

Biomass Energy with Carbon Capture and Storage (BECCS)

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



Biomass energy facility
Electricity
Fuels
Hydrogen

+



Carbon capture and
storage (CCS)

=

Harms To:

Climate

Forest ecosystems

Public health and safety

Environmental justice

BECCS: Pollution at Every Stage



Logging/thinning forests



Trucking (often long distances)



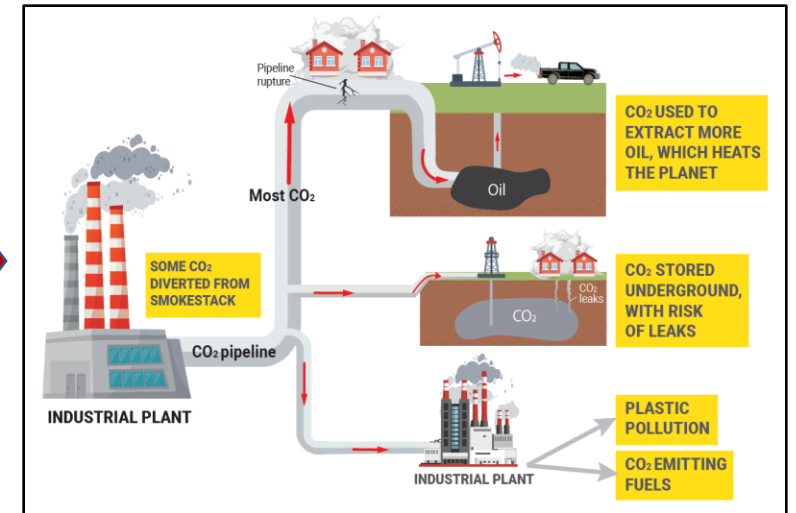
Cutting, chipping, drying



Chip storage piles emitting methane



Combustion, gasification, pyrolysis



Carbon Capture and Storage (CCS)

BECCS: Pollution at Every Stage



George Wuerthner

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, defensible space immediately around home



Recent documentary sharing science on community wildfire safety

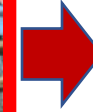
BECCS: Pollution at Every Stage



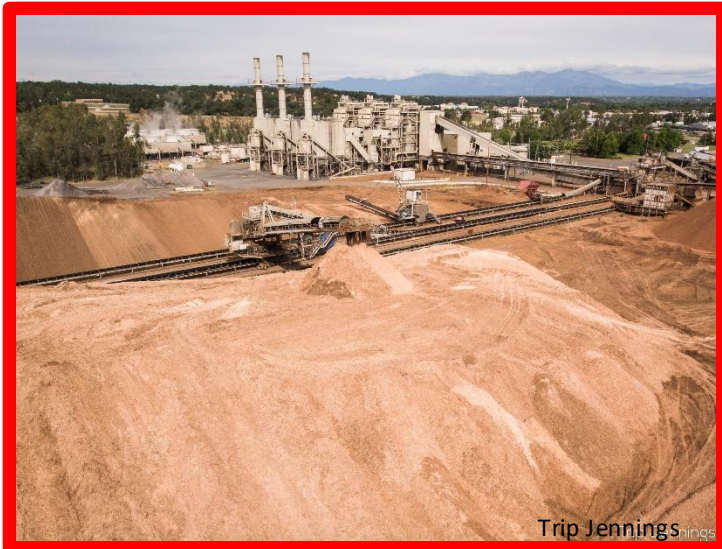
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BECCS: Pollution at Every Stage



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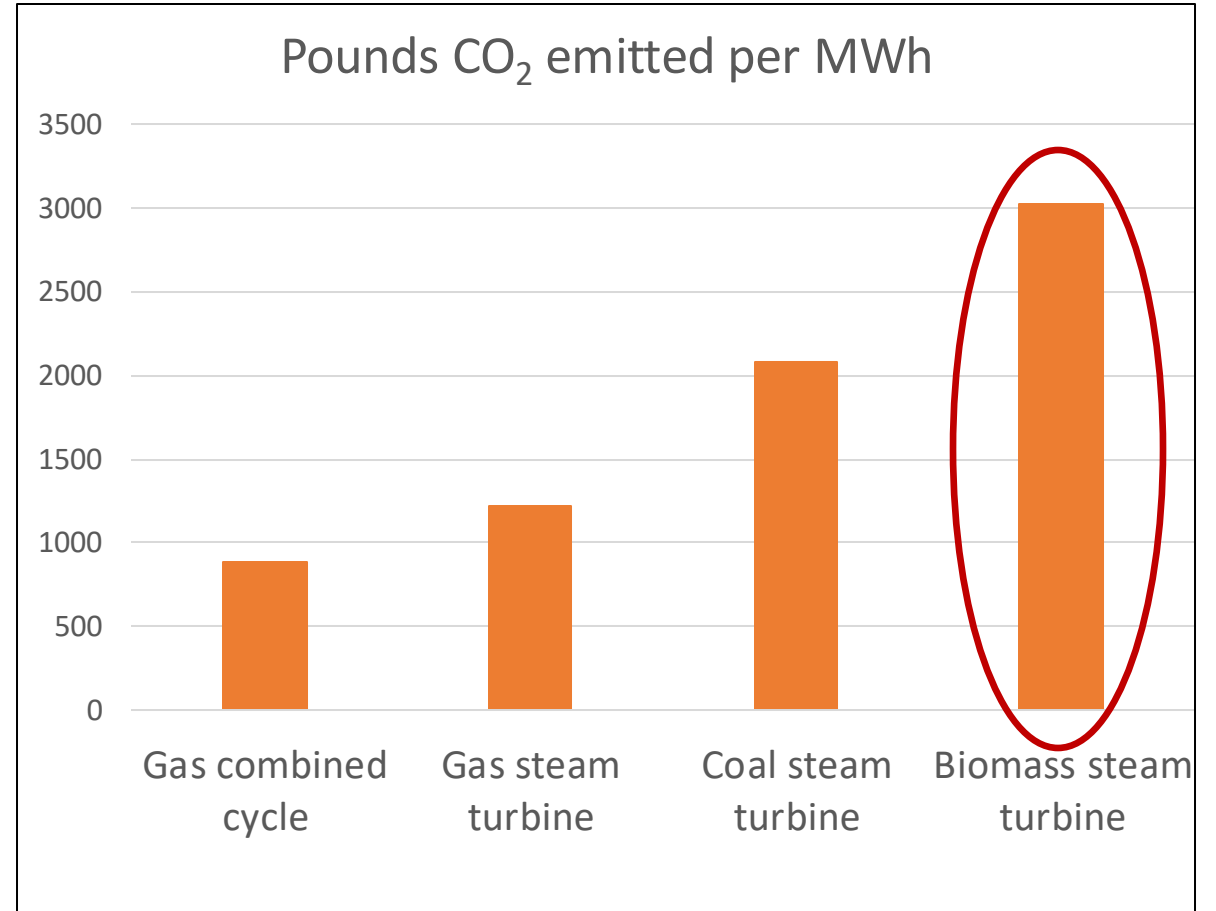
Chip storage piles emitting methane



Combustion, gasification, pyrolysis

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 (CO₂)
methane (CH₄)
carbon monoxide (CO)
hydrogen (H₂)

Liquids

hydrocarbons
tar

Solids

char
ash

Air Pollutants

fine particulate matter (PM)
nitrogen oxides (NO_x)
sulfur oxides (SO_x)
benzene and other carcinogens
heavy metals
persistent organic pollutants

BECCS: Pollution at Every Stage



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Logging/thinning forests



Dogwood Alliance

Trucking (over long distances)



USDA

Cutting, chipping, drying

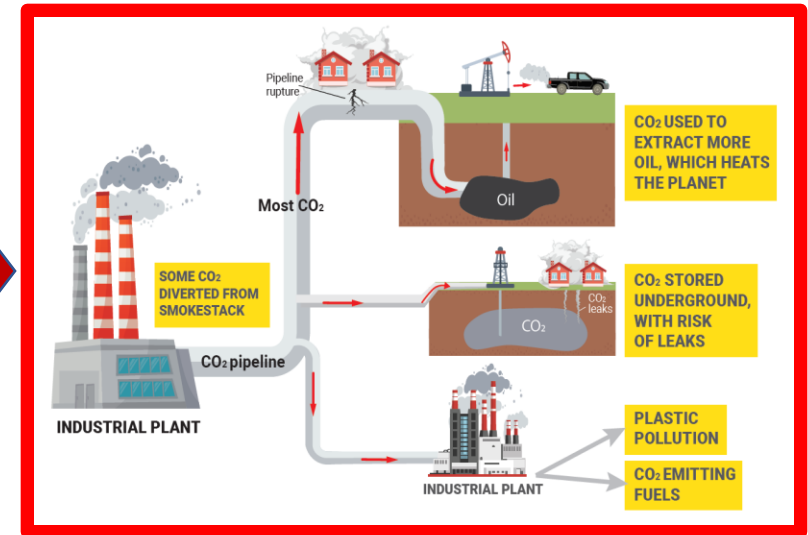


Trip Jennings

Chip storage piles emitting methane



Combustion, gasification, pyrolysis



Carbon Capture and Storage (CCS)

Not carbon neutral

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:**

- CO₂ 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

- **Expensive:**

- Propped up by massive public subsidies



In Feb 2020, 300 people evacuated and 45 people hospitalized when a [CO₂ 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 CO₂ target](#)
- Captured [only 10% to 12% of its emissions](#)
- CO₂ 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.**”

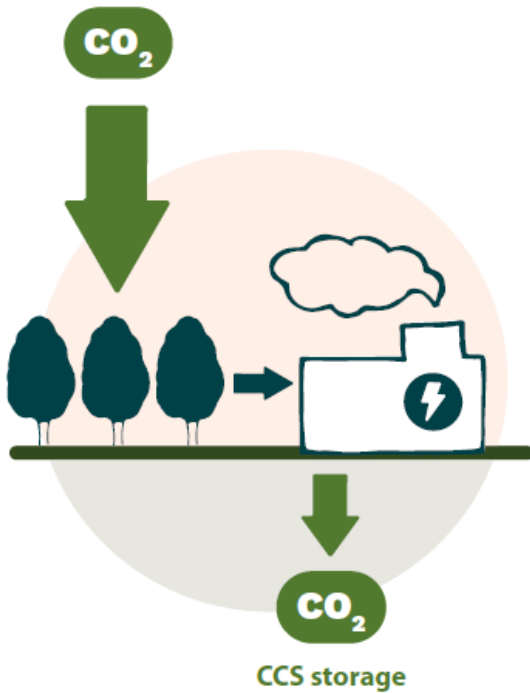
Science and Justice-Based Solutions

- 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

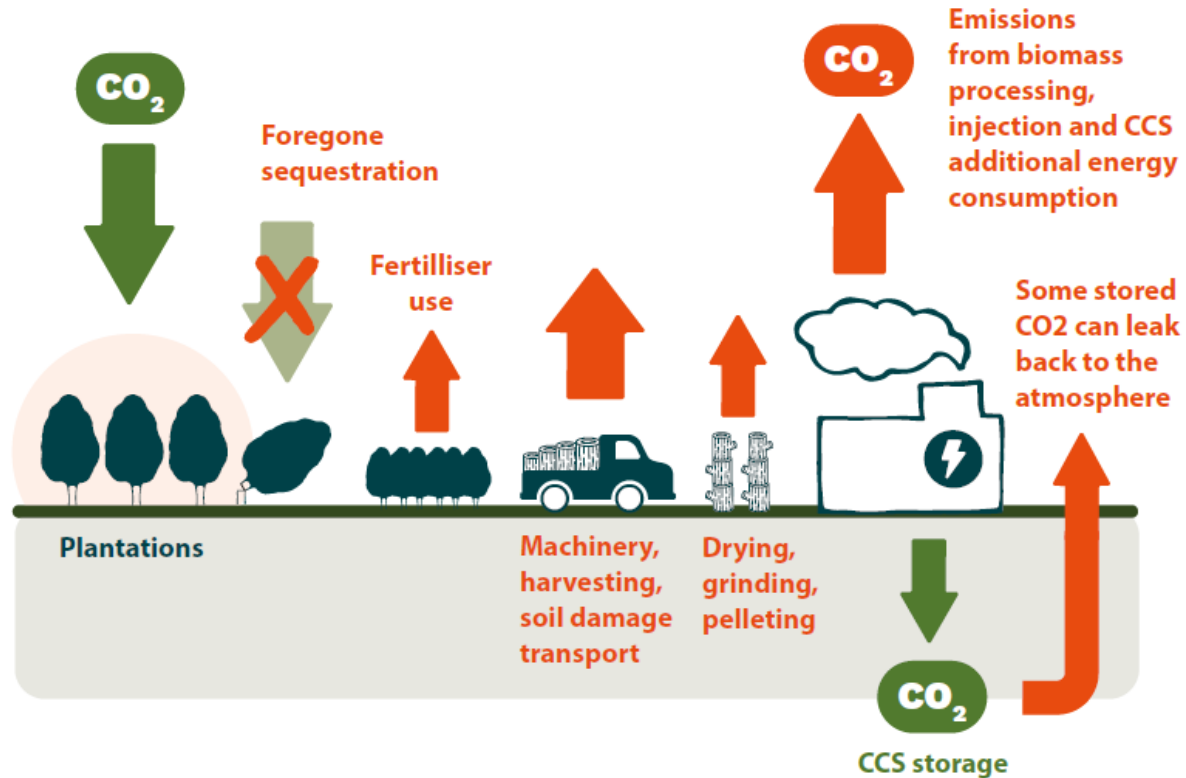


Thank you!

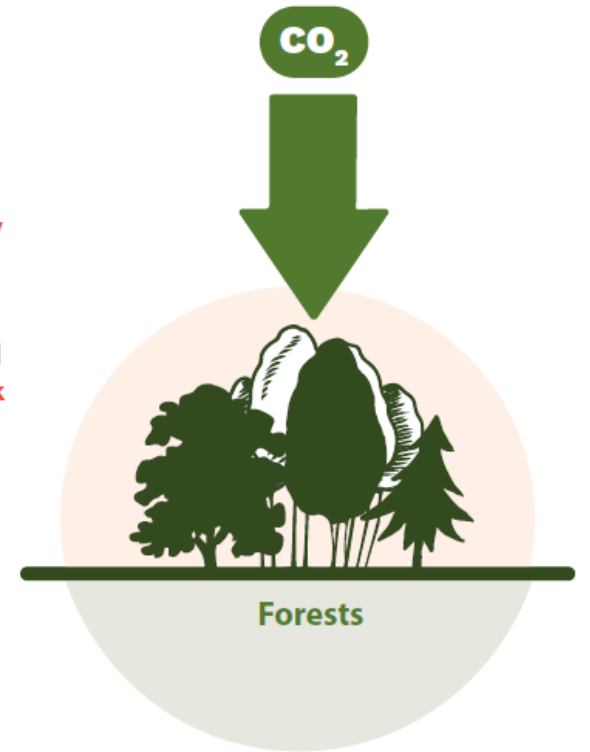
WHAT INDUSTRY CLAIMS BECCS LOOKS LIKE



WHAT BECCS ACTUALLY LOOKS LIKE



WHAT WE NEED



Source: Fern.org