

Adventures in Biomass Utilization

Lessons Learned from Trinity County





Our Biomass Background

- The Watershed Center has been trying to figure out how to squeeze value... and jobs... out of biomass since it was known as “small diameter” timber
- We’ve worked on manufacturing and marketing durable products such as lumber and posts/poles
- Began with piloting products and markets – targeted niches
- Moved into efficient production and commodity markets
- Manufactured value-added products
- Ran a sort yard
- Investigated wood pellet manufacturing
- Currently investigating gasification for combined heat and power
- Focus on “appropriate-scale” – socially, ecologically and economically... which happens to be small...

Primary Topics

- The Economizer portable small log mill
- Post and Pole processing
- Utilizing slash - compost and mulch
- Small-scale and portable pellet/brick manufacturing
- Small-scale CHP biomass energy
- Sorting and the “integrated biomass facility”





Key Themes

- The importance of sorting
- Making small-scale work... the challenges of competing with economies of scale
- The importance of adding value locally and/or having proximate markets for residuals
- The costs and demands of marketing
- Sustaining success requires capital and cash flow
- Portability theoretically could help
- Integration key for small, medium or large-scale operations

The Economizer

- Specifics
 - Small log chipper-canter
 - Handles less than 10" diameter
 - Single pass creates rough-cut lumber
 - Approx 7 mbf/shift production (varies by species)
- Major challenges
 - Commodity products – competing with high through-put mills
 - Requires careful batch sorting
 - Time consuming change-outs to switch dimensions
 - Approx 50% waste
 - Requires additional processing to add value



Post and Pole Manufacturing in Hayfork





Post and Pole Processing

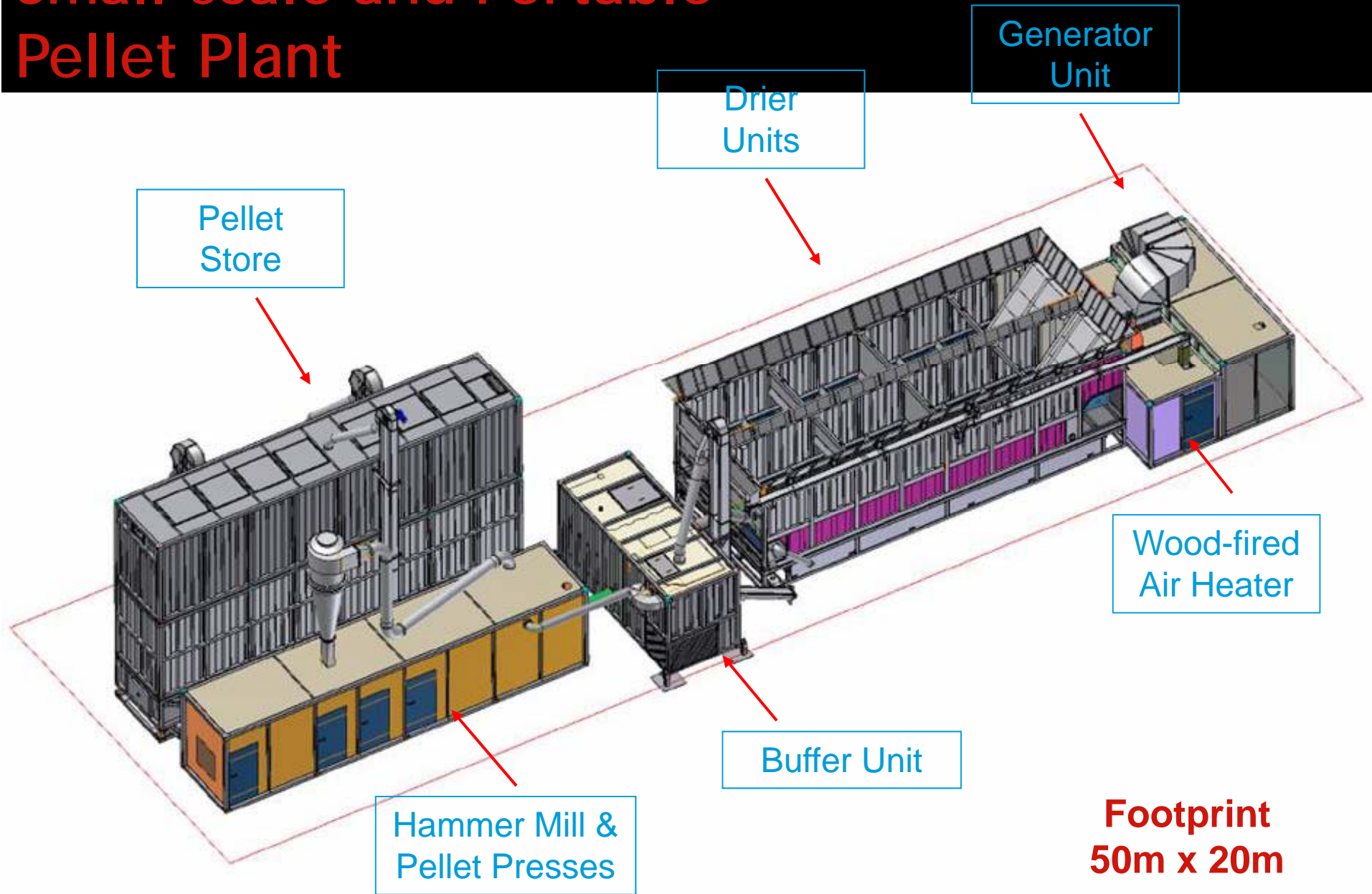
- Specifics
 - Efficient up to 20' lengths and 12" diameter and down to 8' and 3" diameter
 - Ideal for smaller logs
 - OK to sort after peeling
 - Approx 4 mbf/shift
- Major Challenges
 - Species of generally lower quality than lodgepole
 - Commodity products in variable market
 - Seasonal markets mean high inventory costs – challenging cash flow
 - Low margin, even with efficient production
 - Need residual biomass market for profitability

Composting and Mulch

- A potential use for slash
- Composting as an art and science
- Local markets at a small scale
- Mulch generally lacks sufficient value, but compost could be profitable
- A work in progress for us... but some folks make it work



Small-scale and Portable Pellet Plant

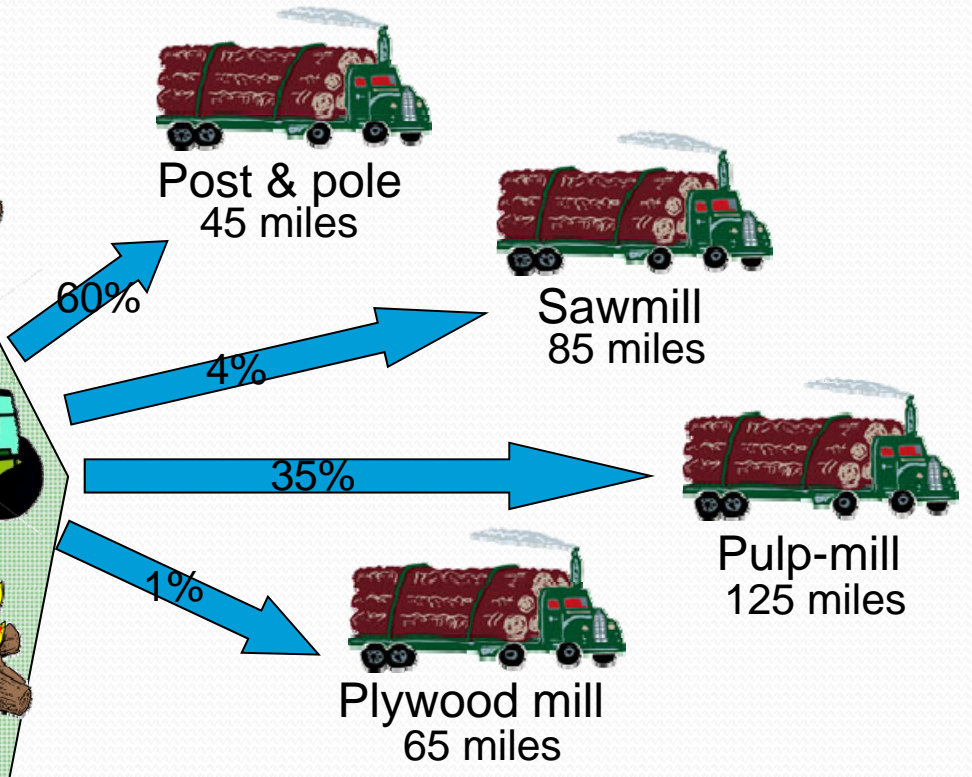
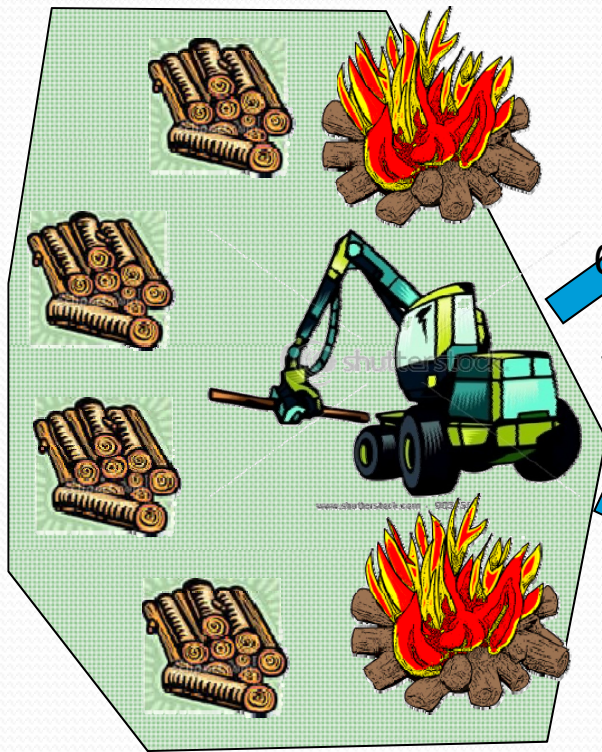




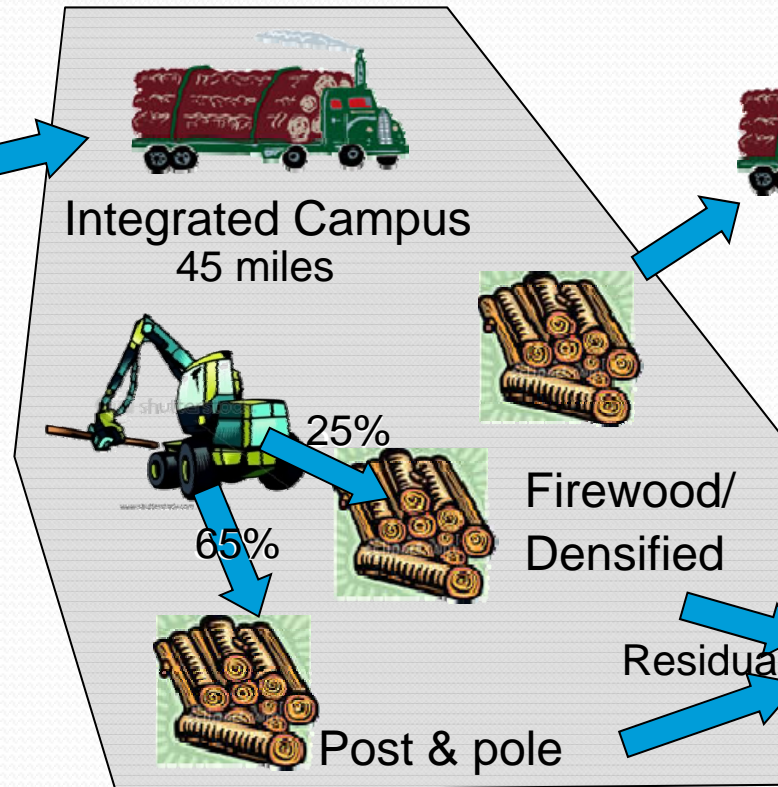
Small-scale and Portable Pellet or Brick Manufacturing

- Portability considerations
- Feedstock issues
 - Species
 - Sourcing (small logs or mill residuals)
- Manufacturing considerations
 - Drying
 - Tight allowances for premium pellets
 - Bricks can take more bark/dirty chips
- Marketing
 - CA opportunity, but costly to enter marketplace
- Seasonal market creates high inventory costs and cash flow challenge

“Typical” forest supply chain



“Integrated facility” supply chain



Sawmill
40 miles

Integrated Campus
45 miles

25%

Firewood/
Densified

65%

Post & pole

Residuals

Energy

Sorting and the “integrated facility”

- First-sort happens in the woods
- The rest was delivered to the sort yard – “integrated facility” in Hayfork
- Hayfork sort yard was useful for getting multiple products to markets
 - producing short logs
 - maximizing value from pine
 - capturing value from border-line sawlogs
- Proximity to markets limits value
- Sorting maximizes value with multiple on-site production lines





Many clear challenges,
Fewer clear opportunities:
Closing small-scale considerations

- Proximate residual biomass markets are key to profitably manufacturing durable small-diameter wood products
- Niche markets and value-added processing help considerably
- Significant capital needs – tough financing small projects
- High inventory costs and challenging cash flow
- Who are your business partners?...
- Log procurement and steady wood supply
- Marketing costs and competing in commodity markets



Where does that leave us?

- Post and Pole manufacturing can be viable with efficient systems, sorting, and residual markets
- Small-log milling for dimensional lumber doesn't work at a small scale without clear niche and/or local value-added
- Small-scale pellet and/or brick manufacturing can be viable, but is relatively immature today
- Scale-appropriate and cost-effective CHP technology will be key to local
- Integrated Facilities ARE today's successful models

Many thanks... and good luck!

- Contact us:

Jim Jungwirth and Nick Goulette

The Watershed Research &
Training Center

PO Box 356

Hayfork, CA 96041

530-628-4206

www.thewatershedcenter.com

wrtc@hayfork.net

