Emerging Markets for Wood Energy

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Louisiana Forest Products Development Center
Louisiana State University Agricultural Center

Forest Sector Business Workshops
DeRidder, Louisiana-October 10, 2013
Hammond, Louisiana-November 19, 2013
Lafayette, Louisiana-January 9, 2014
Alexandria, Louisiana-February 25, 2014
Port St. Vincent, Louisiana-March 13, 2014
Hammond, Louisiana-March 14, 2014

Federal-State Marketing Improvement Program
USDA/Agricultural Marketing Service Grant Award
12-25-G-111

And

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Presentation Outline

- The Louisiana Forest Products Development Center
- Wood-to-Energy
- Wood Biomass
- Energy Options
- Current Landscape
- Louisiana (mostly)
- Issues & Challenges
- Concluding Observations

The Louisiana Forest Products Development Center

School of Renewable Natural Resources, LSU AgCenter

&

School of Forestry, Louisiana Tech University

Through an act of the Louisiana State Legislature, the LSU AgCenter established the Louisiana Forest Products Laboratory in 1992 (renamed the Louisiana Forest Products Development Center in 2003) to:

1. ***Provide technical assistance & information***
2. ***Promote primary & value-added wood processing industries***
3. ***Aid the state's economy and well-being of its people through forest sector development***

Louisiana Forest Products Development Center

RESEARCH





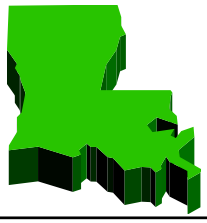



EXTENSION/OUTREACH

LSU AgCenter Research & Extension

Louisiana Cooperative Extension Service

School of Forestry, Louisiana Tech University



Key Areas-Research & Extension

- Manufacturing Efficiency
- Treated Wood
- Wood Quality
- Value-Added Products
- Business & Economic Development
- Nanotechnology
- Composites
- Certification
- Biomass/Biofuels
- Safety
- Wood Durability

Louisiana Forest Products Development Center

The LFPDC at the LSU AgCenter

LSU AgCenter Research & Extension

School of Renewable Natural Resources

Louisiana Forest Products Development Center

- **Wood Durability Laboratory**
  - Director: Dr. Todd Shupe
- **Engineered Composites Laboratory**
  - Director: Dr. Qinglin Wu

Wood-based Biomass→ Energy

Forest Landowner Opportunities and Challenges

- The U.S. South is the "wood basket of the nation."
- 200 million acres or 40% of the 504 million acres of forestland nation-wide.
- Significant forestland partly due to its sub-tropical climate, steady supply of rainfall, and favorable topography.

Sustainability Issues and Concerns

- Biomass industry drivers: sustainable harvest levels, wood fiber prices, and transportation costs.
- Harvesting, collecting and transporting cellulosic biomass residues can be difficult and expensive.
- High transportation costs means cellulosic biomass plants must source feedstocks near plant.

Wood-to-Energy
Why do we care?

The United States currently depends heavily on fossil fuels, much of which comes from foreign sources. According to the Energy Information Administration, in 2011, fossil fuels accounted for 77.6% of all energy produced in the U.S. Nuclear and renewables accounted for 10.6% and 11.8%, respectively. There are several concerns about this reliance on fossil fuels, including:

Wood-to-Energy
Why do we care?

Energy insecurity

About 32% of our fossil fuels and 67% of our crude oil are imported, with 30% of the crude oil coming from relatively politically unstable nations in the Middle East, Latin America, and Africa (Flintoff 2012). Some of these countries from which the U.S. imports oil frequently have interests that are neutral or antagonistic to those of the United States, and many of us remember the Oil Embargo of the 1970s. Another embargo or similar event could have similarly detrimental impacts on the U.S. economy.

Wood-to-Energy
Why do we care?

Price volatility

Energy prices have been volatile since the early 2000's (Murphy 2009) due to shifts in supplies, consumption, financial markets, and government policies. Emerging economies are driving the demand for oil, and China is currently the world's number two user of oil. With international demand for fossil fuels increasing as the emerging economies recover from the economic crisis, fossil fuel, particularly crude oil, prices are expected to increase.

Wood-to-Energy
Why do we care?

High unemployment

The U.S. is technically out of the Great Recession, but unemployment has remained stubbornly high, causing a sense of unease among consumers. Politicians at state and national levels are seeking ways to create and maintain domestic jobs. Locally- produced energy, including biofuels, has the potential to result in new jobs. Biofuel and bio-products production can create jobs involved in growing, harvesting, transporting, and processing biomass into a host of products.

Sustainability Issues and Concerns

- Biomass demand currently driven by wood-burning power companies---Pellets.
- Cellulosic ethanol could impact the structure of the forest sector
- Demand for wood→electricity could also change the landscape.

Overview of Emerging Biomass-to-Energy Markets

- Projections show U.S. energy consumption is increasing
- Concerns about fossil fuel supplies and climate change
- Interest in renewable energy sources among energy producers, developers, legislators, investors, and policy makers

Overview of Emerging Biomass-to-Energy Markets

- Government support of market development include financing the farmers and offering producers incentives and loan guarantees
- Programs for growers (farmers) are Woody Biomass Utilization Grants (Woody BUG) and Biomass Crop Assistance Program (BCAP)
- Renewable Fuel Standard (RFS) - requires annual production of 21 billion gallons of biofuel by 2022

Today's biofuel market

- Government mandates
- Economic trends

→ Emerging biofuel market

Today's biofuel market

- Main biofuels:
  - Wood burned for electricity
  - Corn for ethanol
  - Soybean for biodiesel
- Needed:
  - Non-food sources
  - High biomass growth potential
  - Low fertilizer, herbicide, water inputs
  - Capable of being chipped for dense biomass shipments

Wood-based Biomass Types

Primary mill residues

Wood materials and bark generated at manufacturing plants (primary wood-using mills) when round wood products are processed into primary wood products.

Slabs, edgings, trimmings, sawdust, veneer clippings and cores, and pulp screenings.

Wood-based Biomass Types

Secondary mill residues

Wood scraps and sawdust from woodworking shops, furniture factories, wood container and pallet mills, etc. that use lumber, plywood and other "primary" raw materials.

Wood-based Biomass Types

Urban wood waste

Discarded wood, tree trimmings, material from construction and demolition sites, etc.

Wood-based Biomass Types

Forest residues/Logging Slash

Logging residue, unused portions of trees, cut or killed during logging or silvicultural activities and left in the woods; unutilized volume of trees cut or killed during logging operations.

Wood-based Biomass Types

- **Logging slash:**
  - 3 to 8 tons per acre generated from needles, branches left on site
  - Potential:
    - Chip tree tops instead of pushing it back into stand

Forests for Biofuel: Potential forest biofuel products

- Logging slash bundled to support power plant
  - 100-MW Southern Energy wood-fired power plant in Nacogdoches (currently idled)
  - 20-year power purchase agreement with Austin Energy

Management Approaches: Short-rotation woody crops

- Fast-growing plantations that produce large amounts of biomass in short time
- Whole tree chipped in harvest
- Rotation lengths:
  - 3 to 7 years
  - Possibly get 1.5 rotations per planting due to re-sprouting

Short-rotation woody crops

- Species grow along SE coastal region
  - *E. benthamii, macarthurii, camadulensis*
- Tolerant to temperatures down to 17 degrees F
- Yields:
  - 12-20 tons per acre per year (loblolly pine = 8 tons per acre per year)
  - Mature by age 6-9

Short-rotation woody crops

- Many species with potential:
  - Loblolly pine
  - Cottonwood
  - Black willow
  - Hybrid poplar
  - Sweetgum
  - Sycamore

  → 2 to 8 tons/ac/year
- DOE: 8-10 tons/ac/year needed for sustainable biofuel production

Mead 2005, Davis and Trettin 2005, Merker 2007

Short-rotation woody crops

Hybrid Poplar

Paulownia (1 year)
Fastest Growing Species

Eucalyptus globulus
(3 years)
Australia

Eucalyptus sp.
(6 years-rotation age)
Brazil

Long-rotation woody crops

Frankensteinus sempervirens
6 years old

Management approaches

- Early-mid rotation biofuel:
  - Plant higher than normal tree numbers
  - Thin frequently (every 5 years, beginning age 5) until reach merchantable size for traditional products
    - Precommercial thinnings become commercial thinnings
    - "Hog fuel" operations

Blazier, 2013

Management approaches

- Hog fuel = in-woods chipping
- Minimum acreage ~ 50 acres

Blazier, 2013

Management approaches

- More harvest = less nutrients returned?

Blazier, 2013

Management approaches

- Whole-tree harvest shown to reduce site productivity 18% on 15 of 19 research sites in Gulf Coastal Plain
  - Susceptible sites: low available P concentrations
- N + P fertilization increased productivity of whole-tree harvested sites to levels above stem-only harvest
- Fertilization, weed control highly energy efficient for increasing productivity

Scott and Dean 2006

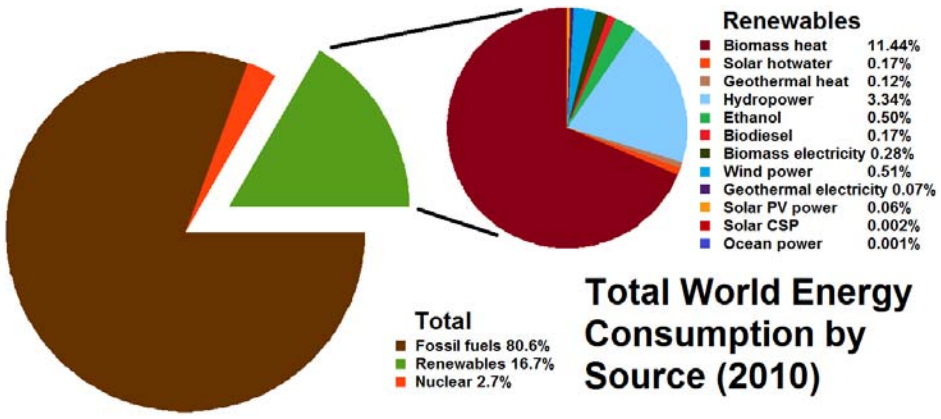
Management approaches

- Early rotation biofuel alternative:
  - Plant trees in wide rows (15 to 25 ft.)
  - Direct seed between rows
  - Cut all seeded trees around age 5
  - Continue managing stand for pulpwood and sawtimber

Scott and Tiarks 2008

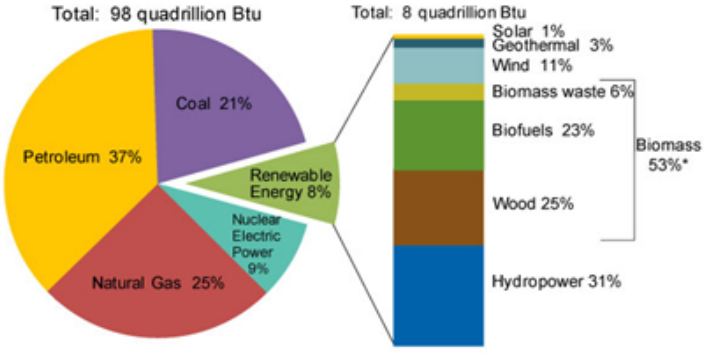
Other Wood-based Biomass Sources

Where Does Wood Fit into the Picture?



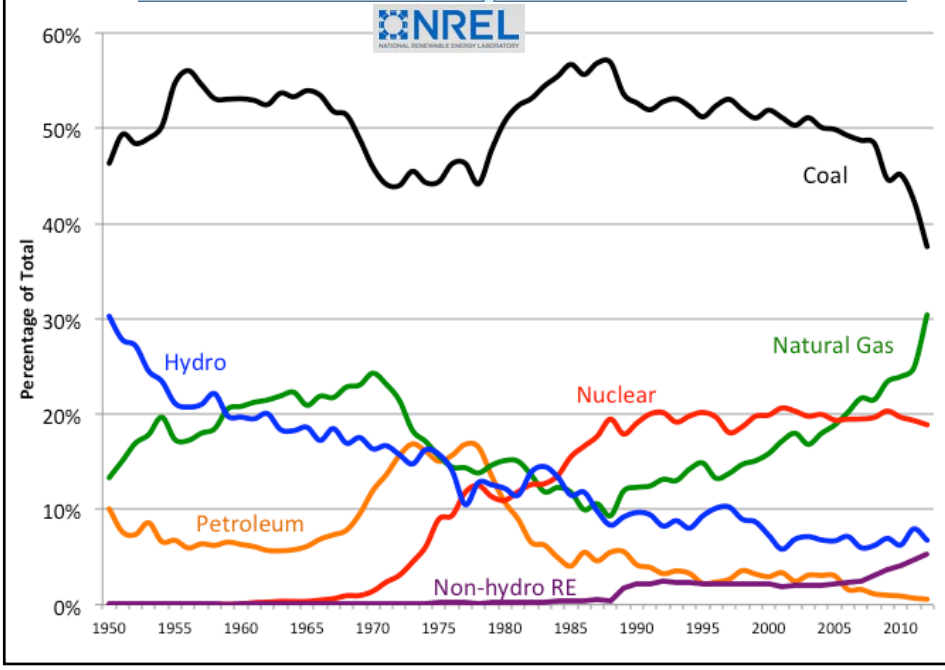
REN21 Renewables 2012 Global Status Report

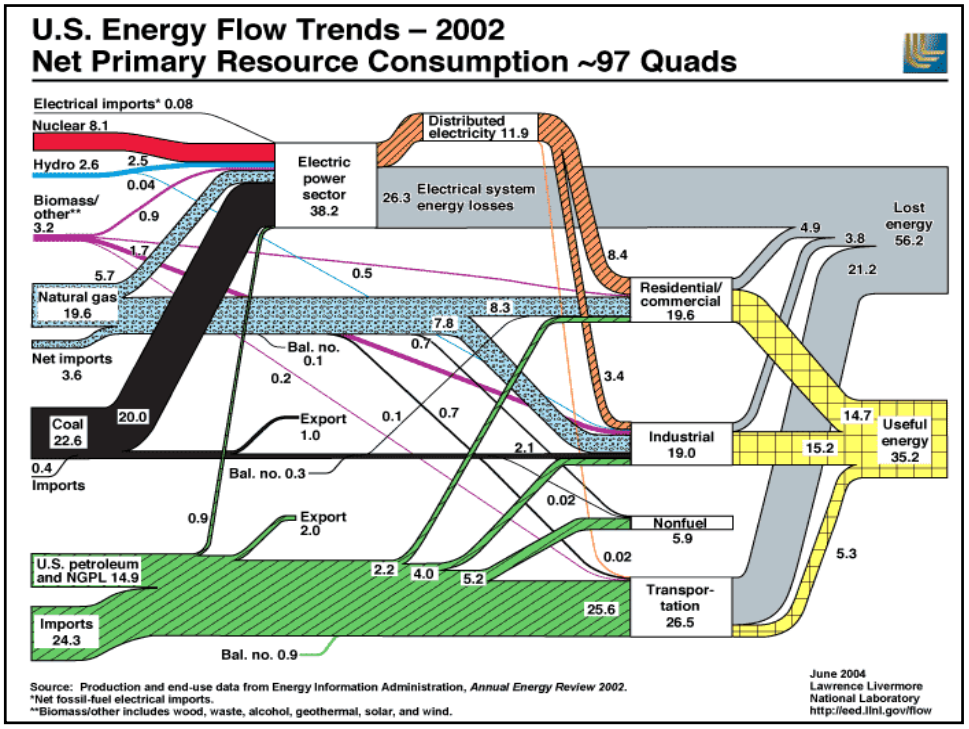
U.S. Primary Energy Consumption by Energy Source, 2010



Note: Sum of biomass components does not equal 53% due to independent rounding.
Source: U.S. Energy Information Administration, *Annual Energy Review 2010*.

Net U.S. Power Generation Share by Source, 1949-2012





Wood Energy in the U.S.

- Wood is the most commonly used biomass fuel for heat and power in the U.S.
- About 84% of the wood and wood waste fuel used in the U.S. is consumed by industry, electric power producers, and commercial businesses.
- Most of this is used at wood product manufacturing facilities in cogeneration.

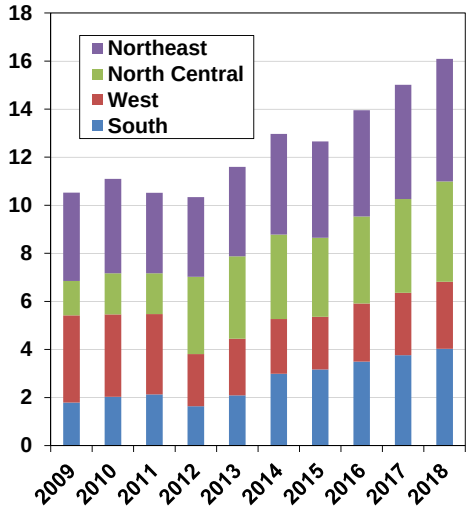
Why Wood?

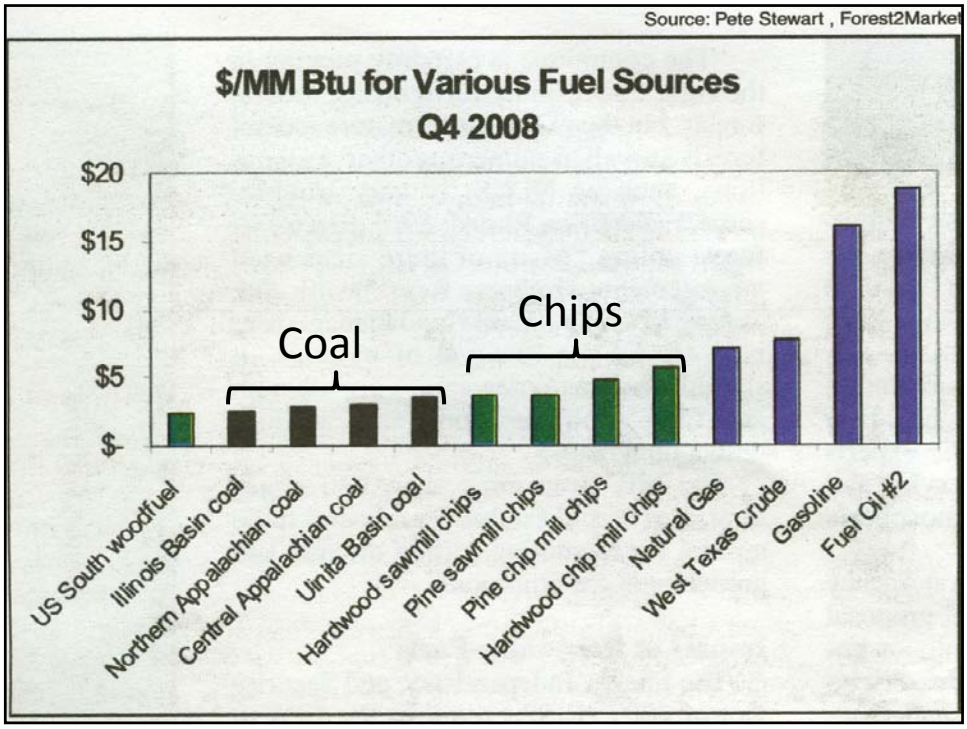
- Renewable, carbon-neutral, and locally available compared to most fossil fuels.
- In combustion, wood produces 90% less carbon dioxide (CO_2) than fossil fuels with minimal emissions of sulfur, heavy metals and particulates (USDA 2004).
- Cellulosic content of wood → candidate biomass for transportation fuel production (USDA 2004).

US Biomass Power Generation

Million MWh

- **Despite new capacity coming online, actual generation fell!**
  - **2010-2011 and 2011-2012**
- **Regulatory Support Limited**
  - **Federal**
    - **Zero**
  - **State:**
    - **31 states with RPS**
- **Recent Developments**
  - **Dominion x3**

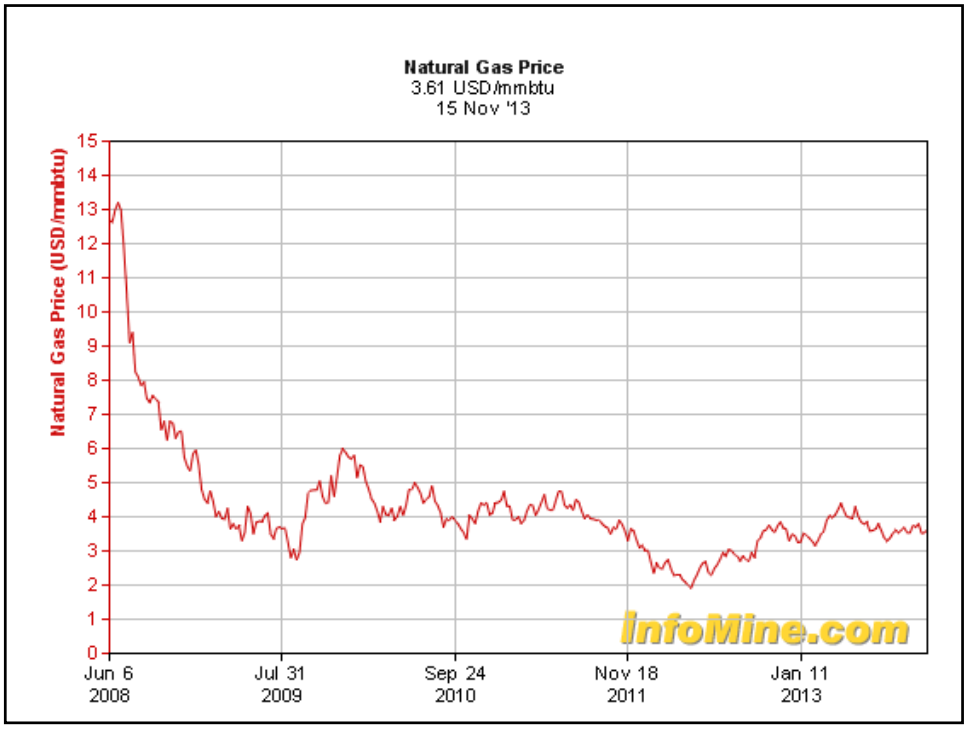


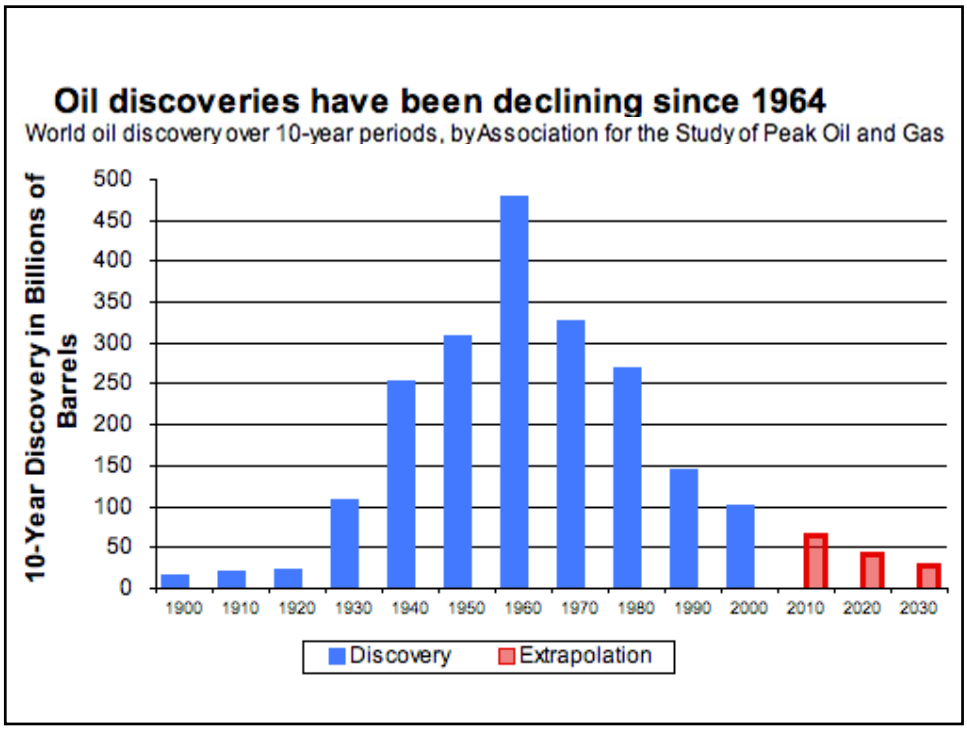


Energy Prices per Million BTU

- Coal – Powder River Basin[1] – $0.56
- Coal – Northern Appalachia[1] - $2.08
- Natural gas[2] - $5.69
- Ethanol tax credit[3] – $5.92
- Propane[4] - $13.28
- Petroleum[5] – $13.43
- #2 Heating oil[4] - $14.74
- Jet fuel[4] - $15.48
- Diesel[4] - $15.59
- Gasoline[4] - $17.81
- Wood pellets[6] - $18.57
- Corn ethanol[7] - $23.46
- Electricity[8] - $26.31
- Cellulosic ethanol from corn cobs[9] – $30.92

Forbes, The Price of Energy, 2010


Natural Gas Price
3.61 USD/mmbtu
15 Nov '13
Natural Gas Price (USD/mmbtu)
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
Jun 6
2008
Jul 31
2009
Sep 24
2010
Nov 18
2011
Jan 11
2013
InfoMine.com


Oil discoveries have been declining since 1964
World oil discovery over 10-year periods, by Association for the Study of Peak Oil and Gas
10-Year Discovery in Billions of Barrels
500
450
400
350
300
250
200
150
100
50
0
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010
2020
2030
Discovery
Extrapolation

Wood to Energy
What are the options?

Gasification

- Converts carbon-based materials, such as coal, petroleum, biofuel, or biomass…..
- into carbon monoxide and hydrogen…..
- by reacting the raw material, at high temperatures controlled *with oxygen* and/or steam.
- The resulting gas mixture is called synthesis gas or syngas and is itself a fuel.

Pyrolysis

- Chemical decomposition of a condensed substance by heating.
- Does not require oxygen.
- Extreme pyrolysis, which leaves only carbon as the residue, is called *carbonization* and is also related to the chemical process of *charring*.
- Pyrolysis is used in the to produce charcoal, activated carbon, methanol and other chemicals from wood.

Cogeneration

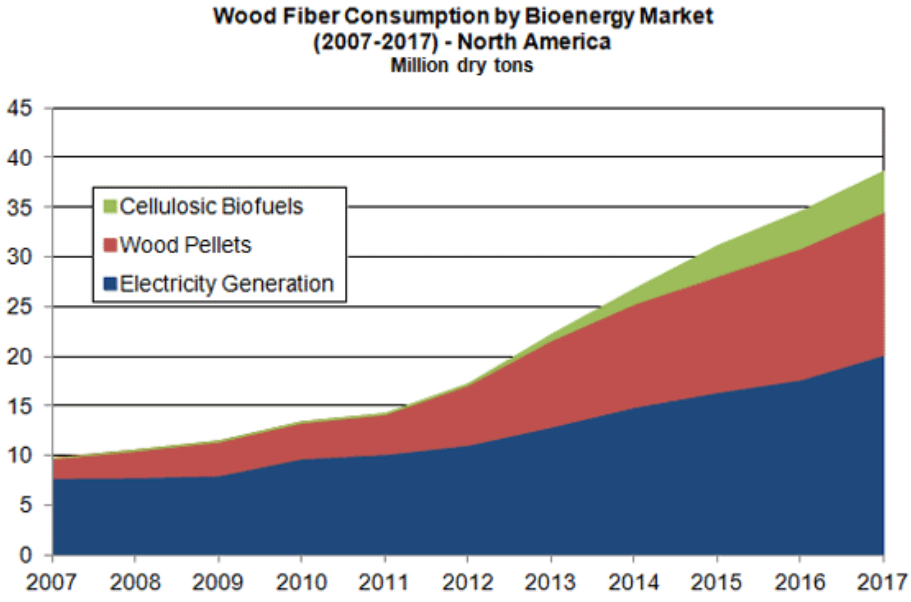
- Simultaneous production of heat and electricity, commonly called combined heat and power (CHP), from a single fuel.
- Traditionally, a steam turbine is used to produce electricity, although a wood gasification/ internal combustion unit can also be a cogeneration unit.
- Most of **U.S**. CHP capacity is in wood products manufacturing industries.

Ethanol

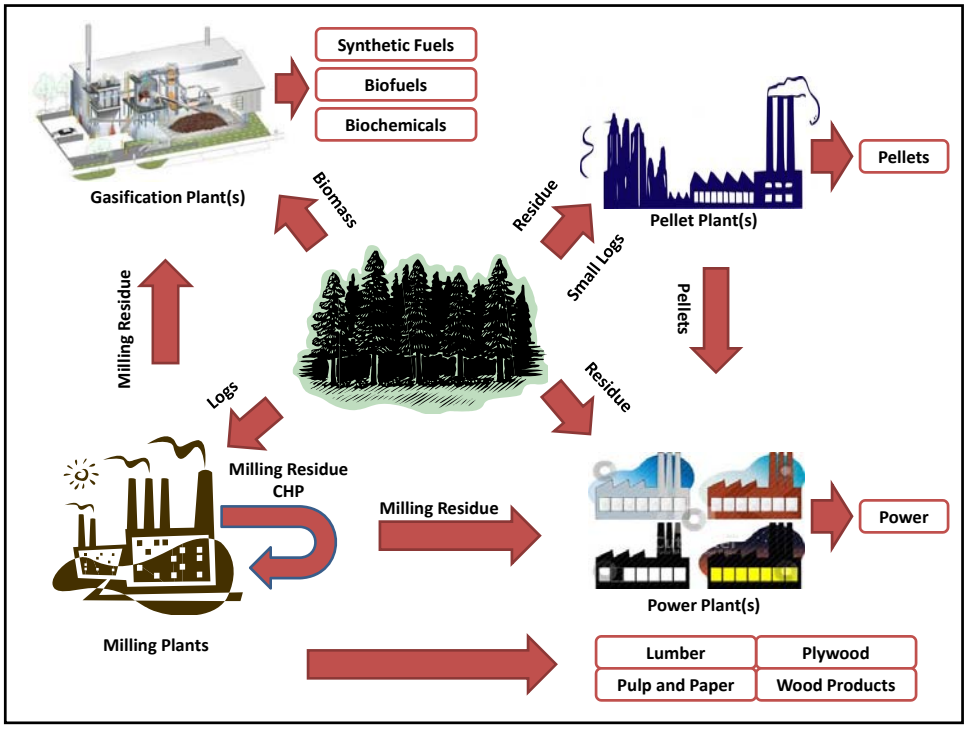
"Fuel or food debate" – ethical challenges in deciding the best use of natural resources.

There were purported to be 13 cellulosic ethanol plants currently operating or under construction in the U.S. that use woody biomass as feedstock (C. Cornell, 2009 in Biofuels Business).



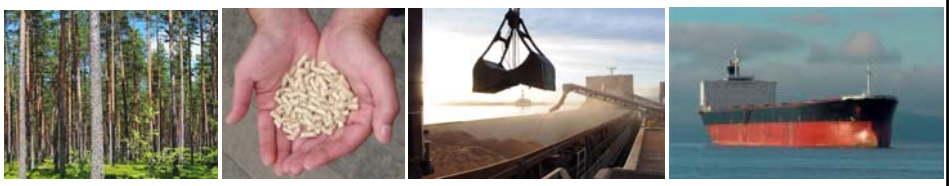


Source: risi.com



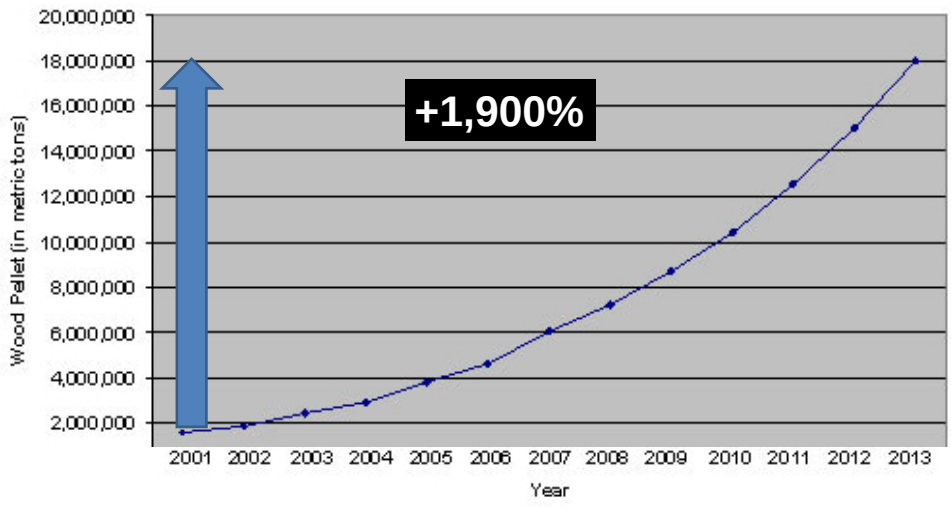
Pellets

- European Union nations imported some 4.46 million metric tons of wood pellets in 2012 up from 3.2 million in 2011.
- Sweden consumes more than 20% of the world's wood pellets and demand is growing.
- 36% of those pellets came from the United States, the most of any nation.
- Wood pellets have about 70 percent of the calorific value of coal.



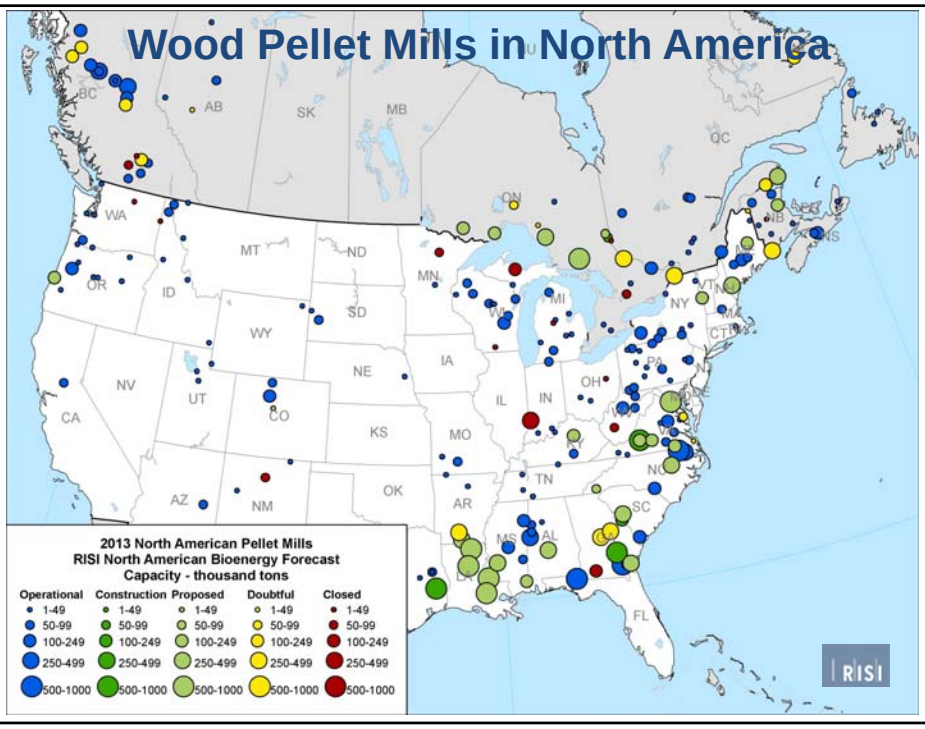
Source: Baton Rouge Business Report, June26, 2013

Wood Pellet Demand in Europe



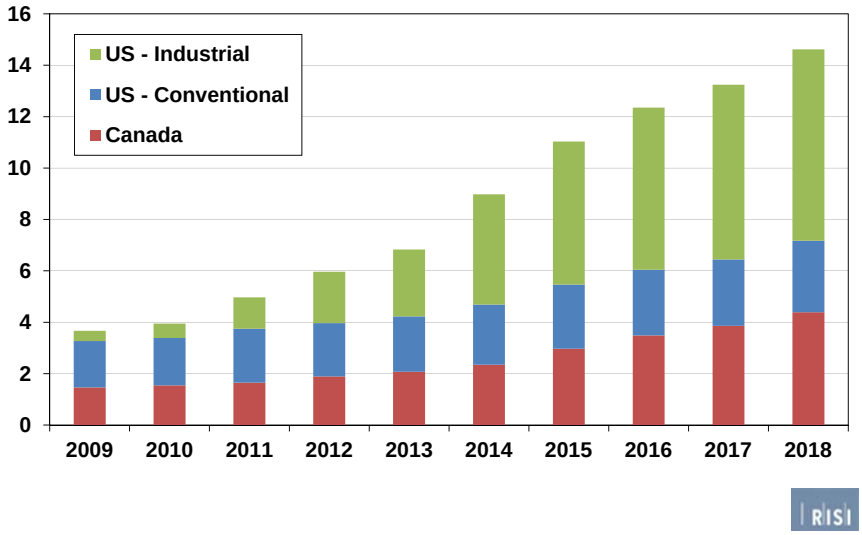
Sources – Pellets@las and Wood Resource Quarterly

Wood Pellet Mills in North America

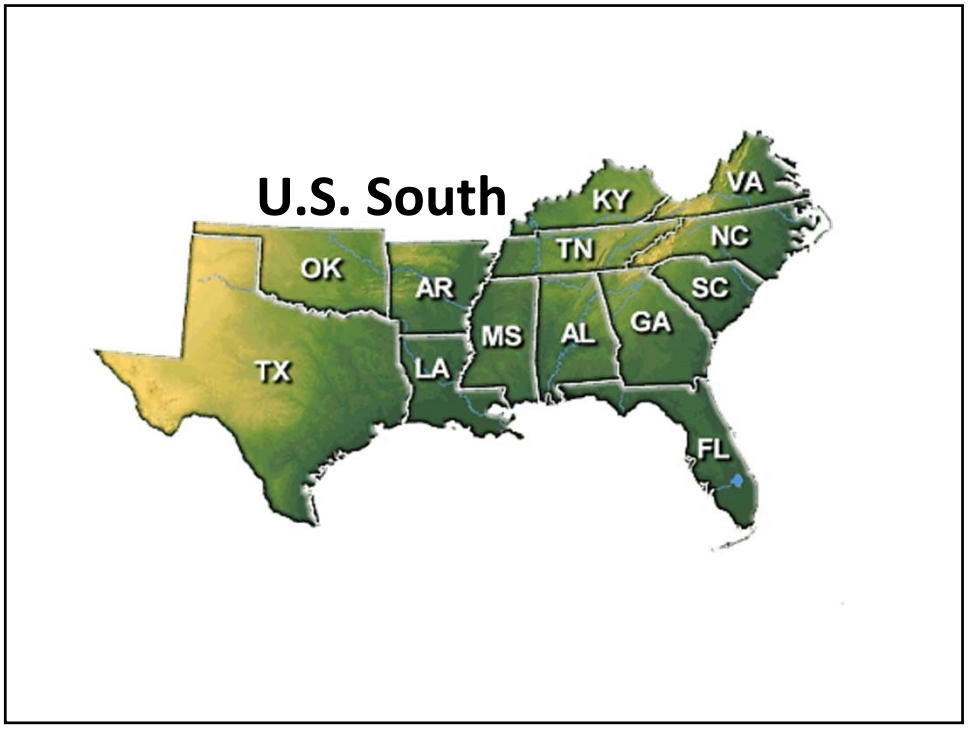


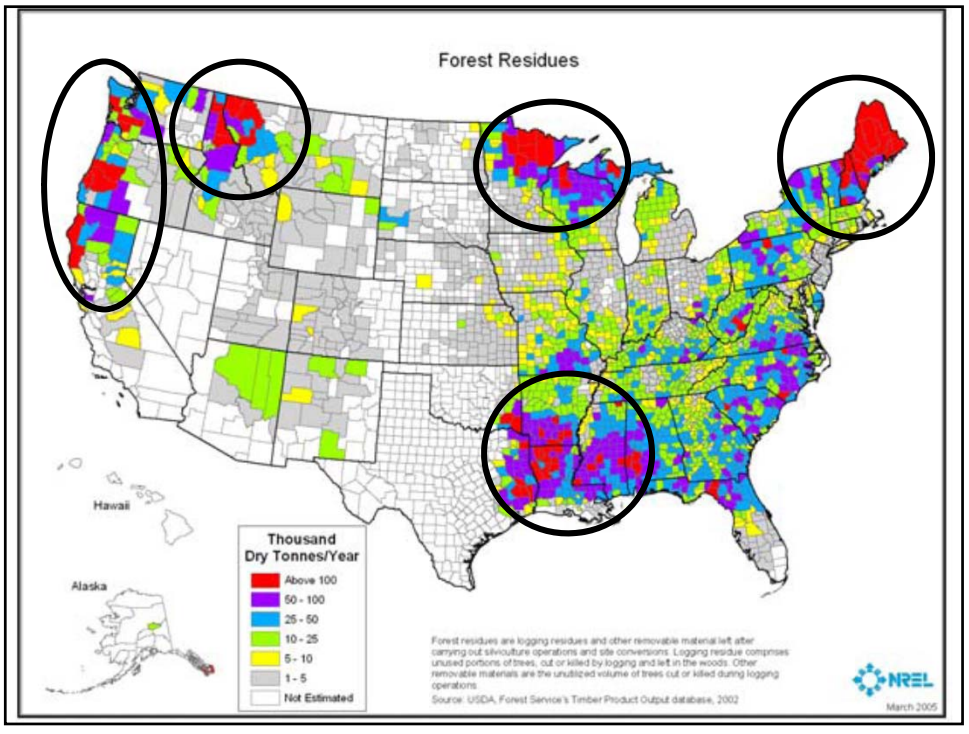
North American Wood Pellet Production

Million tonnes



What's Happening Here?

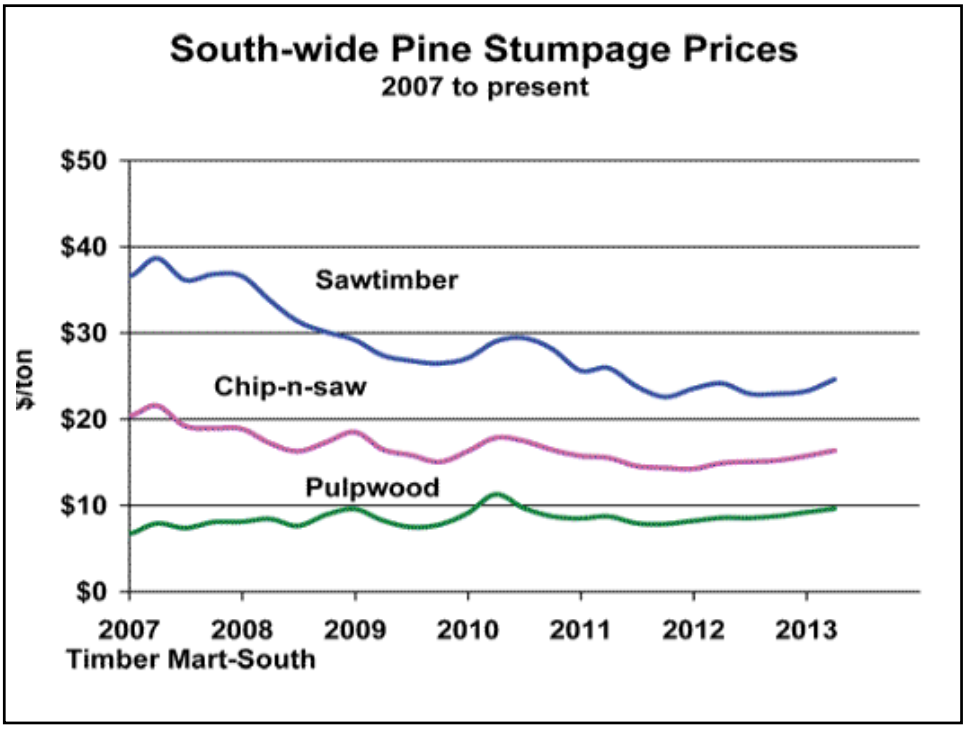

U.S. South
KY
VA
TN
NC
OK
AR
SC
MS
AL
GA
TX
LA
FL

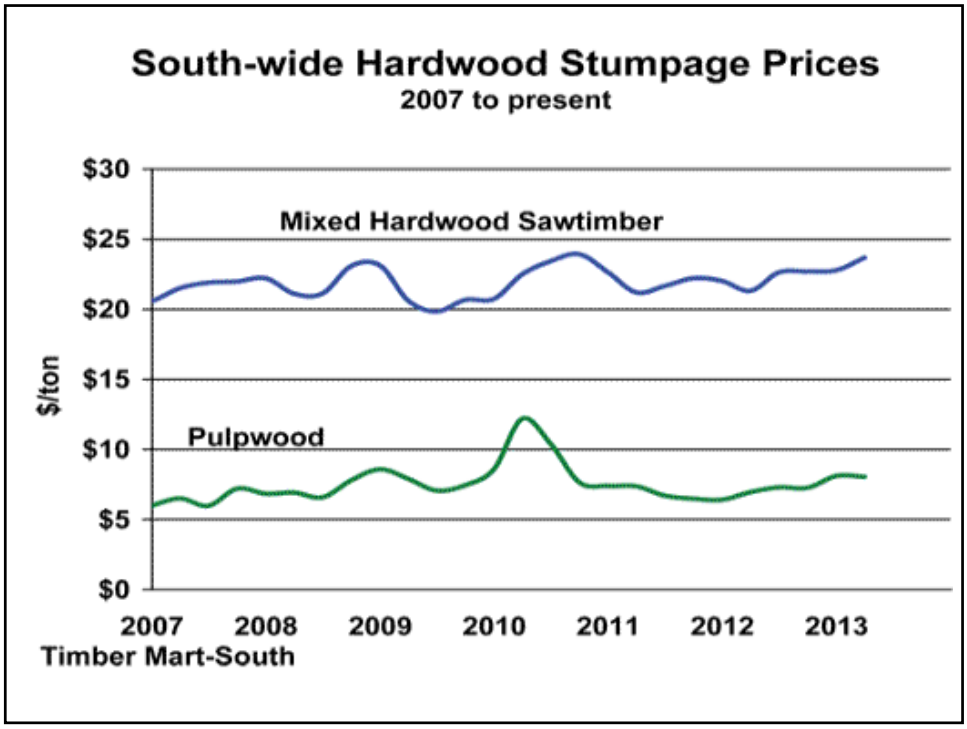

Forest Residues
Hawaii
Alaska
Thousand
Dry Tonnes/Year
Above 100
50 - 100
25 - 50
10 - 25
5 - 10
1 - 5
Not Estimated
Forest residues are logging residues and other removable material left after carrying out silviculture operations and site conversions. Logging residue comprises unused portions of trees, cut or killed by logging and left in the woods. Other removable materials are the unutilized volume of trees cut or killed during logging operations
Source: USDA, Forest Service's Timber Product Output database, 2002
NREL
March 2005

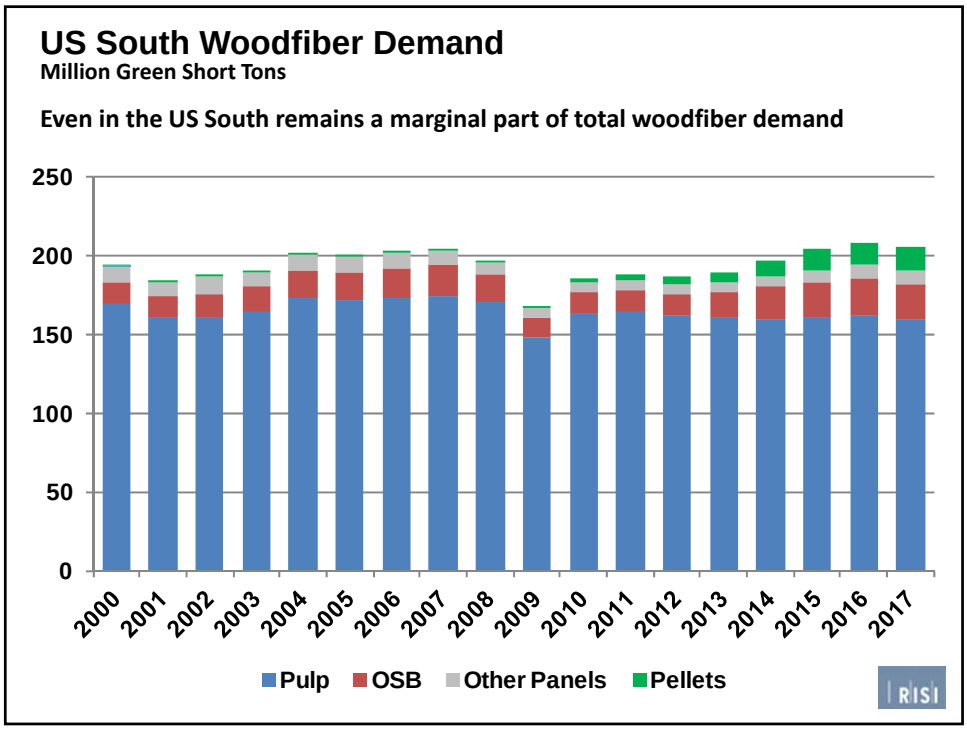
Southeastern Average Stumpage Prices - US$/ton					
	one quarter			year ago	
	1Q 13	4Q 12	up/(dn)	1Q 12	up/(dn)
Pine Sawtimber	$24.61	$23.27	+$1.34	$24.15	+$0.46
Pine Pulpwood	$9.63	$9.21	+$0.42	$8.56	+$1.07

1st Qtr 2012-1st Qtr 2013	
Pine Sawtimber	+1.9%
Pine Pulpwood	+12.5%

Source: Timber Mart South




South-wide Hardwood Stumpage Prices
2007 to present
$30
$25
$20
$15
$10
$5
$0
$/ton
Mixed Hardwood Sawtimber
Pulpwood
2007
2008
2009
2010
2011
2012
2013
Timber Mart-South


US South Woodfiber Demand
Million Green Short Tons
Even in the US South remains a marginal part of total woodfiber demand
250
200
150
100
50
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Pulp
OSB
Other Panels
Pellets
RISI

An Example of Interaction in the Industry

A resurgence in OSB demand in the US,

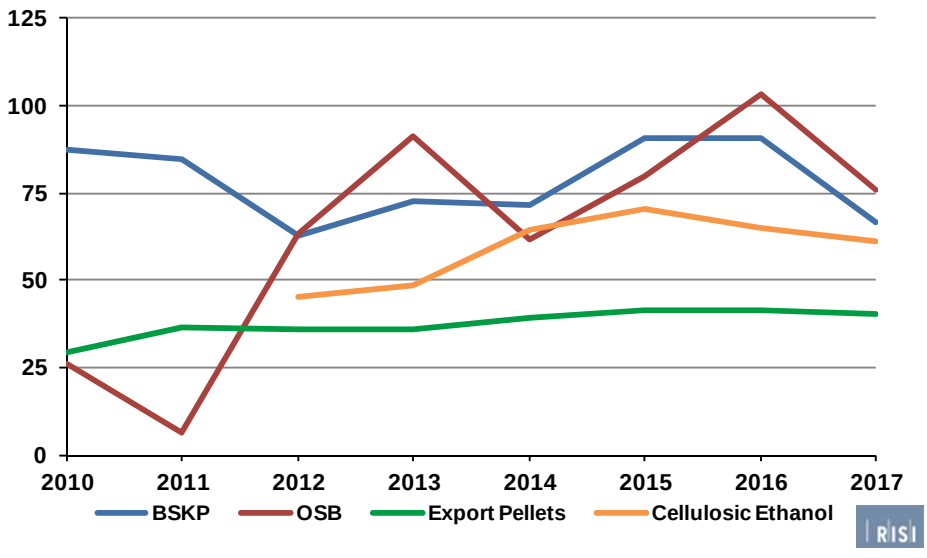
prompted by an earlier- and stronger-than-expected housing recovery,

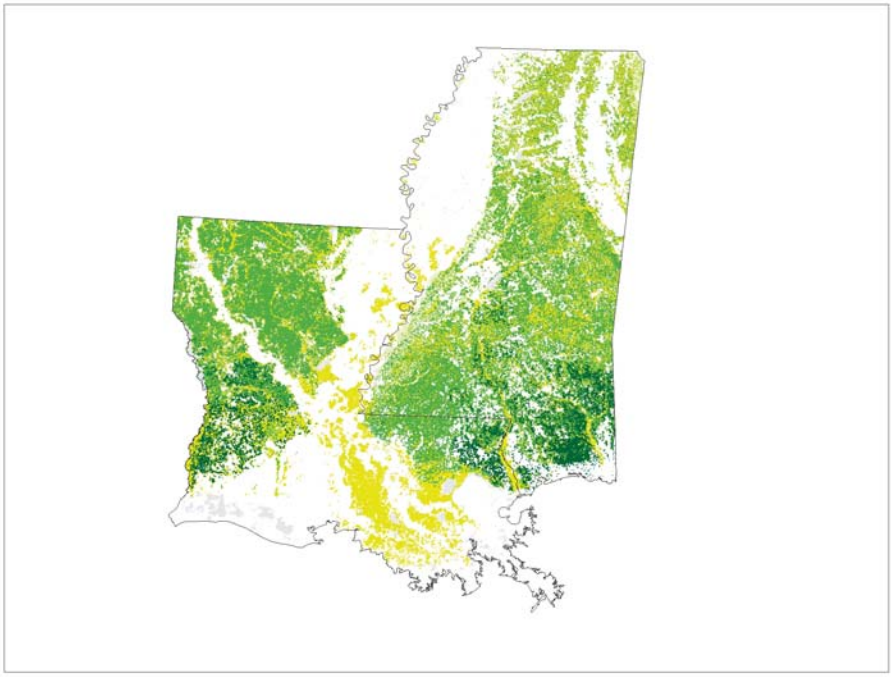
will mean stiffer competition for pulpwood,

putting pellet manufacturers at a competitive disadvantage.

Pulp, OSB Have Substantial FPC Advantage Over Wood Pellets

Fiber Paying Capability $,Green Short Ton – US South





Current Projects-Louisiana & Mississippi

1. **Enviva Pellets | Amory, MS**
   Capacity to convert 100,000 tons of woody biomass per year.
2. **Enviva Pellets | Wiggins, MS**
   Capacity to convert 150,000 tons of woody biomass per year.
3. **KiOr | Columbus, MS**
   Uses wood chips to produce gasoline and biodiesel.
4. **BTH Quitman Hickory | Quitman, MS**
   Produces 80,000 dry tons per year of terrified wood pellets.
5. **Recast Energy | Wiggins, MS**
   Uses wood chips to produce 52,000 pounds/hour of steam for use in an adjacent Clearwater Paper mill.
6. **Scott Biodiesel | Greenville, MS**
   Produces 15 million gallons of biodiesel per year from corn oil (75%) and used cooking oil (25%)
7. **Bayou Wood Pellets | West Monroe, LA**
   Production capacity is 60,000 metric tons/year from hardwood and softwood - Operational
8. **Biomass Secure Power, LLC | Baton Rouge, LA**
   Production capacity is 1,000,000 metric tons/year from softwood - Proposed
9. **German Pellets | Urania, LA**
   Production capacity is 1,000,000 metric tons/year from softwood Under Construction
10. **Sundrop Fuels | Alexandria, LA**
    Production of drop-in biogasoline from wood biomass – Under Construction

Pellets-U.S. South

- The expansion of pellet production has been particularly noteworthy in the U.S. South
- 14 new pellet plants that are either new or planning to expand production in the coming year.

Pellets-Louisiana

- ***Drax Biomass*** is building two wood pellet plants in this region: one in Bastrop, and one in Gloster, Miss.
- Plum Creek will deliver up to 770,000 tons annually of wood fiber to the two locations over a 10-year contract.
- Will ship pellets from a to-be-constructed export facility at the Port of Greater Baton Rouge.
- The combined investments in Louisiana are worth more than $120 million officials.
- Operational by late 2014 or early 2015.

Source: Baton Rouge Business Report, June26, 2013

Pellets-Louisiana

- ***German Pellets GmbH*** will begin work immediately on a $300 million pellet plant in Urania.
- The plant is expected to produce 1 million tons of pellets per year.
- The wood pellet plant will be located at the site of the former Louisiana Pacific and Georgia Pacific plant that closed in 2002, eliminating 355 jobs.
- German Pellets GmbH is the leading manufacturer of wood pellets in Europe.
- Will be biggest in the world- expected to employ about 80 people directly and support more than 400 indirect jobs
- The plant is expected to be operational in the spring of 2014.

Source: Town Talk May 1, 2013

Green Gasoline-Louisiana

- ***Sundrop Fuels*** is building a $450 million refinery near Alexandria that will convert wood waste and natural gas into gasoline.
- They have agreed to purchase about 1,200 acres of land.
- Will use wood 1 Million tons of wood biomass as a feedstock.
- Will extract hydrogen natural gas, combining the hydrogen in a proprietary reactor with carbon extracted from wood waste.
- The result — up to 50 million gallons of fuel a year — will be the world's first renewable green gasoline that's immediately usable in the U.S. transportation infrastructure.

Source: Baton Rouge Business Report, June26, 2013

Green Gasoline-Louisiana

- ***Cool Planet*** is investing $168 million in refineries in bio-refineries in Alexandria and Natchitoches.
- Wood feedstock-waste and byproducts.
- Will produce 10 million gallons of high octane gasoline and jet fuel.
- Will also use proprietary process to make biochar with carbon extracted from wood waste.
- A third Louisiana location is being researched.

Other Recent Announcements

- RoyOMartin announced the company will invest $20 million to modernize and expand the Martco plywood facility in Chopin, La.
- Boise-based Idaho Timber, will make a $3.5 million capital investment to refurbish and reopen a sawmill in Coushatta, Louisiana, with plans to create 90 jobs.
- Packaging Corporation of America (previously Boise, Inc.) plans a $111 million revamp at its mill in DeRidder to change a newsprint machine idled since 2009 to one that will make packaging components.

Research Studies

Forest Landowner Study I

This project was supported by the Agriculture and Food Research Initiative of the National Institute of Food and Agriculture, Grant #2010-85211-20492.

United States Department of Agriculture

National Institute of Food and Agriculture

Forest Landowner Study I

Objectives. . .

1. To identify key characteristics of NIPF landowners at the enterprise level
2. To determine NIPF landowners' knowledge of biomass concepts and issues
3. To discern the willingness to provide feedstock dedicated to producing bio-based products (post-harvest residuals, pulpwood, or dedicated energy tree crops)

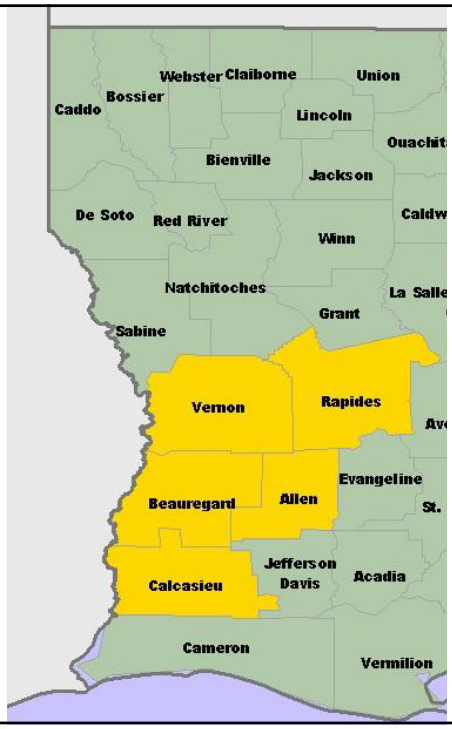
Forest Landowner Study

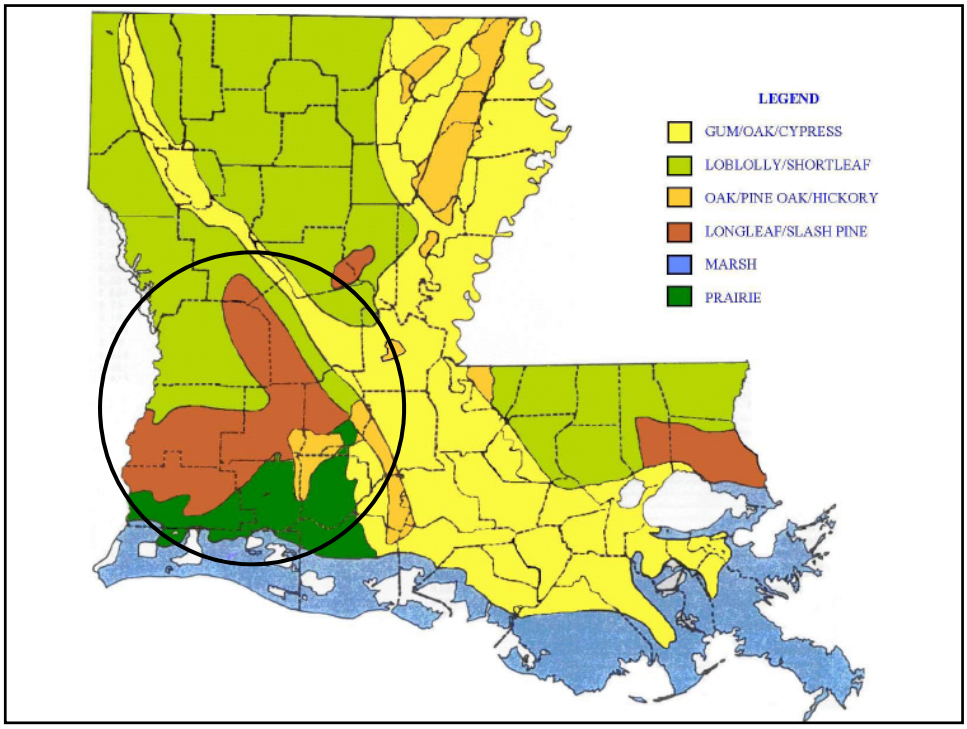
- 99% of landholdings in South are less than 999 acres.
- Non-industrial Private Forest (NIPF) landowners account for 81% of forest land ownership in Louisiana.

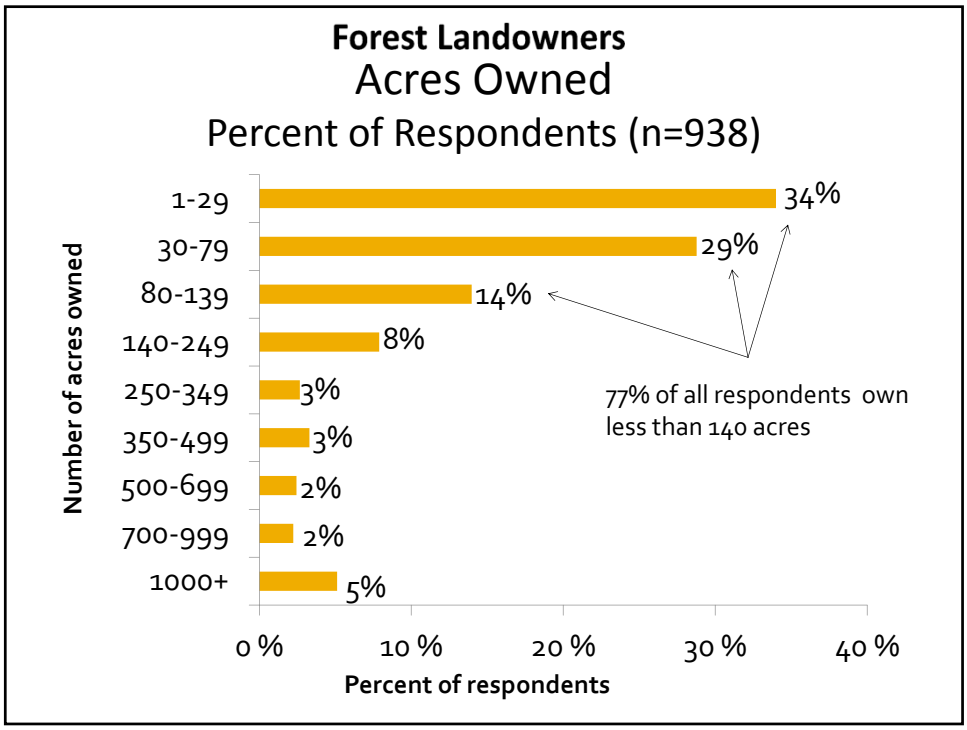
Methods

- Sample was 3,500 randomly selected Small & Medium Enterprise (SME) non-industrial private forest landowners **in SW Louisiana**.
- Sample frame information was from tax rolls and professional databases.
- The method of data collection were mail surveys.
- Adjusted Response Rate = 28.2%

Study Region



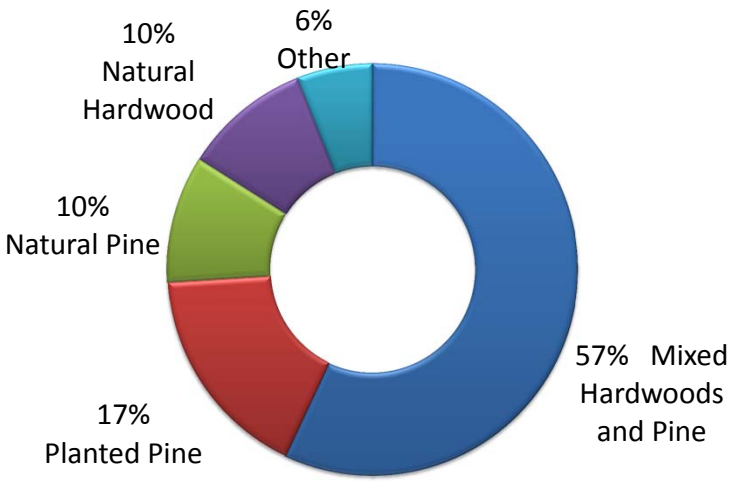

LEGEND
GUM/OAK/CYPRESS
LOBLOLLY/SHORTLEAF
OAK/PINE OAK/HICKORY
LONGLEAF/SLASH PINE
MARSH
PRAIRIE


Forest Landowners
Acres Owned
Percent of Respondents (n=938)
Number of acres owned
1-29
30-79
80-139
140-249
250-349
350-499
500-699
700-999
1000+
34%
29%
14%
8%
3%
3%
2%
2%
5%
77% of all respondents own less than 140 acres
0 %
10 %
20 %
30 %
40 %
Percent of respondents

Forest Landowners

Major Respondent Forest Types

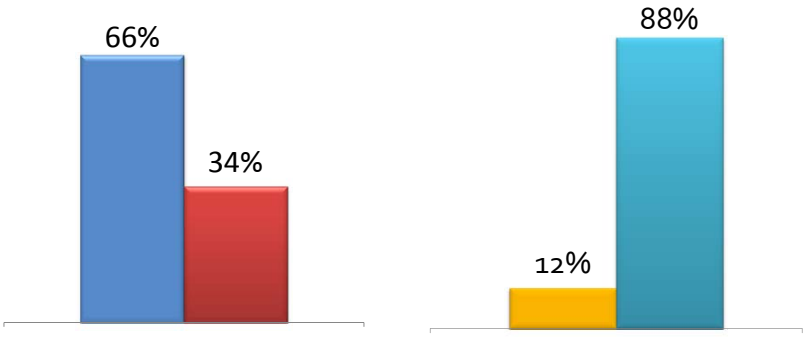
Percent of Forest Type Owned (n=916)



Forest Landowners

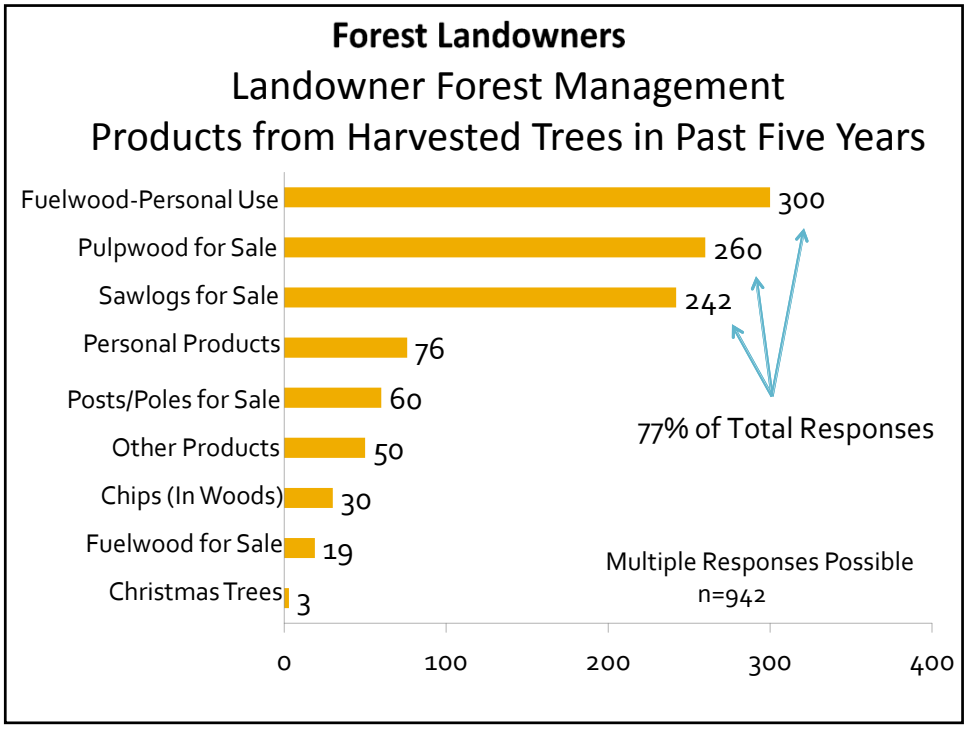
Landowner Forest Management

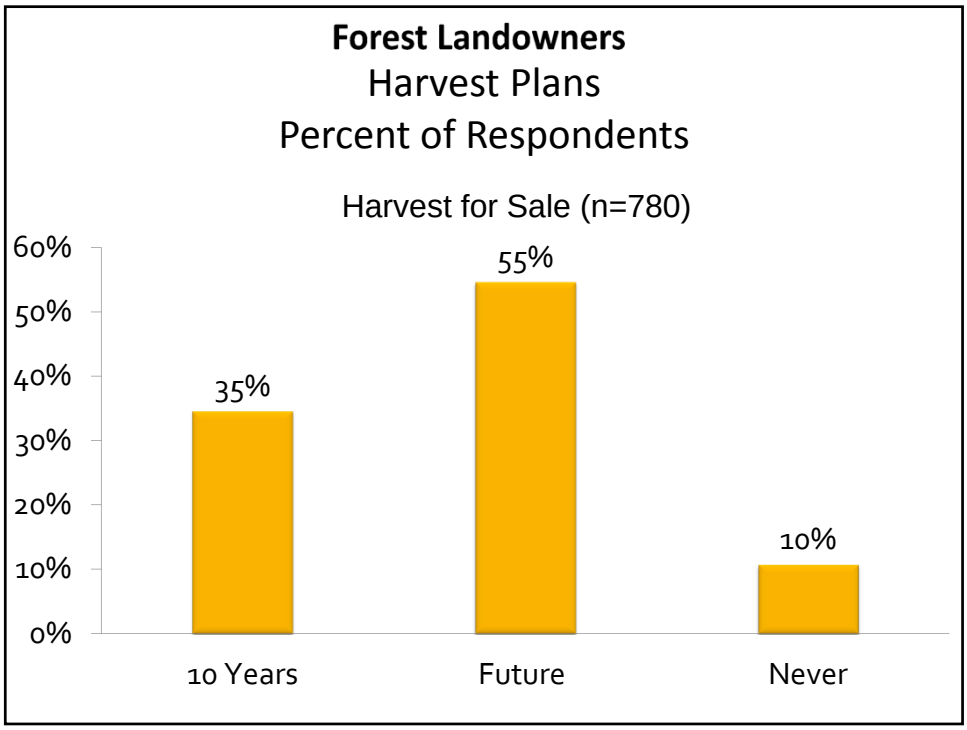
Percent of Respondents



Respondents who have harvested trees from their land (n = 924)

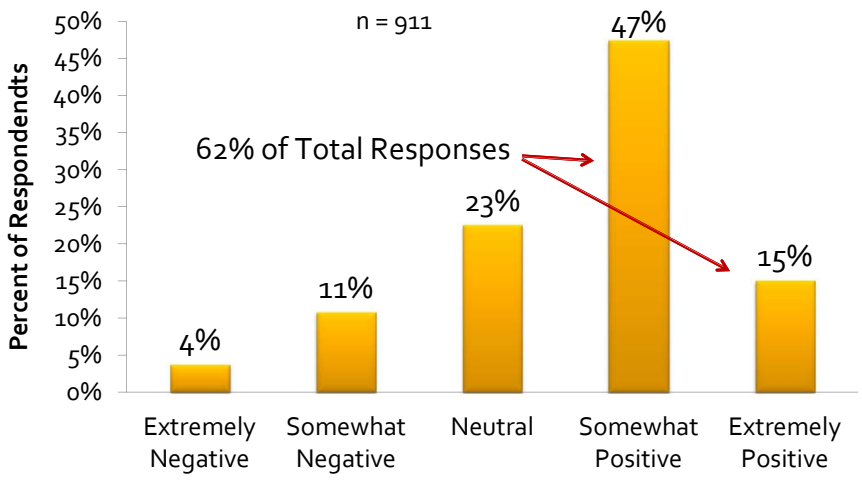
Respondents with a written forestry plan (n=923)


Forest Landowners
Landowner Forest Management
Products from Harvested Trees in Past Five Years
Fuelwood-Personal Use
300
Pulpwood for Sale
260
Sawlogs for Sale
242
Personal Products
76
Posts/Poles for Sale
60
Other Products
50
Chips (In Woods)
30
Fuelwood for Sale
19
Christmas Trees
3
77% of Total Responses
Multiple Responses Possible
n=942
0
100
200
300
400


Forest Landowners
Harvest Plans
Percent of Respondents
Harvest for Sale (n=780)
60%
50%
40%
30%
20%
10%
0%
35%
55%
10%
10 Years
Future
Never

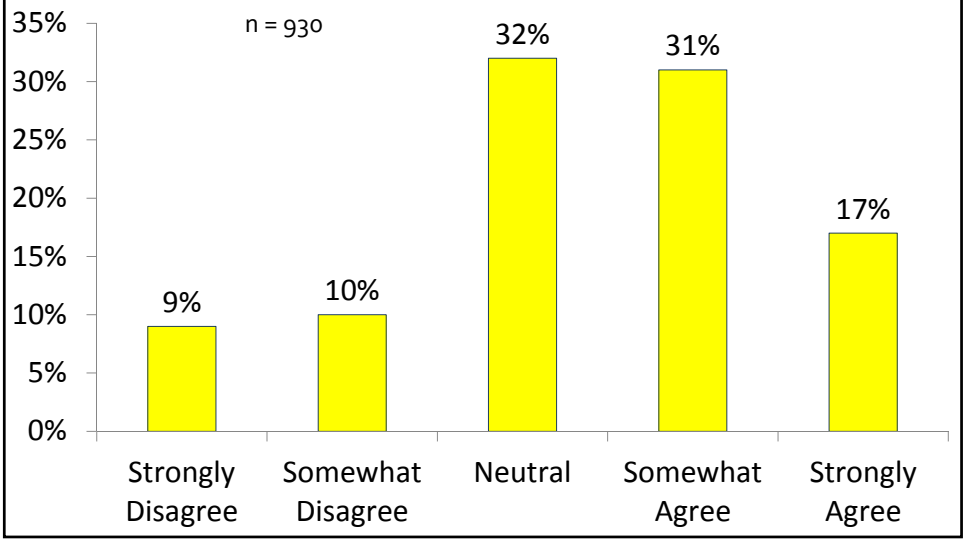
Forest Landowners

"What is your overall opinion of using biomass for bioenergy?"



Forest Landowners

"A bioenergy market will be competitive compared to conventional energy markets."



Forest Landowners

Biomass Perceptions-Percent of Respondents

Survey Questions	Somewhat/ Strongly Disagree	Somewhat/ Strongly Agree
Economically viable technologies exist for converting wood to bioenergy. (n=881)	15%	55%
Wood biomass transportation can be done with traditional logging trucks. (n=903)	20%	47%

Forest Landowners

Respondent Perceptions of Environmental and Market Issues

Harvesting Wood Biomass……	Percent of Respondents that Somewhat/ Strongly Agree
negatively impacts *wildlife habitat* (n=884)	62%*
negatively impacts *air and water quality* (n=909)	31%
negatively impacts *soil quality* (n=908)	30%
will *reduce growth production* of standing timber (n=899)	21%

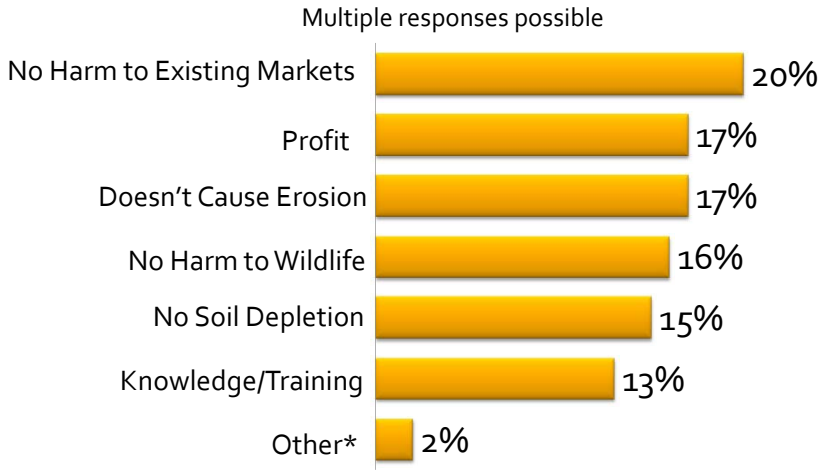
Forest Landowners

Respondent Perceptions of Environmental and Market Issues

	Percent of Respondents that Somewhat/ Strongly Agree
Tax credits should be given to landowners, harvesters, and companies that utilize biomass for bioenergy (n=904)	60%
Subsidies should be provided as an incentive to companies for selling biomass residues from forestry and mill operations (n=901)	42%
Secured loans should be provided to develop and construct commercial scale bio-refineries. (n= 900)	62%

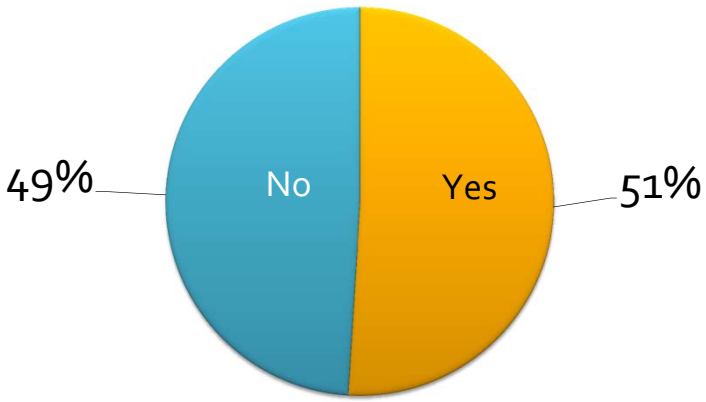
Forest Landowners

Incentives for Participating in Biomass to Bioenergy Markets
(n=942) Percent of Respondents



Forest Landowners

"Would you be ***willing to participate*** in management activities specifically geared toward biomass production?"



n = 874

Conclusions

- In general, respondents have a limited level of familiarity with biomass issues (~1/3 have a neutral position for many issues/questions).
- The top prerequisites for respondents to participate in biomass-to-bioenergy markets are:
  1. Does not upset existing sectors that use same raw materials
  2. Profit
  3. Does not harm the environment
- Overall opinion of bioenergy markets is positive.
- 48% of respondents think biomass generated bioenergy is competitive with conventional energy markets.

Forest Landowner Study II

(Statewide Study)

Federal-State Marketing Improvement Program
USDA/Agricultural Marketing Service Grant Award
12-25-G-111

U.S. DEPARTMENT OF AGRICULTURE
AMS
AGRICULTURAL MARKETING SERVICE

Forest Landowner Study II

(Statewide Study)

Objectives:

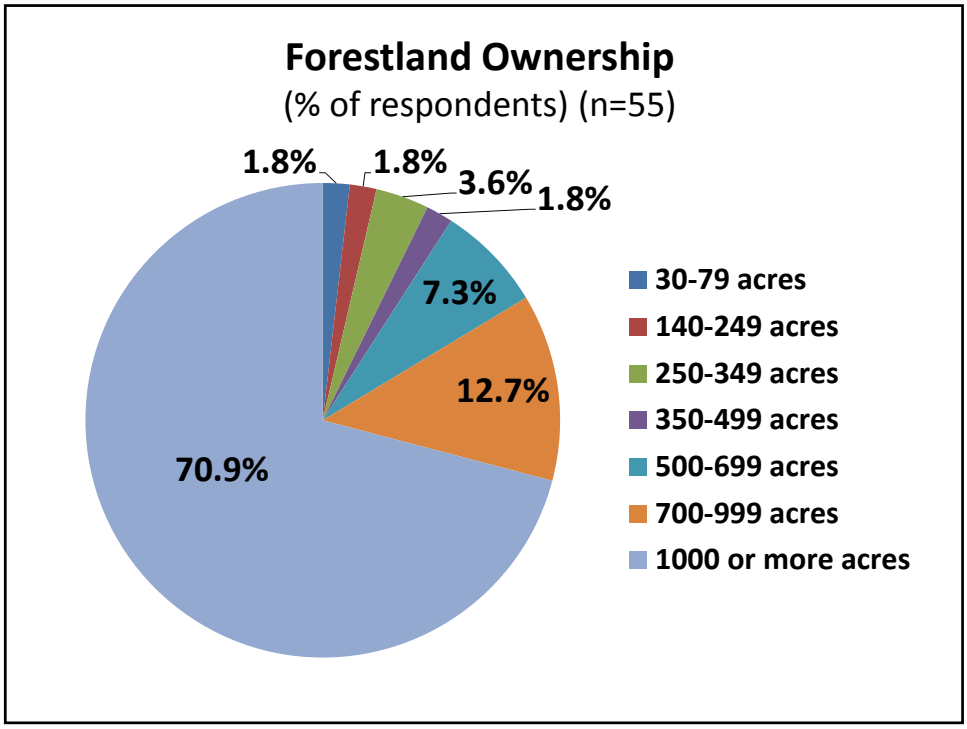
1. To update forest landowners' knowledge of biomass concepts and issues.
2. To understand willingness to participate in bio-supply for energy.

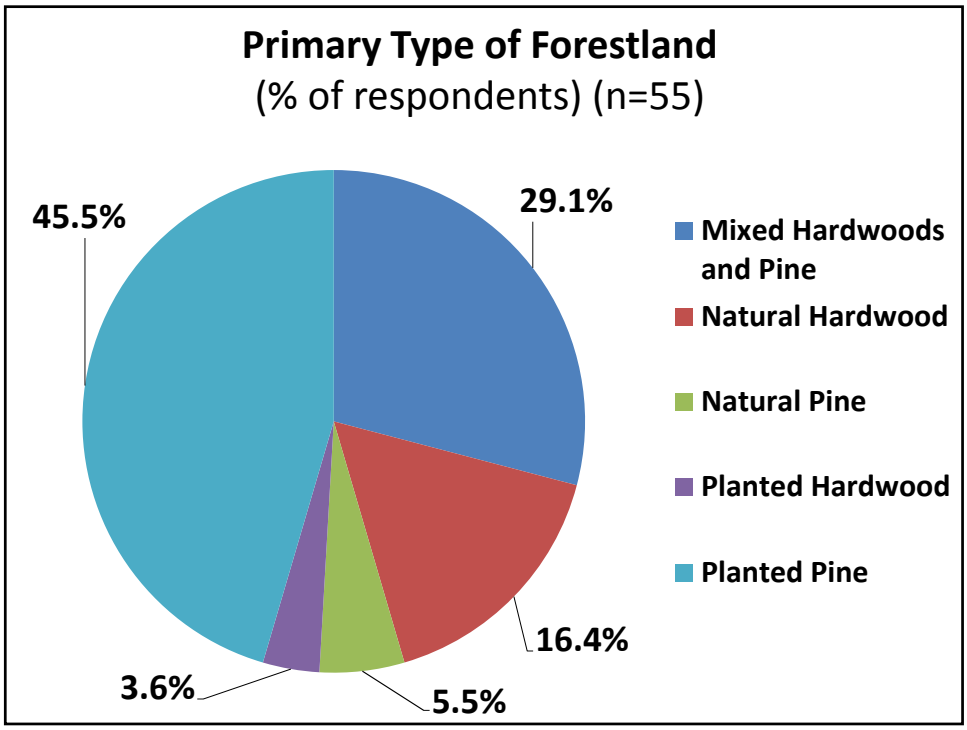
Methods

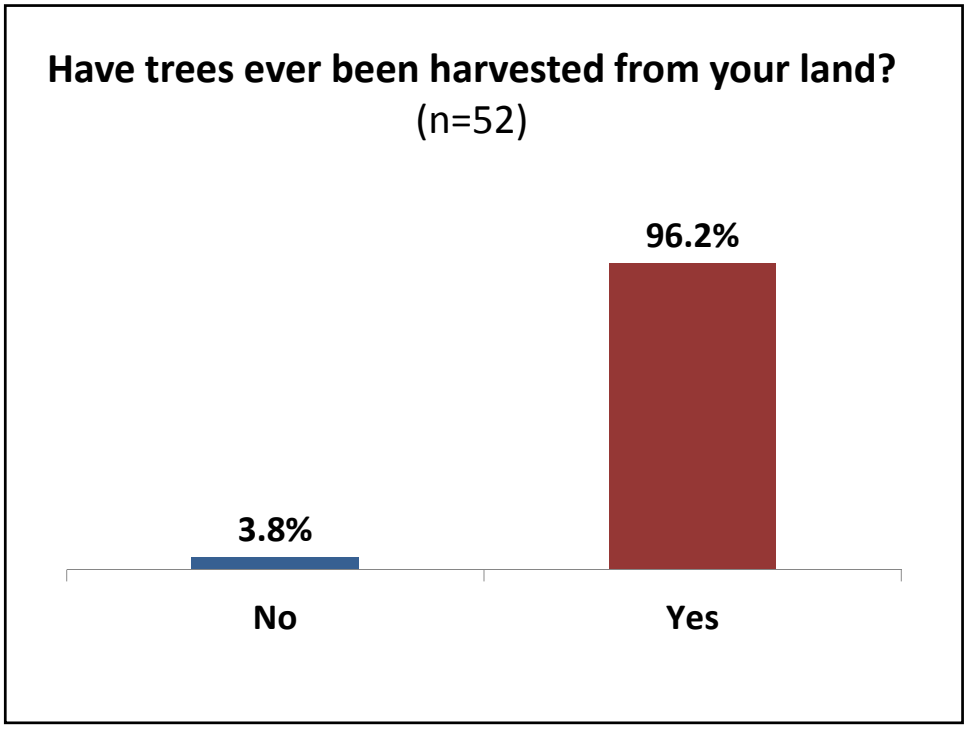
- Sample Frame for the study was 1,000 randomly sampled, forest landowners in Louisiana from 2002 tax rolls.
- The method of data collection were phone and mail surveys.
- 468 were undeliverable/unusable. Only 55 were useable.
- Adjusted Response Rate = 10.3%

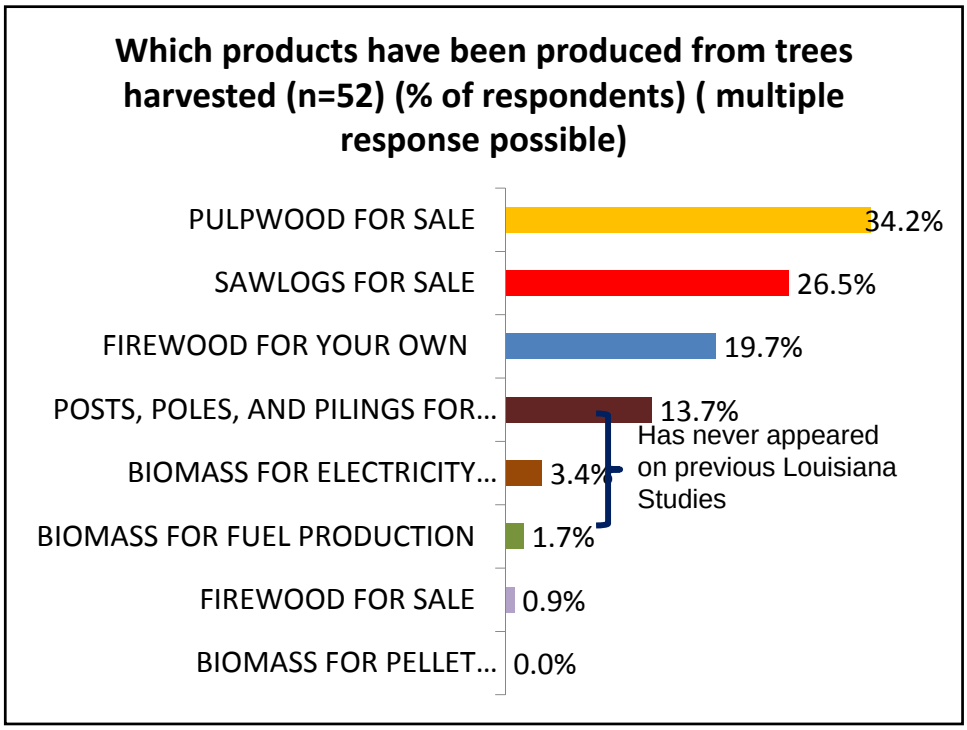
Forestland Ownership: Parishes
Multiple Parishes Possible (n=125)

Parishes	Frquency	Parishes	Frequency
EAST BATON ROUGE	2	LIVINGSTON	1
ALLEN	4	LINCOLN	1
BOSSIER	3	LASALLE	1
BIENVILLE	3	OUACHITA	1
BEAUREGARD	11	PLAQUEMINES	1
CLAIBORNE	3	RED RIVER	3
CALDWELL	1	RAPIDES	7
CADDO	5	ST. TAMMANY	1
CALCASIEU	7	ST. HELENA	3
DESOTO	7	SABINE	5
EVANGELINE	1	TANGIPAHOA	2
E. FELICIANA	14	TERREBONNE	1
W. FELICIANA	6	TENSAS	2
FRANKLIN	1	UNION	1
GRANT	7	VERNON	4
JACKSON	1	WEBSTER	1
JEFFERSON DAVIS	3	WINN	3
MOREHOUSE	2		
NATCHITOCHES	6		


Forestland Ownership
(% of respondents) (n=55)
1.8%
1.8%
3.6%
1.8%
7.3%
12.7%
70.9%
30-79 acres
140-249 acres
250-349 acres
350-499 acres
500-699 acres
700-999 acres
1000 or more acres


Primary Type of Forestland
(% of respondents) (n=55)
45.5%
29.1%
16.4%
5.5%
3.6%
Mixed Hardwoods and Pine
Natural Hardwood
Natural Pine
Planted Hardwood
Planted Pine


Have trees ever been harvested from your land?
(n=52)
96.2%
3.8%
No
Yes

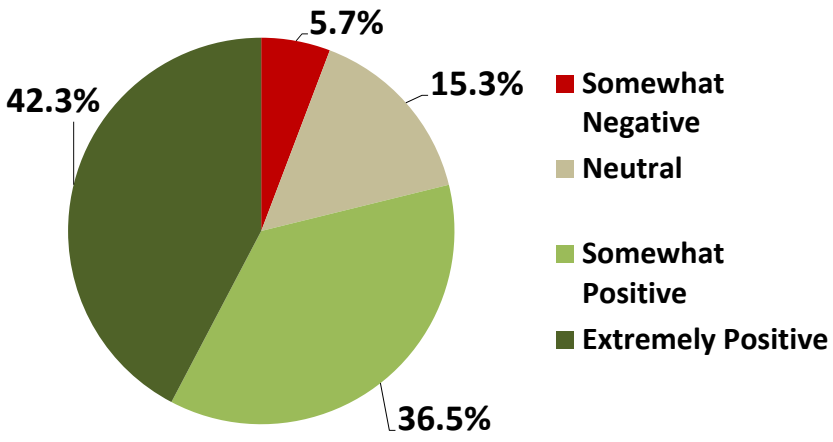

Which products have been produced from trees harvested (n=52) (% of respondents) (multiple response possible)
PULPWOOD FOR SALE
34.2%
SAWLOGS FOR SALE
26.5%
FIREWOOD FOR YOUR OWN
19.7%
POSTS, POLES, AND PILINGS FOR…
13.7%
BIOMASS FOR ELECTRICITY…
3.4%
BIOMASS FOR FUEL PRODUCTION
1.7%
FIREWOOD FOR SALE
0.9%
BIOMASS FOR PELLET…
0.0%
Has never appeared on previous Louisiana Studies

Pulpwood for sold in 2012
620,000 tons

Number of posts, poles, and pilings sold
125,104

Biomass sold for bioenergy
34,000 tons

Overall opinion of using biomass for bioenergy (n=52)



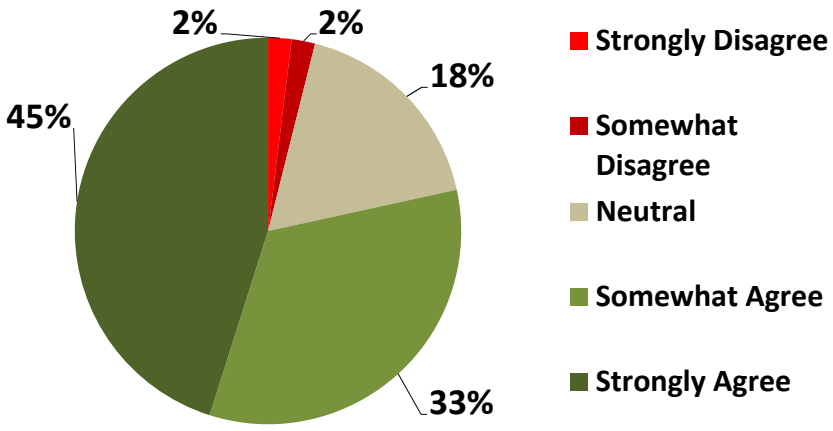
Management Cost involves burning/ removing slash piles or harvesting residue?	%
No	48.1
Yes	51.9

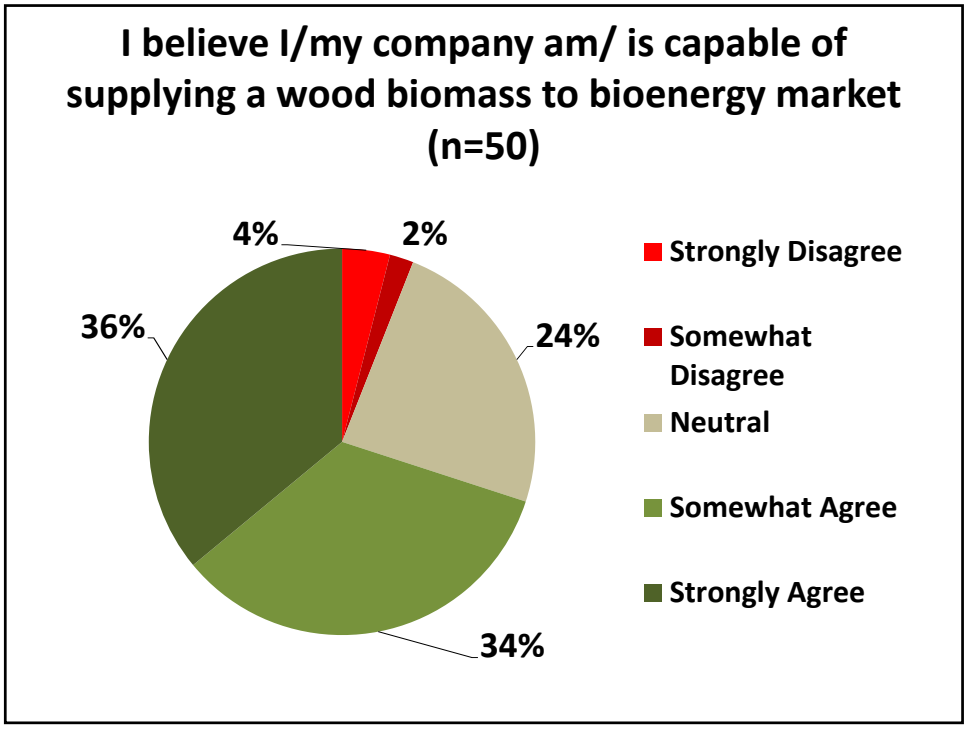
n=52

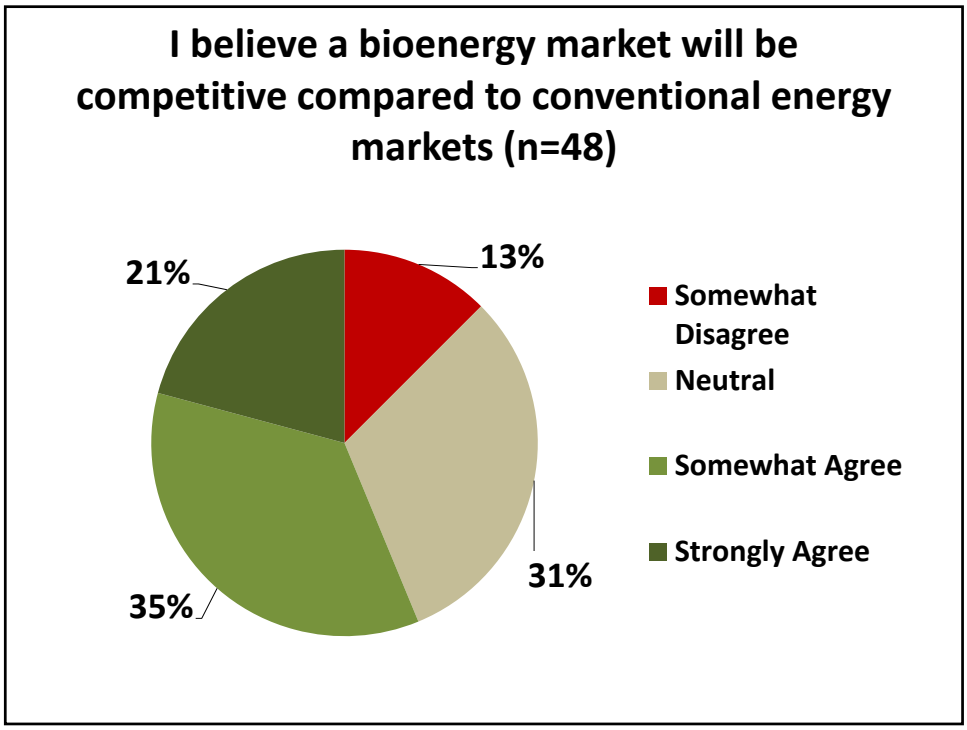
Willing to participate in biomass production	%
No	23.9
Yes	76.1

n=46

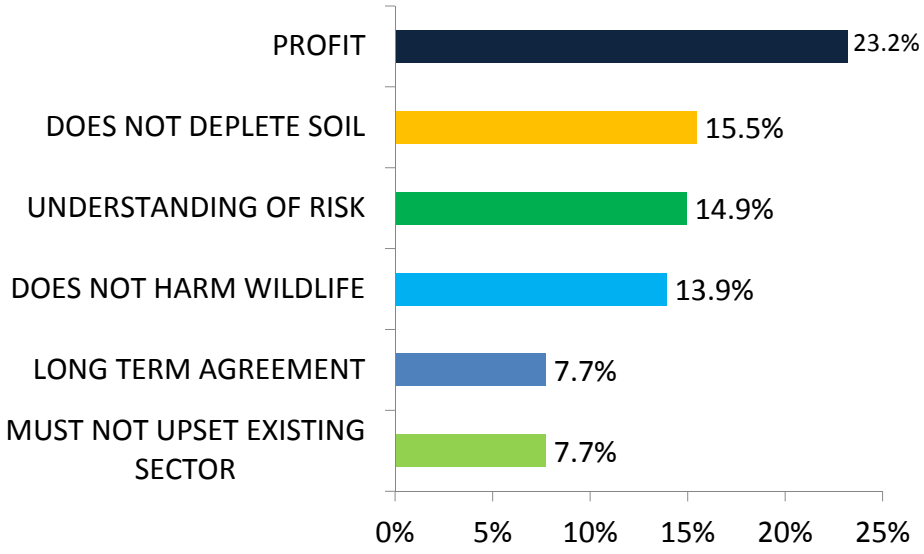
Wood should be used for biomass feedstock for bioenergy markets (n=51)




I believe I/my company am/ is capable of supplying a wood biomass to bioenergy market (n=50)
4%
2%
36%
24%
34%
Strongly Disagree
Somewhat Disagree
Neutral
Somewhat Agree
Strongly Agree


I believe a bioenergy market will be competitive compared to conventional energy markets (n=48)
21%
13%
35%
31%
Somewhat Disagree
Neutral
Somewhat Agree
Strongly Agree

Prerequisites for you to participate in biomass-to-bioenergy markets (n=51) (multiple responses possible)



Estimated Economic Impact of Hypothetical Woody Biomass Plants

1. Electric power plant
2. Wood pellet plant

Hypothetical Biomass Facilities in Louisiana

Electric power plant in Southwest Louisiana using chips/post-harvest residuals as a feedstock

Assumptions

- 55 megawatt
- Construction cost: $250 million
- 25% construction expenditures from within the region
- Feedstock cost: $30/green ton
- Feedstock annual consumption: 600,000 green tons

The Economic Impact of *Construction* of a Woody Biomass Electric Plant in Southwest Louisiana

	Jobs	Earnings	Output
Direct Effect	410	$22.7	$62.5
Indirect Effect	121	$6.0	$20.1
Induced Effect	133	$4.6	$14.7
Total Effect	**664**	**$33.2**	**$97.3**

Earnings and Output Figures are in $ Million (2011)

The Economic Impact of *Operations* of a Woody Biomass Electric Plant in Southwest Louisiana

	Jobs	Earnings	Output
Direct Effect	92	$6.6	$31.1
Indirect Effect	62	$3.0	$13.4
Induced Effect	45	$1.5	$5.0
Total Effect	**199**	**$11.1**	**$49.5**

Earnings and Output Figures are in $ Million (2011)

Hypothetical Biomass Facilities in Louisiana

Wood pellet plant in Southwest Louisiana using clean chips as feedstock (pulpwood, thinnings, energy trees)

Assumptions

- Annual production output: 187,500 tons of pellets
- Construction cost: $200 million
- Feedstock cost: $35/green ton
- Feedstock annual consumption: 375,000 green tons

The Economic Impact of *Construction* of a Wood Pellet Plant in Southwest Louisiana

	Jobs	Earnings	Output
Direct Effect	104	$5.7	$15.8
Indirect Effect	31	$1.5	$5.1
Induced Effect	34	$1.2	$3.7
Total Effect	**168**	**$8.4**	**$24.6**

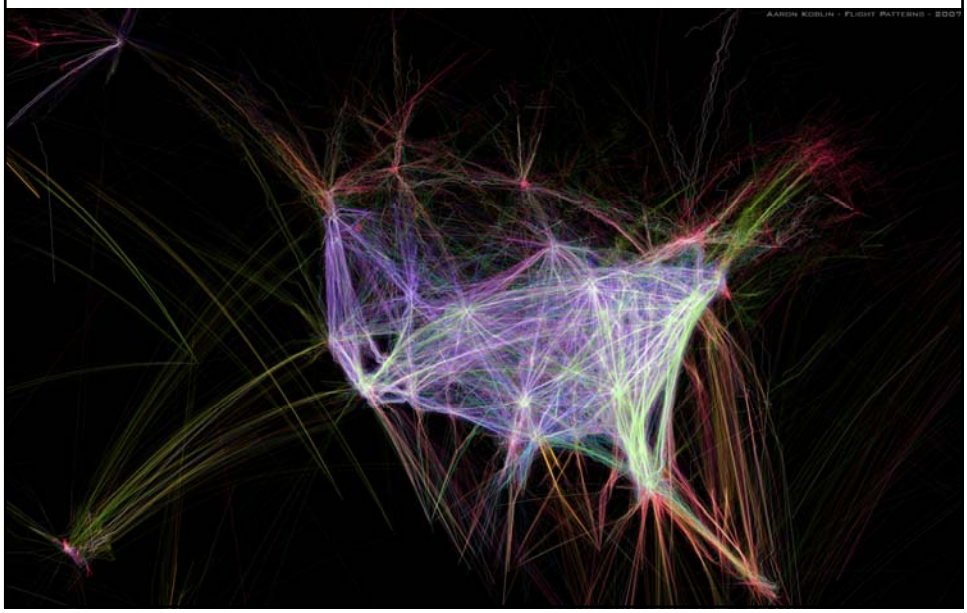
Earnings and Output Figures are in $ Million (2011)

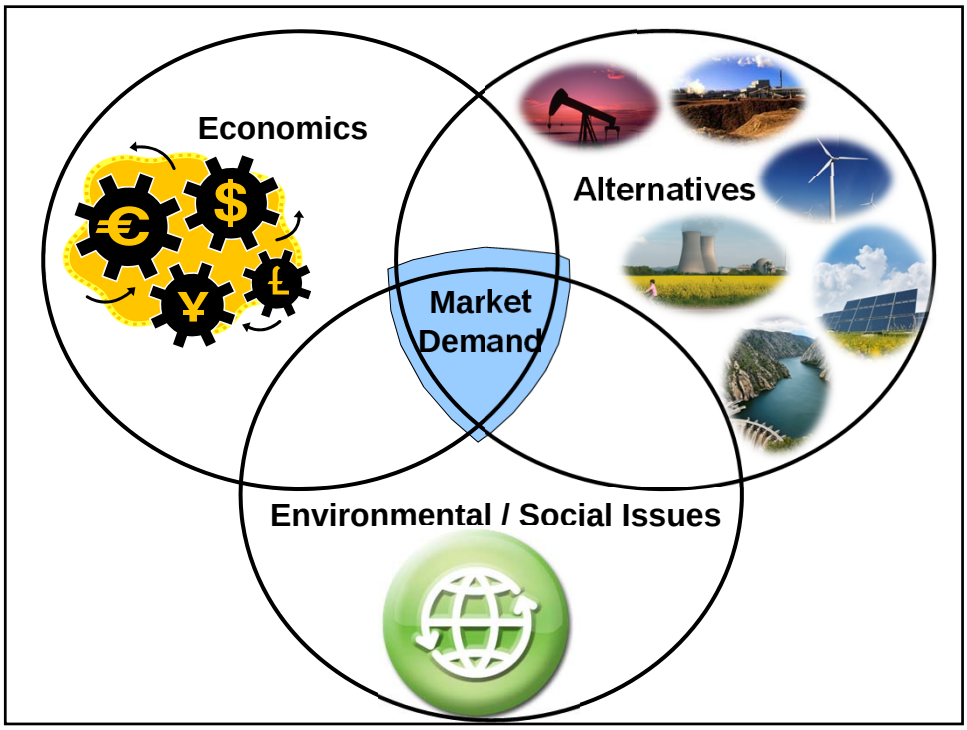
The Economic Impact of *Operations* of a Wood Pellet Plant in Southwest Louisiana

	Jobs	Earnings	Output
Direct Effect	136	$7.6	$36.4
Indirect Effect	116	$5.4	$25.1
Induced Effect	62	$2.1	$6.8
Total Effect	**313**	**$15.1**	**$68.3**

Earnings and Output Figures are in $ Million (2011)

Issues & Challenges





Effects on Forest Sector Structure?

- Federal and state mandates, if fully implemented, would lead to over-harvesting of forests in the United States and are unrealistic.
- Growth for wood-energy industry will be constrained by sustainable harvest levels and wood fiber prices.

Source: RISI. Sept. 23, 2008 (PRNewswire)

Effects on Forest Sector Structure?

- U.S. demand for wood fiber from these emerging biomass markets is expected to rise from 2 million tons in 2008 to at least 13.5 million tons in 2020.
- Higher prices for traditional biomass inputs (chips).
- Demand will be driven by a) wood-burning power companies that produce and sell electricity to public utilities and; b) increasing wood pellets exported to Europe.
- Biomass → cellulosic ethanol for transportation fuel will also impact the forest products industry.

Source: Forest2Market. 2008

Concluding Observations

- Development of the wood energy sector is growing (slowly) in the U.S.
- Investors are opportunistic and are seeking competitive advantage.
- First mover advantage is significant; finite feedstock supply.
- Increased demand for wood biomass = increased wood biomass/chip prices.
- Subsidies and other policy instruments can create an uneven playing field.
- Forest landowners are examining restructuring their business portfolios to include biomass→ energy.
- *But…The wood energy industry trajectory is uncertain* in light of current economic conditions and availability of capital in the U.S.

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Questions??? Discussion!!!

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