

Progress Report

Cereal Straw Utilization

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Project Tasks

- Bleaching of Wheat Straw
- Molded pulp applications with wheat and alfalfa
- Wheat straw trials on pilot and commercial papermachines
- Road application of spent liquor

Bleaching Research

- Ferrulic Acid Determination
 - Development of Procedure
- Wheat straw vs. Seed Alfalfa Straw Differences
 - Wheat Straw 2.6% vs. Alfalfa 0.38%
- Kappa Reduction with peracetic acid
 - Determining optimum conditions to bleach with peracetic acid
- UW pulping and bleaching vs. BioRegional
 - UW 90.2 vs. BioRegional 88.2 under same conditions

Molded Pulp Applications

- Three commercial trials since Dec. 2005
 - Better Drainage
 - Better strength
 - Harder to dry
 - Last trial June 8 & 9 quite successful

Commercial and Pilot Machine Trials

- August Trial date for UW Pilot Papermachine trials with Sonoco
- 4 days running on pilot machine leading to another commercial machine trial
- Starbucks as an interested third party purchaser

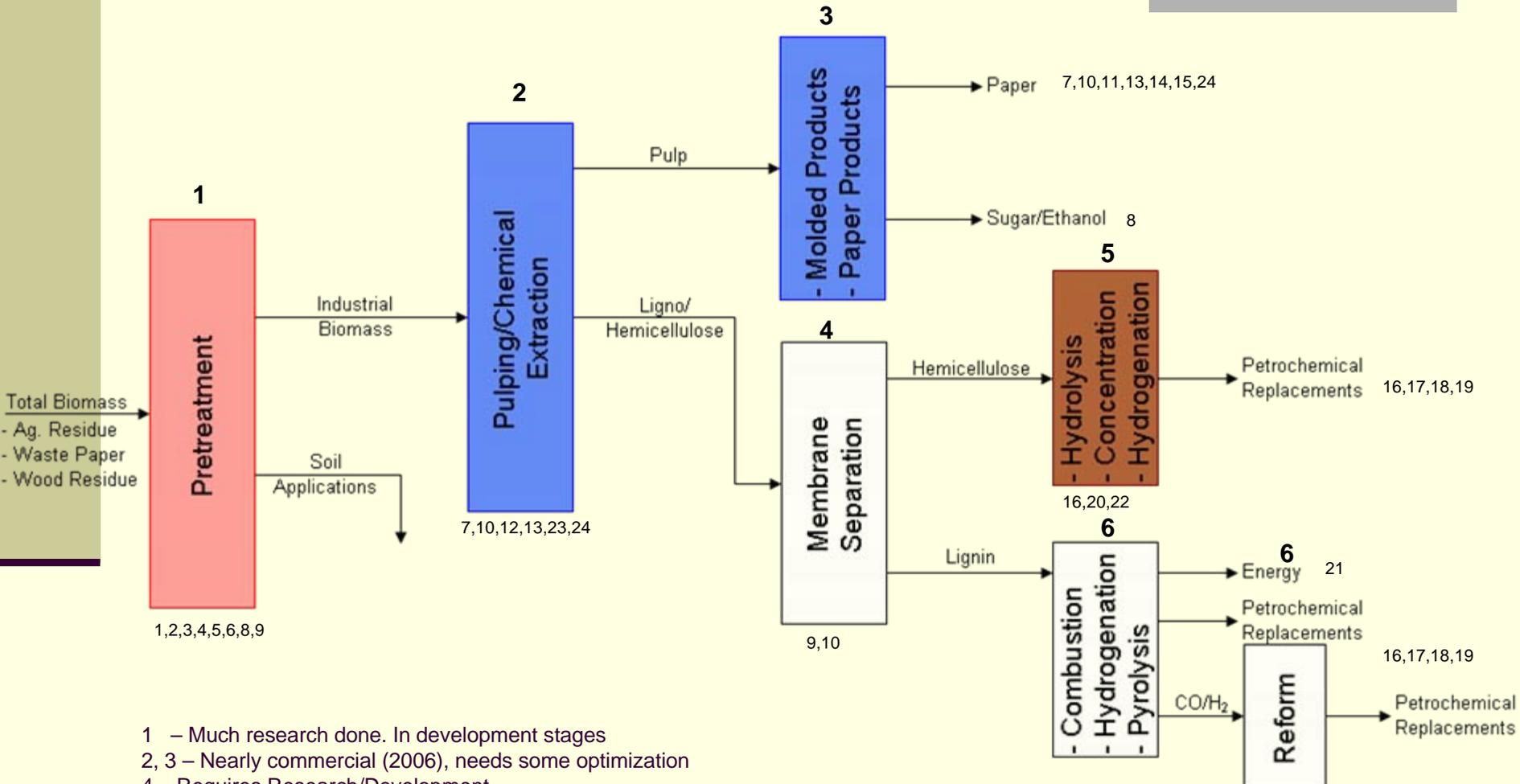
Road Applications

- 1000 gallons of liquor have been produce
- Applications will be made to dirt roads
- Applications will be made to field borders in Horse Heaven Hills
- Applications delayed due to wet spring

Opportunities

- Liquor issues now a viable product
- UW technology is optimum way to extract hemicellulose
- Ponderosa Fibers Mill

Potential Washington Agro-Industry Manufacturing Configuration



- 1 – Much research done. In development stages
- 2, 3 – Nearly commercial (2006), needs some optimization
- 4 – Requires Research/Development
- 5 – Process presently commercial/needs R/D for bio-sugar and glycerin feeds
- 6 – Requires Research/Development – Current Agenda 2020 USDOE Projects

List of Current/Potential Stakeholders

* Indicates Sources of Funding for Joint UW/WSU Biomass Projects (1993-2006)

- 1) WSU Crop/Soil Science
- 2) * Wheat Growers/Commissions
- 3) * Alfalfa Seed Producers
- 4) * Other (Canola, Arundo Donax, etc.)
- 5) Farm Equipment
* Manufacturers
- 6) * Fertilizer/Chemical Suppliers
- 7) * Weyerhaeuser
- 8) * Washington State Dept. of
* Ecology
- 9) * U.S. DOE, USDA
- 10) * Sonoco
- 11) Michelsen Packaging
Company
- 12) Columbia River Pulp
- 13) * Boise
- 14) PNW Newsprint Manufacturers
- 15) * Grays Harbor Paper
- 16) * IPCI
- 17) Arkema Group
- 18) Nike
- 19) U.S. Polyester/Polyurethane
Producers
- 20) PNW Biodiesel Manufacturers
- 21) Energy Producers/Consumers
- 22) Dairygold and Other Cheese
Mnfg – Yakima Valley
- 23) Washington State Orchards
- 24) Keyes Fiber

Conclusions

- Great steps have been made in 2005-6
- Successful trials at molded pulp operation
- Interested parties in straw black liquor/lignin
- Moving closer to commercialization at 2 sites