

# Biomass Availability for Generation

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*CCI/IA  
Snowmass, CO*

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# Detailed economic modeling of U.S. agriculture & forestry sectors

- Modeling alternative U.S. land-use, land management, and GHG strategies – land allocated based on relative economic returns and suitability
- Sub-national modeling with international trade
- Sectors
  - Forestry — log, pulp, and wood chip markets
  - Agriculture – primary and processed commodities, crops and animal products
- Bioenergy
  - Liquid and solid end-use
  - Forest & ag dedicated and residue feedstocks
  - Biofuel co-products
- GHG accounting – N<sub>2</sub>O, CH<sub>4</sub>, CO<sub>2</sub> (emissions and sequestration)
- Policy baseline: EISA renewable fuels mandate, CRP min (30 million acres)
- **Biomass supply = delivered to the power plant gate (not the supply of bioelectricity)**

# Biomass feedstocks, costs, GHG value

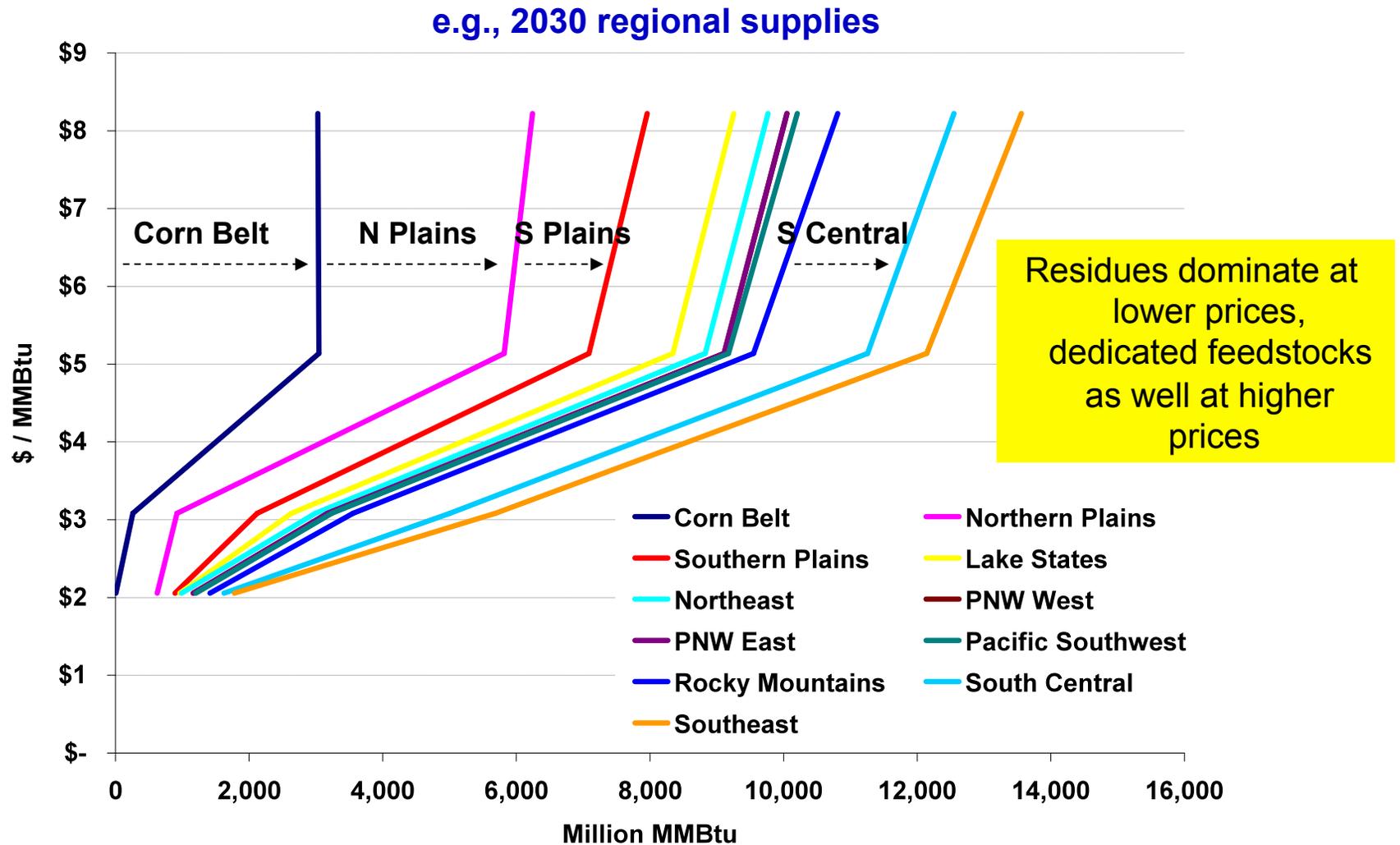
- Costs: processing, harvesting, and transportation (f(avg distance(biomass density, yield), load size)
- Relative mitigation value function of...
  - HHV
  - Moisture content
  - Direct GHG benefit
    - e.g, ethanol vs. gasoline
  - Net GHG effect
  - Direct costs
  - Opportunity costs (commodity & GHG)
  - Energy prices
  - Co-products

Feedstock	Electricity	Ethanol	Biodiesel
<i>Biomass:</i>			
Softwood Logging Residues	x	x	
Hardwood Logging Residues	x	x	
Softwood Milling Residues	x	x	
Hardwood Milling Residues	x	x	
Bagasse	x	x	
Switchgrass	x	x	
Poplar	x	x	
Willow	x	x	
Corn Residue	x	x	
Sorghum Residue	x	x	
Wheat Residue	x	x	
Barley Residue	x	x	
Oat Residue	x	x	
Rice Residue	x	x	
Lignin	x		
Hardwood Lignin	x		
Softwood Lignin	x		
Manure	x		
<i>Grains and Sugar:</i>			
Corn		x	x*
Sorghum		x	
Wheat		x	
Barley		x	
Oats		x	
Rice		x	
Sugar		x	
Soybeans			x*
<i>Other:</i>			
Edible tallow			x
Non-edible tallow			x
Lard			x

\* includes oils and yellow grease

# Significant U.S. biomass supply for generation

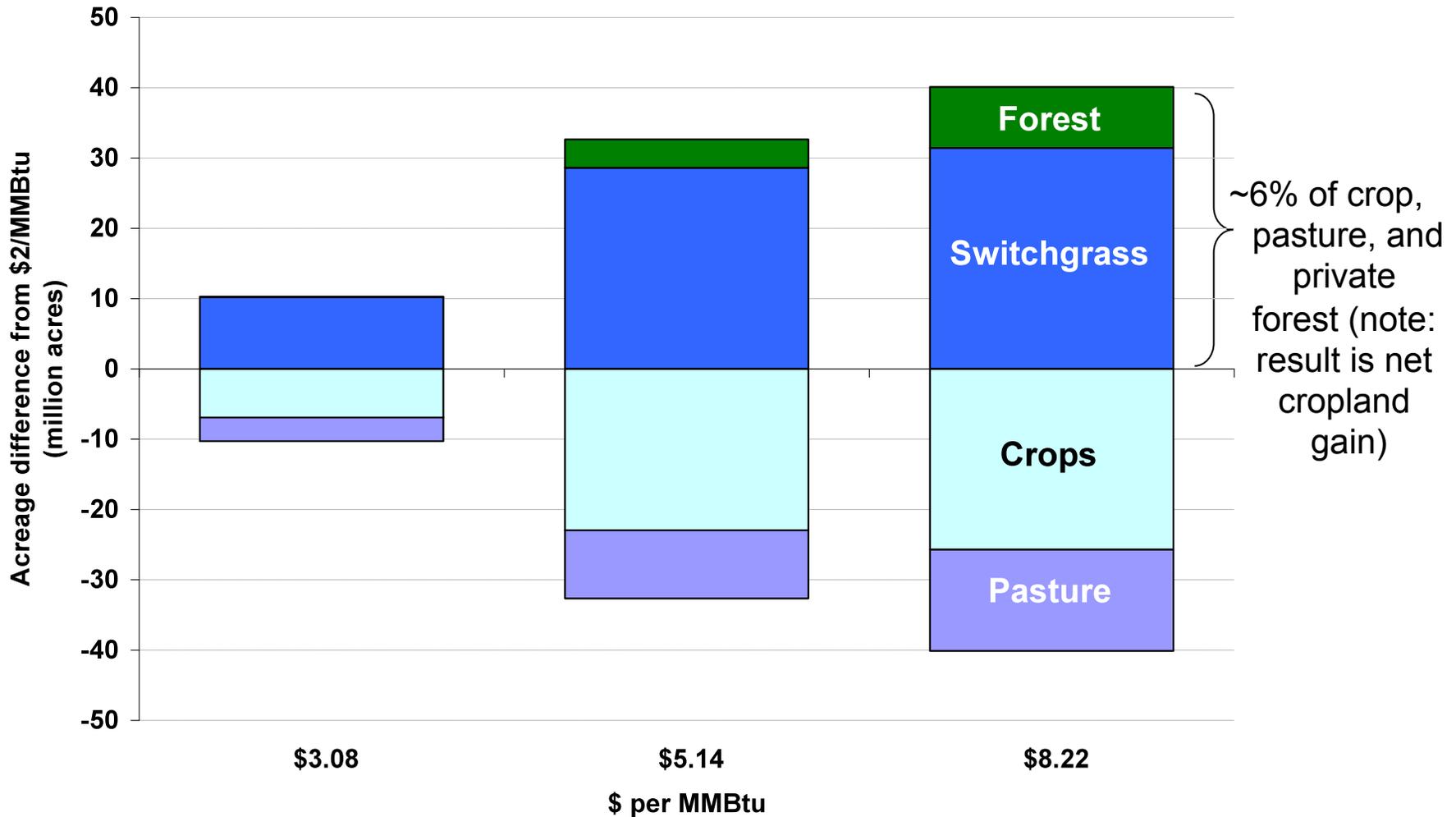
## Regional supplies vary (Corn Belt, Plains, S. Central dominate)



Preliminary results. Do not cite.

# National land-use change

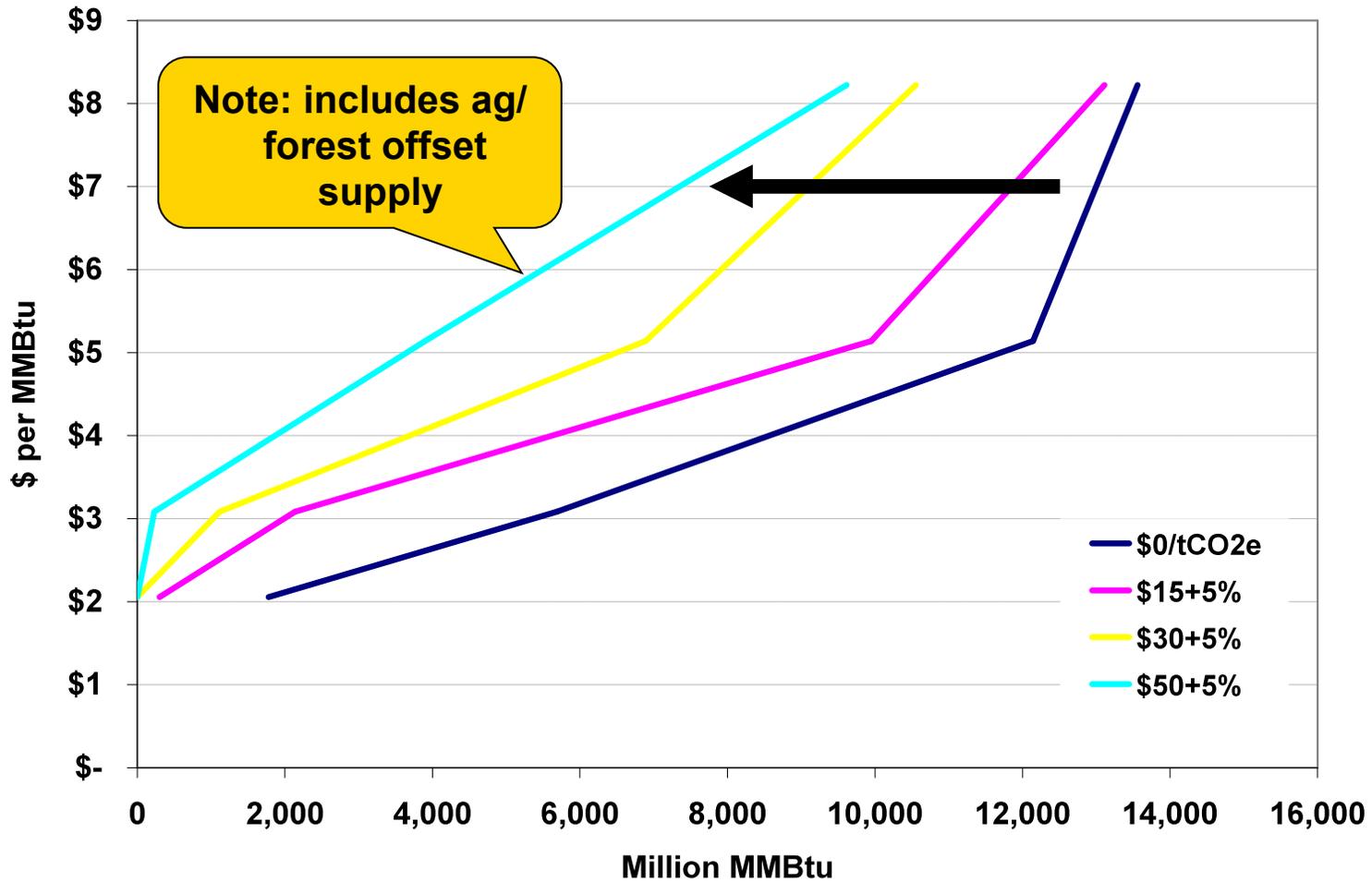
e.g., US 2030 land use relative to \$2/MMBtu, no GHG price



*Preliminary results. Do not cite.*

# GHG policy increases delivered biomass cost

e.g., US supply 2030



Preliminary results. Do not cite.



**Thank you!**

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