

Forest Biomaterials

NC STATE UNIVERSITY



Outline

1. Organization: CNR, FB (PSE & WP)

2. Where we were?

3. Where we are headed?



1

College of Natural Resources - PSE & WP



College of Natural
Resources

Department of Forest Biomaterials

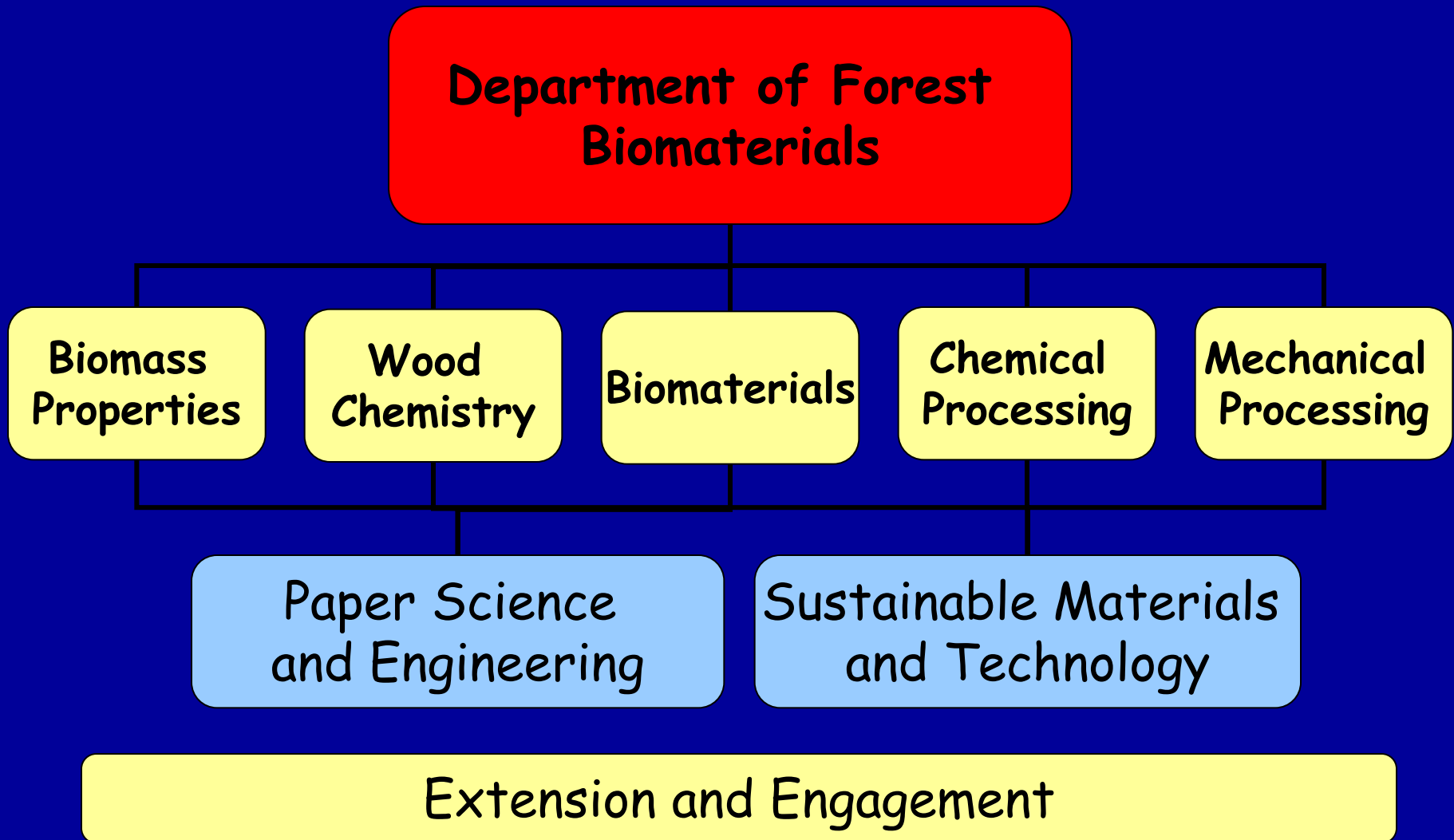
Department of Forestry

Paper Science and
Engineering (PSE)

Dept. of Parks and Recreation
and Tourism Management

Sustainable Materials and
Technology (SMT)

Department Overview



<http://natural-resources.ncsu.edu/wps/wp>

- ✓ 4 Teaching/Research Faculty
 - ✓ 3 Extension Faculty (open position)
 - ✓ 1 Research Faculty
 - ✓ Wood Products, Chemistry
-
- ✓ 45 Undergraduate Students
 - ✓ 12 Graduate Students



Paper Science and Engineering

<http://natural-resources.ncsu.edu/wps/pp>

- ✓ 12 Faculty- 4 Chem Eng., 4 Chemists, 4 PSE
- ✓ 5 have more than 5 yrs. of industry experience
- ✓ Exec in Residence, Adjunct

- ✓ 20 Research Associates
- ✓ 165 Undergrad Students

Dual Chem Eng degree is unique in the US

Options in Chemistry, Textiles, Environmental Science, Business

- ✓ 25 Graduate Students
- ✓ 135 Endowed Scholarships



Our Products...



Total Package

- ✓ ABET Accredited degree
- ✓ Dual degree with Chemical Engineering very important, 9 semesters (different Colleges)
- ✓ Pulp and Paper Foundation
 - ✓ 135 endowments, \$150k annual contributions
 - ✓ All students above 3.0 on scholarship
 - ✓ Internships/Co-ops
- ✓ Strong emphasis on professional development
- ✓ Tremendous salaries, \$65-67k



Total Package – Slow changes to successful program

- ✓ New classes in Process Analysis, Life Cycle Analysis, Green Chemistry
- ✓ Careful integration of specific technology into the manufacturing system, 'keep score' with dollars or carbon
- ✓ Jobs with the current industry, skills for the future industry



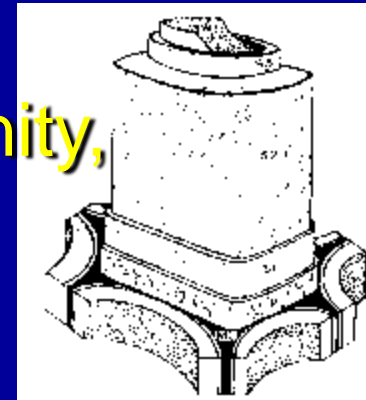
Changes in Landscape

- ✓ 12 PPERA programs – all growing, many in Chem. Eng. Departments, moving faculty positions away from PSE
- ✓ Consolidation of industry, new jobs but no new mills
- ✓ Only 25-33% of new hires are PSE, but PSE graduates stay longer
- ✓ Value proposition for companies
- ✓ Value proposition for land owners, heat/power, fuels, paper, wood products, specialty products



<http://natural-resources.ncsu.edu/wps/wp>

- ✓ Significant changes to curriculum and 'sell' for students (WP UG programs at MSU, SUNY, PSU all closed or merged into other Dept.)
- ✓ Capital for new manufacturing infrastructure is a challenge
- ✓ Entrepreneurship, innovation, value-added (buy local)
- ✓ Voluntary branding programs an opportunity, SFI/FSC, LEED, EDP, Organic Food

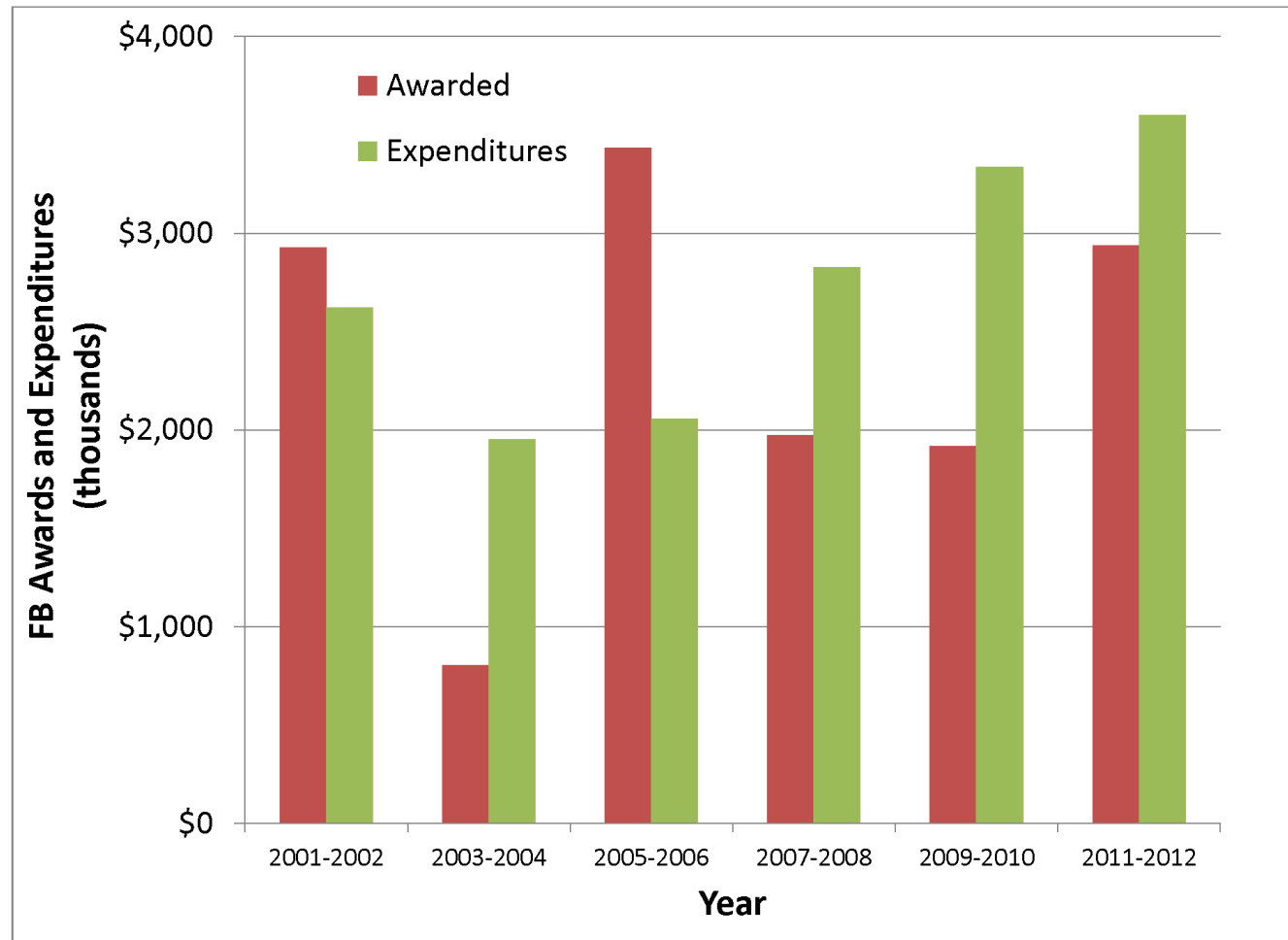


Research Follows Funding

- ✓ USFS, industry funding has declined significantly!
- ✓ New research focus on energy, liquid fuels, integrated systems, biomaterials
- ✓ Systems integration includes finance, LCA
- ✓ Federal funding dominates, but with industry connections 40 companies in 5 different consortia, \$3 mil
- ✓ Partnerships with other Universities
- ✓ Eastman partnership, \$10mil/5yrs, \$12 bil., 15% of sales in buildings and construction

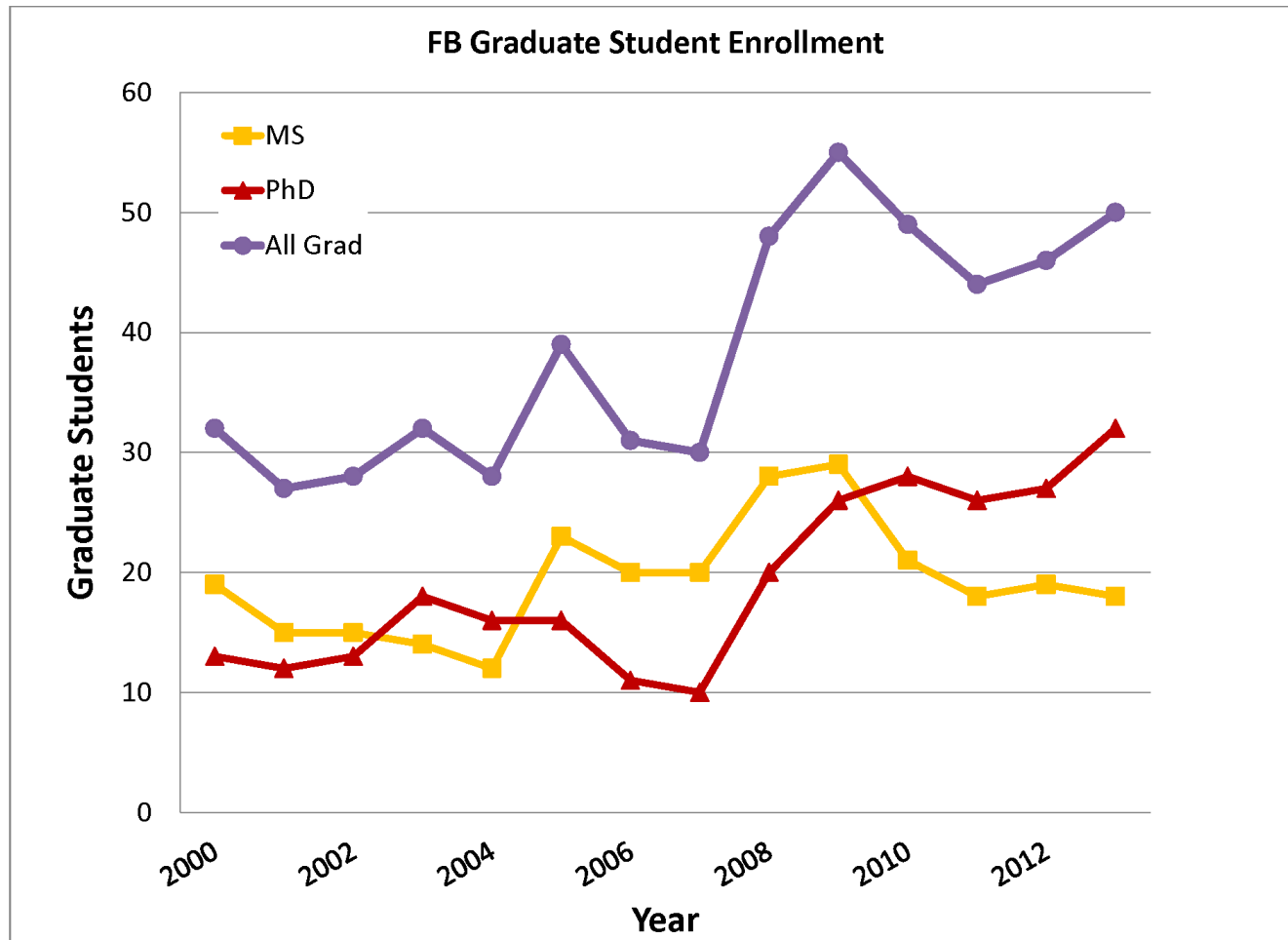
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Forest Biomaterials



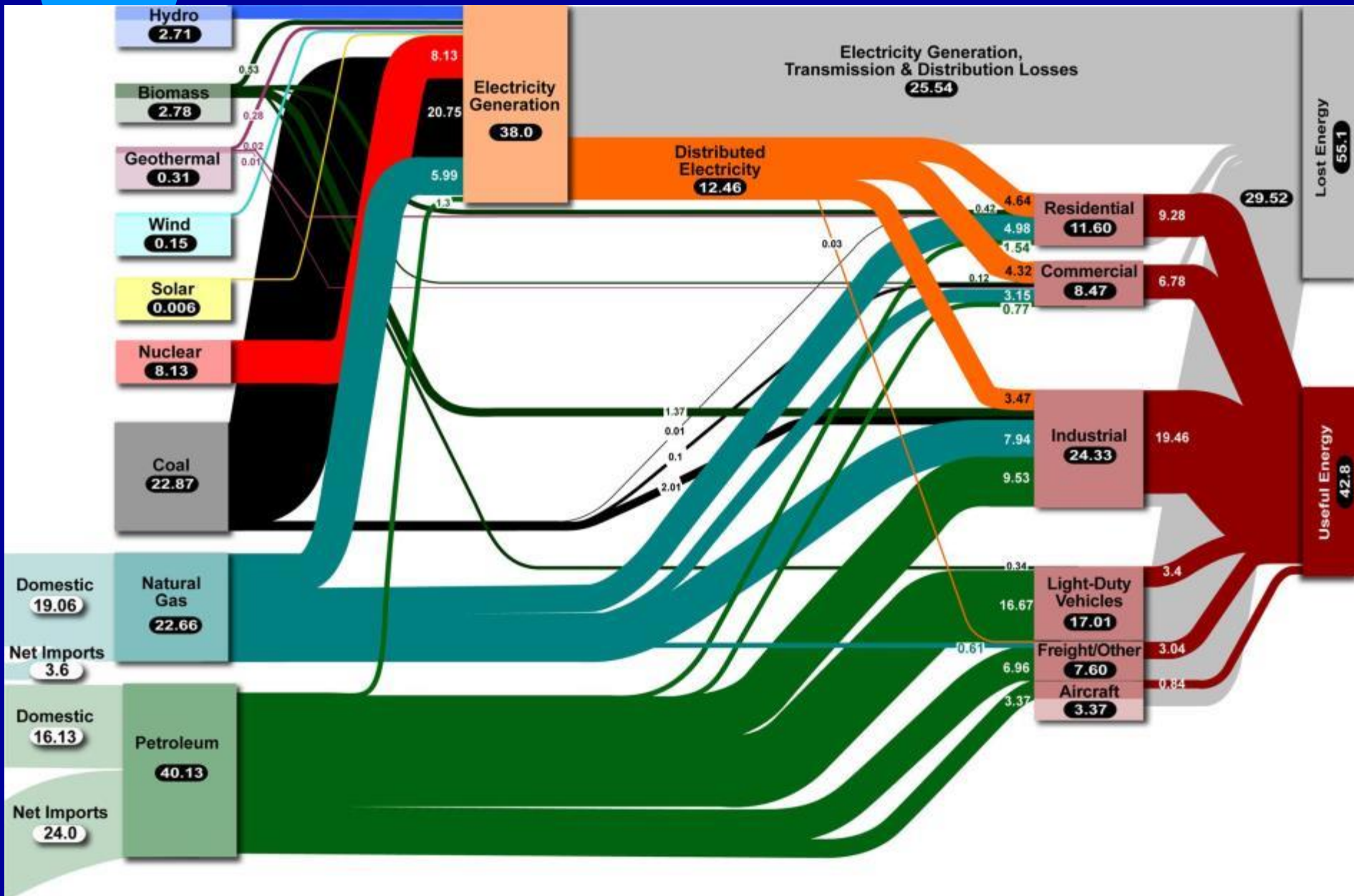
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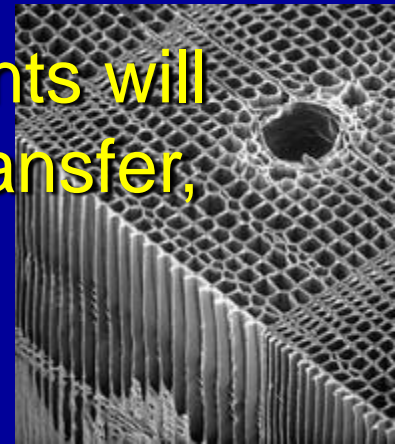


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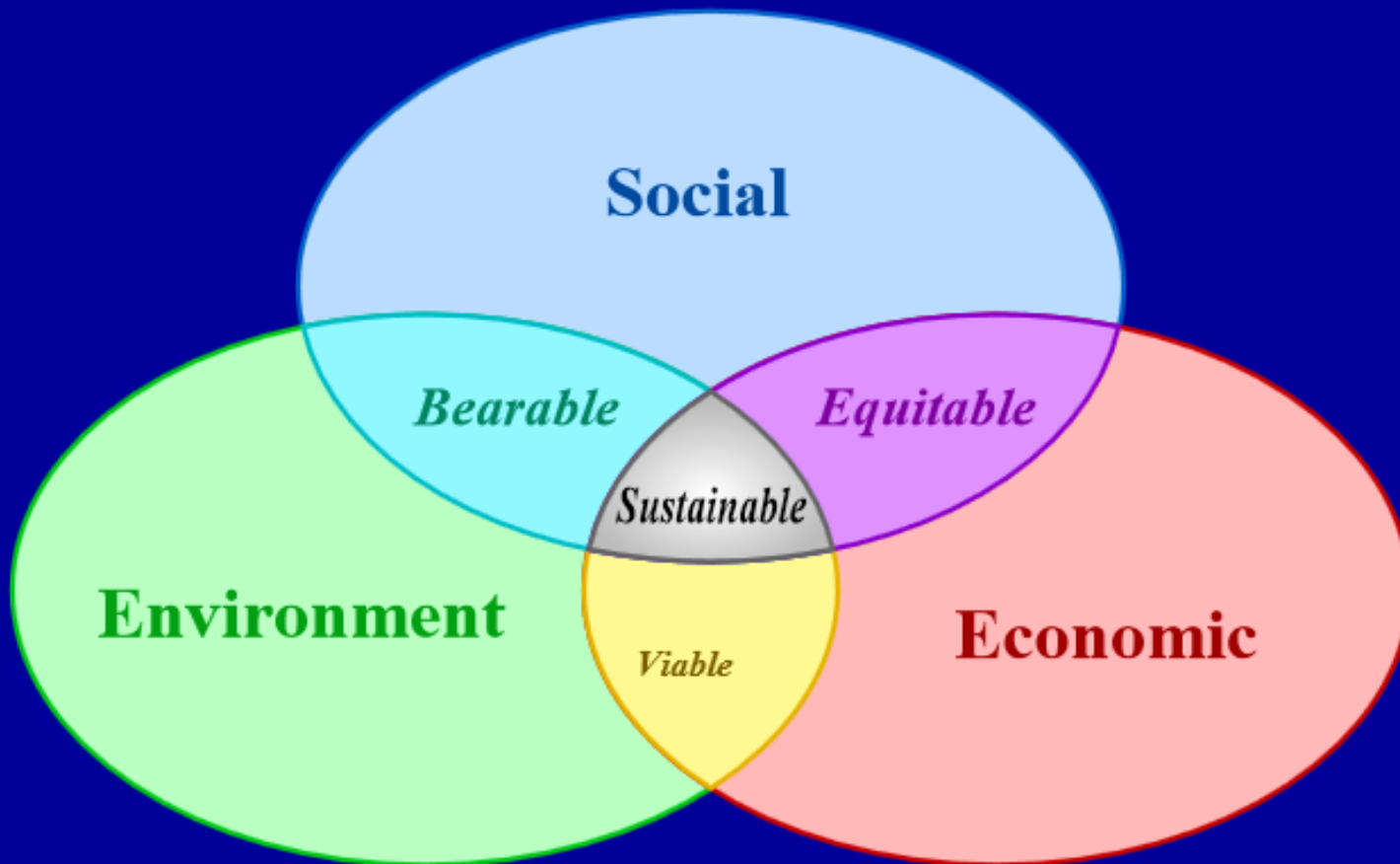
Forest Biomaterials



- ✓ Who are the Universities' 'customers'?
- ✓ Students are our 'products'; employers and funders are primary 'customers'
- ✓ Differences in campus structures and histories limit replication
- ✓ Models for successful recruiting of students will vary between Universities, on campus transfer, HS, community colleges



Forests are a great framework for sustainability discussion



FB

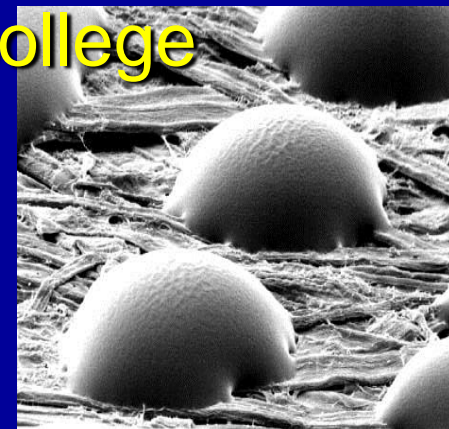
Thoughts on the Future

- ✓ Need to be candid on economics; current/future, risks for new ventures
- ✓ Willingness to invest \$300-500 mil. on a subsidized 'product'
- ✓ Growth rates, ownership patterns and infrastructure
- ✓ Jobs and economic growth at the local level
- ✓ Ecosystem services is a developing area, important but who is really willing to pay? (water)



Summary

- ✓ Good progress and response to changes in industry
- ✓ Maintain quality of students
- ✓ Continue to grow programs to match 'demand'
- ✓ Need to expand appeal to mirror the states' population, women, minorities, first to college



FB

Questions?