

Low-Grade Wood Markets: The New England Perspective

New England Regional Council on Forest Engineering
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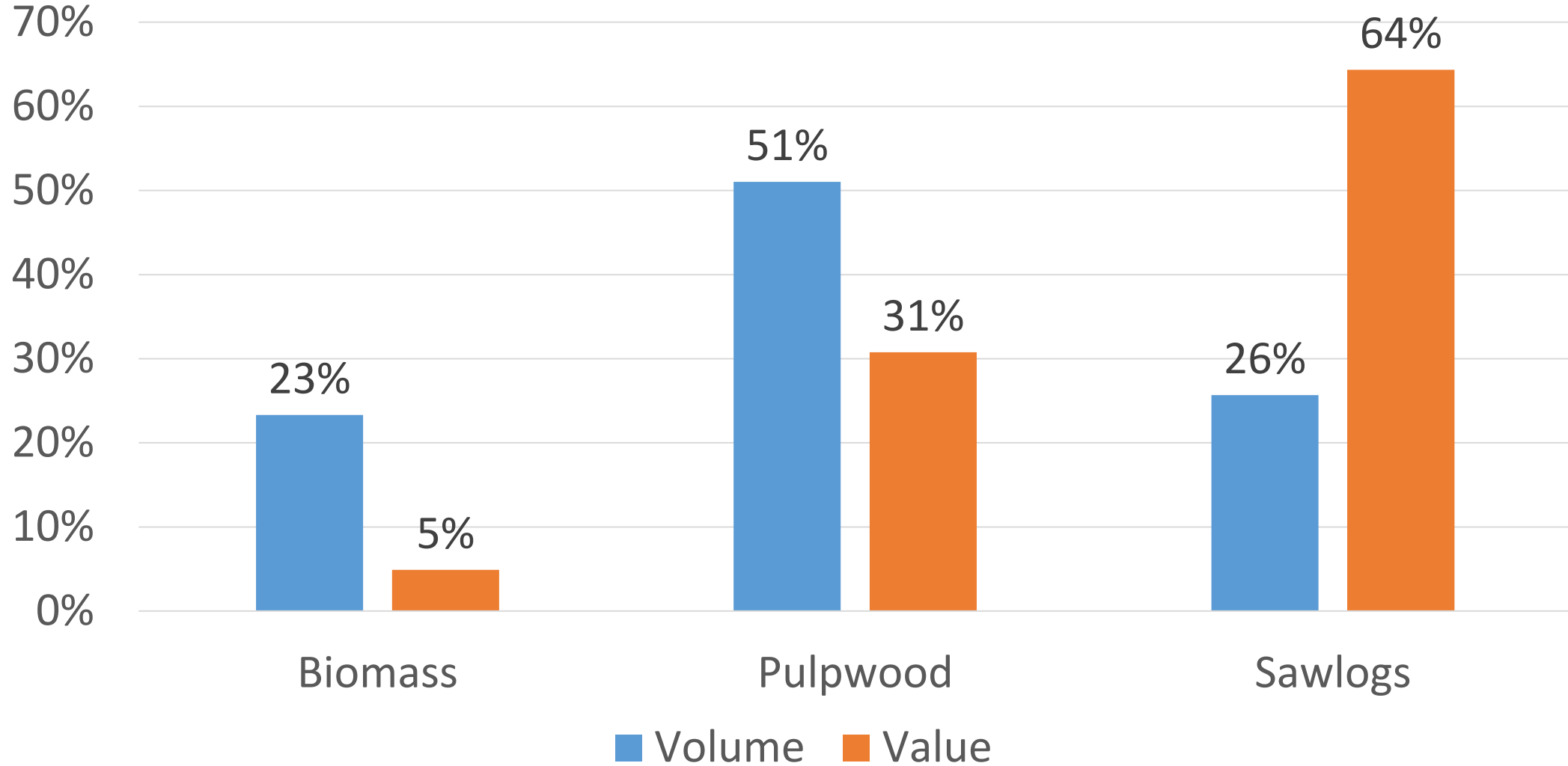
Innovative Natural Resource Solutions LLC



- Founded in 1994
- Offices in New Hampshire and Maine
- Focus at the intersection of forest industry, energy and economic development
- Services include:
 - consulting in renewable energy
 - advocacy
 - forest management and protection
 - forest certification and sustainability
- Clients from the private, non-profit and government sectors
- Conducted work in all regions of North America
- www.inrsllc.com

Volume and Value from a Timber Harvest

Maine, Statewide, 2014



Pulp and Paper





Since 1999, the Northern Forest region has lost 11 pulp mills

New York

- Deferiet
- Lyons Falls

New Hampshire

- Groveton
- Berlin

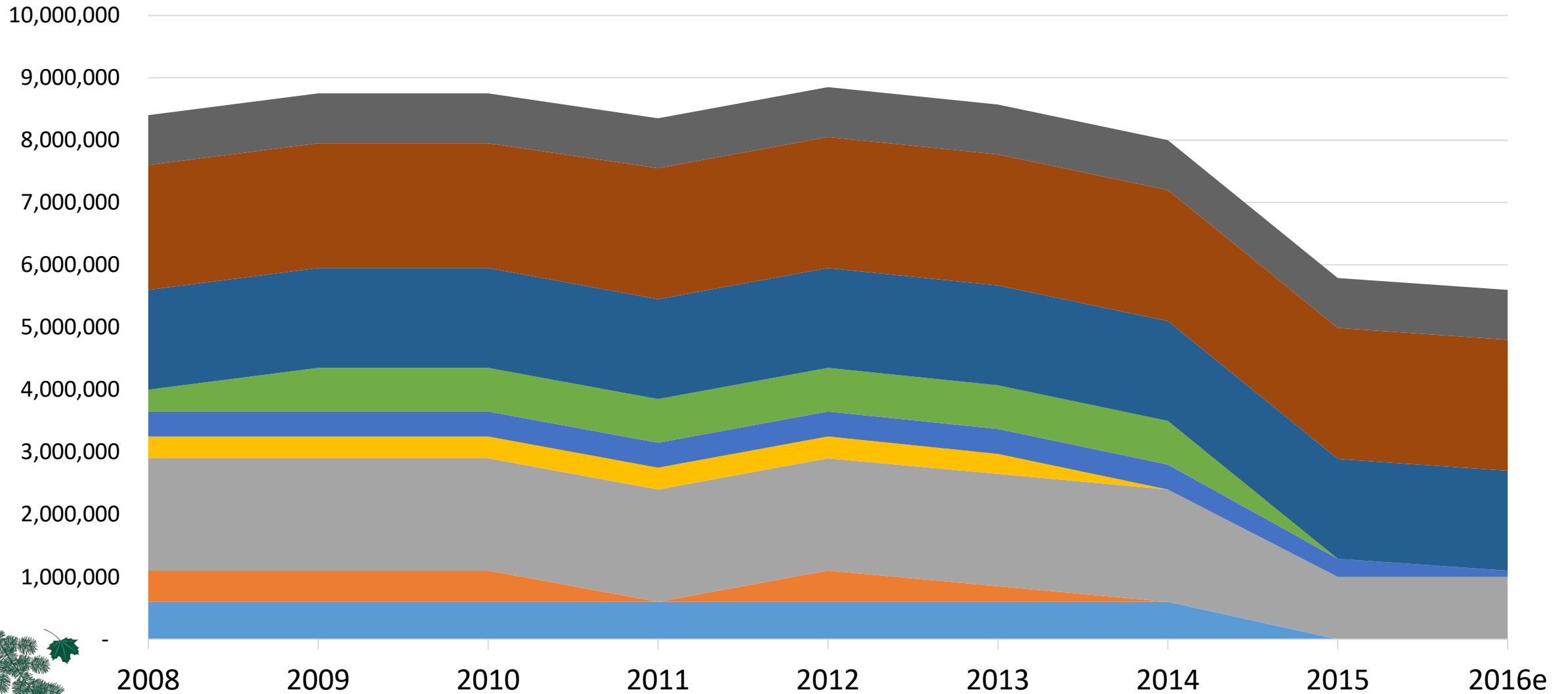
Maine

- Westbrook
- Bucksport
- Old Town
- Lincoln
- Millinocket
- East Millinocket
- Madison (May 2016)

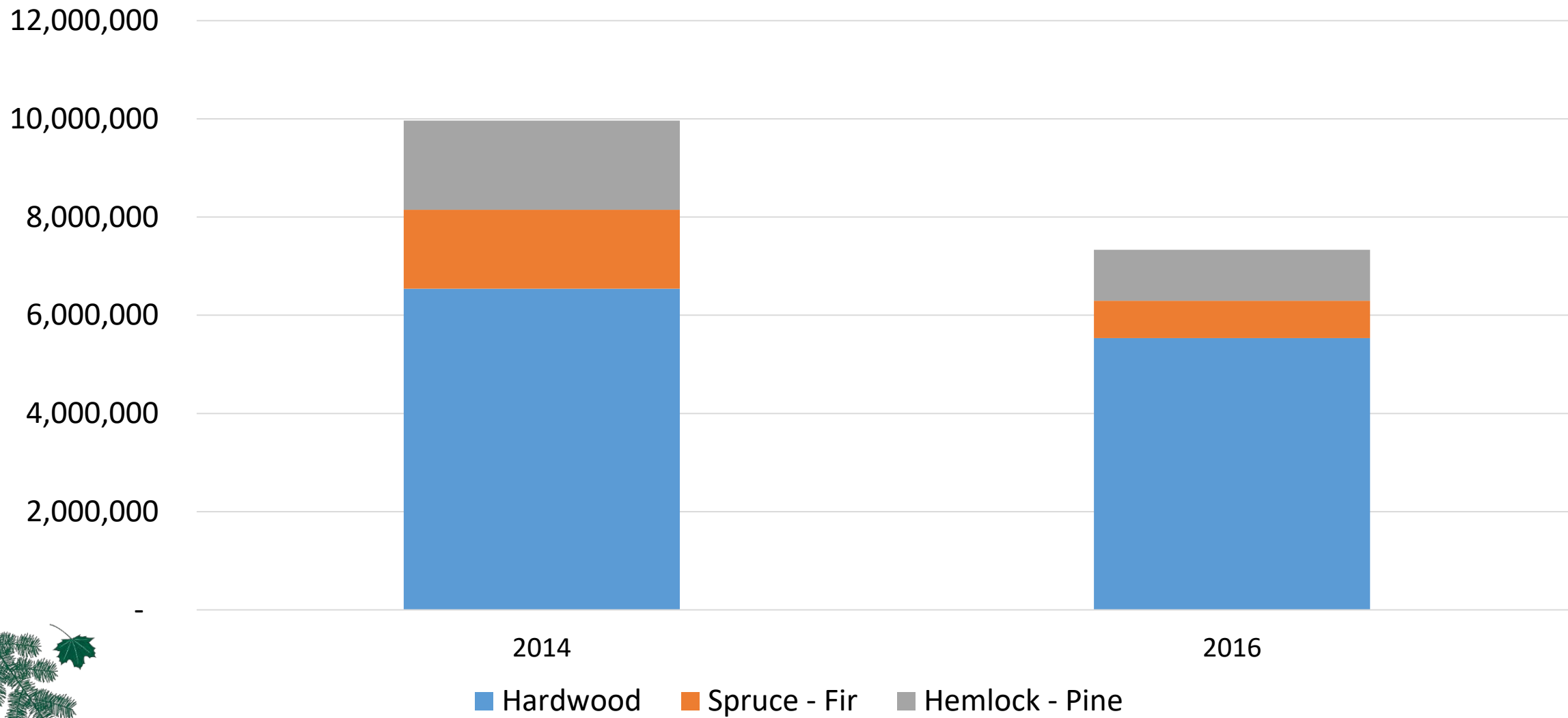


Estimated Pulpwood Consumption by Maine Pulp Mills

Estimates Based Upon INRS Data

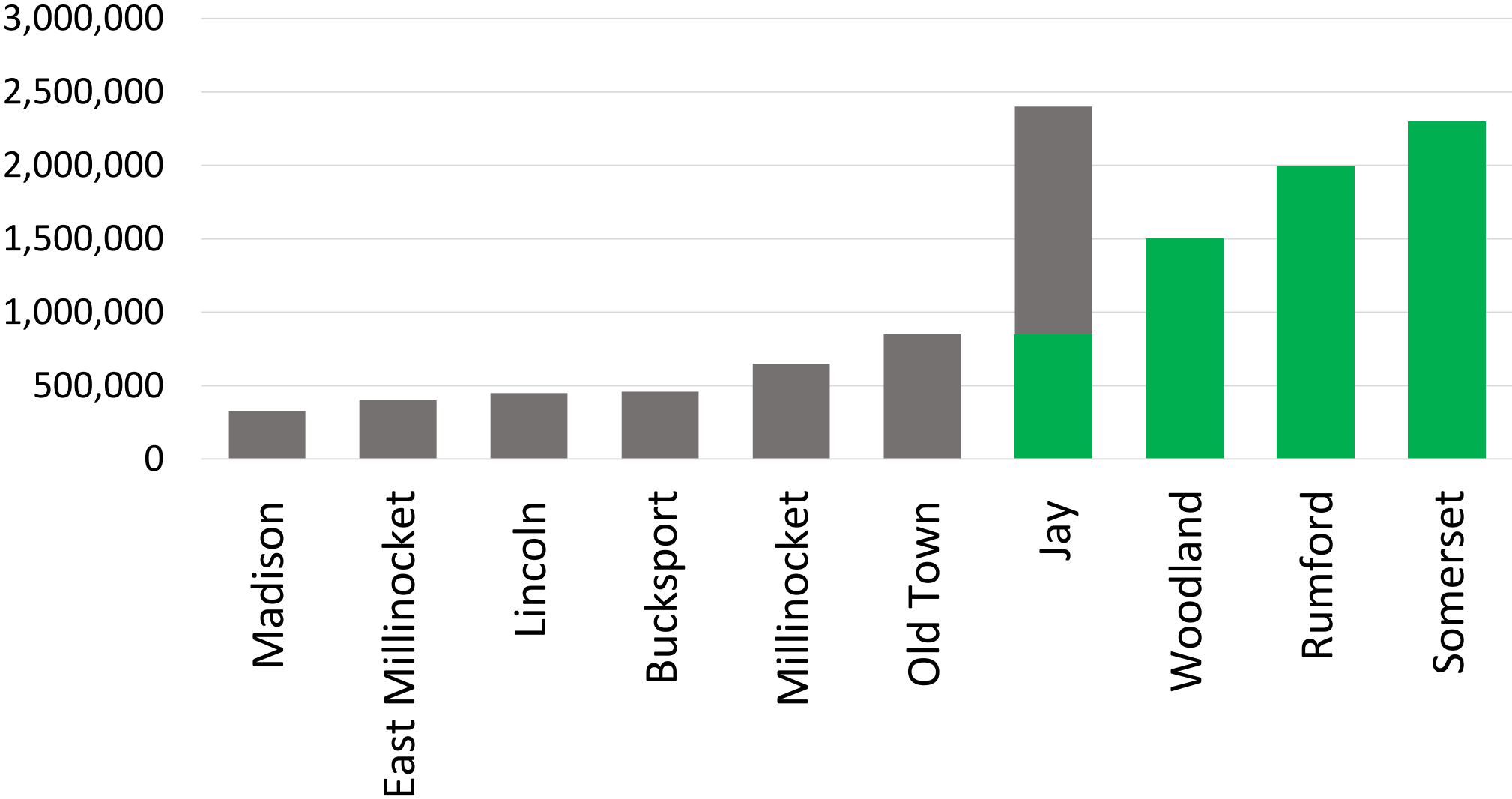


Maine Pulpmill Wood Use (tons)



Maine Pulpwood Consumption by Mill

Green Tons



Coated Paper Market

Key Items from Verso bankruptcy filing – Verso emerged from bankruptcy July 2016

- Traditional markets face decline
- “The coated paper industry faces long-term, structural decline”
- Driven by a move to digital in key markets (magazines, catalogues)
- A strong dollar has increased imports



Emails you never expected...

If you like Pulp & Paper
In print...



you'll love PPI online!

PULP & PAPER PPI
INTERNATIONAL

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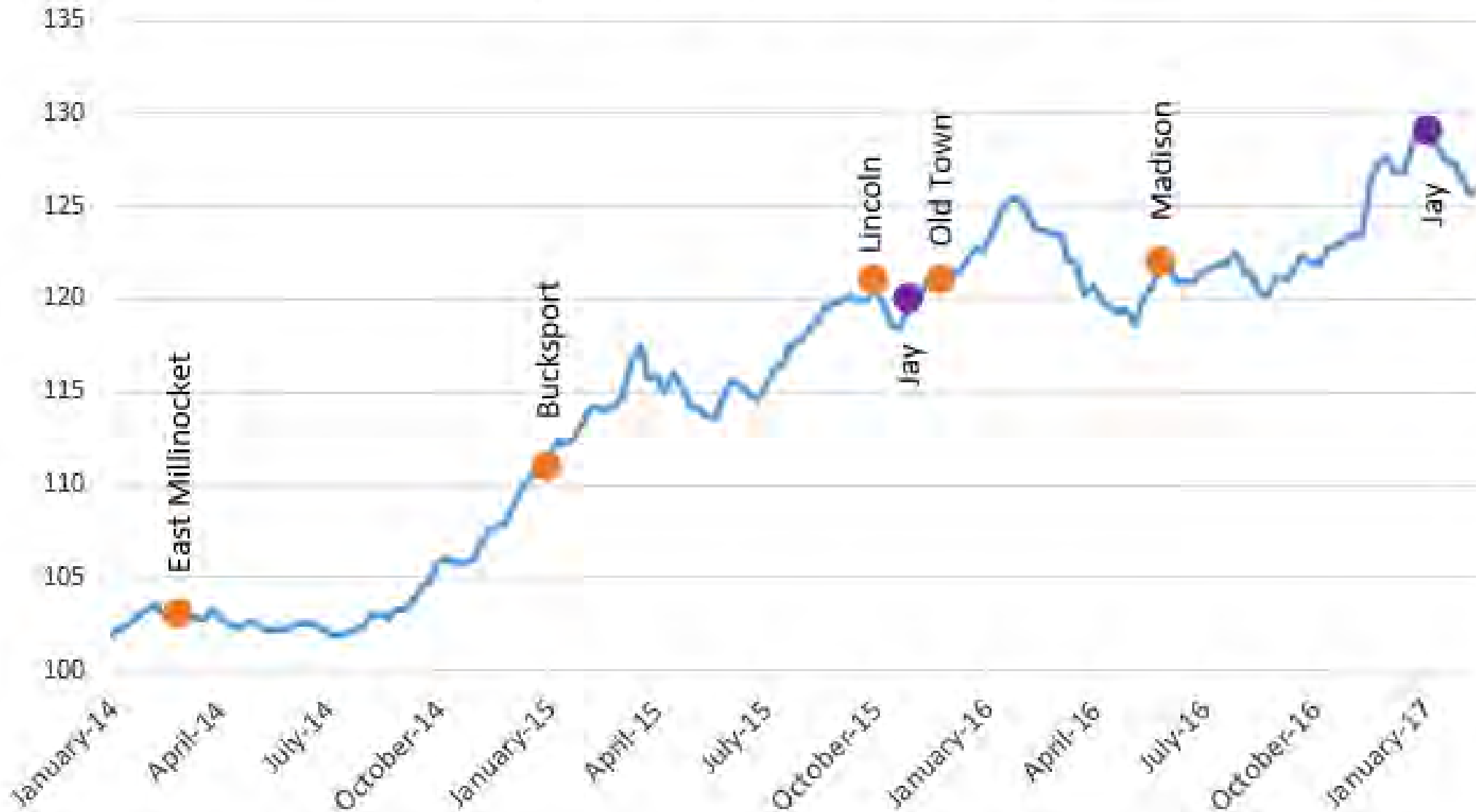
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Trade-Weighted U.S. Dollar Index and Maine Paper Mill Struggles

2014 - 2017, 1997 = 100

Data Source: Federal Reserve Economic Data



Pulp and Paper

- Pulp and paper mills remain region's largest consumer of wood products, and represent significant fixed infrastructure.
- Mills produce a variety of products, including market pulp, communication papers (coated and uncoated), and tissue. Each of these markets is unique.
- The Northern American paper industry has been shrinking, both in output and capacity. Individual mills often do well, but new investment in production is extremely limited in the U.S.
- Maine will remain a paper producing state for well into the future
- I expect reduced pulpwood consumption, and reduced prices for pulpwood (a bunch of factors in this one, not just demand).
- The closures are **NOT** cyclical



Challenges to the Pulp & Paper Industry

- You will hear
 - High taxes
 - High energy costs
 - High wood costs
 - And so on
- There are all very real, and present real challenges to the industry
 - Mills and regions now fighting over a shrinking pie
- They aren't the fundamental issue, which is change in the marketplace, and a capital intensive industry that is hard to change with any reasonable speed



New Investment at Woodland Pulp



- 2 new tissue machines
- ~\$150 million in new investment
- Used New Markets Tax Credits
- 70 new employees



**FIRST SALEABLE JUMBO ROLL
MARCH 16**

SAPPI Announced Investment This Week

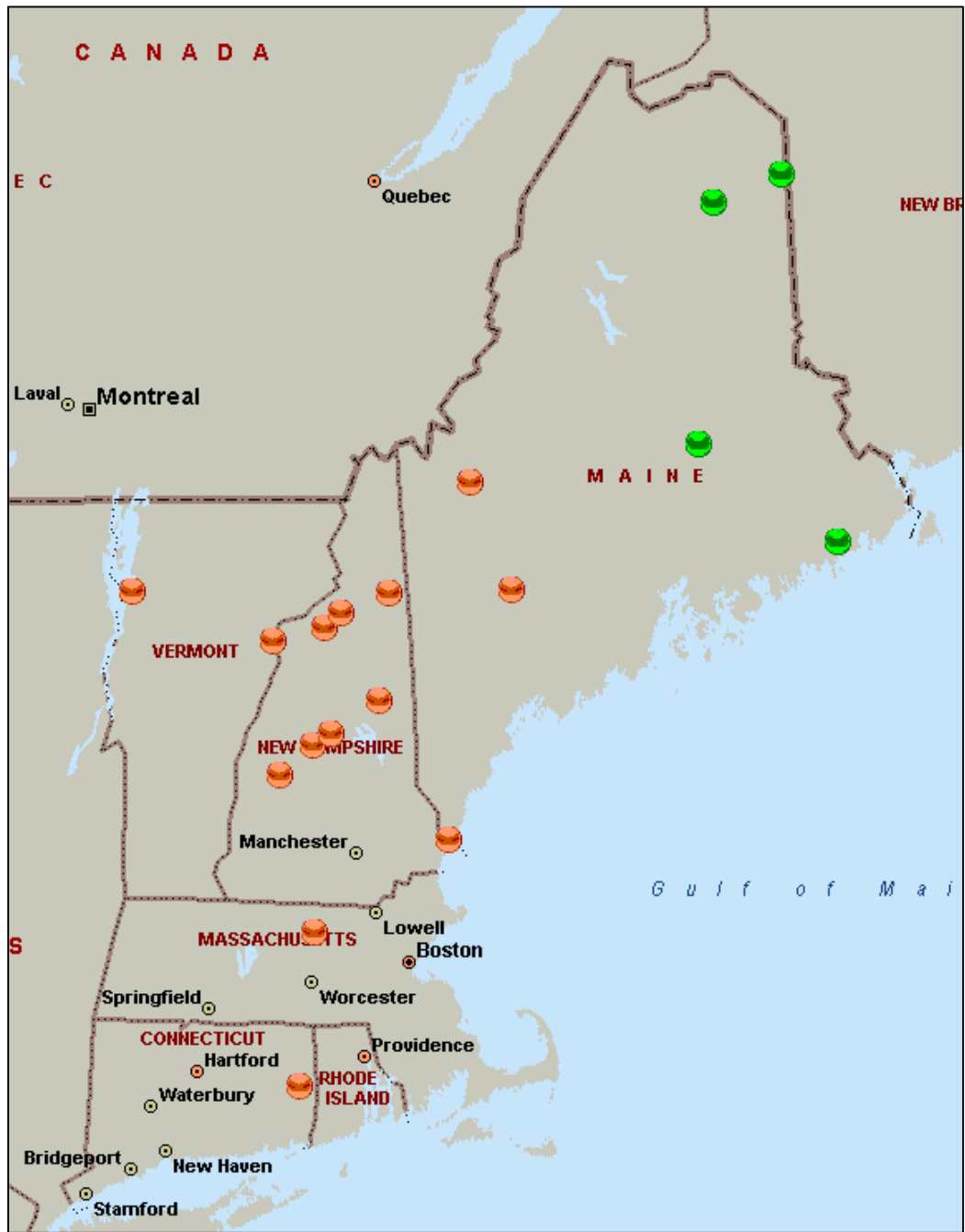
- \$165 million rebuild of PM1 at Somerset Mill
- \$25 million in new wood yard (October 2016 completion)
- Clearly investing in the future of the mill, New England's largest market for low-grade wood

sappi

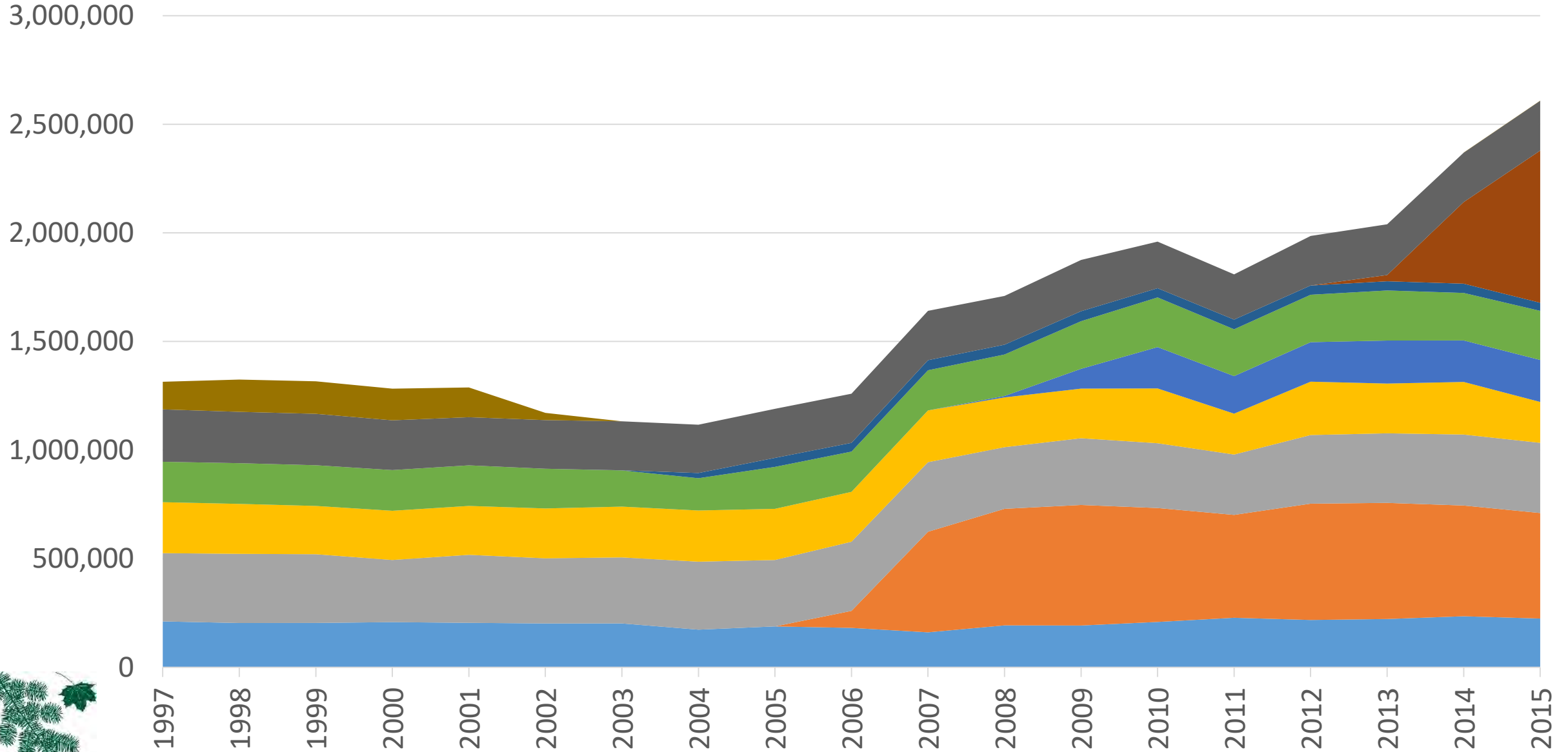


Biomass





Biomass Fuel Use - New Hampshire



Biomass
Electricity
(MWh)

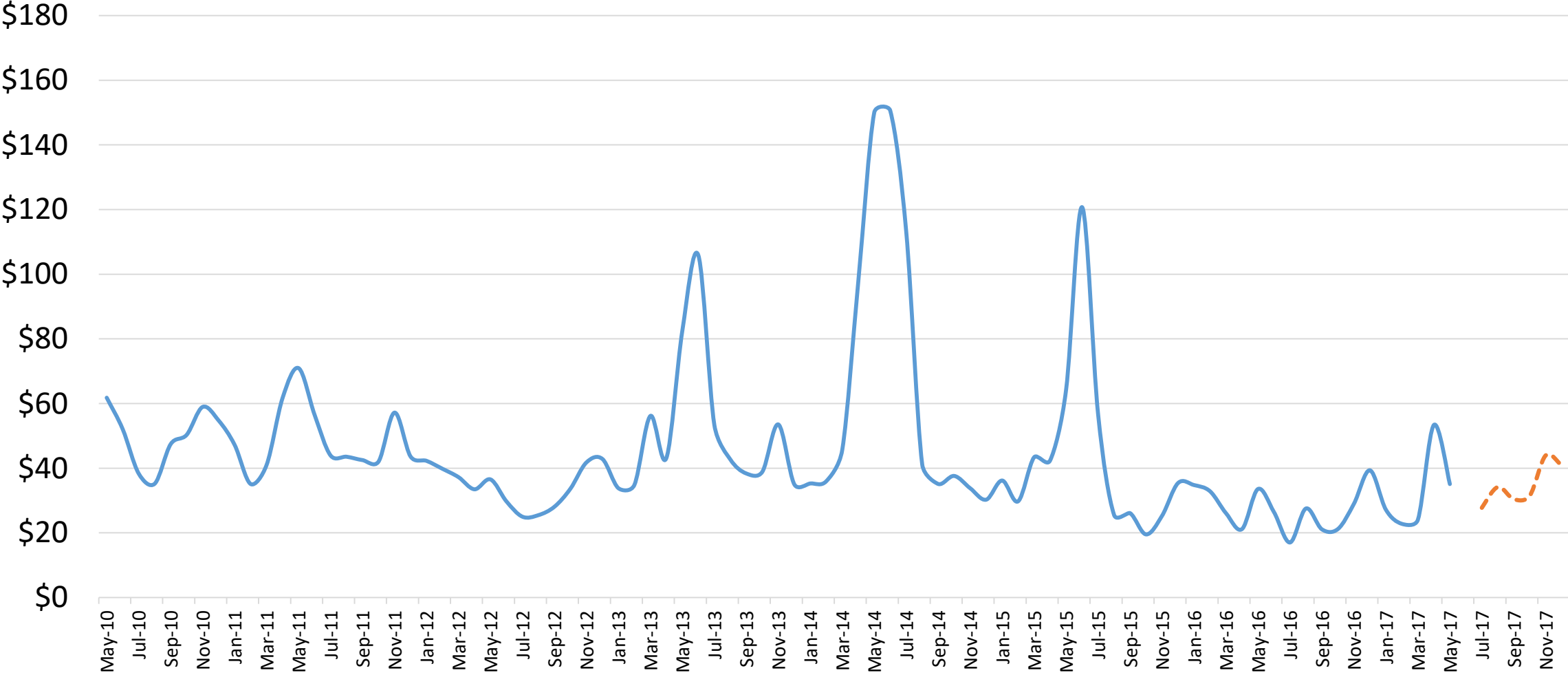
“Green” Attributes
(Renewable Energy Certificate)

Electricity (MWh)
(Wholesale)



Average Real Time Wholesale Electricity Prices

Dollars per MWh, Futures Prices for On-Peak, as of 3.7.2017 11:30 AM

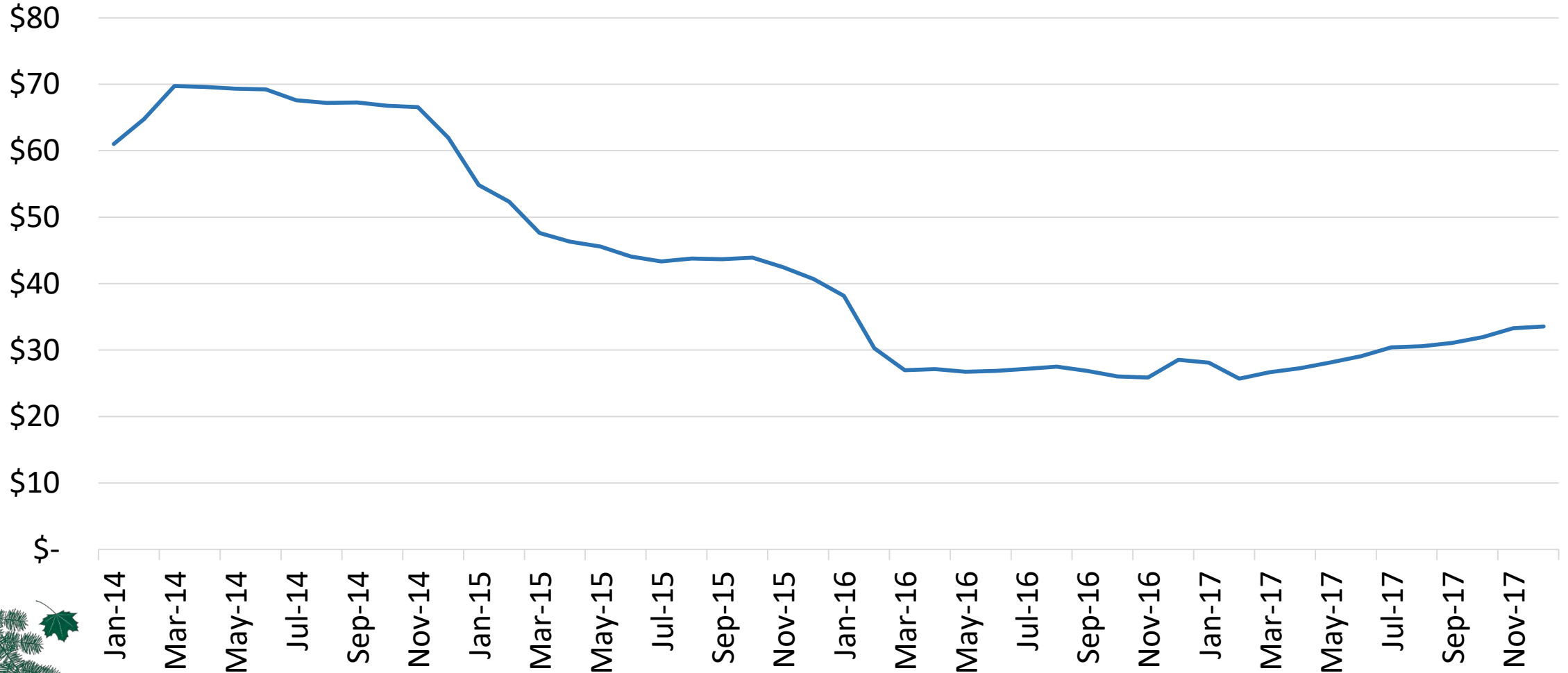


— Actual - - - Futures

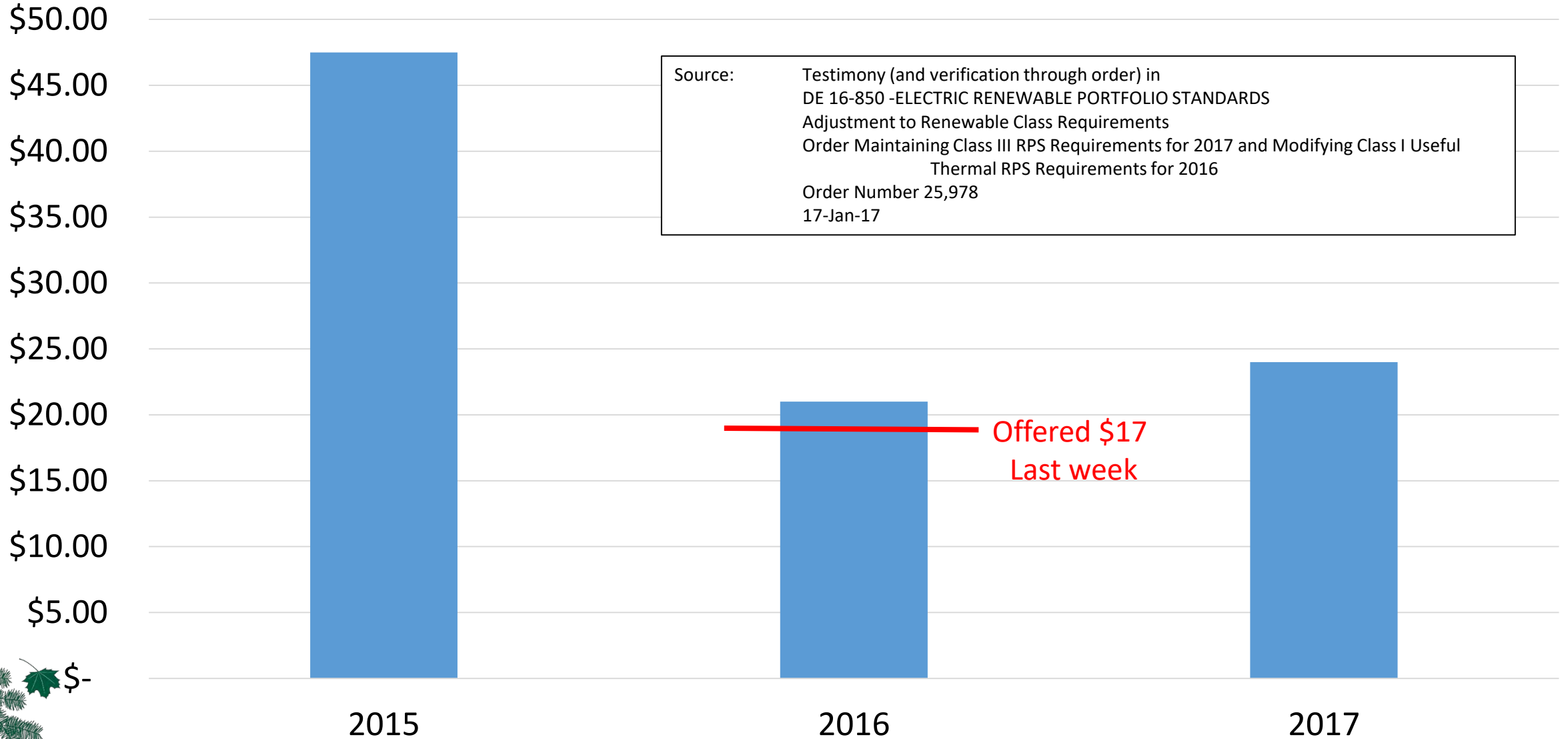


Average Monthly Wholesale Electricity Price

Trailing 12 Month Average



CT Class 1 RECs (estimated)

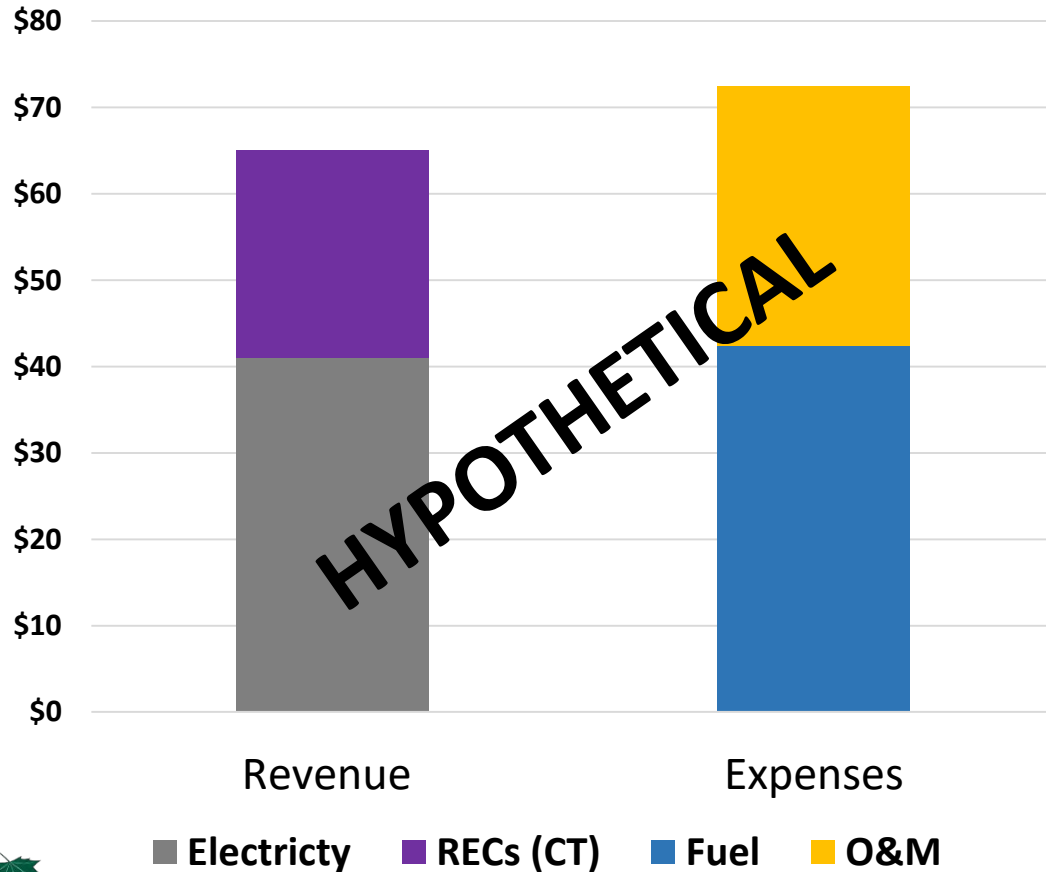


Source: Testimony (and verification through order) in
DE 16-850 -ELECTRIC RENEWABLE PORTFOLIO STANDARDS
Adjustment to Renewable Class Requirements
Order Maintaining Class III RPS Requirements for 2017 and Modifying Class I Useful
Thermal RPS Requirements for 2016
Order Number 25,978
17-Jan-17



\$-

What does it take to operate biomass in 2016?



- Assumes:

- Electricity at current futures price for the next year (\$41)
- RECs at recent broker quote (\$24)
- Biomass fuel at \$25, 1.7 green tons per MWh
- O&M at \$30 per MWh

- **With these assumptions, this is not an attractive business**



Wood Energy in the Northeast:

Pellet Producers and Facilities Using Wood-for-Energy

February 2012

Facility Size
(green tons per year)

Pellet Producers

■ < 250,000

■ < 100,000

Institutional & Commercial

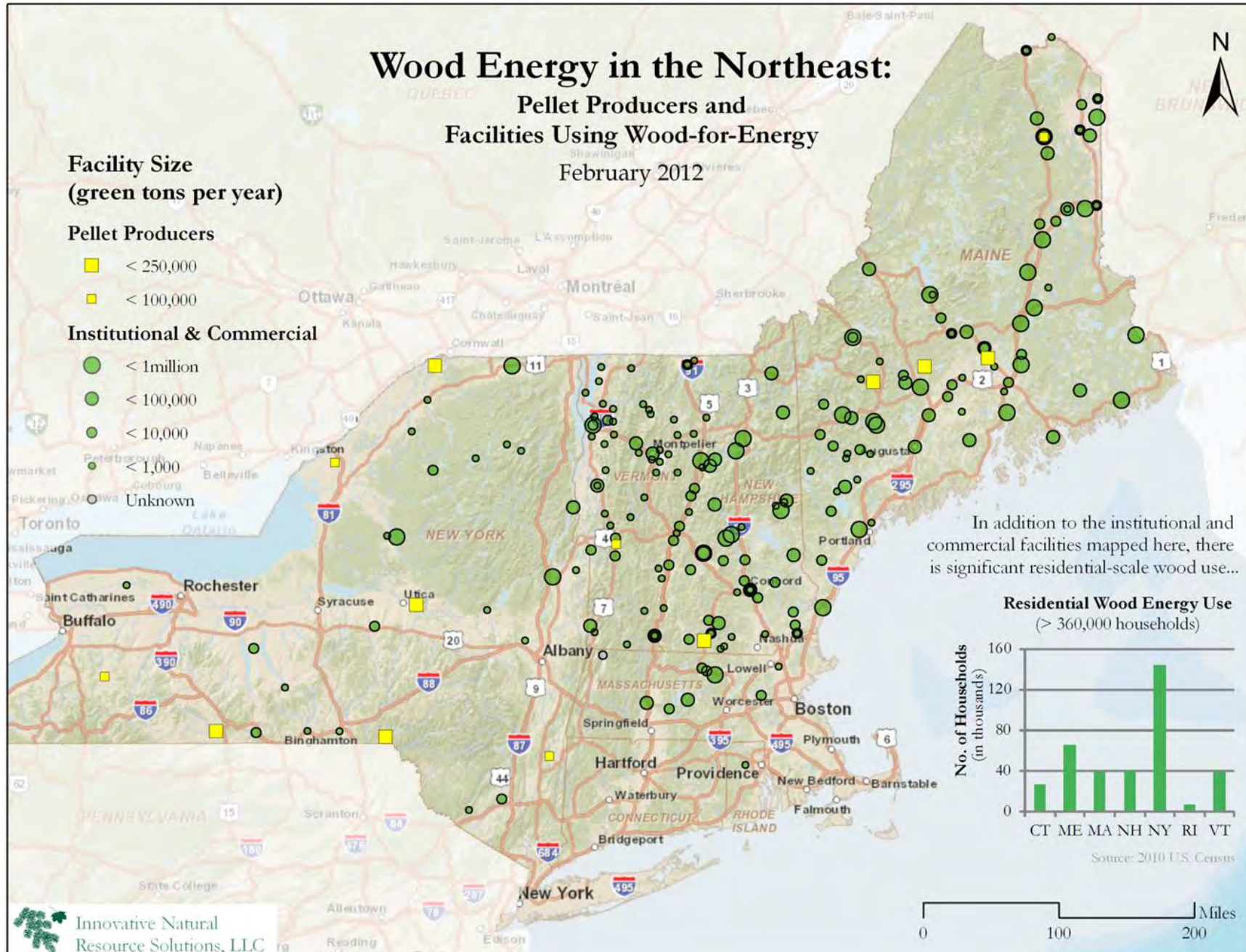
● < 1million

● < 100,000

● < 10,000

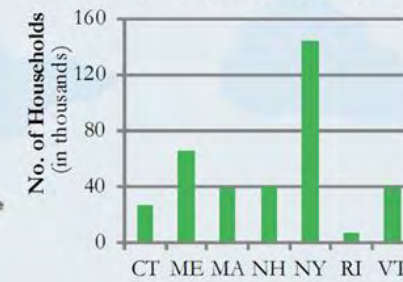
● < 1,000

○ Unknown



In addition to the institutional and commercial facilities mapped here, there is significant residential-scale wood use...

Residential Wood Energy Use
(> 360,000 households)



Source: 2010 U.S. Census



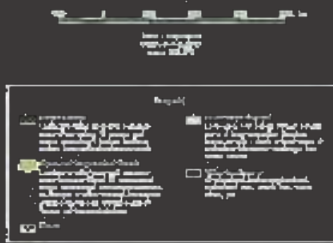


The Wood



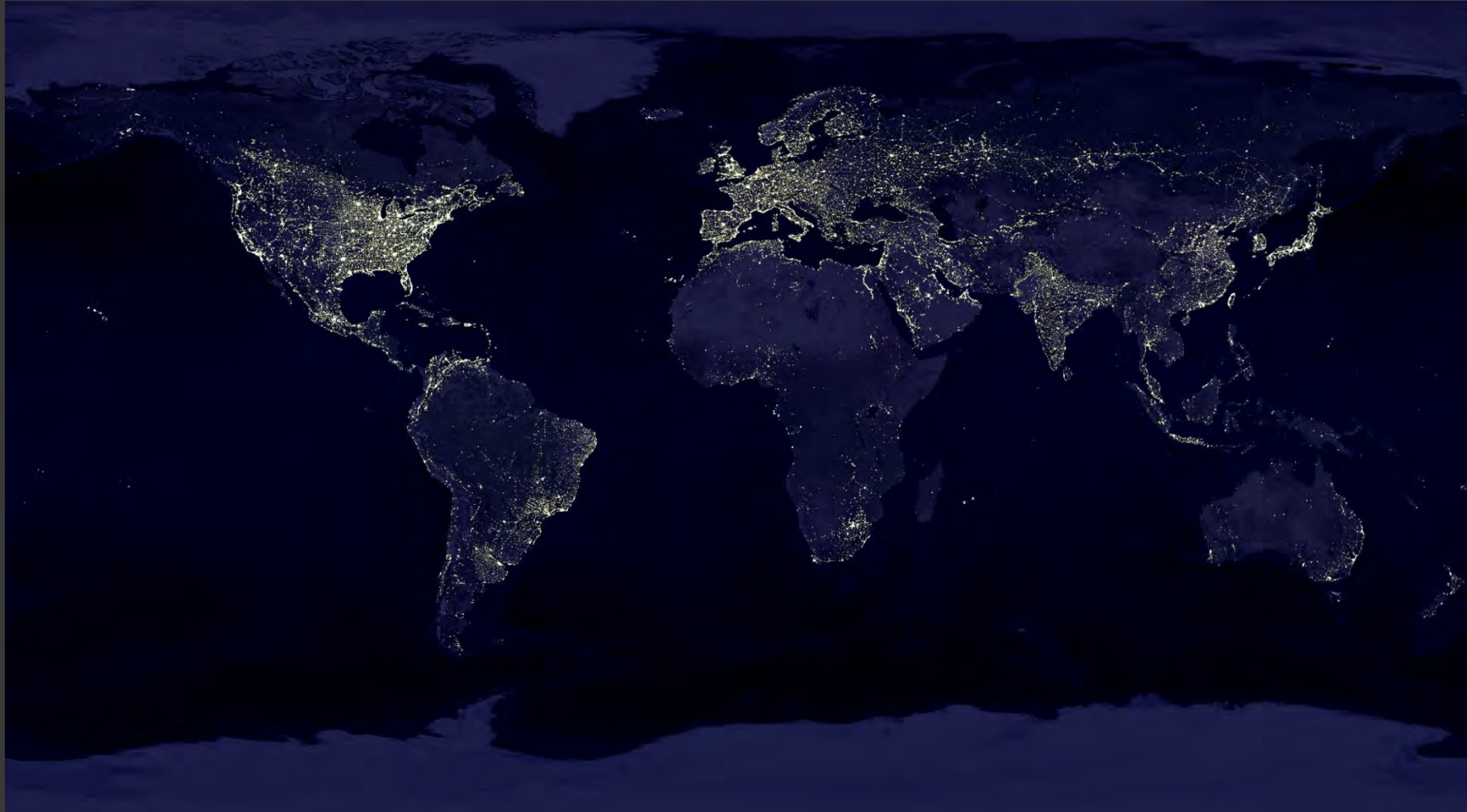
USDA, Forest Service, Pacific West Region

World Map of Wood Resources: This map shows the estimated global wood resources in 2005. It is based on the Forest Resources Assessment (FRA) conducted by the Food and Agriculture Organization (FAO) of the United Nations. The map shows the distribution of wood resources by region, with the highest concentrations in North America, Europe, and parts of Asia and South America. The map also shows the distribution of wood resources by type, with the highest concentrations in softwood and hardwood. The map is intended to provide a general overview of the global wood resources and to highlight the need for sustainable forest management.



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The Markets



The glass is half full...

- We have **markets**, and are incredibly well positioned compared to other parts of the country
- We have the **forest resource and supply infrastructure** (landowners, loggers, entire forest industry ecosystem) that would make other regions jealous
- We live in close proximity to (and are part of) the **greatest collection of consumers** in the history of the world
- It is cold in New England, we heat buildings, we need process heat
- There may **never be a better time** to be develop a project or technology that uses low-grade, particularly softwood



Projects on the Drawing Board

- Sherman Station (18 MW power, activated carbon)
- East Millinocket Biorefinery
- Maine Biomass Exports (Searsport export)
- Phyto-Charter (Eastport exports)
- Ensyn (bio-oil, no location publicly suggested)





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- Five 2-day sessions in 2017 and repeated in 2018.
- Will be available online at end of 2017.

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