

THE BIOMASS CONUNDRUM:

Do We Have to Burn the Furniture to Save the Planet?

CDM

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The Biomass Conundrum

- Is biomass a savior to our problems?
 - Green and renewable?
 - Dirty and polluting?
- What about other renewable fuels?
 - Solar and wind do not emit CO₂, but biomass does...
- Does it matter where CO₂ was generated?
- Is a “green” source of CO₂ better than a non-renewable source of CO₂?
- How sustainable is it?
- If forest stocks are depleted, then do we need to start burning our furniture?

What is Biomass?

- **Biomass:** “Non-fossilized and biodegradable organic material originating from plants, animals, or micro-organisms, including products, by-products, residues, and waste from agriculture, forestry, and related industries...” (40 CFR 98)
- **Biogenic CO₂:** “CO₂ emissions generated as result of biomass combustion... “(40 CFR 98)
- Methane (CH₄) and nitrous oxide (N₂O) emissions from biomass combustion are not biogenic – they would have not otherwise occurred from decomposition.

Some Examples (CO₂ Only!)

- Combustion of biological material, including wood and wood waste, forest residue, and agricultural material
- Biological decomposition of waste in landfills and wastewater treatment plants
- Combustion of biogas
- Combustion of the biological fraction of municipal solid waste or of biosolids
- Combustion of the biological fraction of tire-derived fuel

How Green is Biomass?

- What is the status of biomass in the national energy policy?
- Should we discount natural biogenic carbon dioxide (CO₂) emissions?
- What role should life-cycle emissions and carbon neutrality play in accounting for greenhouse gas (GHG) emissions?
- Is there an equitable manner to address issues of timing in carbon uptake and release in sinks and sources?
- Can we justify the incentivization of using biomass as an energy source as a means of reducing reliance on fossil fuels?

Biomass Theory – Why Should it be Good?

- Current policy = biomass is carbon neutral
 - Combustion or oxidation of biomass should cause no net increase in CO₂ emissions on a lifecycle basis
 - Biogenic CO₂ emissions considered equivalent to CO₂ that was absorbed by biomass when it was growing
- Viewpoint assumes that carbon released from woody biomass would be reabsorbed by growing trees
- Is burning biomass in a state-of-the-art power plant better than open burning of agricultural waste?

Biomass Theory – Why Might it be Bad?

- Manomet Study (2010) concluded that forest regeneration and growth would not instantaneously recapture all of the carbon release as result of using woody biomass for energy generation
- Per unit of usable energy, biomass typically releases more CO₂ than fossil fuels
- Impact on climate change dependent on several factors
 - Specific characteristics of site being harvested
 - Energy technologies used
 - Timeframe over which impacts are viewed
- Is it possible to manage biomass supply sustainably?

Contradictions

- U.S. EPA Tailoring Rule does not distinguish between biogenic and anthropogenic CO₂ emissions
 - Three year deferral of GHG permitting requirements finalized
- Federal Mandatory GHG Reporting Rule does not consider biogenic emissions when evaluating rule applicability
- Massachusetts announced proposed rules that would restrict access to tax credits for large wood-burning power plants
- California counts biomass as an Renewable Portfolio Standard (RPS) eligible fuel
- How many contradictions can we have regarding the status of biomass?

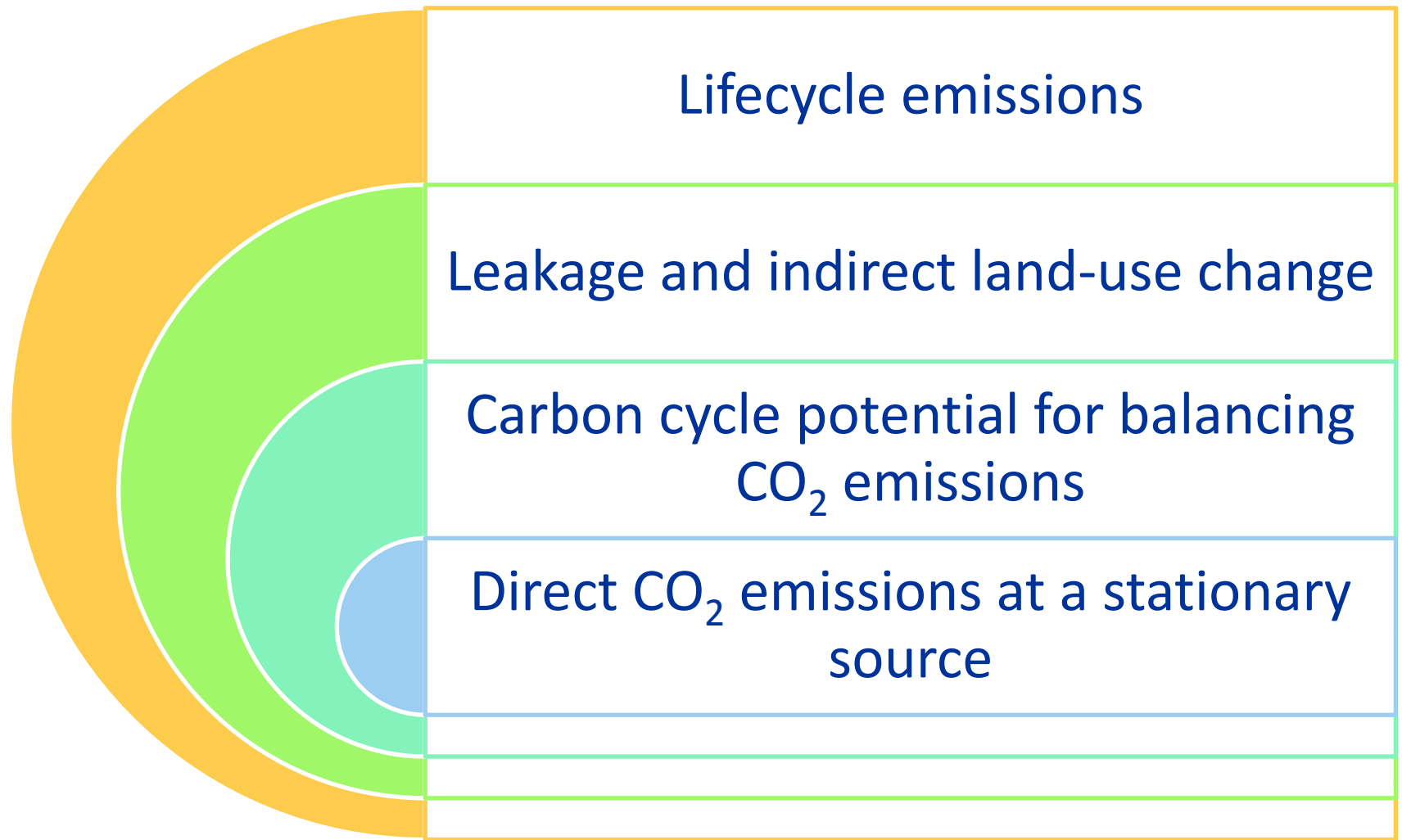
Accounting Framework for Biogenic CO₂

- EPA stepped back to consider the scientific and technical issues associated with biogenic CO₂ from stationary sources
- Biogenic CO₂ emissions need to be “adjusted” for growth of feedstock (spatial and temporal scale)
- Fossil and biogenic carbon interact with the overall carbon cycle on different time scales
 - CO₂ from combustion of fossil fuel will inevitably increase carbon in atmosphere
 - Combustion of biologically-based feedstocks may be partially or completely balanced by the amount of feedstock that grows during the year

Technological and Methodological Issues

- Gases to Include
- Direct Emissions
- Feedstock Losses During Transportation and Storage
- Carbon Contained in Products and Byproducts
- Feedstock Growth: Emissions and Sequestration on Land
- Waste Materials
- Land-Use and Management Changes
- Temporal Scale
- Spatial Scale
- Baselines
- Biogenic Feedstock Categorization and Disaggregation

Which Emissions to Consider?



Feedstock Issues

- What is the impact of transforming biologically based carbon (e.g., aboveground biomass) into CO₂ via combustion?
- Balance of emissions must be estimated
 - Emissions of CO₂ to atmosphere from stationary source
 - Net changes in carbon stocks as the biomass grows
- If emissions of CO₂ from combustion exceed removal by biomass growth, then feedstock ceases to be sustainable
- Do current inventory methods account for feedstock issues?
- What needs to be done to change accounting methods?

Timescale Issues

- Emissions and removals of CO₂ may occur in different places and at different times
 - CO₂ sequestration occurs on land where plants and trees grow
 - Emissions from combustion can happen in different locations
 - Wood chips harvested in one location may be combusted in a different county, state, or country
- Carbon storage
 - Tree takes decades to grow and store carbon
 - Wood is burned in matter of minutes or hours
- How is an agency supposed to resolve all of these issues?

Summary

- If biogenic CO₂ “doesn’t count,” then can climate change be reversed?
- How can biomass stocks be managed sustainably?
- If biomass combustion is a cure-all, then do we need to burn our treasured antiques if stocks cannot be managed sustainably?
- Regulatory actions must consider the implications of what carbon neutrality means

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