

North American Bioenergy Forecast

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| RISI |



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Bioenergy Offerings

- Wood Biomass Market Report
- Biomass Projects Database
 - North America
 - Europe
- Bioenergy Forecast
- Consulting Services
- **RISI and PFI Pellet Manufacturing Survey

RISI North American Bioenergy Forecast

2008 – RISI Study: The Emerging Biomass Industry

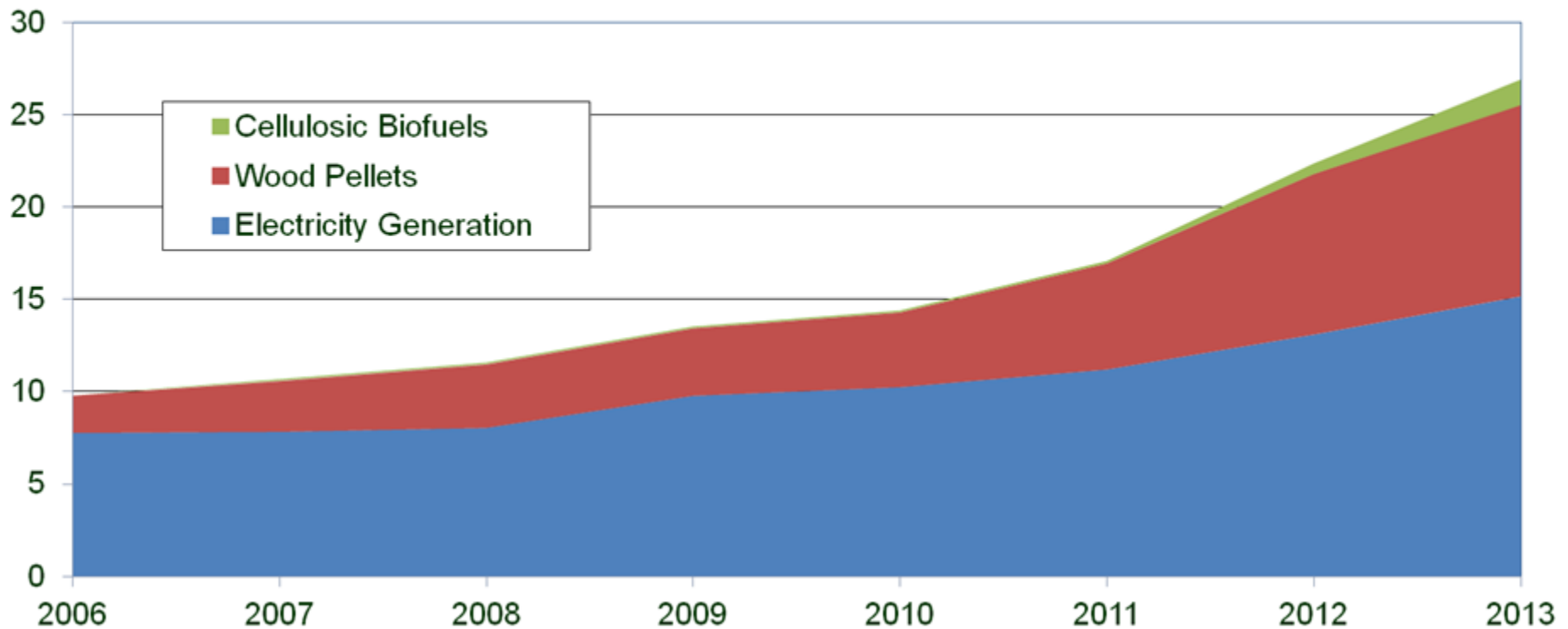
2010 – RISI Study: North American Bioenergy Review

2011 – RISI North American Bioenergy 5-year Forecast

2012 – incorporated into RISI's regular forecast schedule, further integration with NA Timber Forecast

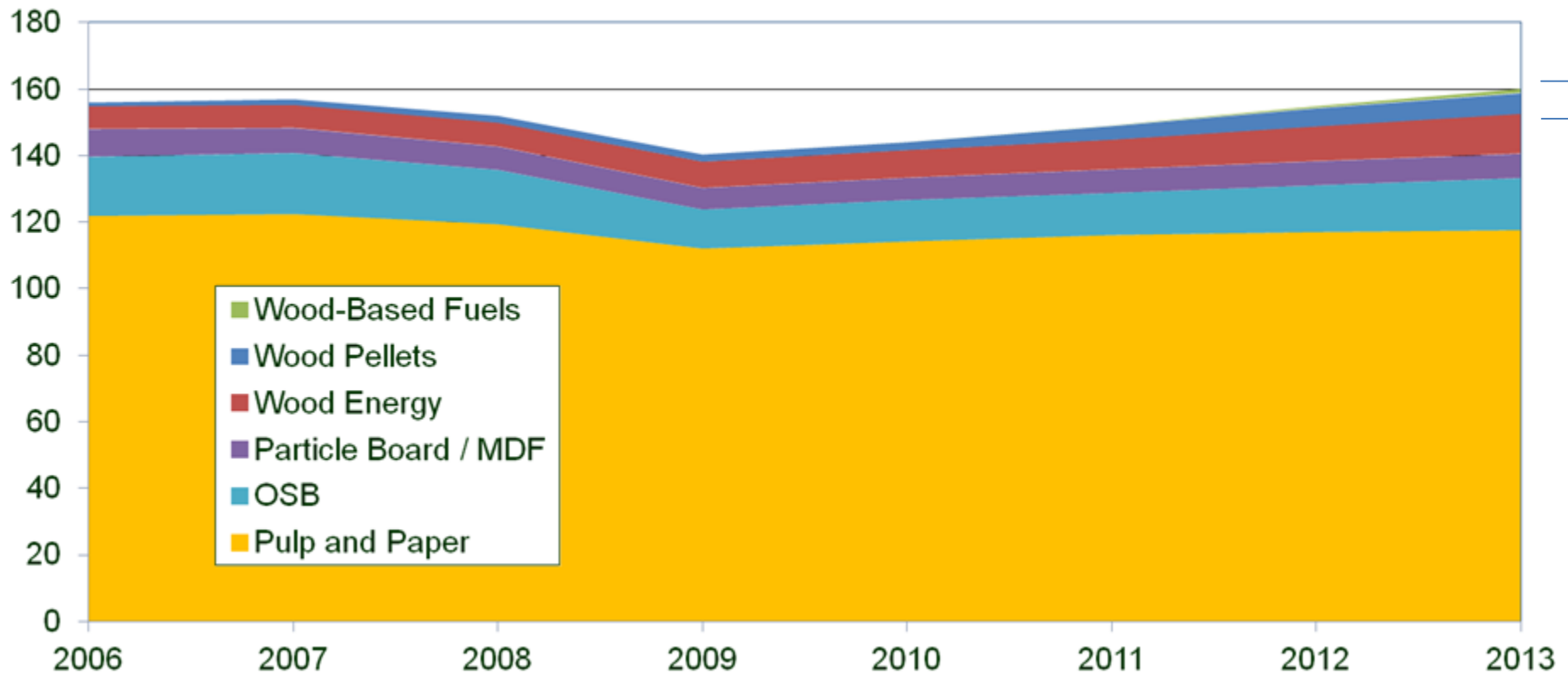
Wood Bioenergy: Tremendous growth over the next 5 years

**Wood Fiber Consumption by Bioenergy Market
(2006-2016) - North America
Million dry tons**

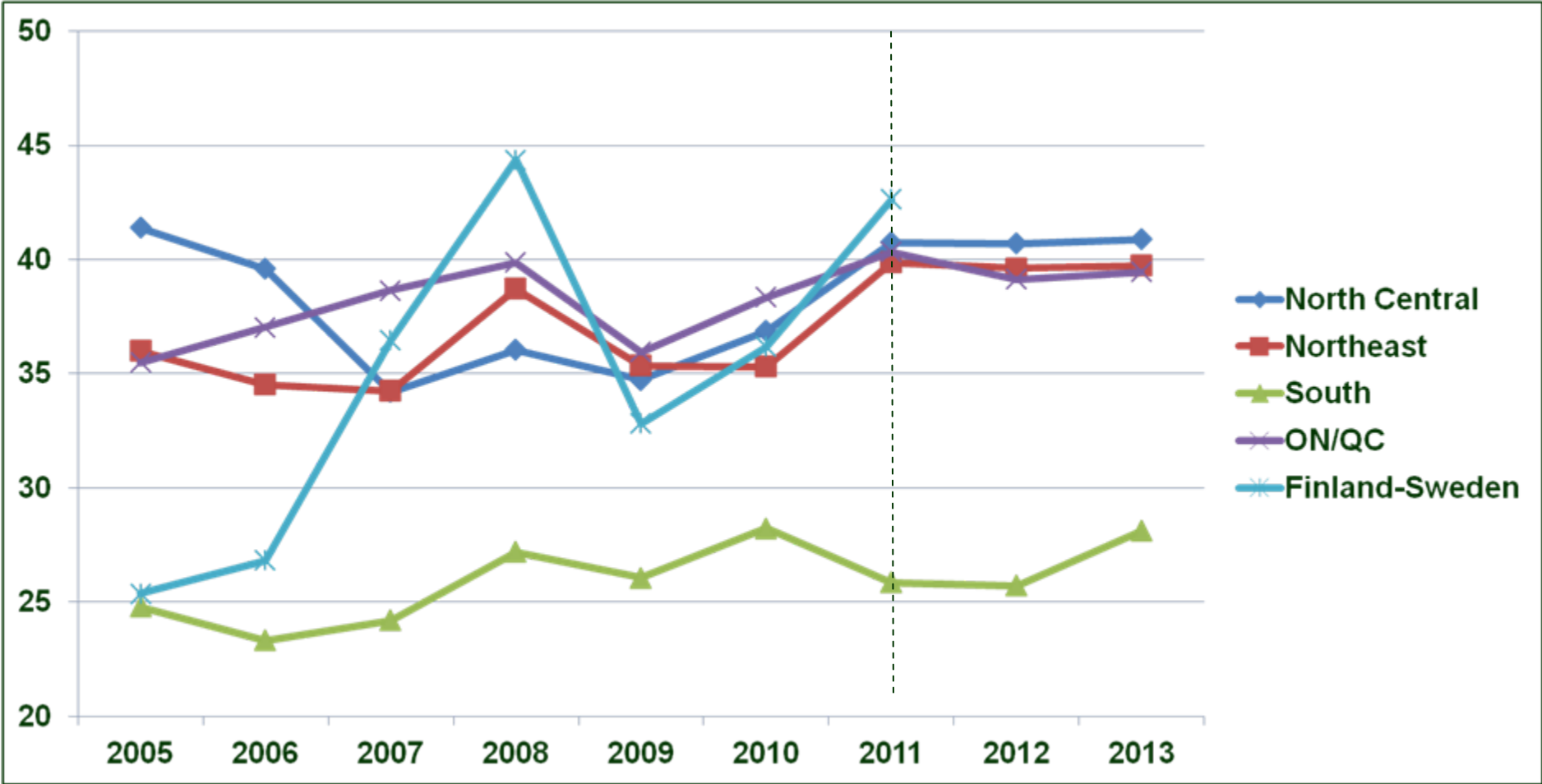


A small but growing impact on low-grade woodfiber markets

Wood Fiber Demand (2006-2016) - United States
Million DST



Int'l Delivered Pulpwood Prices Compared USD per ton



Projecting Industry Growth: Our Methodology Example - Pellets

Step 1: Estimate new industry capacity based on announcements

Mill ID	Domestic Capacity	Export Capacity	% of Capacity operational							"Domestic"						"Export"					
			2009	2010	2011	2012	2013	2014	2015	2016	2011	2012	2013	2014	2015	2016	2011	2012	2013	2014	2015
PEL001_EC	70	70			1	1	1	1	1	0	70	70	70	70	70	0	70	70	70	70	70
PEL002_EC	49.61411	44.6527			1	1	1	1	1	0	49.6	49.6	49.6	49.6	49.6	0	44.7	44.7	44.7	44.7	44.7
PEL003_EC	310	310			1	1	1	1	1	0	310	310	310	310	310	0	310	310	310	310	310
PEL013_EC	55	0		0.5	1	1	1	1	1	27.5	55	55	55	55	55	0	0	0	0	0	0
PEL015_EC	90	0			0.5	1	1	1	1	0	45	90	90	90	90	0	0	0	0	0	0
PEL016_EC	55	165			0.75	1	1	1	1	0	41.3	55	55	55	55	0	124	165	165	165	165
PEL017_EC	#N/A	#N/A								0	0	0	0	0	0	0	0	0	0	0	0

Mill ID
Capacity

% of Capacity
operational

"Domestic"

"Export"

Net Capacity by
year

Step 2: Use time series analysis to forecast industry growth out to 2016.

- Step 1 is used to project growth through 2013
- Domestic/Conventional mills are modeled separately from industrial export mills
- RISI Macroeconomic forecast used for independent variables

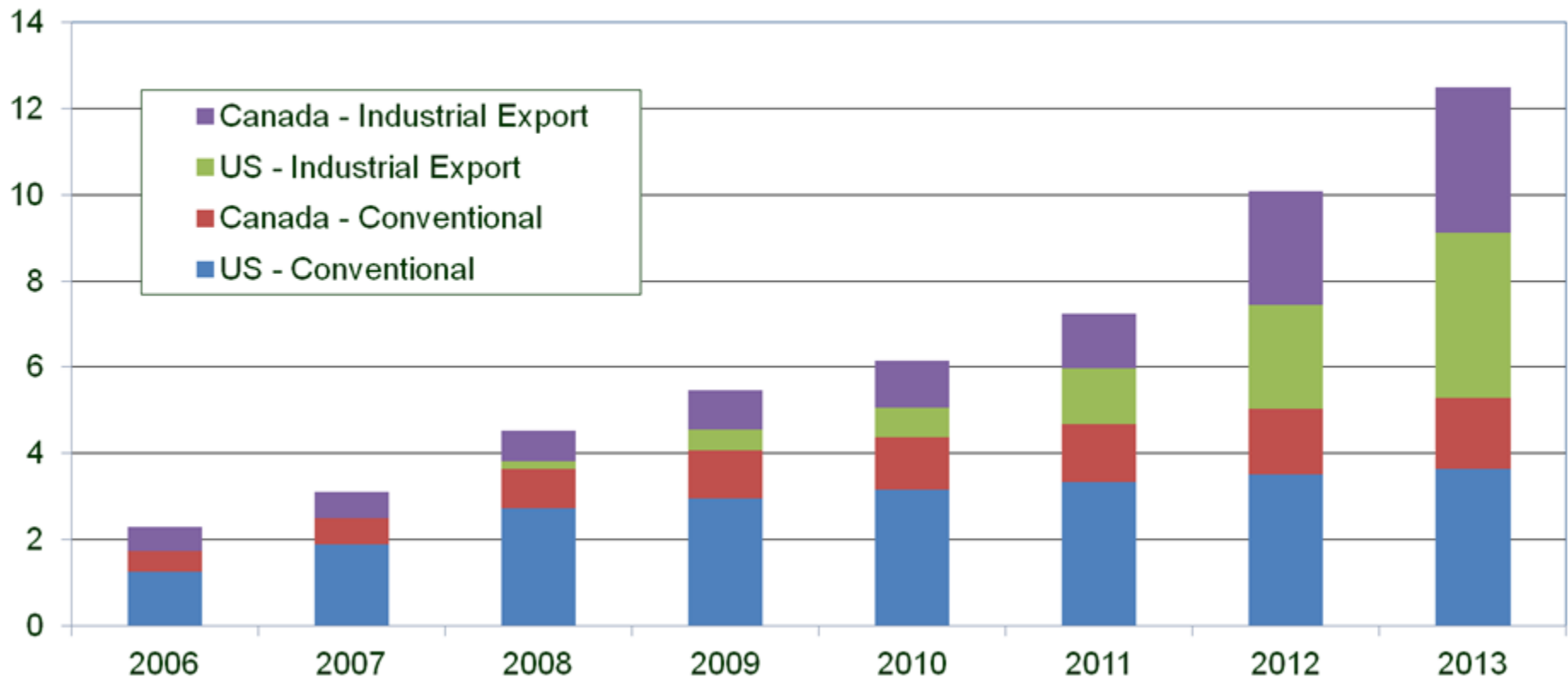
Pellets

- Impressive growth should sustain over the next 5 years driven by European exports
- Many questions to be answered:
 - Capacity/Production/Consumption
 - Domestic residential demand
 - Exports
 - Other domestic demand – poultry houses, green houses, schools, hospitals, etc.

Wood Pellet Production

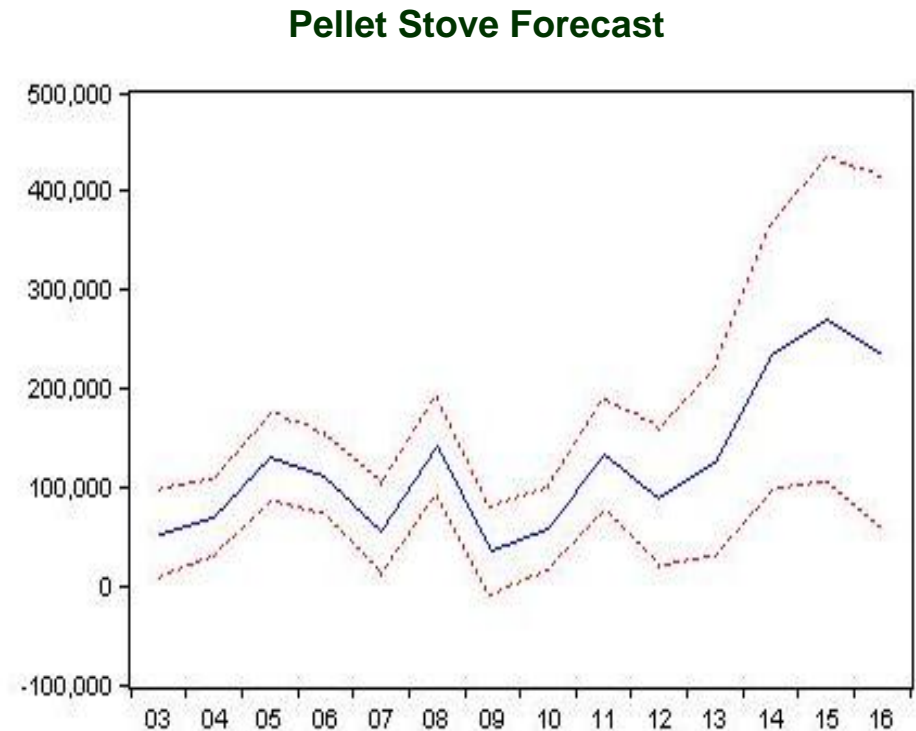
2011 NA Bioenergy Forecast (revised)

Wood Pellet Production (2006-2016) - North America
Million tons



US Domestic Demand

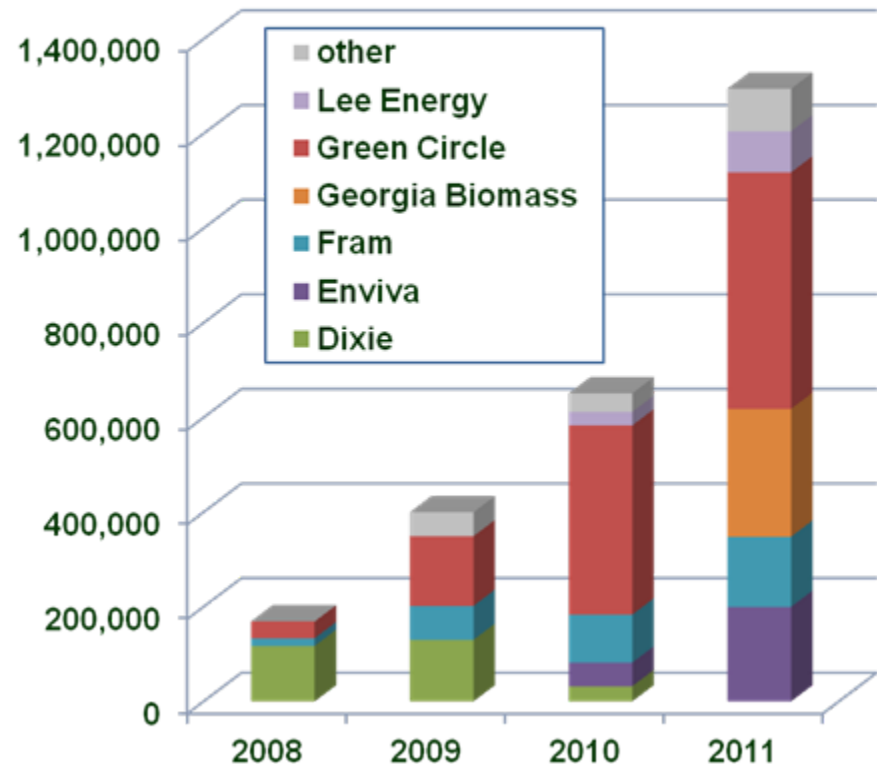
- Pellet stove forecast
 - ~100k units 2011
 - Over 200k units 2014 -2016
- Residential demand
 - ~2.5 million tons in 2011
 - Steady increase through 2016 but not the explosive growth projected for export markets



Exports

- 2.5 million tonnes from NA in 2011 (1.2 CA, 1.3 US)
- Export Industry could grow to 10 million tonnes by 2016
- Downside risk
 - EU subsidy driven
 - BBC: “Drax scraps plans for North Yorkshire biomass plant”
 - Sustainability issues
- Statistical Nightmare
 - No statistics match
 - Standardized reporting needed for transparency

Estimated Pellet Exports from the United States



Other Demand

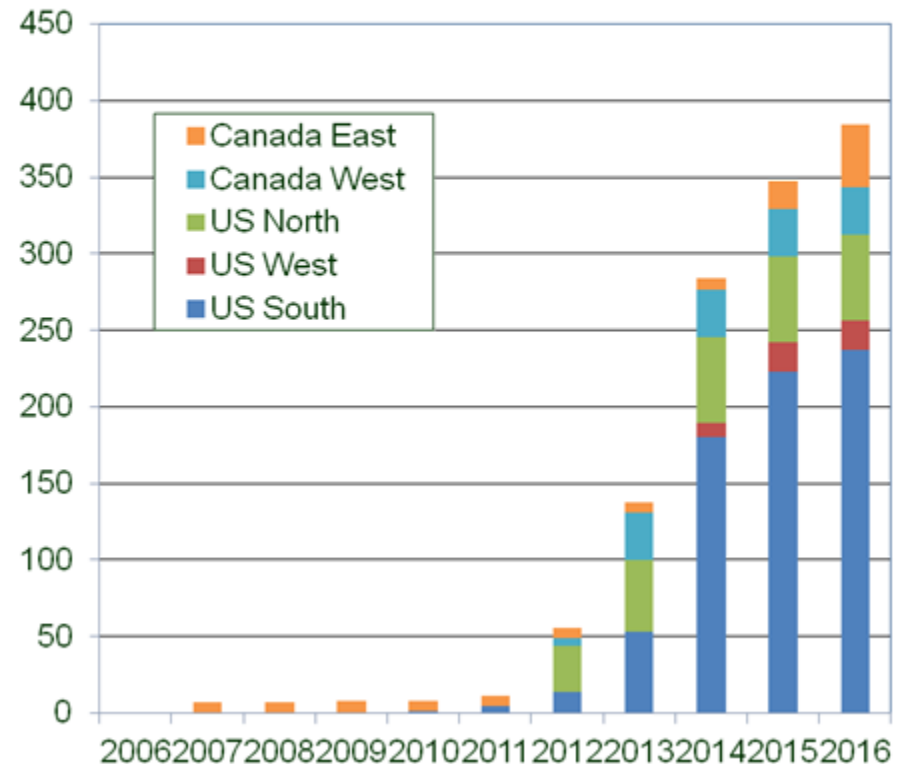
- Most difficult to estimate
- Based on our production figures could be as high as 500k tons
- Includes:
 - Agriculture:
 - Poultry
 - Greenhouses
 - “Bagged” exports
 - Institutional Use
 - Schools
 - Hospitals



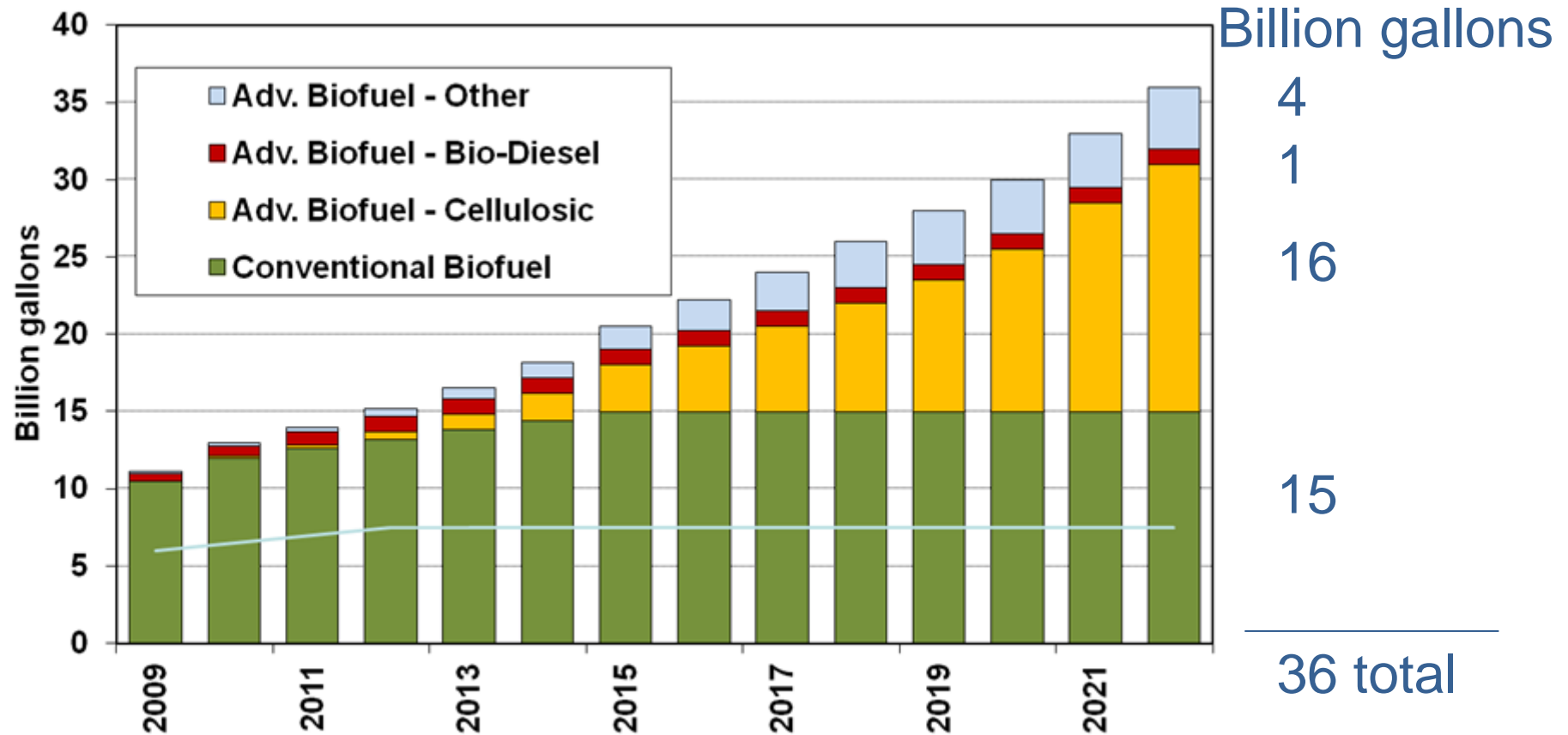
Cellulosic Biofuels

- Commercialization likely to occur within the next five years
- In the short term woodfiber consumption will remain at low levels
- Growth could be much higher than expected near the end of forecast period if “all goes well”
 - RFS2 10x higher than RISI in 2016
 - NYT “A Fine for Not Using a Biofuel That Doesn’t Exist”

Wood Biomass Based Fuel Production
(2006-2016) - North America
Million gallons



RFS2 Sets Target for US Biofuel Production Growth

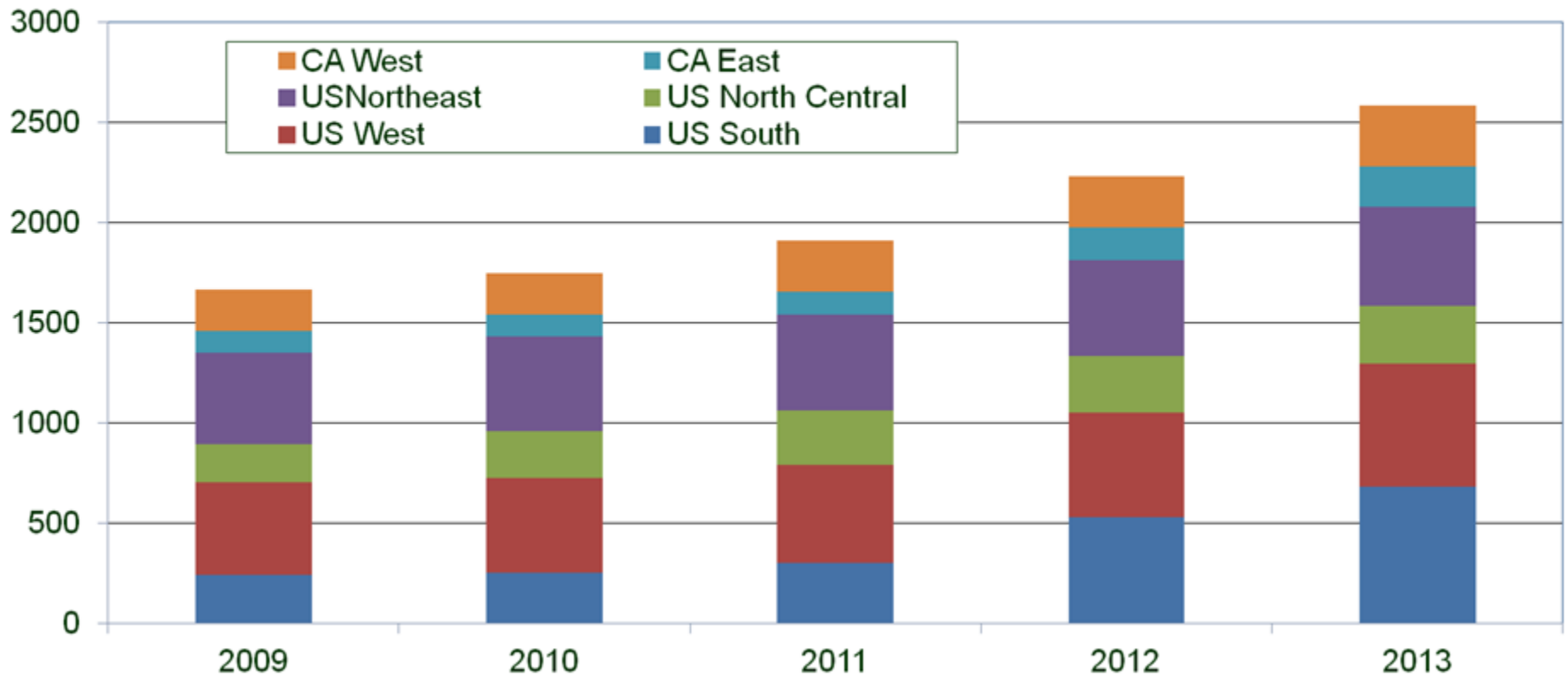


Wood Energy

- Strong growth in the US South, US West and British Columbia
- Successful projects often associated directly with a utility or forest products company
- Smaller scale CHP – strongest support
- Federal energy policy very unlikely to change in the next year
- Stalled development to continue in many regions without more regulatory support
- Hurdles
 - Power Purchase Agreement
 - Financing
 - “Not in my back-yard” – local opposition

Wood Energy Forecast

Wood Biomass Based Power Generation (2006-2016) - North America
Output (MW per year)



Take-Aways

- Fiber markets
 - Begin to tighten but prices stay stable on an inflation adjusted basis
 - US South – most competitive
- Wood Pellets
 - Aggressive growth in export markets
 - Some downside risk – EU uncertainty
 - Domestic market should see slower but steady growth as economic activity picks up in the next few years
- Cellulosic Biofuels
 - Virtually non-existent -> commercialized in the next 5 years
 - Growth could be very rapid once the technology is proven
- Wood Energy
 - Difficult time for renewable energy: PPA, Financing, etc.
 - Most successful:
 - Utilities
 - Forest product companies
 - Smaller-scale and CHP
 - Regulatory support not necessarily on the way

RISI and PFI Survey



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Survey Results

Figure 3
Monthly Survey Participant
Representation
Production and End Use Markets by
Region

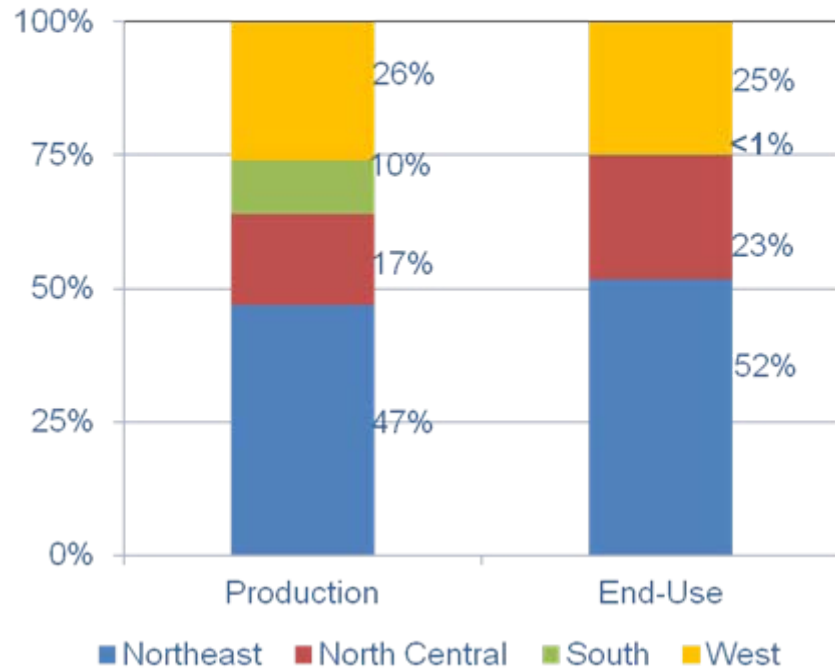
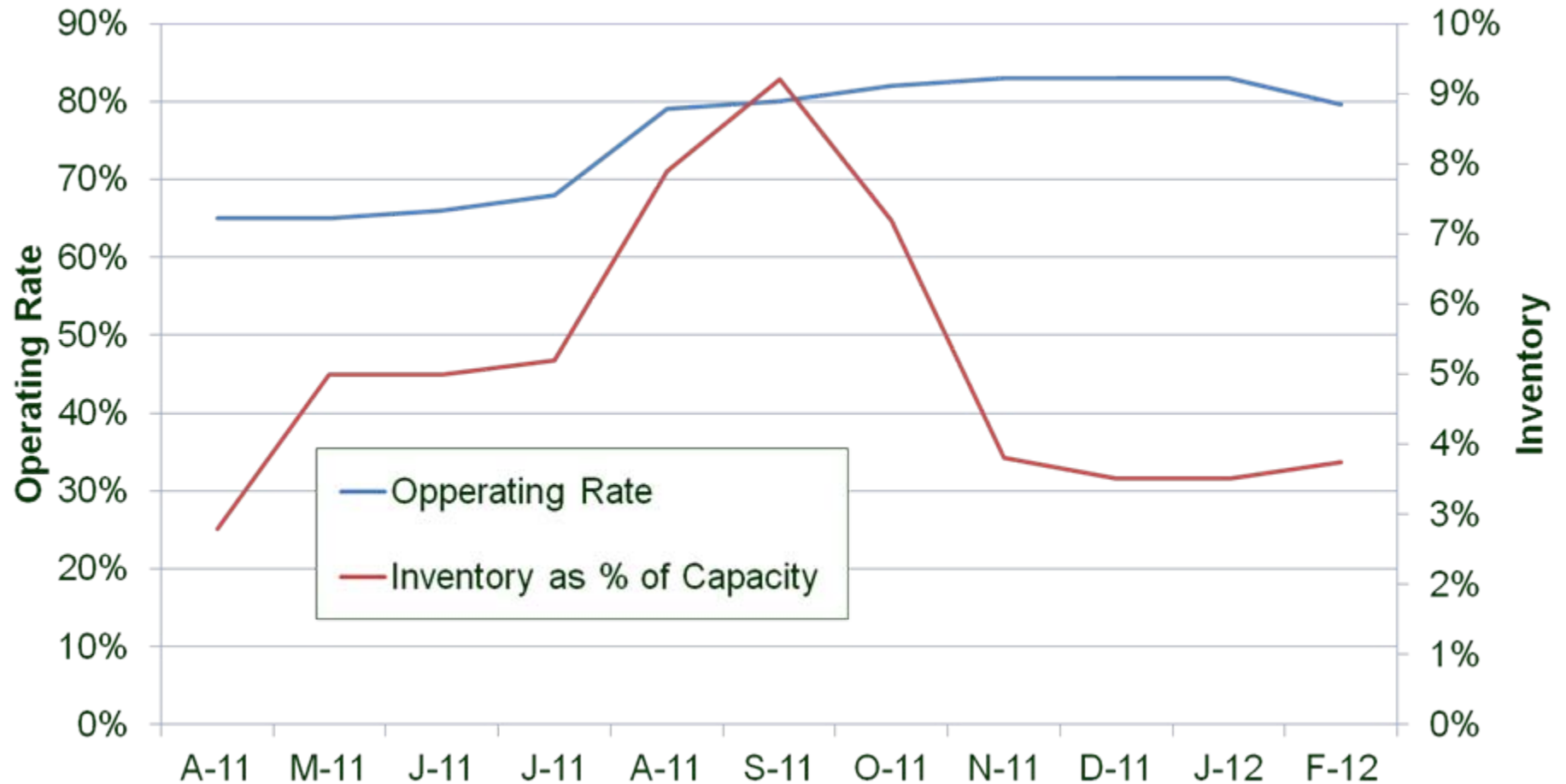


Table 3
Summary Statistics

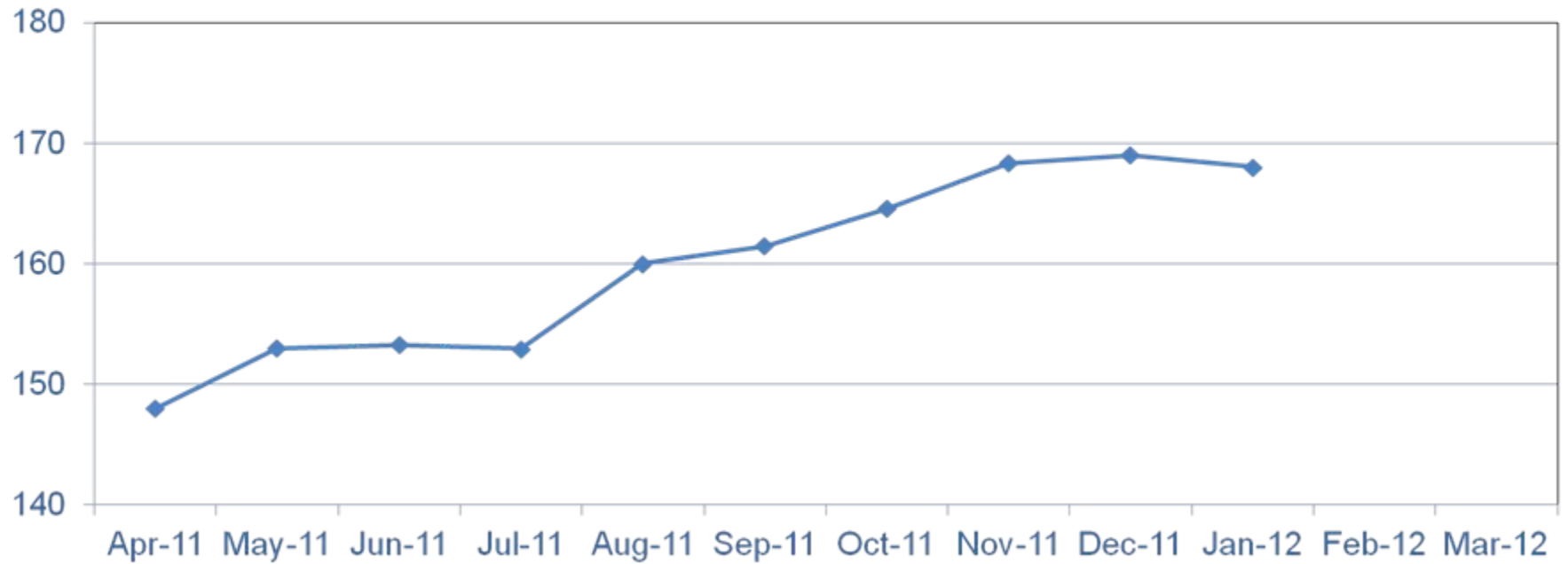
		% Change
Number of Mills Participating	25	39%
Average Annual Capacity	50,700	2%
Current Operating Rate	80%	-4%
Average Inventory	1870	7%
Inventory as % of Capacity	3.7%	7%

Operating Rates and Inventory



Pellet Price Index

Figure 1
US Domestic Premium Wood Pellet Price Index
USD/Ton - Bagged



Employment Figures

- Approximately 3 employees / 10k tons capacity
- 2011 ~5mm tons of capacity ~1500 direct mill employees
- RISI 2016 forecast 10mm tons of capacity in US - doubling of employment?

Questions?

For more information

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