



Biomass Energy: Economic Implications for the Southeast US

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Outline

- ▶ Forisk overview
- ▶ Screening announced bioenergy projects
 - ▶ Wood bioenergy feedstocks
 - ▶ Outlook through 2020 for US & South
- ▶ Bioenergy and pulpwood stumpage pricing
 - ▶ Outlook through 2020 for Southeast
- ▶ Bioenergy and PST stumpage pricing
 - ▶ Outlook through 2020 for Southeast
- ▶ What we're thinking about

Forisk Overview

▶ Services

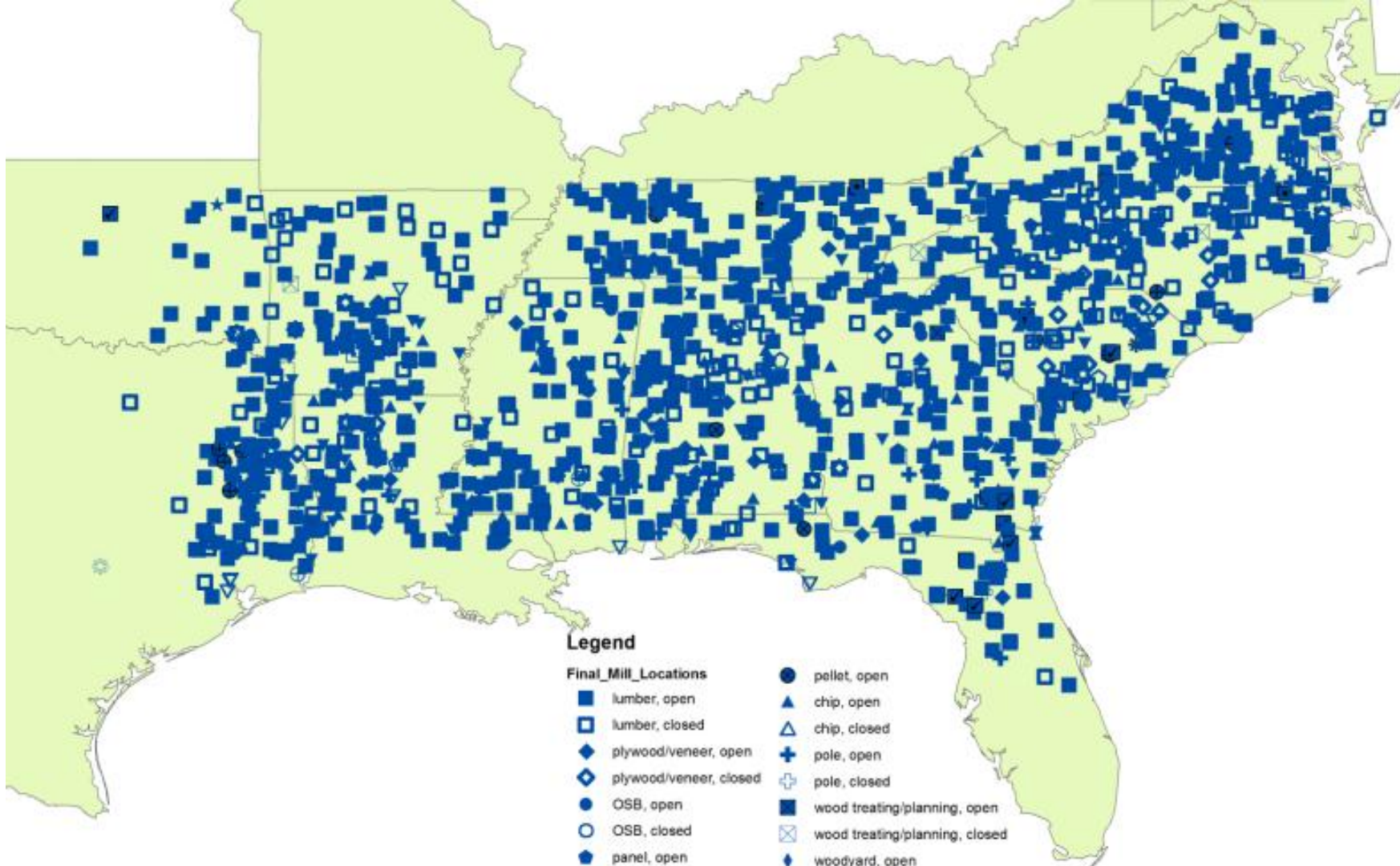
- ▶ Analysis of timber, wood and bioenergy markets;
- ▶ Price forecasts of stumpage prices; and
- ▶ Comparative research on timberland investments.

▶ Publications

- ▶ ***ForiskForecast*** → semi-annual stumpage forecasts
- ▶ ***Wood Bioenergy US*** → US-wide as of July 2010
- ▶ ***Wood Demand Report*** → quarterly analysis of wood flows

▶ Continuing Education

- ▶ August 4, 2010: “**Applied Forest Finance**” in Atlanta.



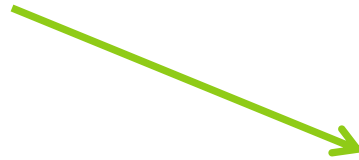
Legend

Final_Mill_Locations

- | | | | |
|---|------------------------|---|--------------------------------|
| ■ | lumber, open | ● | pellet, open |
| □ | lumber, closed | ▲ | chip, open |
| ◆ | plywood/veneer, open | △ | chip, closed |
| ◇ | plywood/veneer, closed | + | pole, open |
| ● | OSB, open | ⊕ | pole, closed |
| ○ | OSB, closed | ■ | wood treating/planning, open |
| ● | panel, open | ⊗ | wood treating/planning, closed |
| ◐ | panel, closed | ◆ | woodyard, open |
| ▼ | pulp/paper, open | ◇ | woodyard, closed |
| ▽ | pulp/paper, closed | ✱ | millwork, open |
| ★ | paperboard, open | ⊗ | millwork, closed |
| ☆ | paperboard, closed | ■ | miscellaneous, open |
| ● | pallet, open | □ | miscellaneous, closed |
| ⊕ | pallet, closed | ■ | mulch/shavings, open |

Wood bioenergy markets differ.

- ▶ Pellet mills



- ▶ Cellulosic ethanol

 - ▶ Liquid fuel

- ▶ Wood-to-electricity & cogeneration

 - ▶ Retrofit coal plants; utilities adding boilers

 - ▶ Renewable Portfolio Standards (RPS)

What forms of wood raw material will be needed by these projects?

- ▶ Pellet plants typically need a clean fuel
 - ▶ Prefer sawdust from sawmills
 - ▶ US projects trending to pulpwood and chip on-site
- ▶ Wood-to-electricity projects (boilers) can accept a range of feedstocks
 - ▶ Dirty chips (logging residues), urban waste (MSW)....
 - ▶ Key: wood is clean and free of chemical contaminants
- ▶ Liquid fuel technology
 - ▶ Announcements include same range as wood-to-electricity
 - ▶ In reality, their processes need a less variable feedstock
- ▶ Analysis: assume pulpwood for pro formas.....

~50% of announced projects will fail.

▶ Screen for failure to rank projects:

▶ Technology

- ▶ Does the project rely on proven or unproven technology?

▶ Status

- ▶ Is the project under construction or operating?
- ▶ Has the project received/secured/signed **two or more** of:

- Financing
- Air quality permits
- EPC contracts (Engineering, Procurement & Construction)
- Power purchase agreements for electricity facilities
- Interconnection agreements for electricity facilities
- Wood supply agreements
- Location

Announced & Operating Wood Bioenergy Projects in US

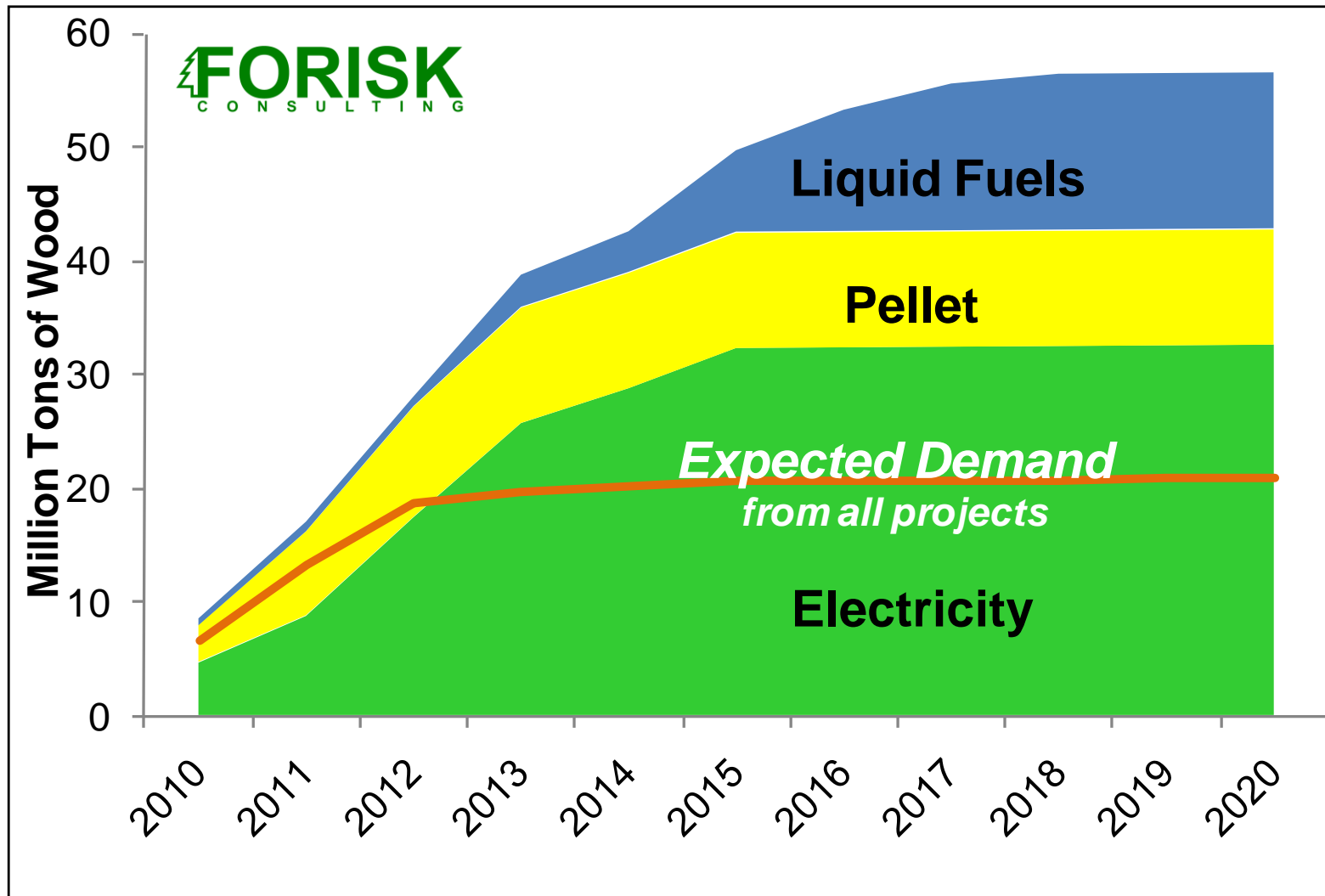
Source: Forisk Consulting

Wood Bioenergy Type	Project Count*	Wood Use in Million Green Tons		
	As of June 15, 2010	2010	2015	2020
Electricity	174	11.63	67.83	68.33
Pellet	149	12.08	19.26	19.26
Liquid fuel	28	0.98	11.87	17.17
Total	351	24.69	98.96	104.77
Wood use that pass screens, million tons		21.71	58.35	58.65
Wood bioenergy use that pass screens, %		87.9%	59.0%	56.0%

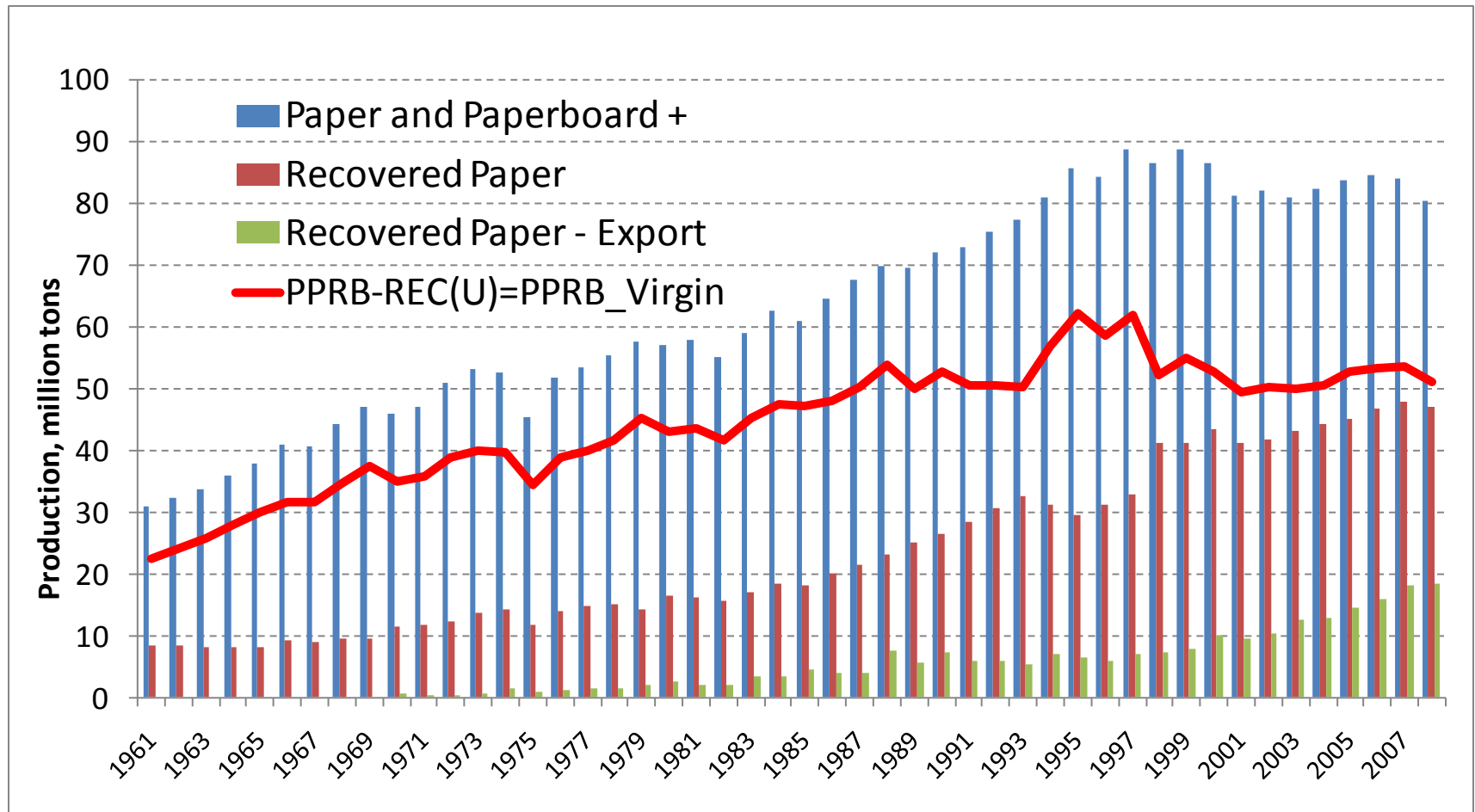
Note: Does not include Alaska and Hawaii

*Wood Bioenergy US

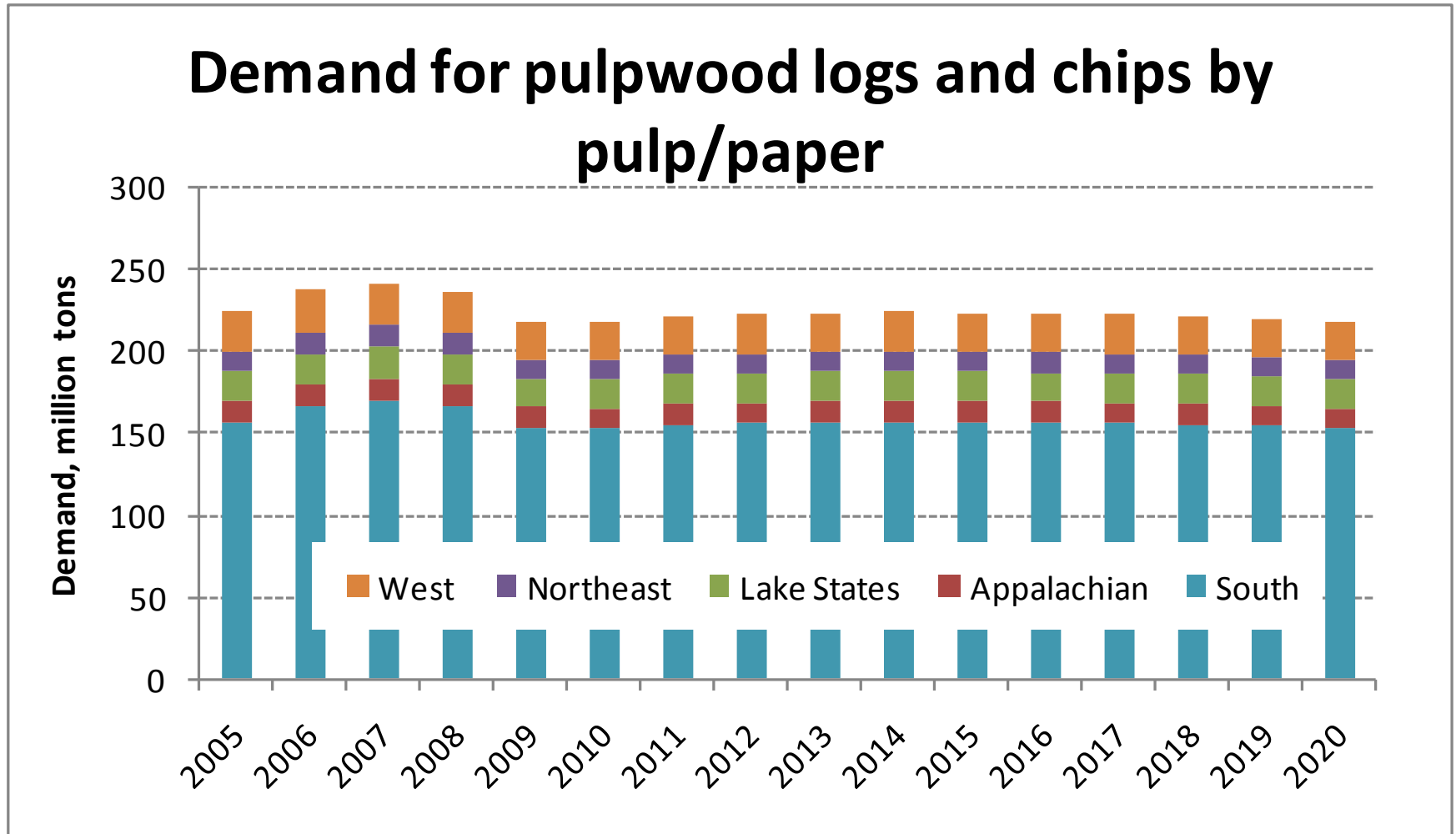
What if all announced bioenergy projects come online in the South?



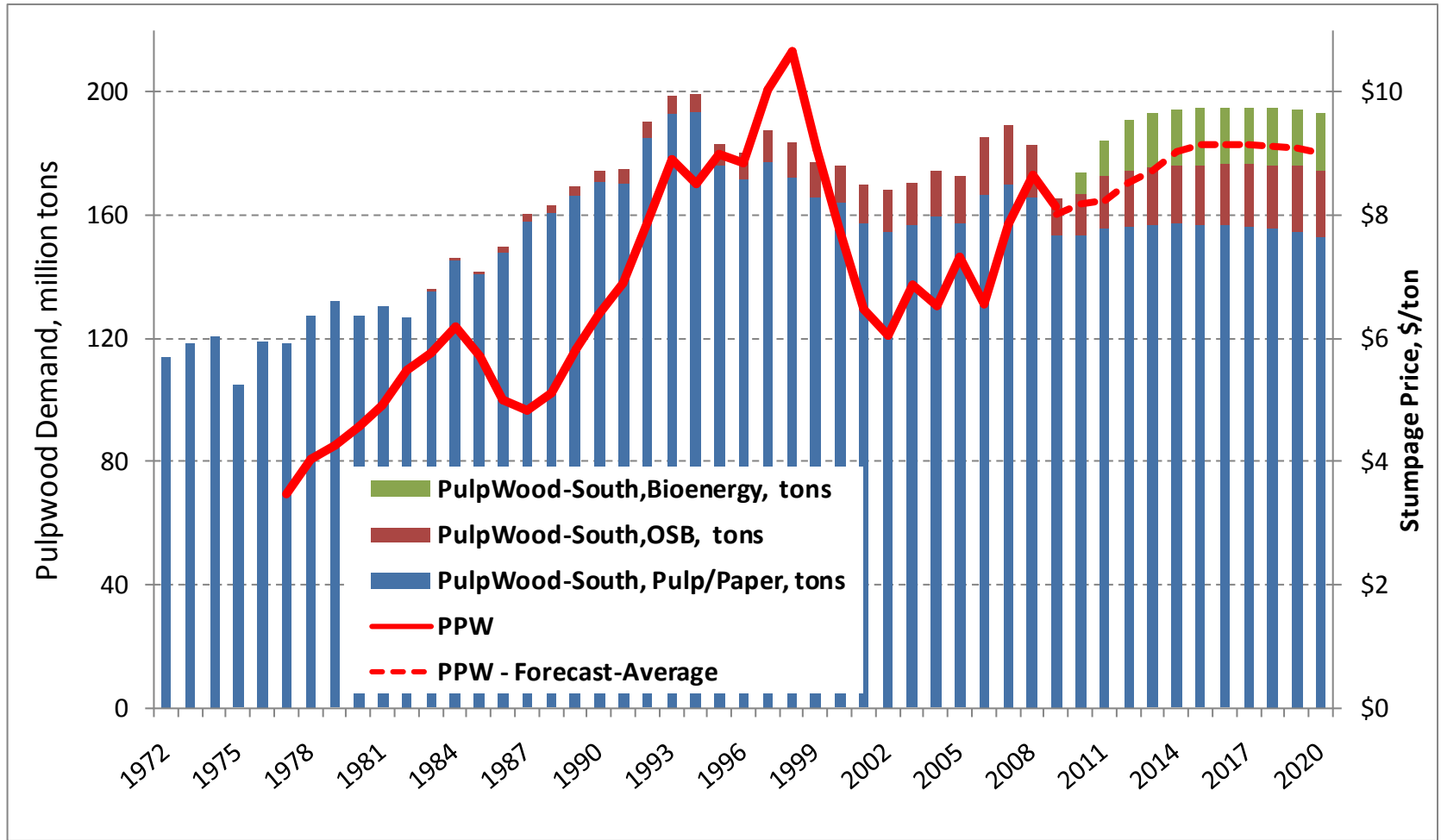
Timber markets depend on demand for virgin fiber (pulpwood).



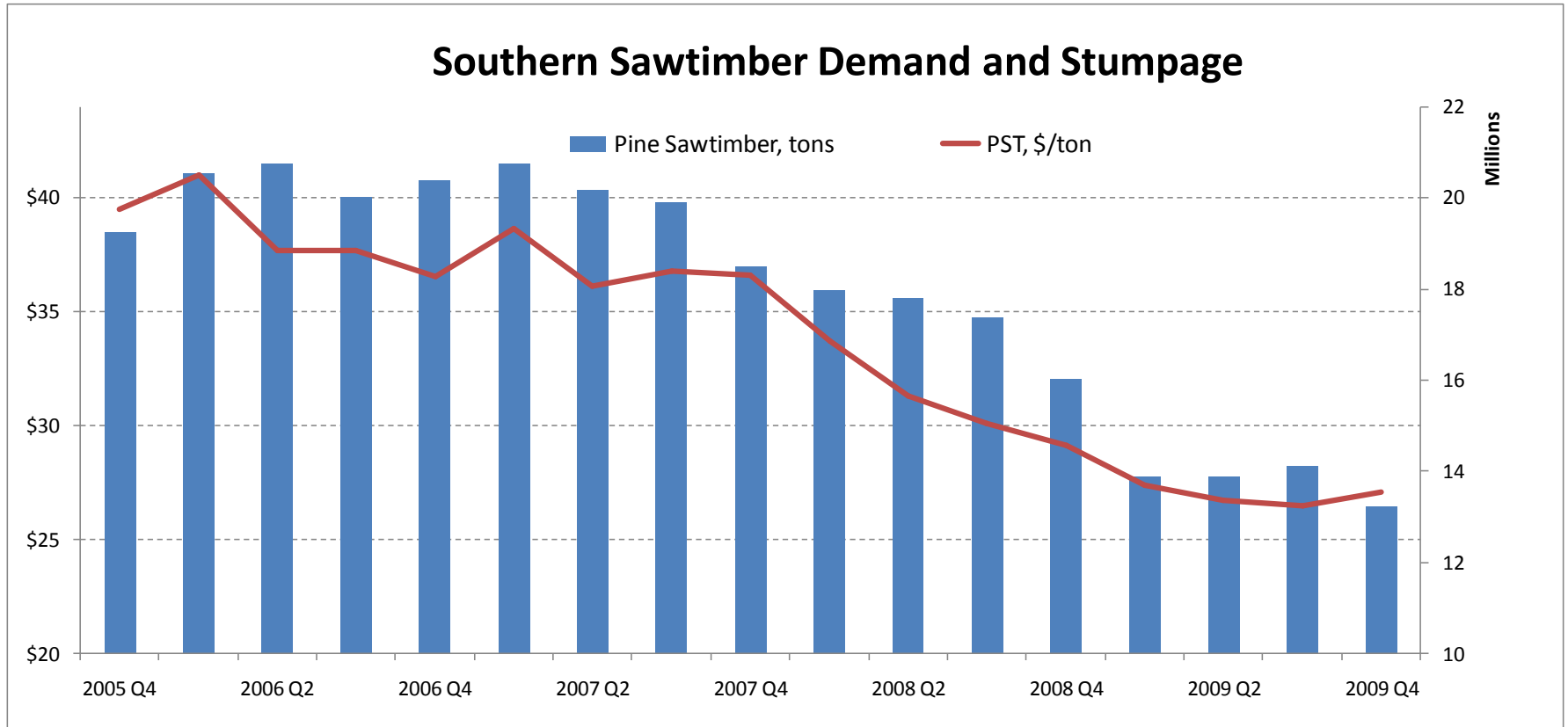
South represents >70% of US PWD use for pulp/paper; per capita pulp/paper use declining.



Outlook for US South to 2020: Pulpwood demand and stumpage



PST demand and price have a positive relationship.....



Pearson = 0.94

Forecasting PST: where do we start?

GDP +



Housing Demand



Lumber Demand



weather

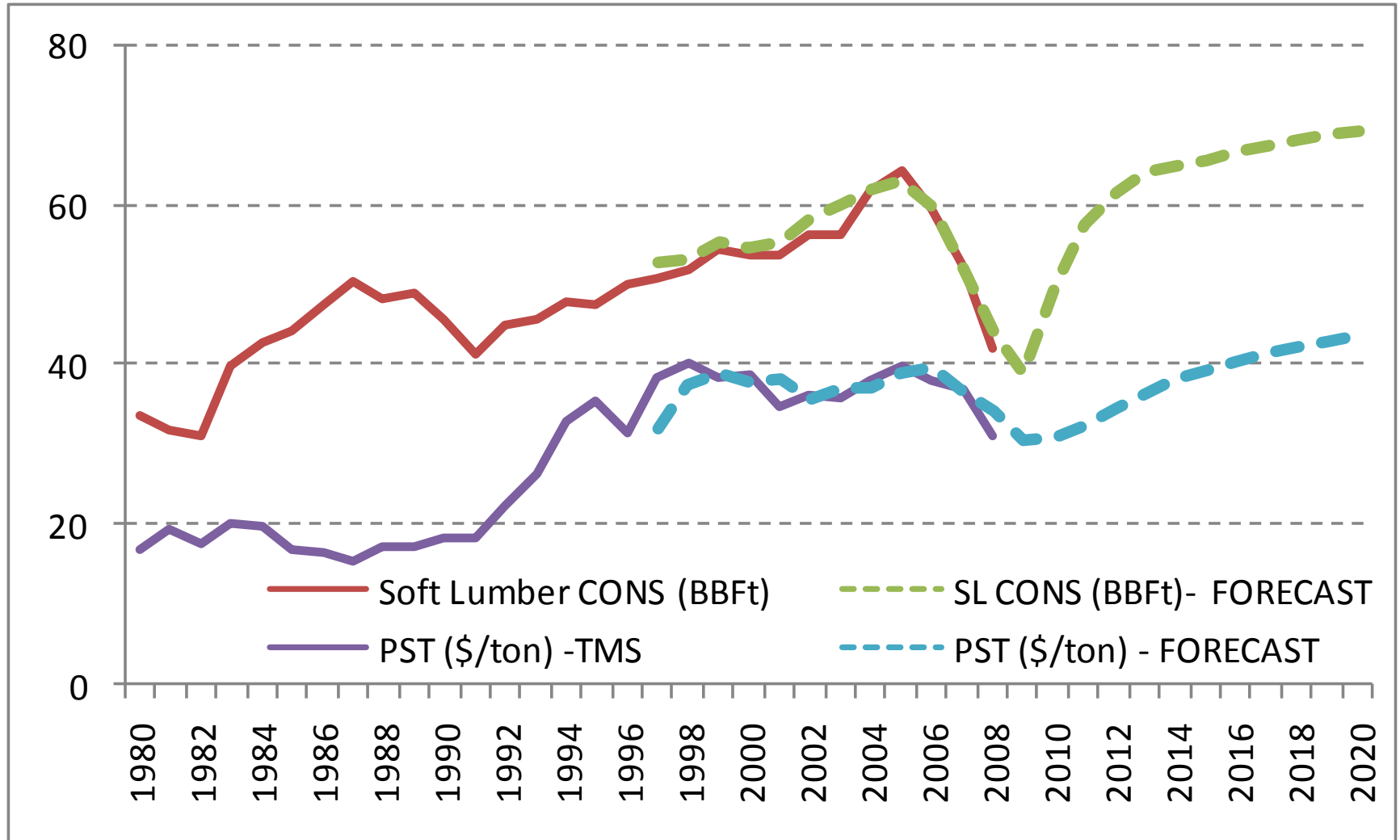


Pine Stumpage, \$

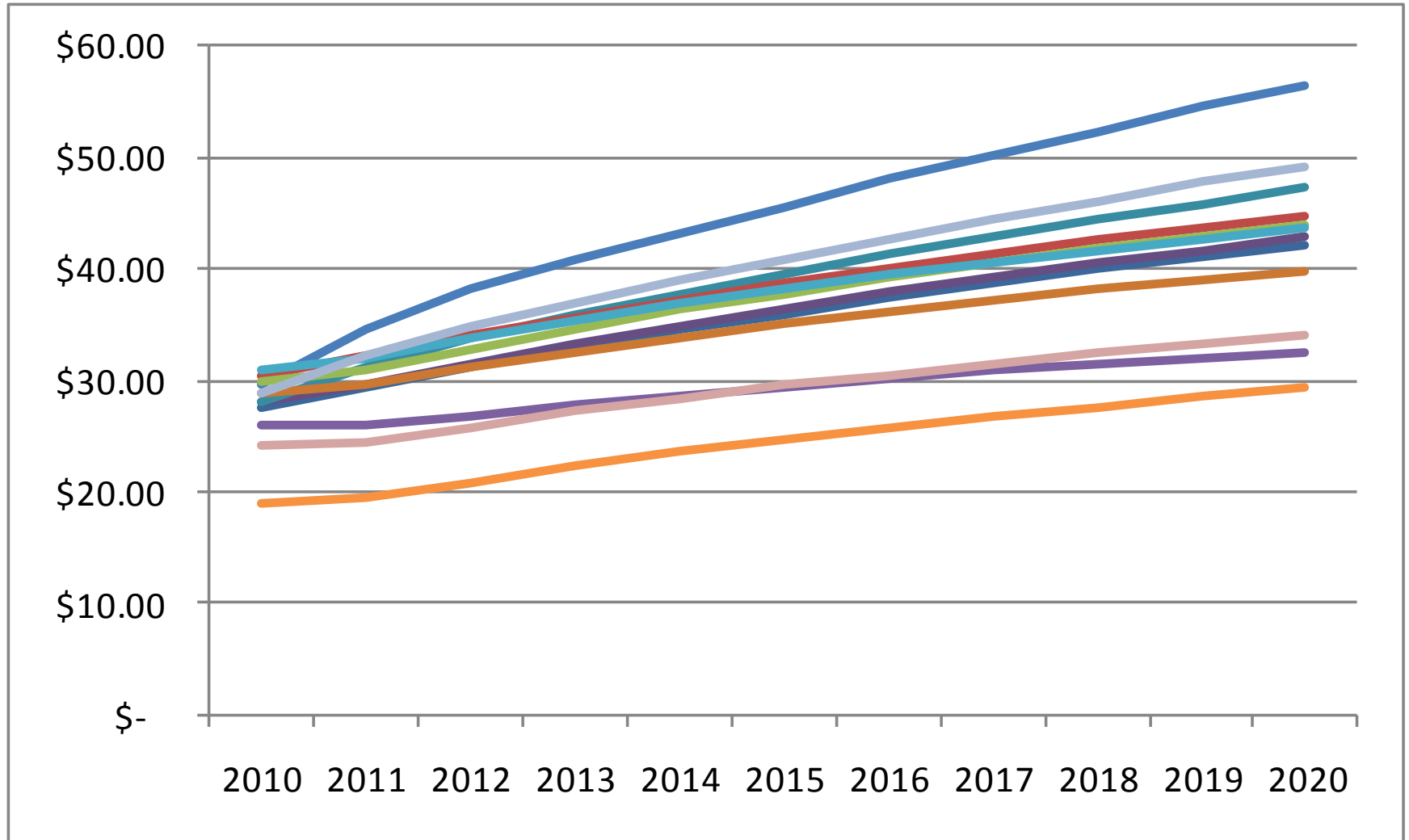


location, size, etc

Outlook for US South to 2020: Lumber and PST stumpage



Outlook for US South to 2020: PST stumpage by state as of Jan '10



What we're thinking about....

- ▶ Housing
- ▶ Future forest supplies
 - ▶ Reforestation rates
 - ▶ Average log size
 - ▶ Impact of new seedlings
- ▶ Access to future forest supplies
 - ▶ Wood/fiber supply agreements
- ▶ Forest industry moves into bioenergy
 - ▶ Obvious synergies

Thank you



**When I Grow Up
I Want to Be
A Forester**

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