Biomass Energy with Carbon Capture and Storage (BECCS)

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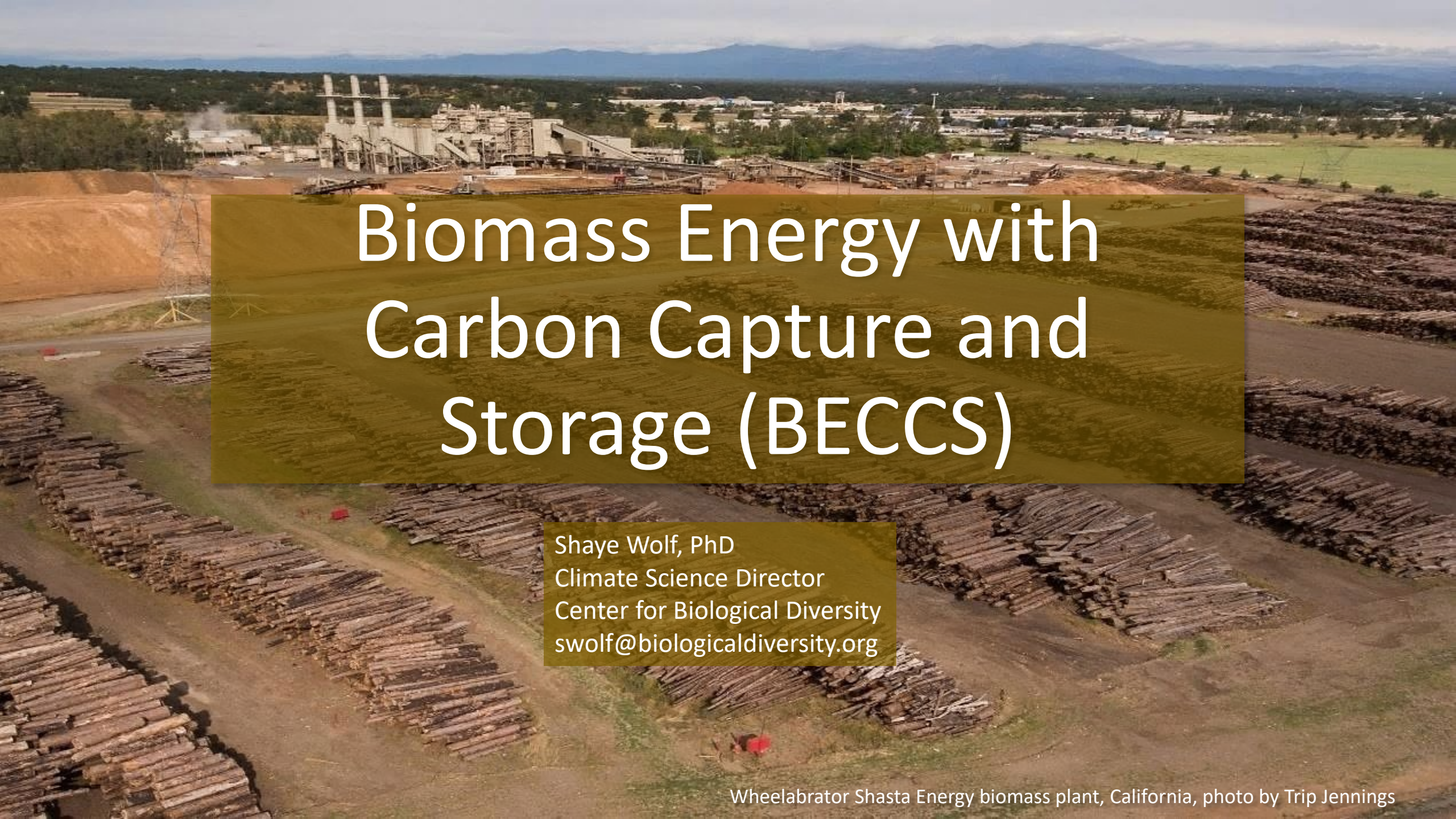

Wheelabrator Shasta Energy biomass plant, California, photo by Trip Jennings

Woody Biomass Energy with Carbon Capture and Storage (BECCS): Not carbon negative

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Harms To:

Climate

Forest ecosystems

Public health and safety

Environmental justice

Biomass energy facility

Electricity

Fuels

Hydrogen

Carbon capture and storage (CCS)

BECCS: Pollution at Every Stage

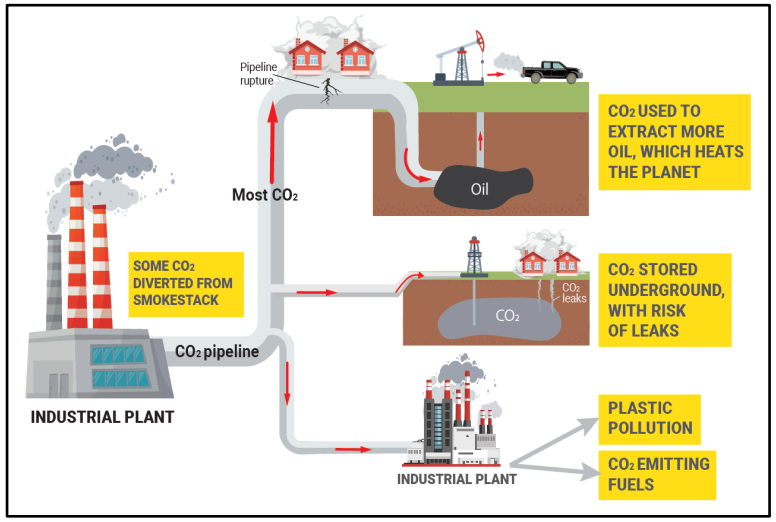
Logging/thinning forests

Trucking (often long distances)

Cutting, chipping, drying

Chip storage piles
emitting methane

Combustion,
gasification, pyrolysis



Carbon Capture
and Storage (CCS)

BECCS: Pollution at Every Stage

Logging/thinning forests

Thinning reduces forest carbon storage and sequestration

Carbon-rich forests

Thinned/depleted forests

False claims to promote biomass energy

Industry claim: Thinning prevents wildfire emissions

Reality:

- Broad-scale thinning releases more carbon emissions than it prevents from being released in wildfire
- Vast majority of carbon retained in forest after wildfire:
  - Even very severe fire patches combust less than 2% of living tree biomass
- Logging/thinning is the biggest carbon emitter from U.S. forests

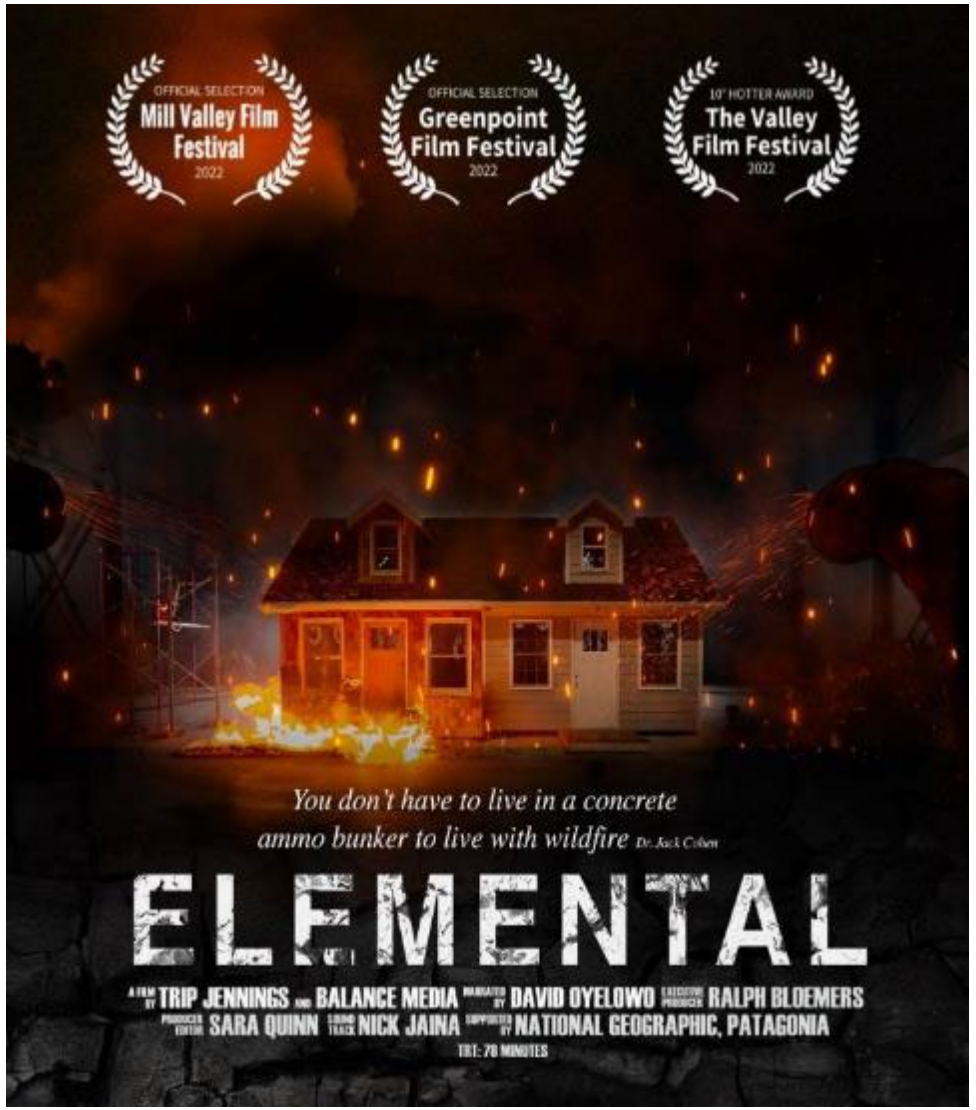
Carbon-depleted forest after thinning and prescribed burning

Post-fire forest after patch of high-severity wildfire = 98% of carbon retained

Industry claim: Logging/thinning needed for community wildfire safety

Reality:

- Most homes and lives are lost in wind-driven fires burning during extreme fire weather made worse by the climate crisis
- Logging/thinning don't stop fire, can make fire burn hotter and faster
- Community fire-safety retrofits work: home hardening, air filters, vegetation work in defensible space immediately surrounding home



Recent documentary sharing science on community wildfire safety

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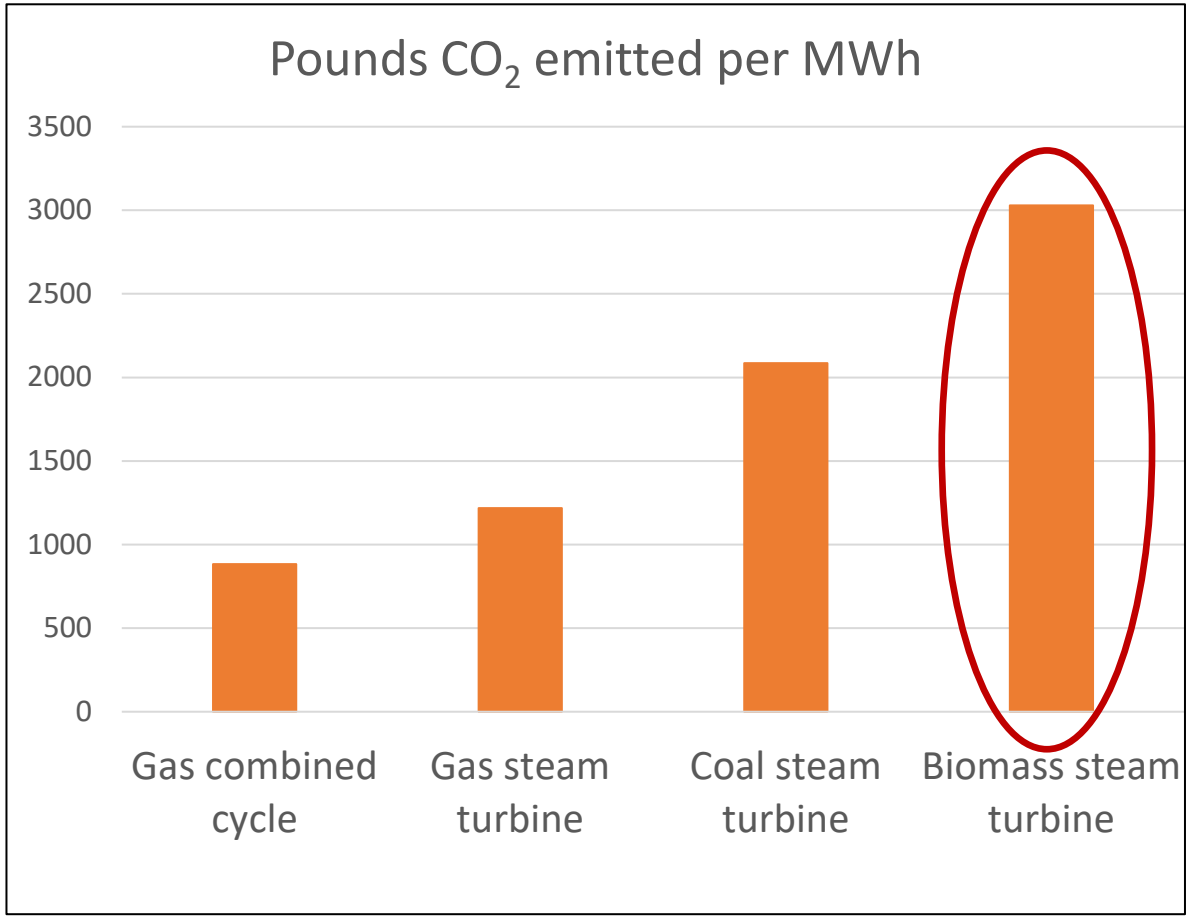
Biomass combustion for electricity

- **Climate harms:**
  - More polluting at the smokestack than coal
  - Burning wood for electricity (even “residue” and “waste”) increases carbon in the atmosphere for decades to centuries
- **Public health harms:** Emit particulate matter, NOx, carcinogens (benzene)
- **Environmental injustice:** Often sited in communities overburdened with pollution
- **Ecosystem harms:** Biomass thinning degrades wildlife habitat and forest ecosystems
- **Expensive:** Propped up by public subsidies



Source data: Partnership for Policy Integrity

Biomass gasification and pyrolysis produce climate pollutants and other pollutants

Gasification

High Heat (800-1200°C)
Steam
Oxygen

Dirty Energy
Electricity production
Methane
Hydrogen

Gases ("syngas")
carbon dioxide (CO_2)
methane (CH_4)
carbon monoxide (CO)
hydrogen (H_2)

Liquids
hydrocarbons
tar

Solids
char
ash

Air Pollutants
fine particulate matter (PM)
nitrogen oxides (NOx)
sulfur oxides (SOx)
benzene and other carcinogens
heavy metals
persistent organic pollutants

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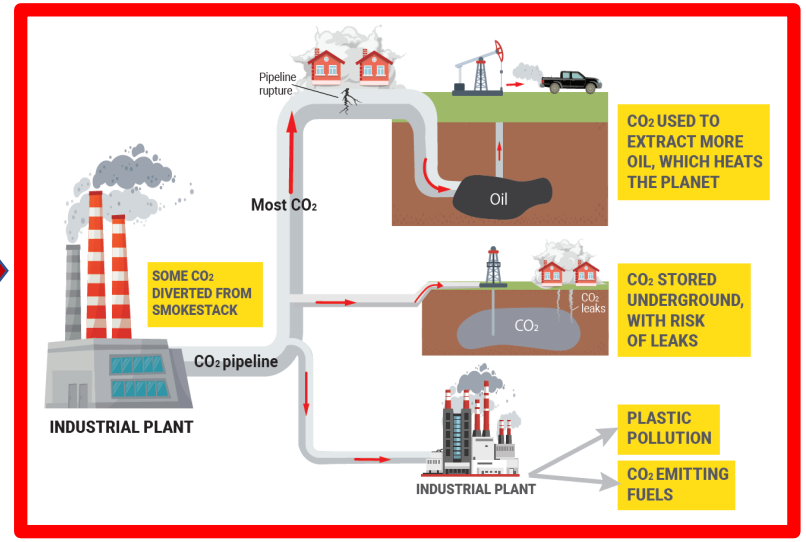


Carbon Capture
and Storage (CCS)

CCS: Ineffective, Unsafe, Unjust, Unnecessary, Expensive

- **Ineffective:**
  - Failures to deliver on carbon capture promises
  - Energy intensive: high energy penalty
  - Risk of leaks and ruptures
- **Unsafe:**
  - CO_2 pipeline ruptures and storage leaks can sicken and even kill people
  - Increases air pollution at facilities and upstream
- **Unjust:**
  - Targets environmental justice communities
  - Perpetuates dirty infrastructure and pollution
- **Unnecessary**:
  - BECCS and CCS not needed for 1.5°C
    - IPCC "Low demand" 1.5°C pathway: no CCS or BECCS
- **Expensive:**
  - Propped up by massive public subsides (45Q tax credit, DOE grants)

In Feb 2020, 300 people evacuated and 45 people hospitalized when a CO_2 pipeline ruptured in Satartia, MS. People suffered disorientation, unconsciousness and seizures, gasping for breath, foaming at the mouth, and acting like "zombies."

Real-World BECCS Failures

- Only industrial BECCS plant in US
- Corn ethanol facility
- $280+ million public dollars in grants + 45Q tax credit
- Storing half of CO_2 target
- Captured only 10% to 12% of its emissions
- CCS injection wells leaking: steel corrosion

Archer Daniels Midland Illinois BECCS facility

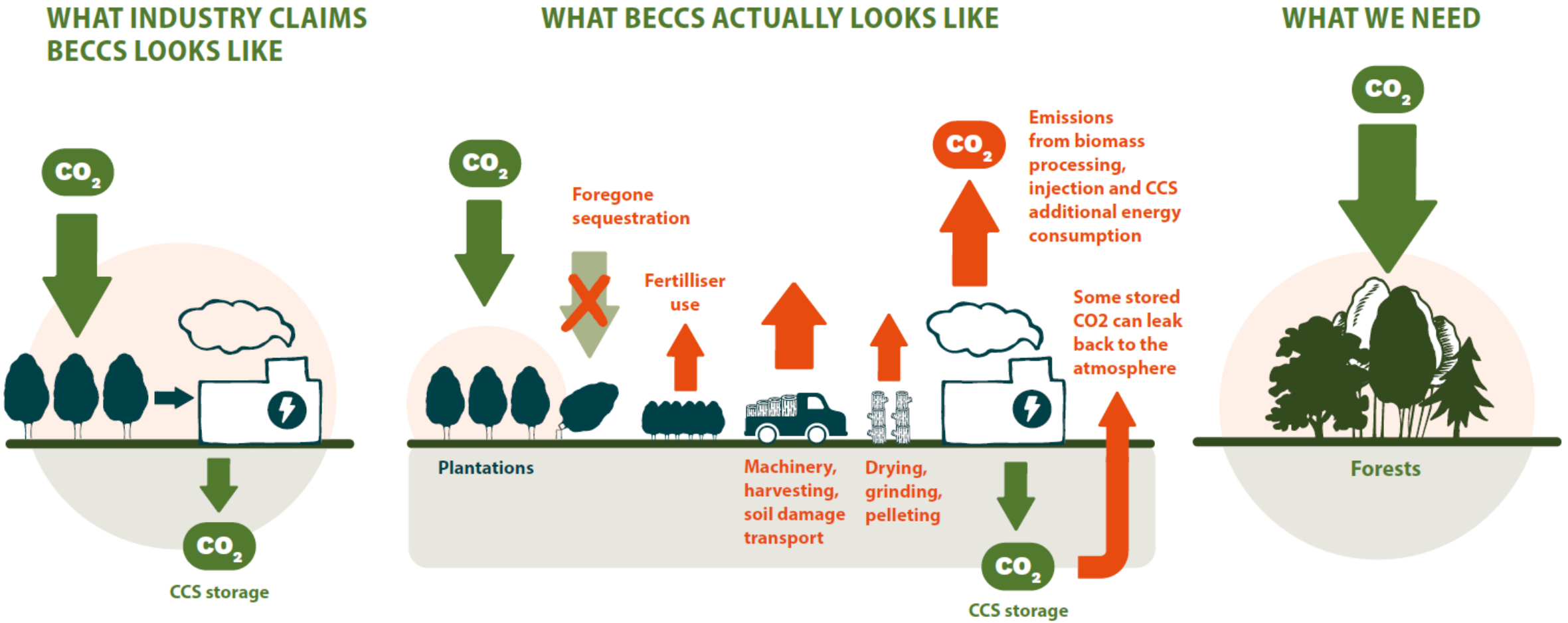
Widespread opposition to BECCS

- Climate Action Network position (1,900+ civil society orgs): “Large-scale deployment of BECCS would result in **unacceptable negative impacts** on food security, land use rights, and biodiversity given its land use, water, and resource requirements.”
- Letter from noted scientists and economists on BECCS from forest biomass: “since burning wood for energy is not carbon neutral in relevant time frames, **capturing the carbon dioxide will not make it carbon negative**.”

Science and Justice-Based Solutions

- End mandates and subsidies for BECCS; invest in truly clean renewable solar and wind energy + energy efficiency
- Protect and increase forest carbon storage and sequestration: proforestation
- Focus on community wildfire safety:
  - home hardening
  - air filters
  - prioritizing investments for disadvantaged communities

Thank you!



Source: Fern.org

Resource links

- Debunking the Biomass Myth, Center for Biological Diversity
- Biomass False Solutions factsheet, Center for Biological Diversity
- Forest Biomass Energy is a False Solution, Center for Biological Diversity
- Map of CA biomass facilities, Center for Biological Diversity
- CCS Explainer, Center for Biological Diversity
- Hydrogen Explainer, Center for Biological Diversity
- The Case Against Negative Emissions, Forest Litigation Collaborative
- The BECCS Hoax, NRDC
- A Bad Biomass Bet: Why The Leading Approach To Biomass Energy With Carbon Capture And Storage Isn't Carbon Negative, NRDC
- Six Problems with BECCS, FERN
- BECCS: Last Ditch Climate Option or Wishful Thinking? Biofuelwatch
- Carbon Capture and Storage: A dangerous climate scam putting people at risk, Center for Biological Diversity
- Carbon Capture and Storage: An Unproven Technology, Institute for Energy Economics and Financial Analysis
- Op-ed on GSNR wood pellet project, Gloria Alonso Cruz, Little Manila Rising, https://www.sacbee.com/opinion/op-ed/article291722575.html
- Does wood bioenergy help or harm the climate?, John Sterman et al.
- Creating Strategic Reserves to Protect Forest Carbon and Reduce Biodiversity Losses in the United States, Beverly Law et al.
- Wood Pellet Biomass, Dogwood Alliance
- Biomass Energy Overview, Partnership for Policy Integrity
- The Environmental Impacts of Biomass Energy, Southern Environmental Law Center
- Dirty Deception: How the Wood Biomass Industry Skirts the Clean Air Act, Environmental Integrity Project
- Siting of Wood Pellet Production Facilities in Environmental Justice Communities in the Southeastern United States, Stefan Koester and Sam Davis
- The Biofuels Myth: Why "Sustainable Aviation Fuels" Won't Power Climate Safe Air Travel, Center for Biological Diversity