

New England Forestry Foundation

Conserving Forests for Future Generations



The Forest and Trees: Making Smart Choices

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Session Description

The Forest and the Trees: Making Smart Choices

Our forests are a dynamic renewable resource from which we can produce energy and serve the material needs of building and other industries. Are we making smart choices about that use? The choices we make about how these resources are managed and when, where, and how they are most appropriately used require us to make sense of system dynamics with competing short and long term effects on climate. They impact regional and global environments and economies, local livelihoods, traditional craft and vernacular style, and the durability and longevity of what we build. They are sources of spiritual renewal, retreat and recreation, and are simultaneously resilient and fragile. We need to understand and appreciate the forest system in order to make smart choices about how it is used.

Learning Objectives

What you'll learn:

- How sustainable forest management is being practiced
- The role of forest biomass in responding to climate change
- The tensions between short and long term climate goals and how that effects policy choices
- How to make smart choices about the use of wood resources
- (list your learning objectives on this slide)
- (contact jkoo@nesea.org if you are unsure of what your session's learning objectives are)

Mitigation of Atmospheric Carbon: Relevant Policy Questions

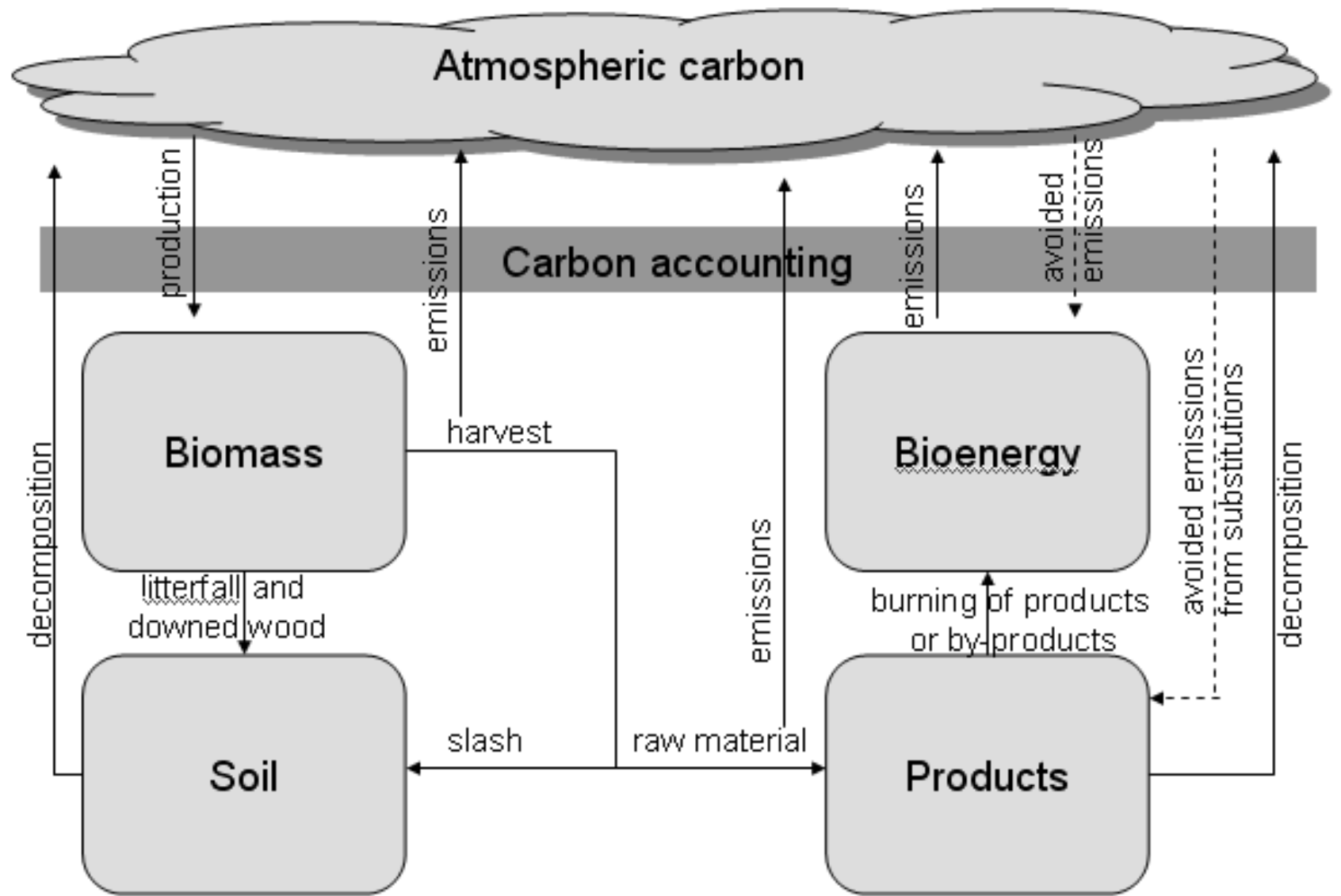
- Is biomass better than fossil fuel alternatives?
 - Short term
 - Long term
- Is biomass carbon neutral and if so, when?
- Will biomass help us avoid climate tipping points or cause us to reach them sooner?

Some Relevant Facts

- Biomass releases more carbon per unit of energy than fossil fuels
- Biomass is a biogenic source of carbon
 - The released carbon is eventually re-sequestered in forests
- Fossil fuels are a geologic source of carbon
 - The released carbon remains in the atm.
- There are climate tipping points that can accelerate the pace of change.
- Peak atmospheric carbon loading dictates the centuries long effect on climate change.

Learning Objectives

- Understand Manomet study modeling approach
- Provide insights into debt and dividend results
- Comparison of using fossil fuels versus biomass over time
- Policy questions and implications
- Assumptions of sustainable forestry in modeling, but comprehensive discussion beyond scope of this presentation.



If you used wood instead of fossil fuels for energy, how much excess emissions would there be?

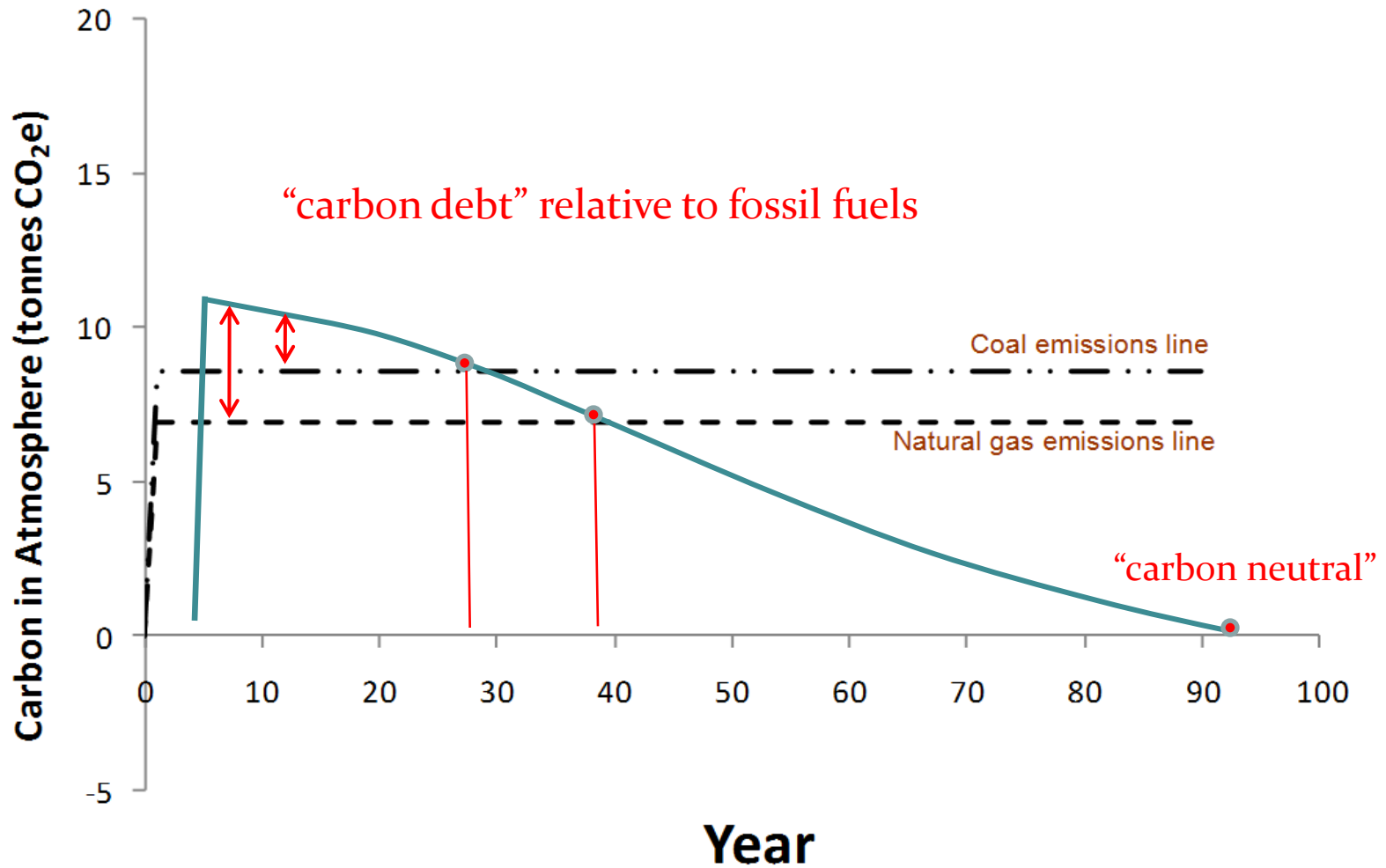
For electricity generation

wood vs. coal	31% more CO ₂ e
wood vs. natural gas	66% more CO ₂ e

For heat generation

wood vs. oil (#6)	2-8% more CO ₂ e
wood vs. oil (#2)	9-15% more CO ₂ e
wood vs. natural gas	33-37% more CO ₂ e

The “Debt-dividend” Model for GHG Emissions



Carbon Recovery Summary Single Year Emissions

Harvest Scenario	Fossil Fuel Technology	Carbon Debt Payoff (yr)
1	Oil (#6), Thermal	7
	Coal, Electric	21
	Gas, Thermal	24
	Gas, Electric	>90
2	Oil (#6), Thermal	3
	Coal, Electric	12
	Gas, Thermal	17
	Gas, Electric	45
3	Oil (#6), Thermal	14
	Coal, Electric	30
	Gas, Thermal	36
	Gas, Electric	89
4	Oil (#6), Thermal	10
	Coal, Electric	27
	Gas, Thermal	31
	Gas, Electric	59
5	Oil (#6), Thermal	15
	Coal, Electric	25
	Gas, Thermal	28
	Gas, Electric	86
6	Oil (#6), Thermal	15
	Coal, Electric	32
	Gas, Thermal	37
	Gas, Electric	85

Debt and Dividend Insights

- Using wood for energy generally emits more GHGs (per unit of energy generated) initially than fossil fuels, these emissions are removed from the atmosphere as harvested forests re-grow.
- Different sources of woody biomass have different GHG profiles (e.g., tops and limbs, or tops and limbs & low-grade).

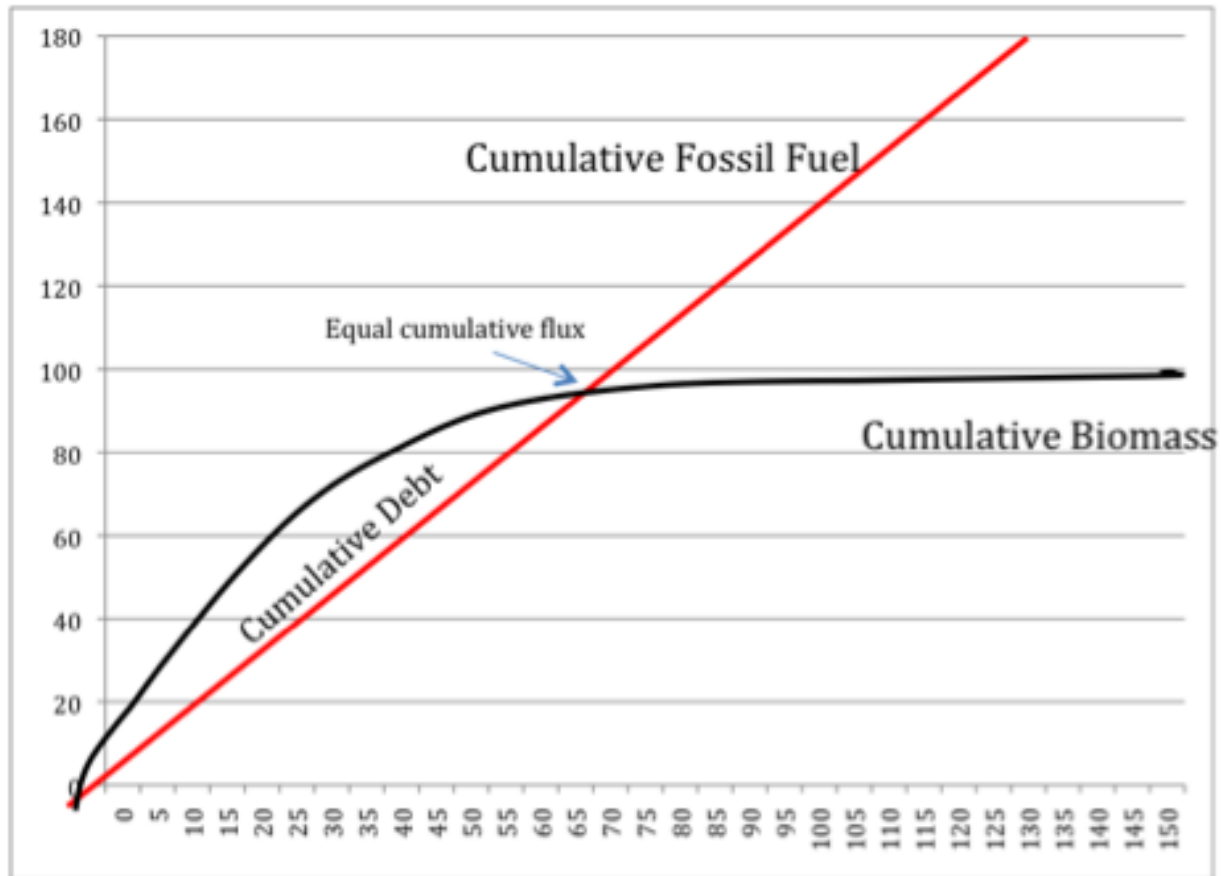
Debt and Dividend Insights

- Biomass technology and fossil fuel replacement choices affect carbon recovery timing.
- Forest management choices by landowners can either accelerate or decelerate carbon recovery.
- Forest emissions baselines will be different – Minnesota is not Massachusetts.

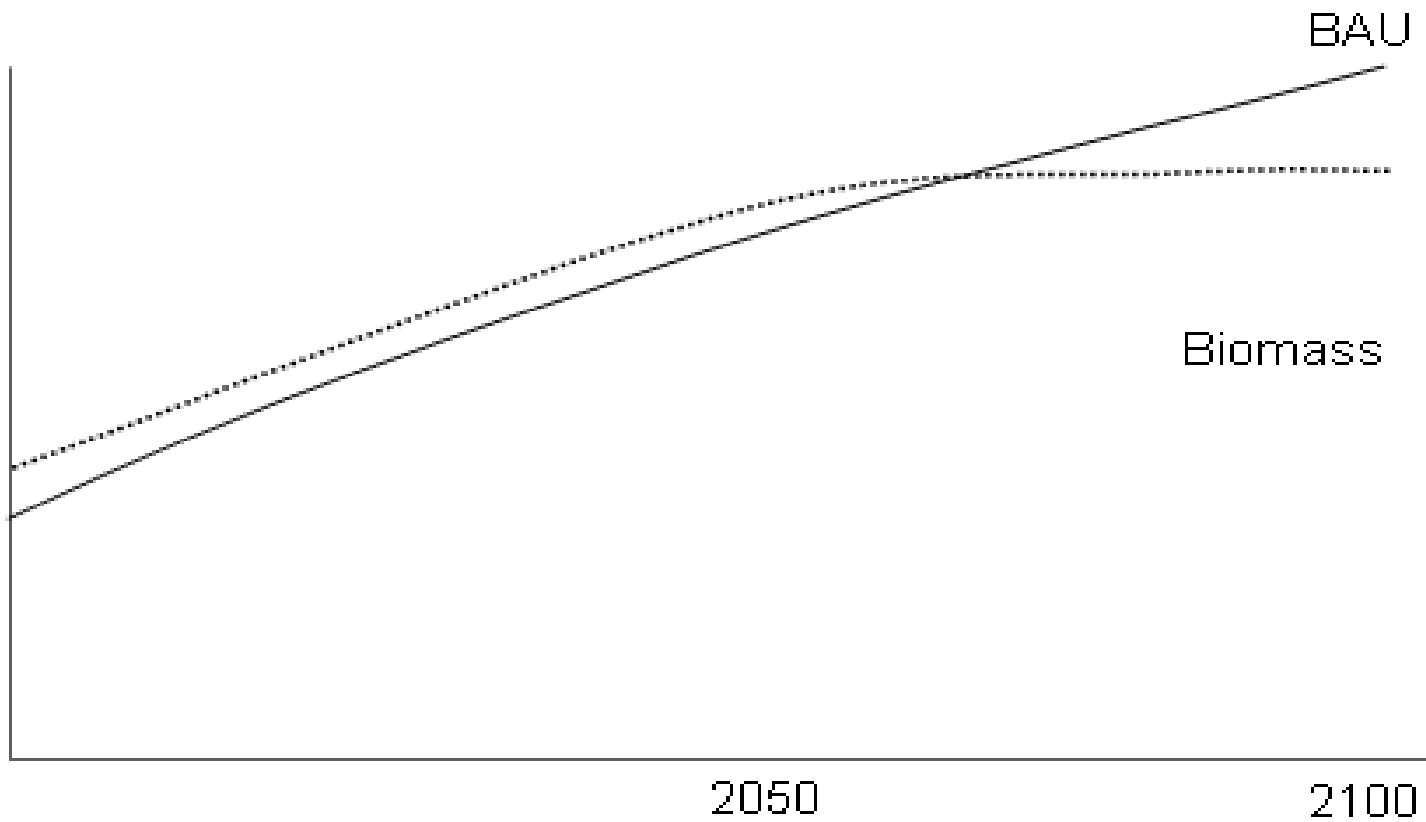
Cumulative Debt and Dividend

- Debt from annual harvesting and annual emissions from energy generation accumulates over time and across the landscape.
- Recovery of harvested stands also accumulates over time and across the landscape.

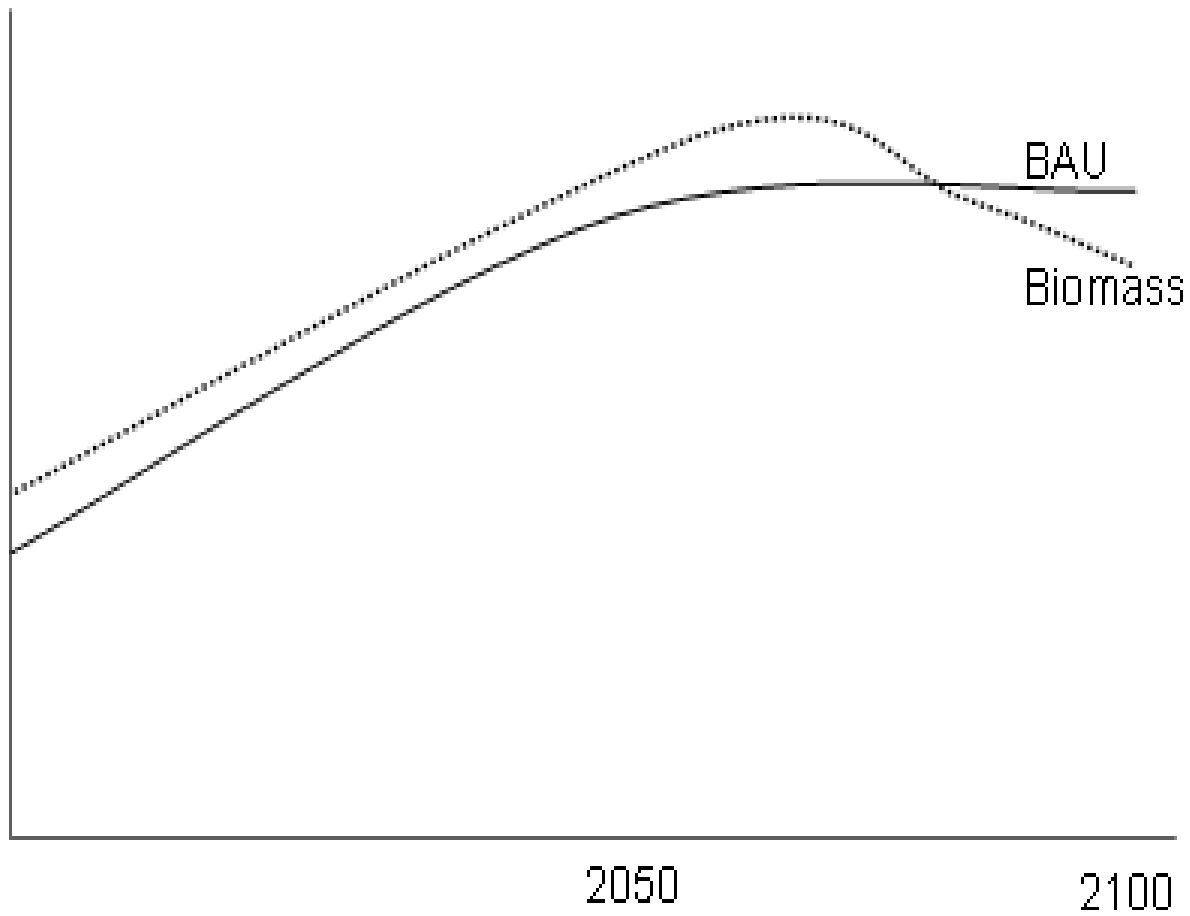
Landscape Scale Cumulative Carbon Debts & Dividends



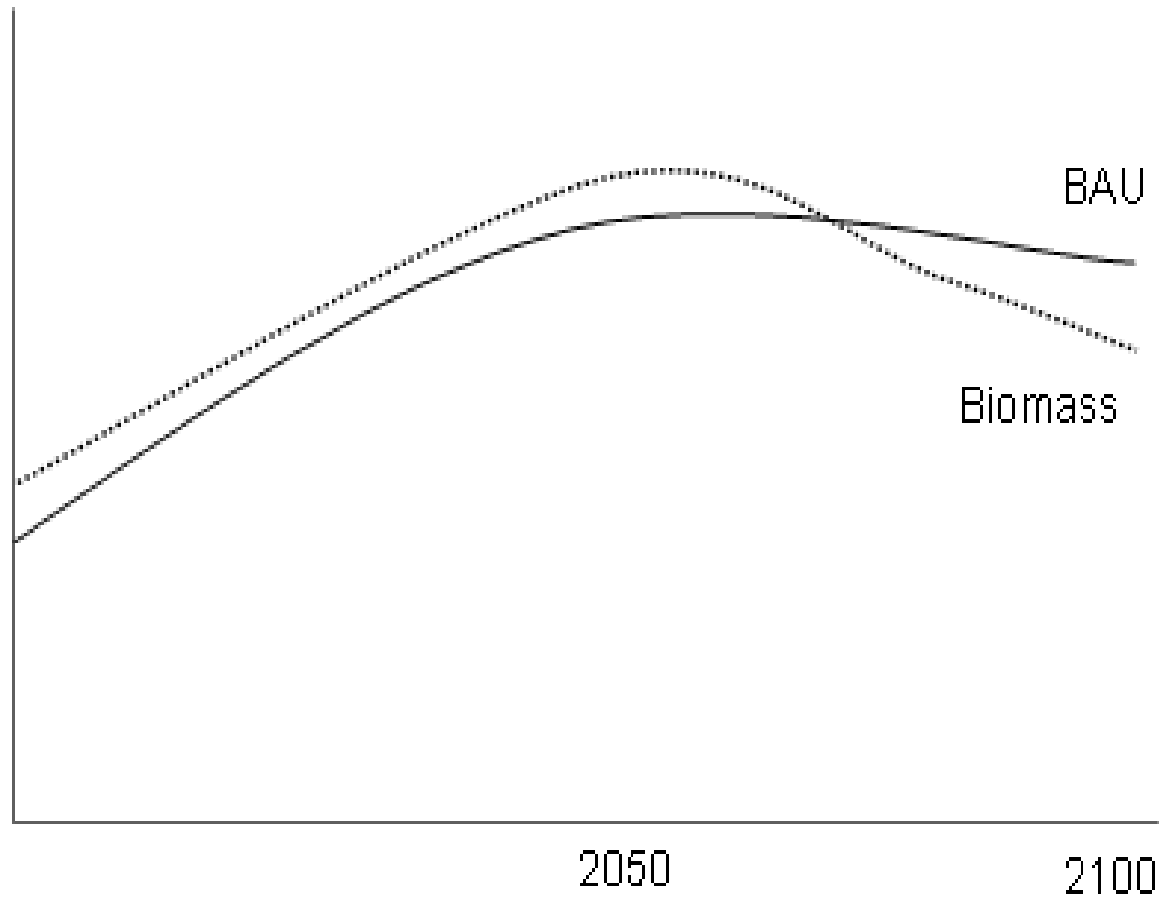
Failure to Hit Emissions Targets



80% by 2050



Carbon Free by 2050



Policy Implications

- Biomass must be accounted for differently than other renewables
- Biomass is an available renewable energy source that can be brought on line relatively quickly
- Its long-term benefits are dramatic
- Its short-term debt = policy challenge

Policy Suggestions

- Use biomass now and in applications that provide the quickest payback.
 - Most efficient technology
 - Best forest management
 - Best forest management policy
 - Provide greatest ecological and economic returns
= appropriate scale

Policy Questions

- What are supply constraints?
- What are short- and long-term climate effects of short-term carbon debt from biomass?
- What kind of emissions regulations can account fairly and accurately for biomass, other renewables and fossil fuels? (EPA)

Helpful Reports

- Changes to the Land: Four Scenarios for the Future of the Massachusetts Landscape – Harvard Forest
www.harvardforest.fas
- Regional Sustainability and the Potential of New England Forests – NEFF, June 2014

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Questions?

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