 will result in 766,666 acres of hand treatment =~ **7.7 million BDT of biomass!!!**

Biomass as an Externality: Current Pathways

- Forest health byproducts (non-sawlog residues)
  - Usually piles are created and either:
    - Left
    - Burned
  - Or they burn in wildfire
- Agricultural production byproducts (non-food residues)
  - In the 1980s and 90s, these went to energy production
  - With closure of biomass facilities, residues were burned
  - Burn prohibition in SJV, so now landfilling or chipping and spreading
- Both “leaving” and “burning” result in GHG and criteria pollutant emissions
  - And, in the case of forest byproducts, leaving them in the forest can negate wildfire risk mitigation efforts



Addressing forest health at the rate of 2.3+ million acres/year will result in a **savings of $3.1 BILLION ANNUALLY in public health costs** from wildfire smoke pollution (2022 Scoping Plan)

Circular Bioeconomy: Biomass as a Resource

- Biomass can take many utilization pathways:
  - Wood fiber applications
  - Innovative wood products, including building materials
  - Ammonia for fertilizer
  - Energy: electricity and fuels
- Bioenergy production uses orders of magnitude more waste than other applications, so is incredibly important in this economic model. It also:
  - Provides high road jobs to a skilled and trained workforce
  - Displaces fossil fuel use
  - Contributes to local energy self-sufficiency
  - Secures our energy supply chain
  - Provides carbon-negative energy: geologic sequestration or biochar applications
- How are we approaching the circular bioeconomy with energy in California?

Policy Factors

- Enabling
  - Small energy procurement mandates – legislature
  - Clean fleet mandates – administration
  - Fossil fuel transition (Scoping Plan, LCFS, etc.) – legislature and administration
  - Climate Bond/Prop 4 – voters
  - CA Jobs First – administration, legislature, voters/public
  - Tribal sovereignty and authorities
  - Chain of custody work – administration
- Gaps
  - Inclusive carbon storage mechanisms
  - Long-term, enabling policy & incentives
  - Finance/venture capital
  - An operating modern facility

CALIFORNIA JOBS FIRST

Where Carbon-negative Bioenergy is Working

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- Rural communities: confluence of biomass, carbon sequestration options, and TRUST
  - San Joaquin Valley
  - Mountain communities with good utilities and transport options
- Tribes using sovereign authorities alongside federal land managers:
  - Tule River Tribe: making biochar with H2, and potentially biomethane, as co-products
  - Redding Rancheria: making bio-based H2
  - Scott's Valley Band of Pomo: bioenergy to the grid
- Analyses showing that bioenergy is the most effective path to achieving our diverse goals:
  - Clean Air Task Force – goal: public health
  - Lawrence Livermore National Laboratory – goal: carbon sequestration
  - TNC/Bain – goal: healthy forests
  - Conservation Strategy Group – goal: climate resilience