

Southern Forest Markets: Pellets and Forest Carbon

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Background

Objective – model the southern forest at a spatial and temporal resolution to be useful for forward-looking decisions.

- Empirically driven model of the southern forest system
 - Sub-Regional Timber Supply Model - SRTS
- Biology based on continuous forest inventory of growth, mortality, removals, and inventory by the USDA FS
- By private owner group (corporate/non-corporate), forest type, age class, and species group.
- Separate empirically driven market responses by sub-region, owner type, species group and product class.

Key questions, in a privately owned timberland market:

Demand side - how does increased demand for wood affect prices, harvest, forest inventory and forest carbon?

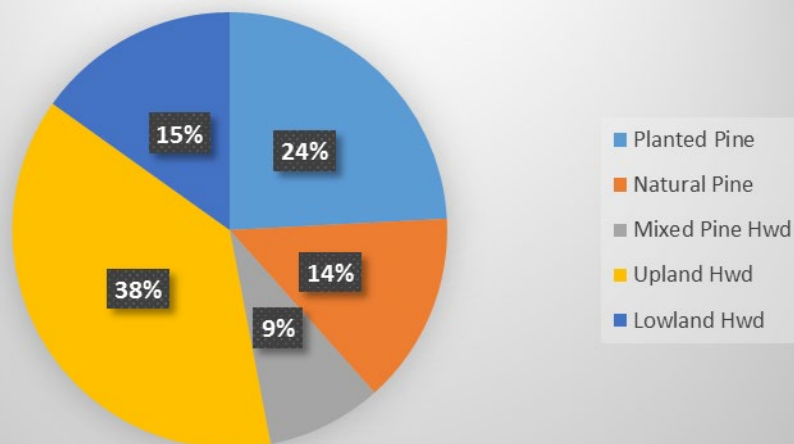
Supply side – how are future markets affected by intensive management, hurricanes, and land use change.

Today's Agenda

- Brief overview of trends and current status of forest markets in the US South
- This provides the market context of for the entrance of bioenergy demand for pellet exports
- Expected and realized effects of pellets on forestland rents – which drive acreage, forest inventory and forest carbon.

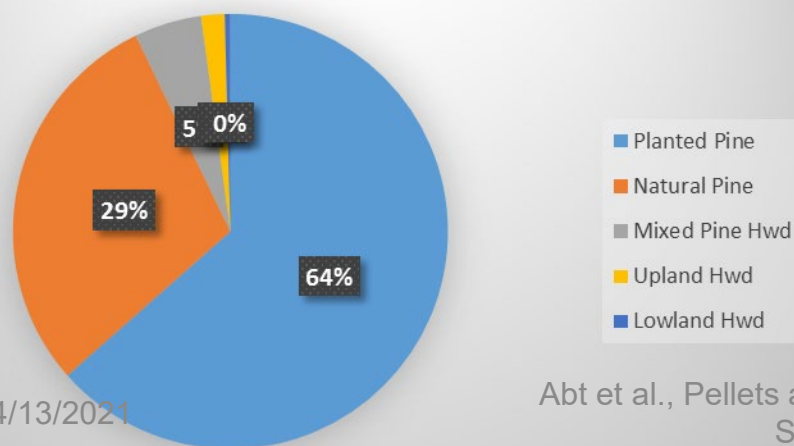
Plantations in a Landscape Context

Southern Timberland Acres by Type

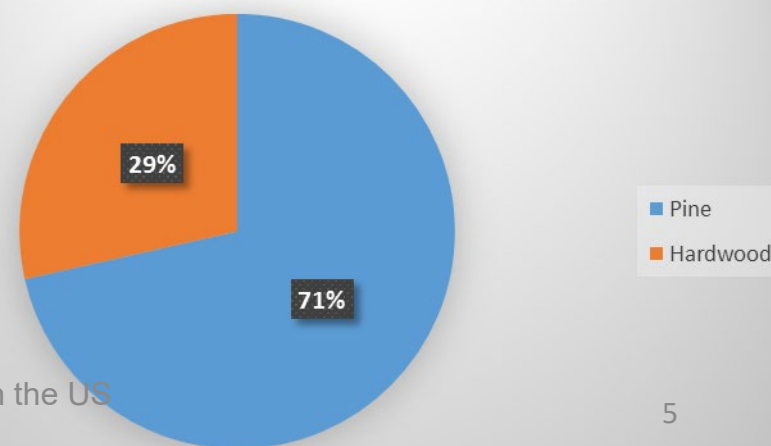


Southern Plantations
24% of timberland
45% of removals
67% of pine removals

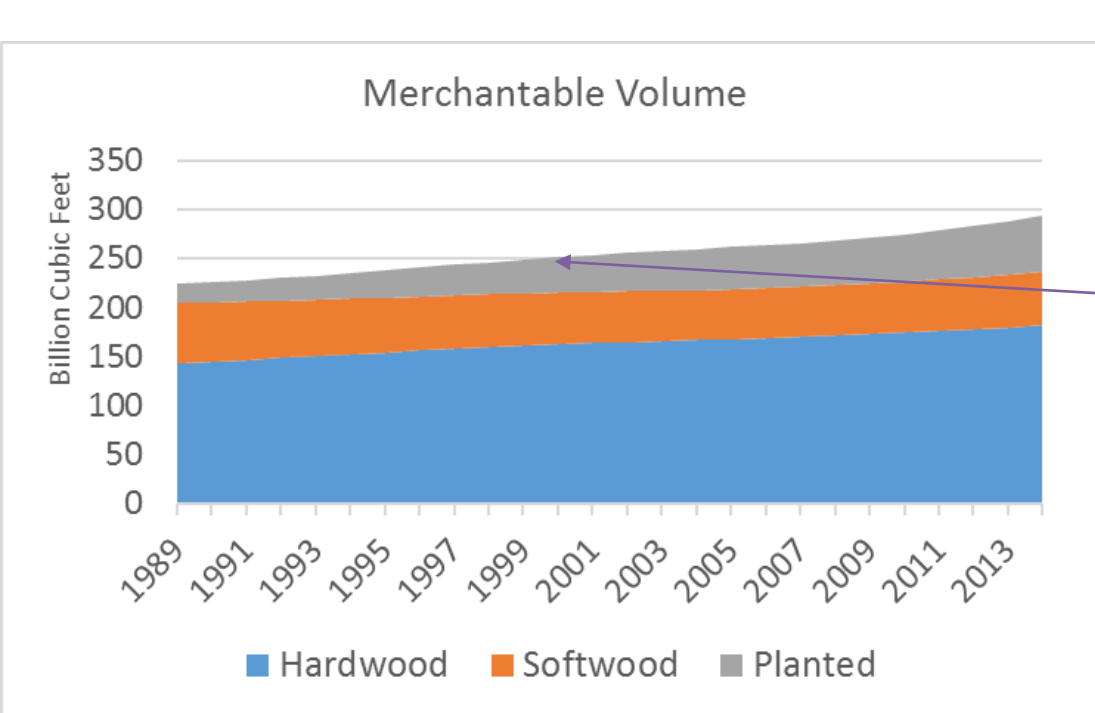
Southern Pine Removals by Type



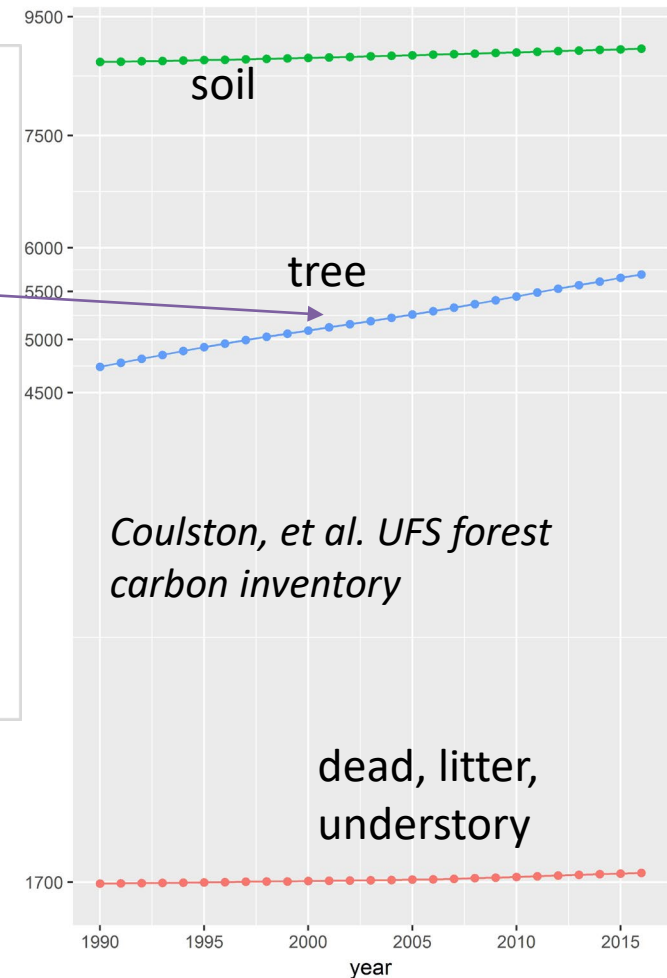
Southern Removals by Species

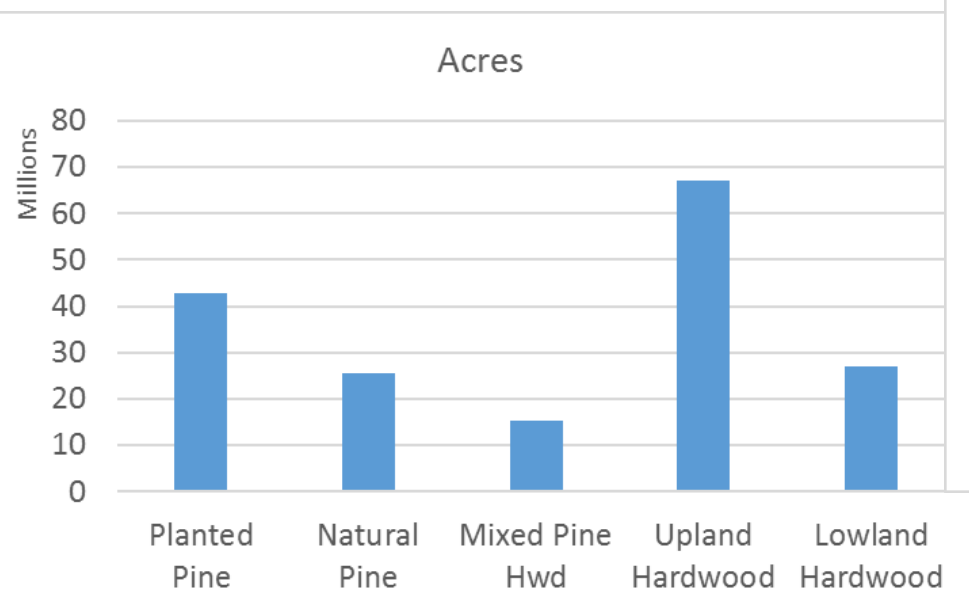
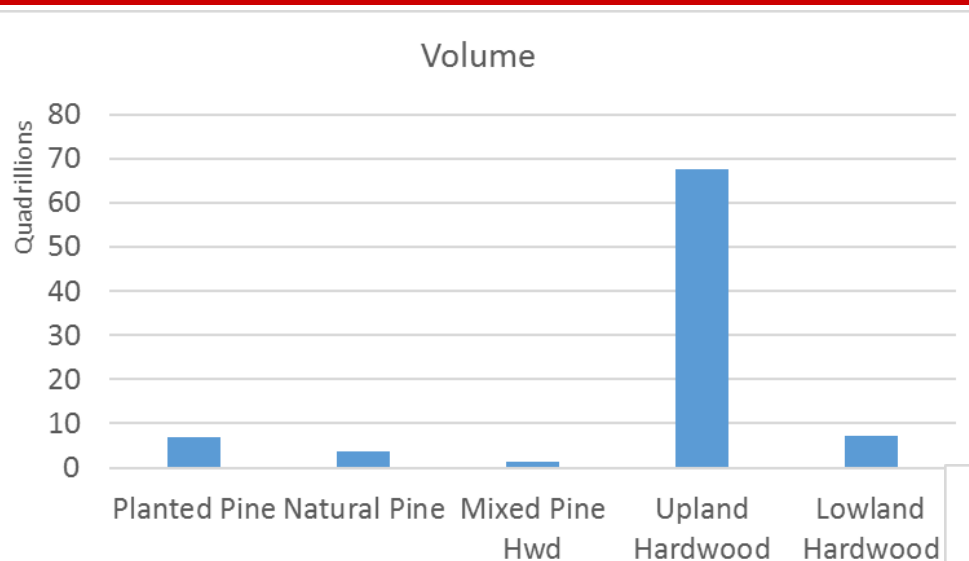


Southwide Forest Inventory/Carbon Stock Increasing



Forest Inventory and Analysis (FIA) plot data used in the model.

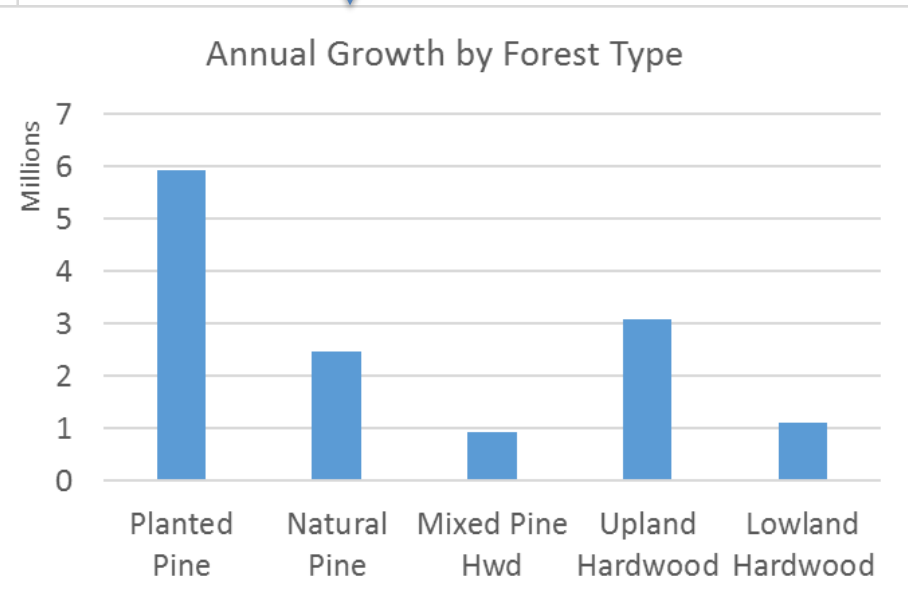




In the southern forest, where's the carbon stock and where's the sequestration?

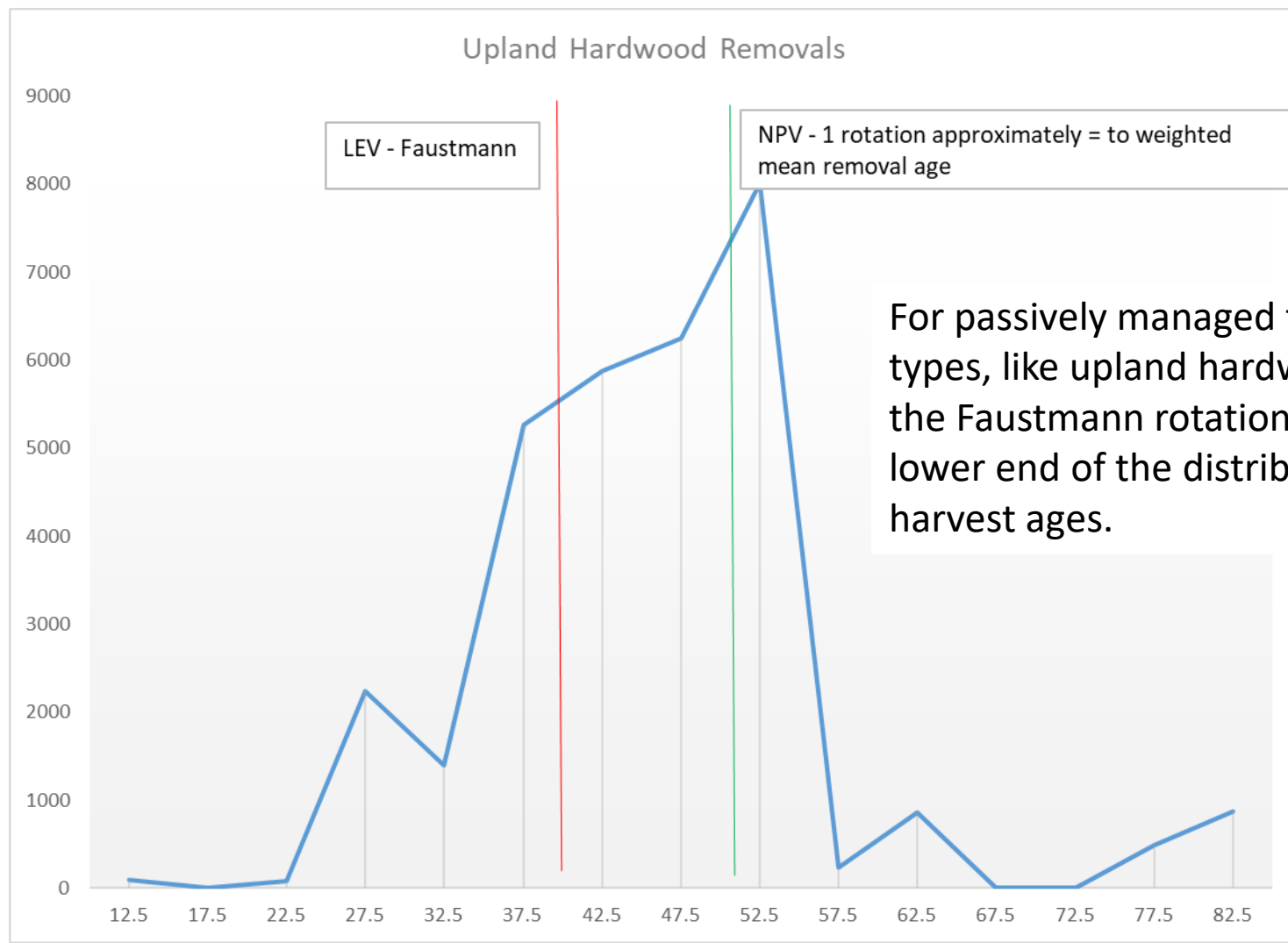
Carbon Stock

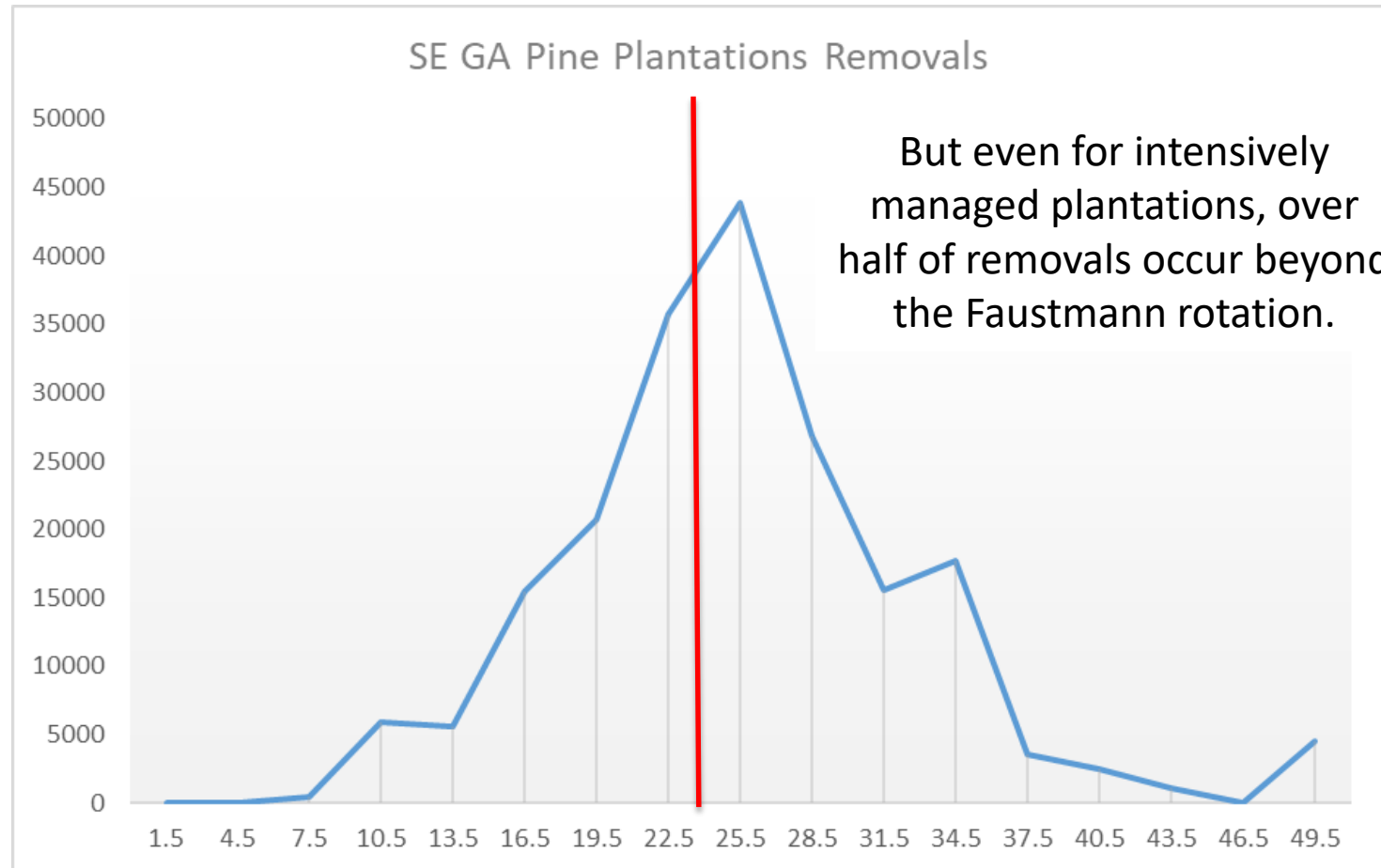
Carbon Sequestration



A Note on Empirical vs Optimization Models of Forest Behavior

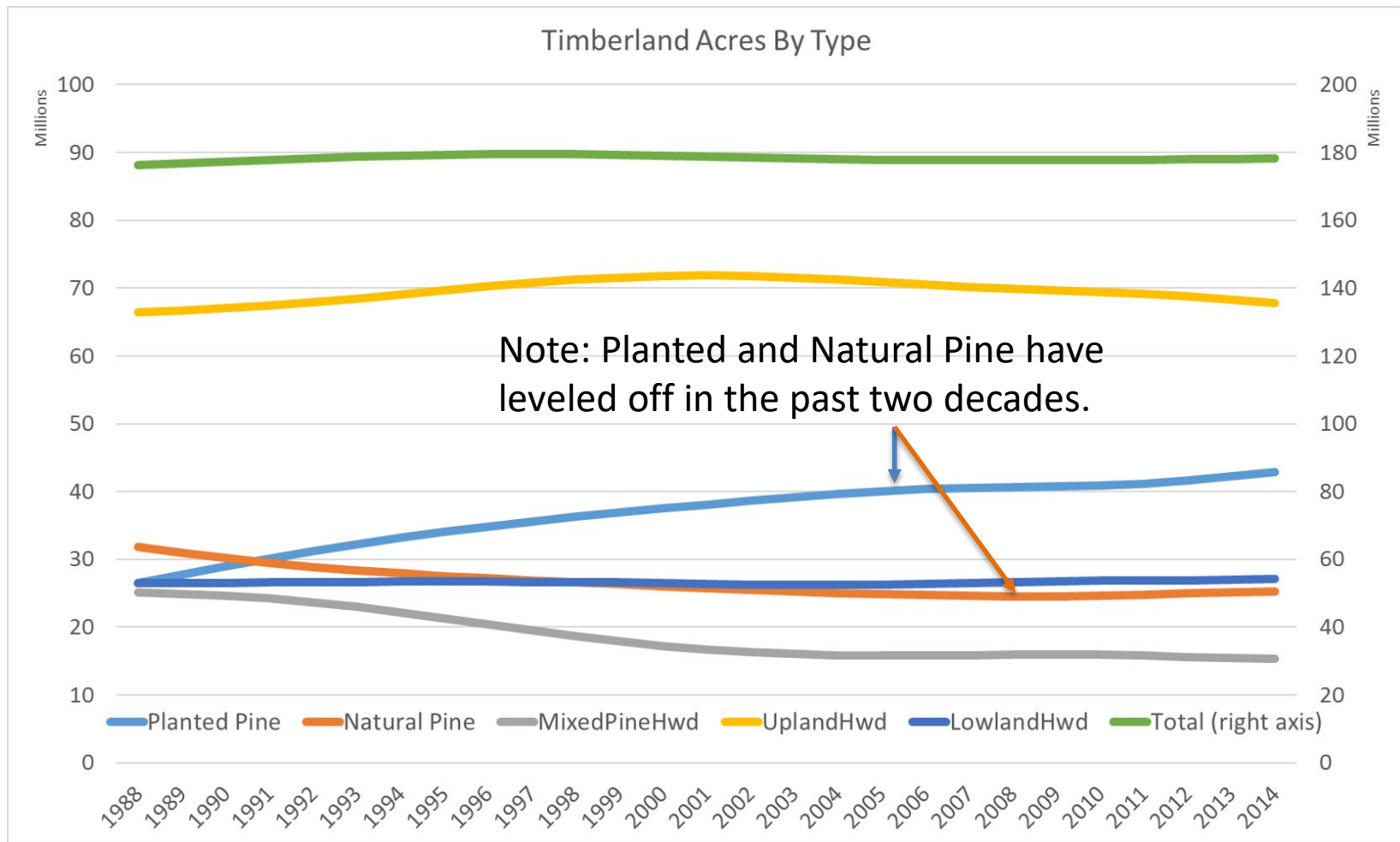
- The harvest decision/rotation length is a critical variable for looking at carbon consequences of forest management.
- Both the sequestration rate (growth) and carbon storage (stock) are determined by rotation.
- Most models of private forests use Faustmann to drive the harvest decisions.
- But what does the empirical data reveal about harvest behavior?



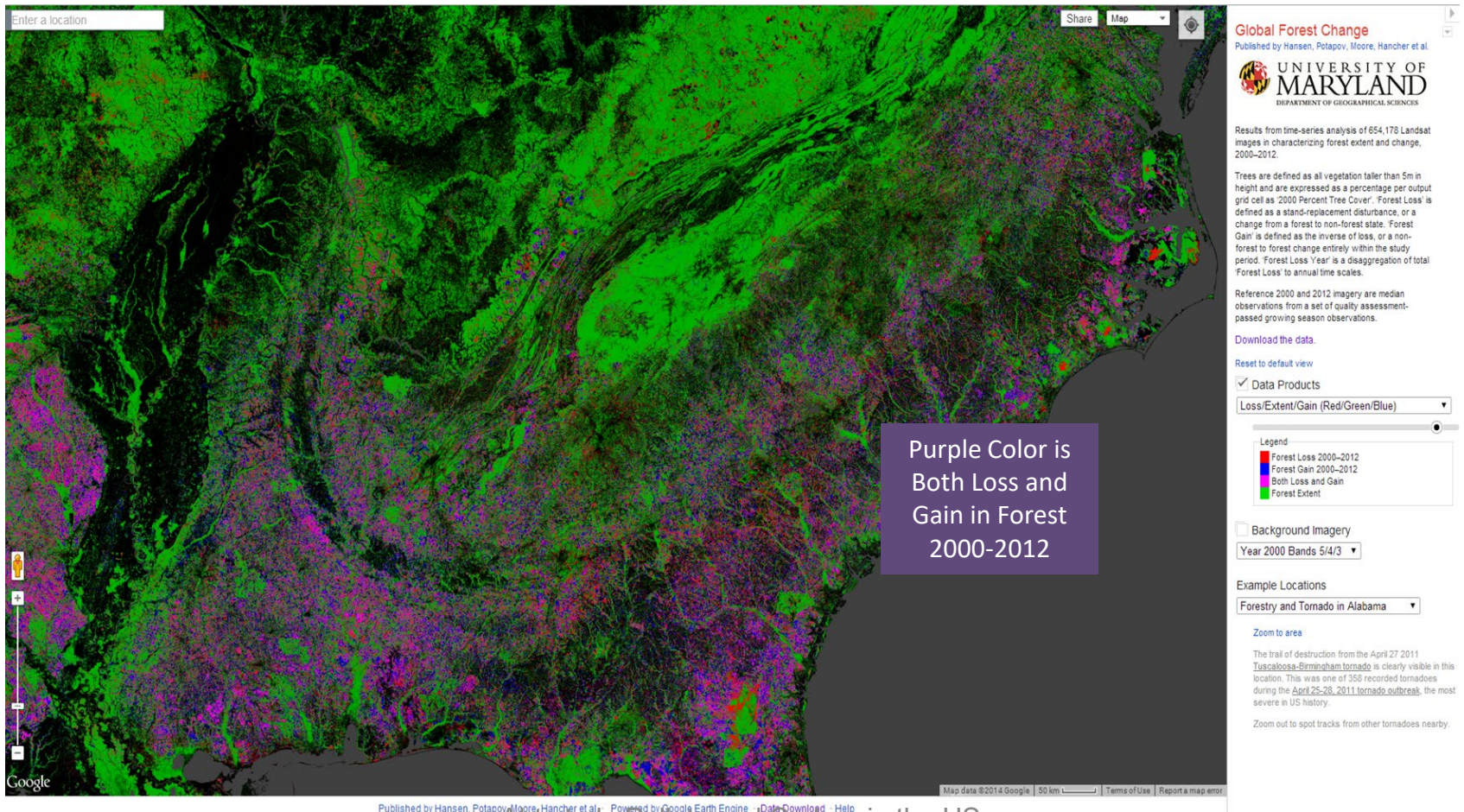


Ownership matters - in the gulf states 15% of corporate plantations are over age 25, while 23% of non-corporate plantations are over 25.

Timberland Area Steady but not Static

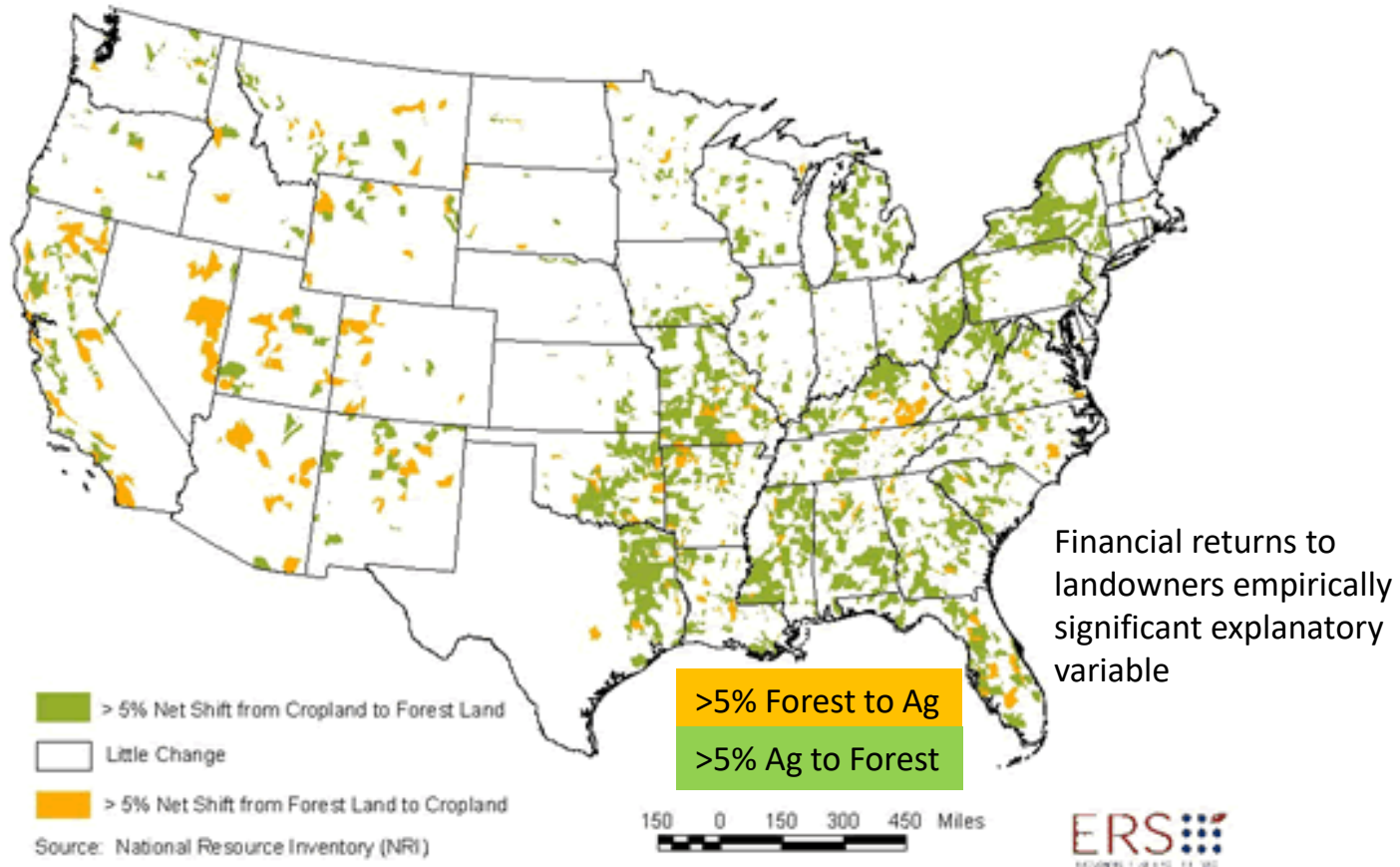


The Global Forest Change Project Shows How Rural Land in the South is Dynamic



Forestland trend stable, but not static

Net shifts between cropland and forest land, 1982-97



Southern Timberland is Dynamic Because:

- This is a privately owned largely un-regulated landscape where marginal agriculture competes with forest land both at the intensive (plantations) and the extensive (fallow agriculture) margins.
- *“...we identified the rise in timber net returns as the most important factor driving the increase in forest areas between 1982 and 1997. This is consistent with reports that the increase in forests largely involved timberland acreage.” (Lubowski et al. 2008)*
- **What does this mean for the carbon consequences of increased demand for pellets?**

Can Pellets Influence Returns to Forestland?

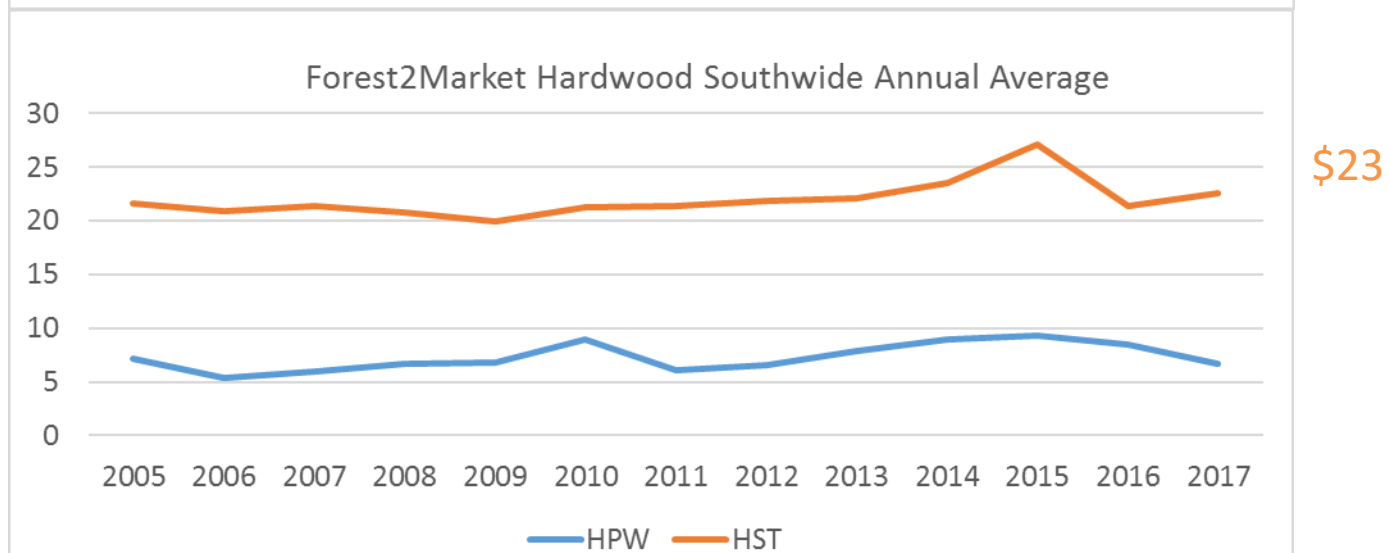
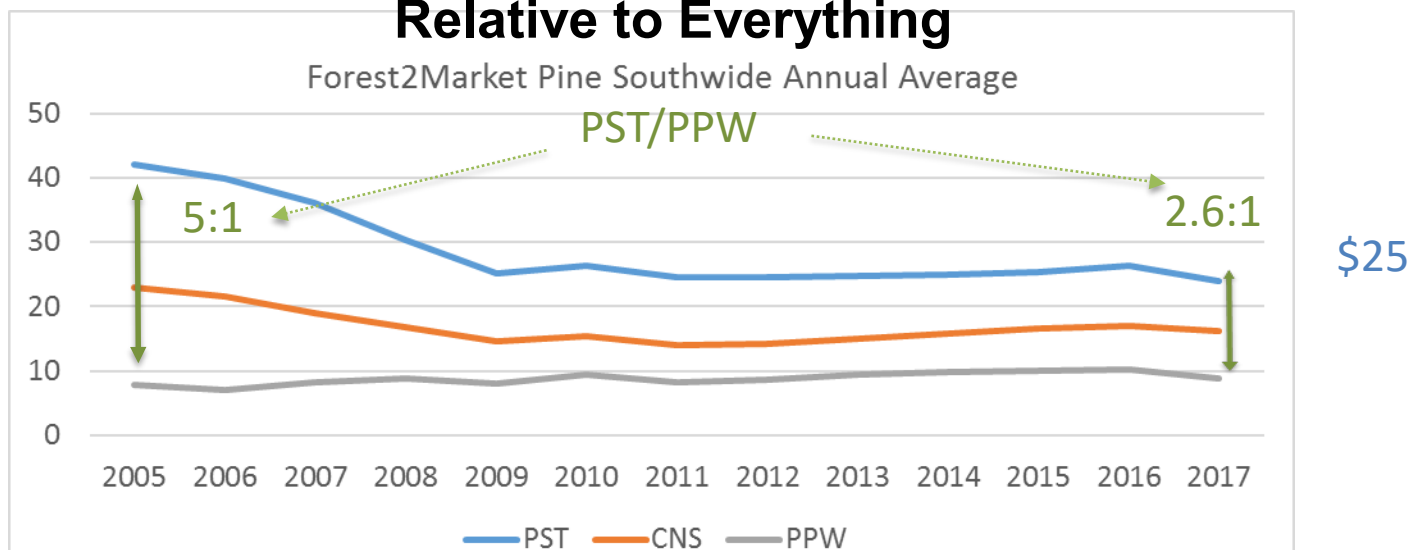
- Pine Sawtimber (PST) has been the primary rent driver on southern timberlands
- Low value products like pulpwood, not so much.
- This matters for pellets. If demand/harvest for pulpwood (e.g. pellet feedstock) doesn't influence returns to landowners and improve opportunities for forest management – the forest carbon benefit is reduced.

For Pellets to Influence Land Rents

- **The PST / PPW price differential needs to decrease**
- **Pellets need to be a significant share of the market** *(large enough to influence prices)*
- Note: this is a local story, markets vary widely across the South.

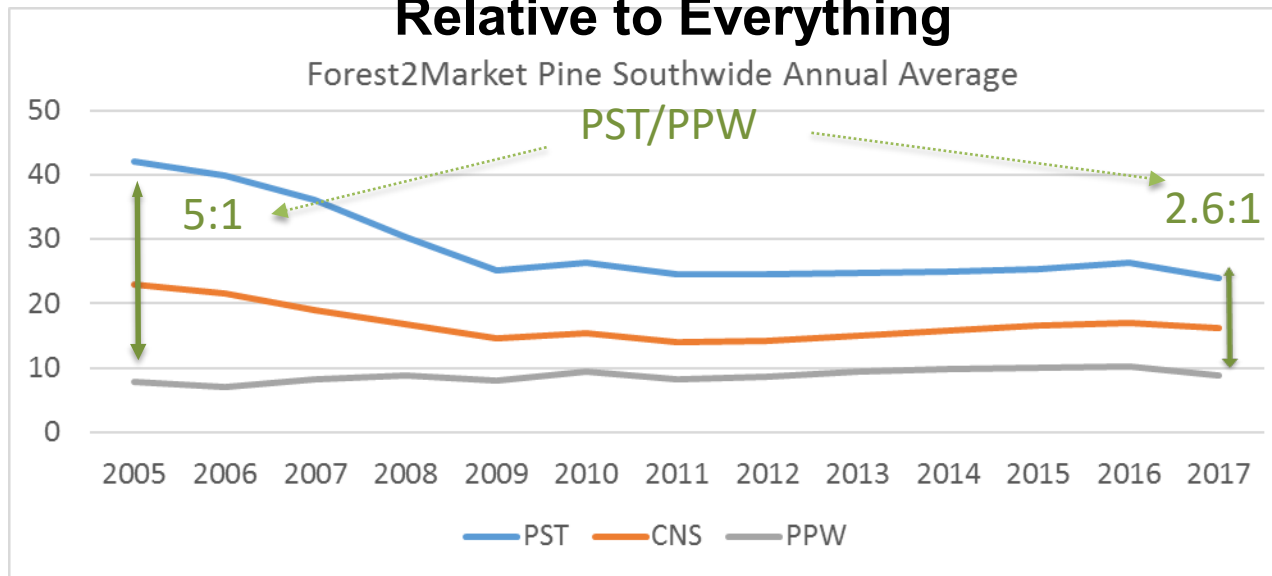
Pine Sawtimber Prices Decline

Relative to Everything



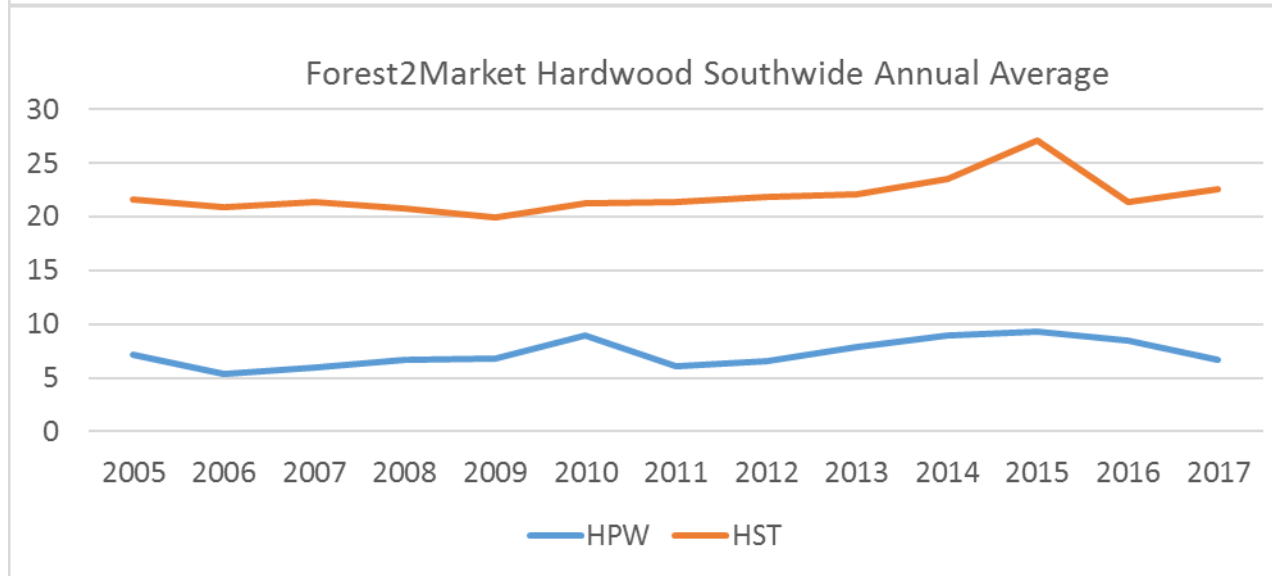
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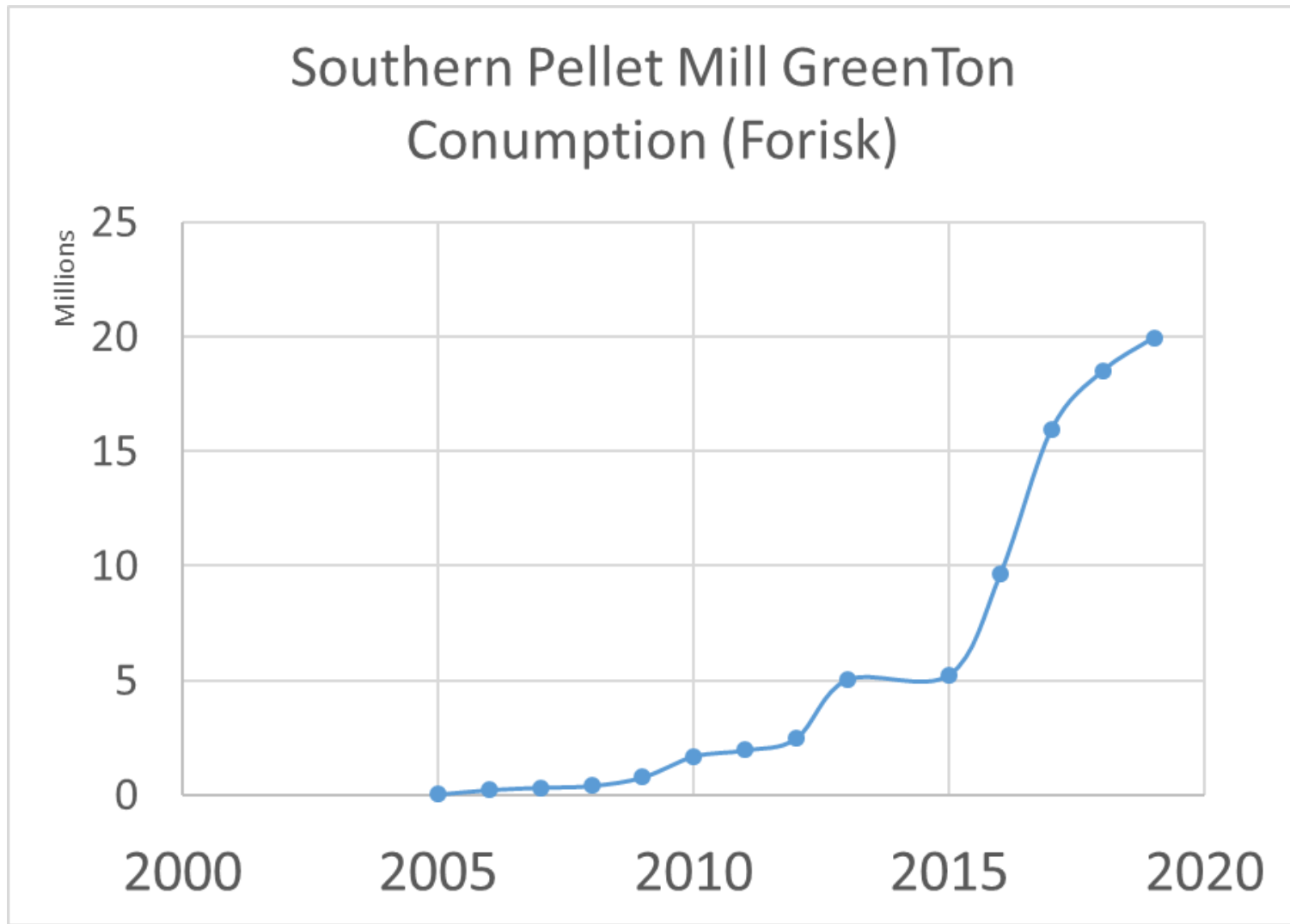
PPW price becomes more important in land rent

\$25



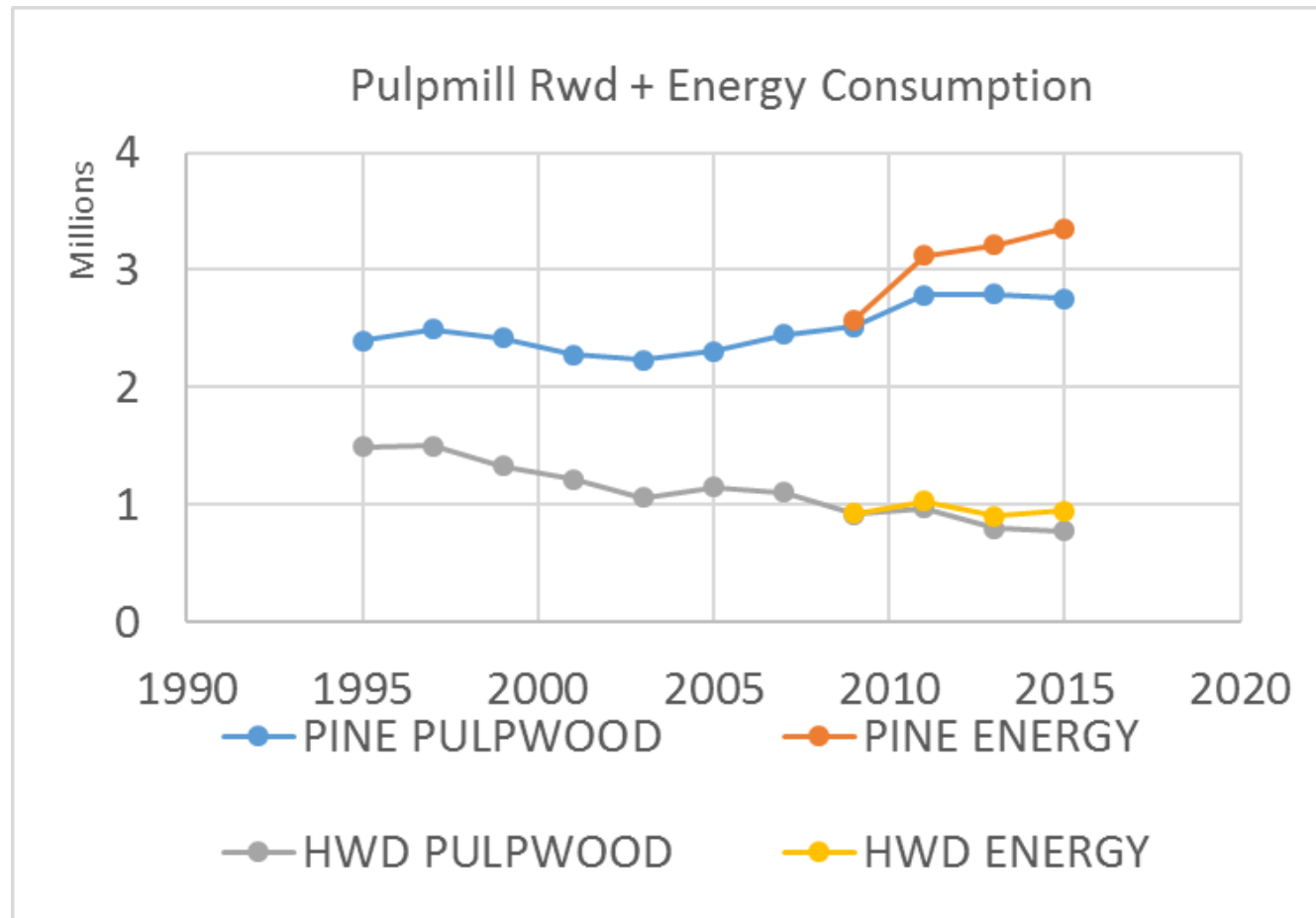
Do they have significant market share?

PELLET PRODUCTION



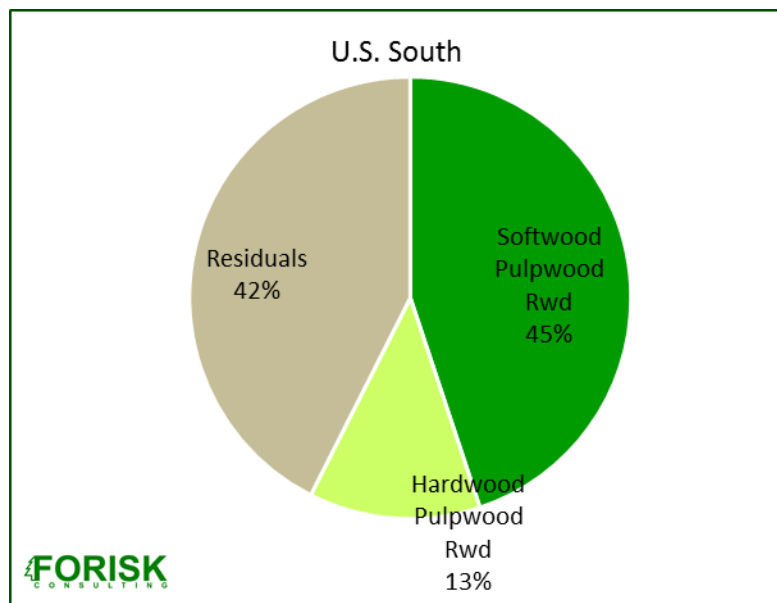
Small Proportion but Changes Trend

TPO
MCF



Energy consumption of pine pulpwood is only about 15%, but it is a marginal 15% on top of the highest pine pulpwood consumption ever.

What do pellet mills use?

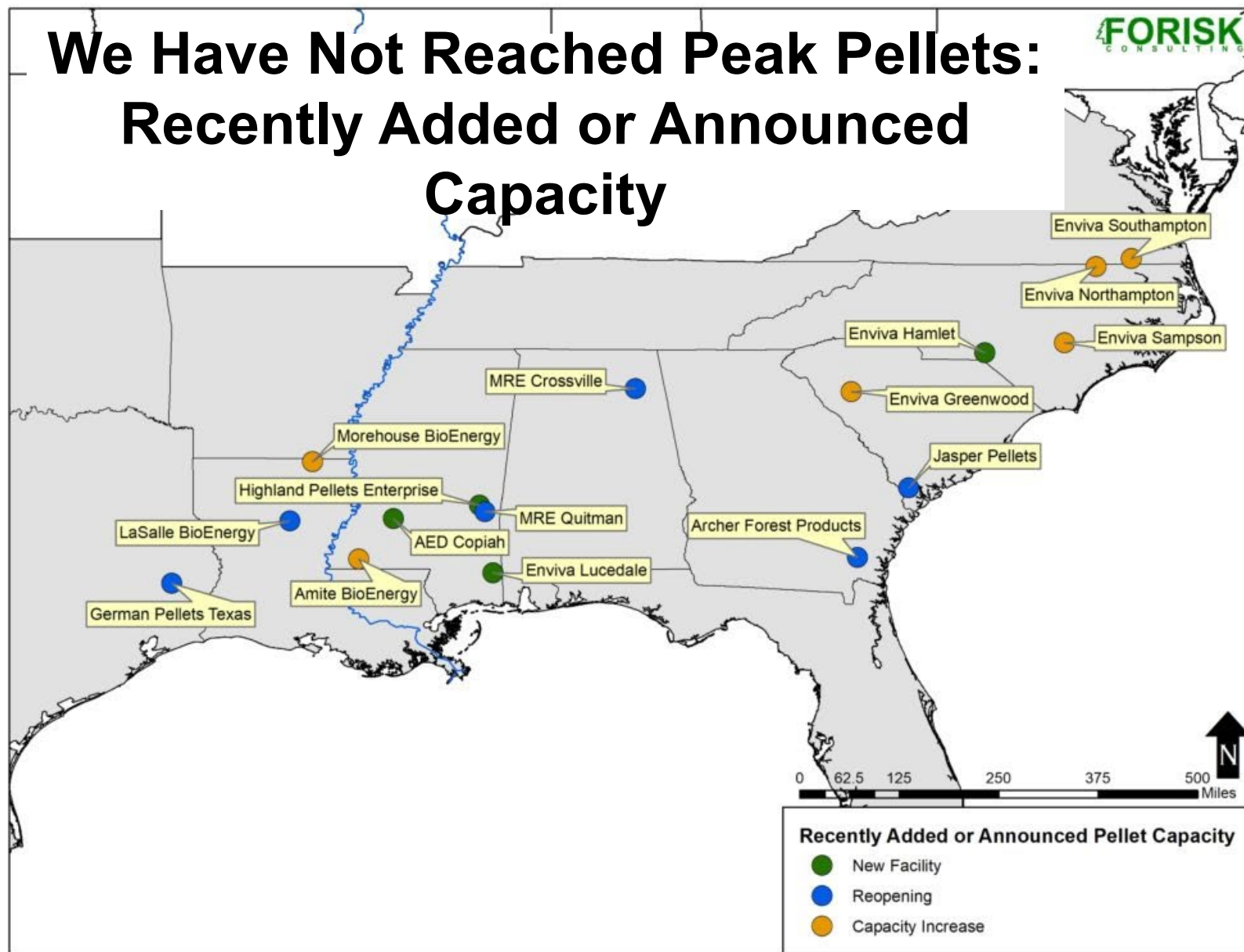


Residuals include mill residues, logging residues/dirty chips, urban wood. These are also used by pulp and OSB plants. Pine is about 80% of feedstock

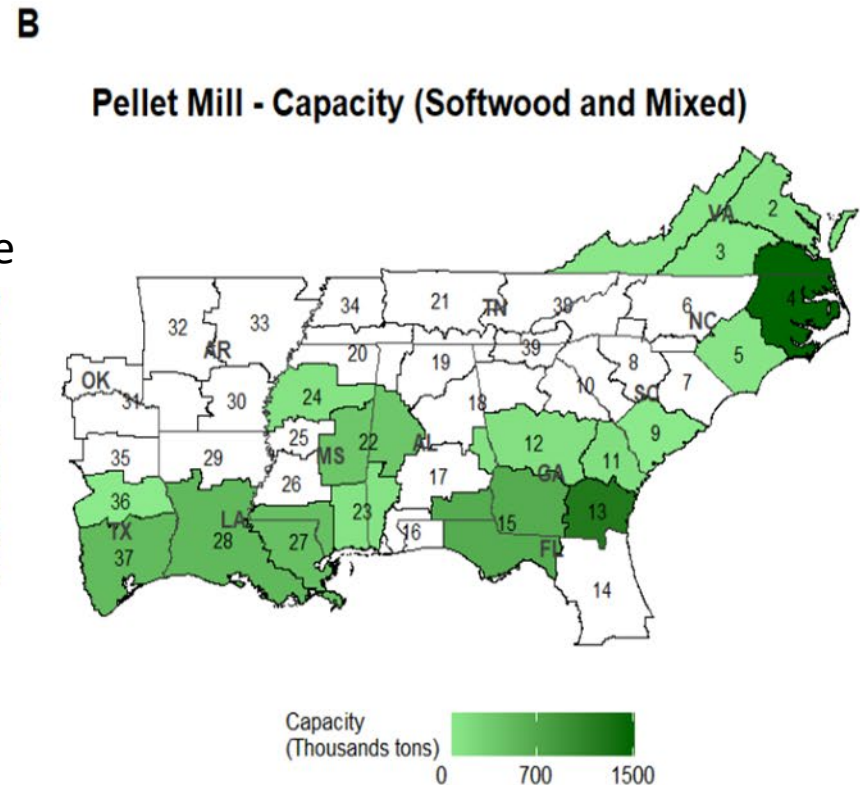
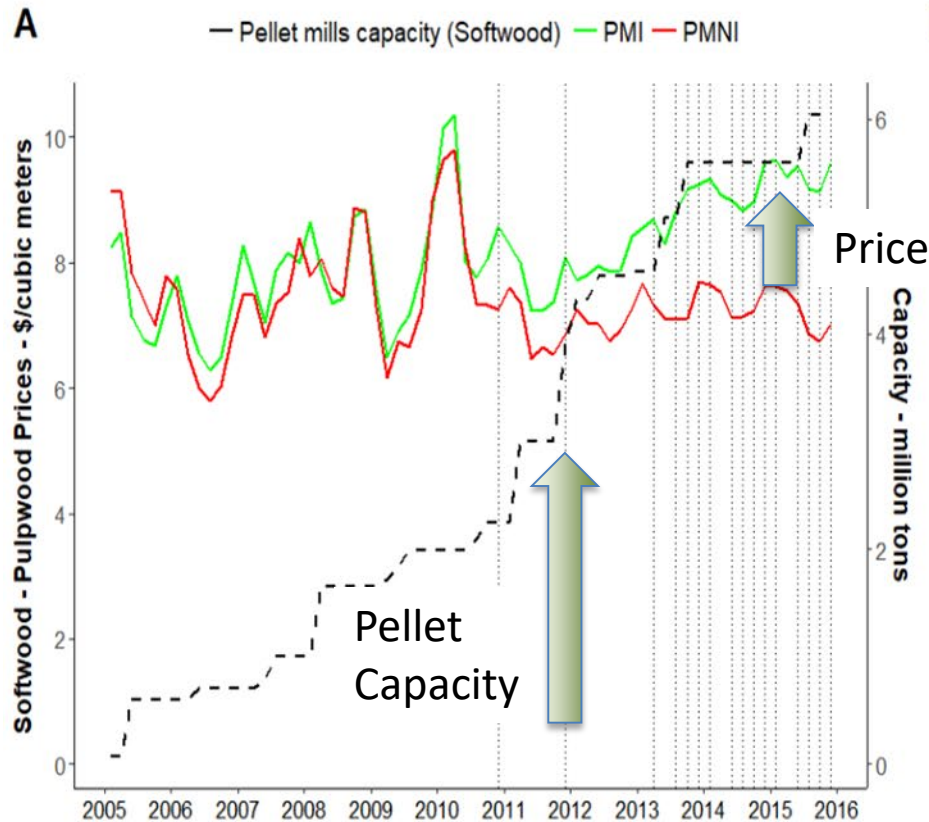
Enviva in NC/VA is probably about 80% hardwood – **why?**

- Franklin mill had just closed.
- Logging/trucking infrastructure
- Hwd PW was \$2/ton.
- Pellet plants that use over about 20% pine need VOC controls which cost about \$1 million.

We Have Not Reached Peak Pellets: Recently Added or Announced Capacity

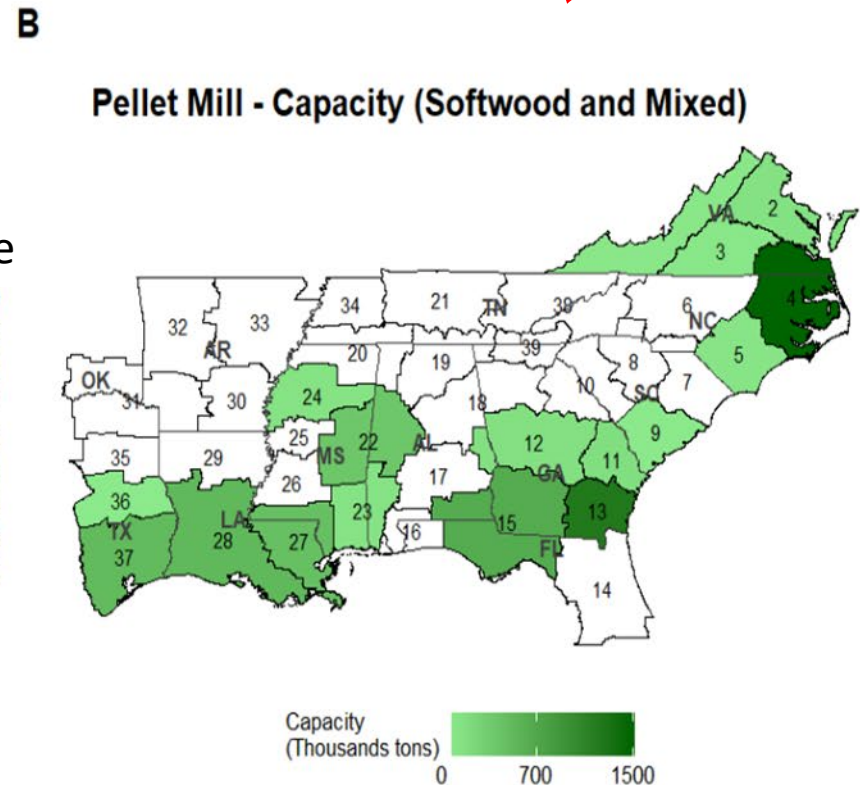
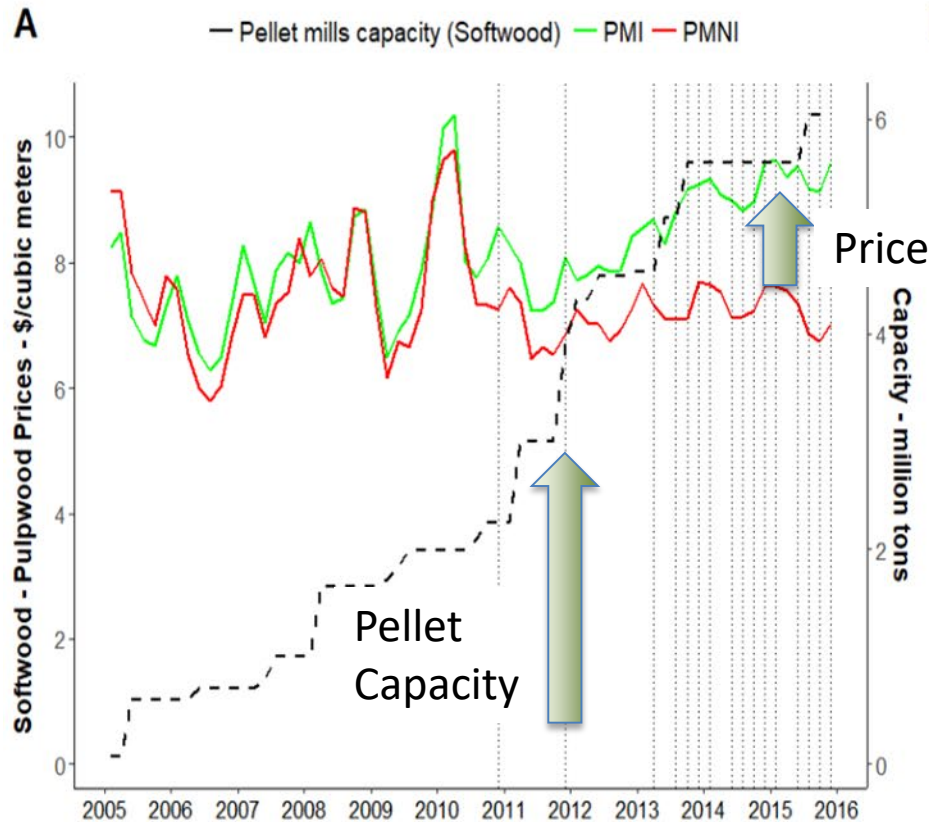


Pellet Demand and Pine Pulpwood Prices



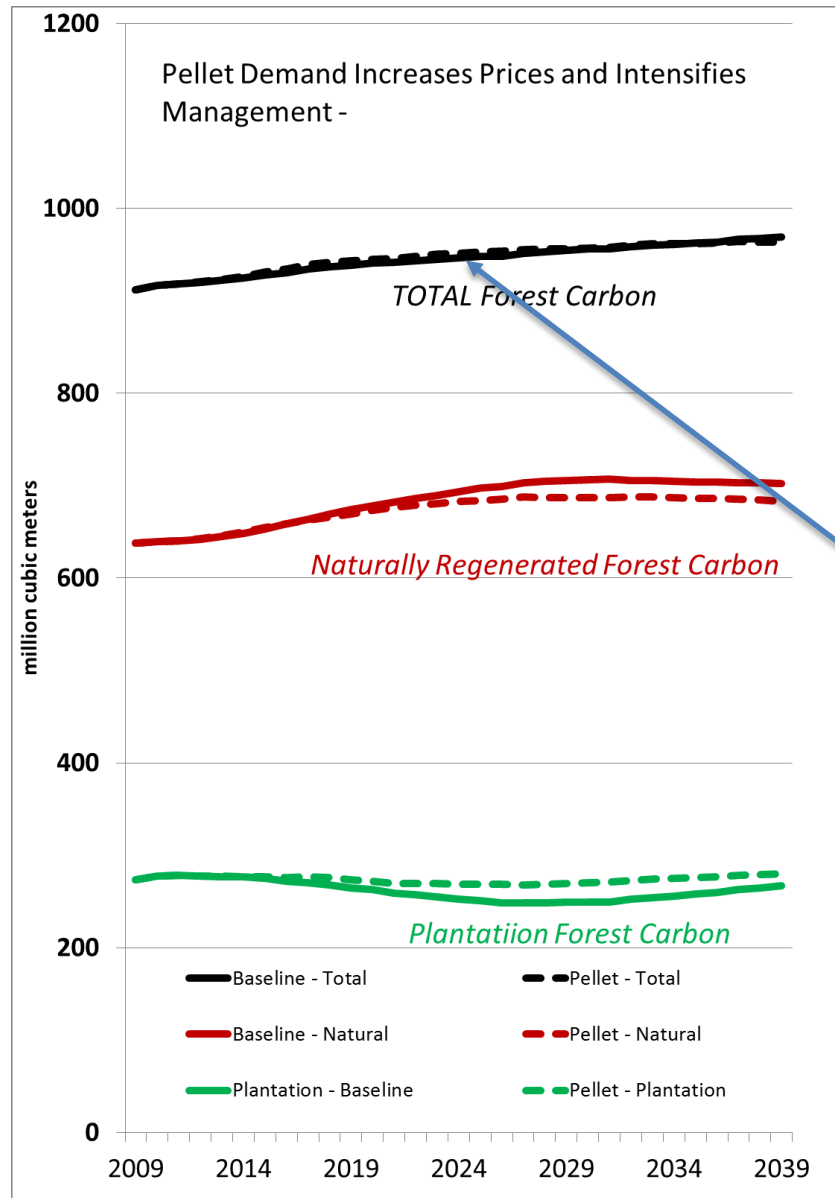
Pellet Demand and Pine Pulpwood Prices

Pellets consumption large enough to affect prices



When pellets can drive local forest returns:

HOW DOES PELLET DEMAND AFFECT FOREST CARBON?



SRTS Model Results:

In the current market, increasing demand for small value trees has more land rent impact than it has historically.

Total Forest Carbon Can Actually Increase. But timing matters.

Rent affects area in forest and distribution of forest types.

Note: This is not the same as “carbon neutral”

The Carbon Score of Wood for Energy Looks Worse When You Assume:

- Small areas (plots) rather than landscapes – *no market effects*
- Short time frames (20 years vs. > 100 years)
- ***Slow growing trees with uncertain regeneration***
- ***Baselines/counterfactuals that assume trees will not be cut and continue to sequester if not used for energy***
- ***No markets, land use or management response***

-The first two are affected by the modeling assumptions.

-The last three do NOT apply in the U.S. South.

The south is the world's largest timber producer and the land/timber base is privately owned and market driven.

Market and Resource Summary

In an open land market:

Increased forest product demand leads to:

- Higher prices

- Land use change and management response

- Net inventory/carbon response depends on local markets (shifts, substitutions, expansion)

Note: Agriculture markets matter too

- high prices reduces area of fallow ag land (and reduces CRP land remaining in forest). Ag technical change can reduce demand for ag land and marginal land reverts forest.

Questions?

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