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Panel

Evolving Industry Opportunities

New Processes - Biorefinery

Bio-Refinery And National Forest Policy

- 1] return more forest cover on national park lands to more natural conditions;
- 2] increase multi-use recreation and economic activities on national forests;
- 3] reduce fire hazards on Western public lands; and
- 4] locate forest management and silva-culture practices that reduce carbon emissions.

Innovation Under a Microscope

Regulation
Drives
Innovation



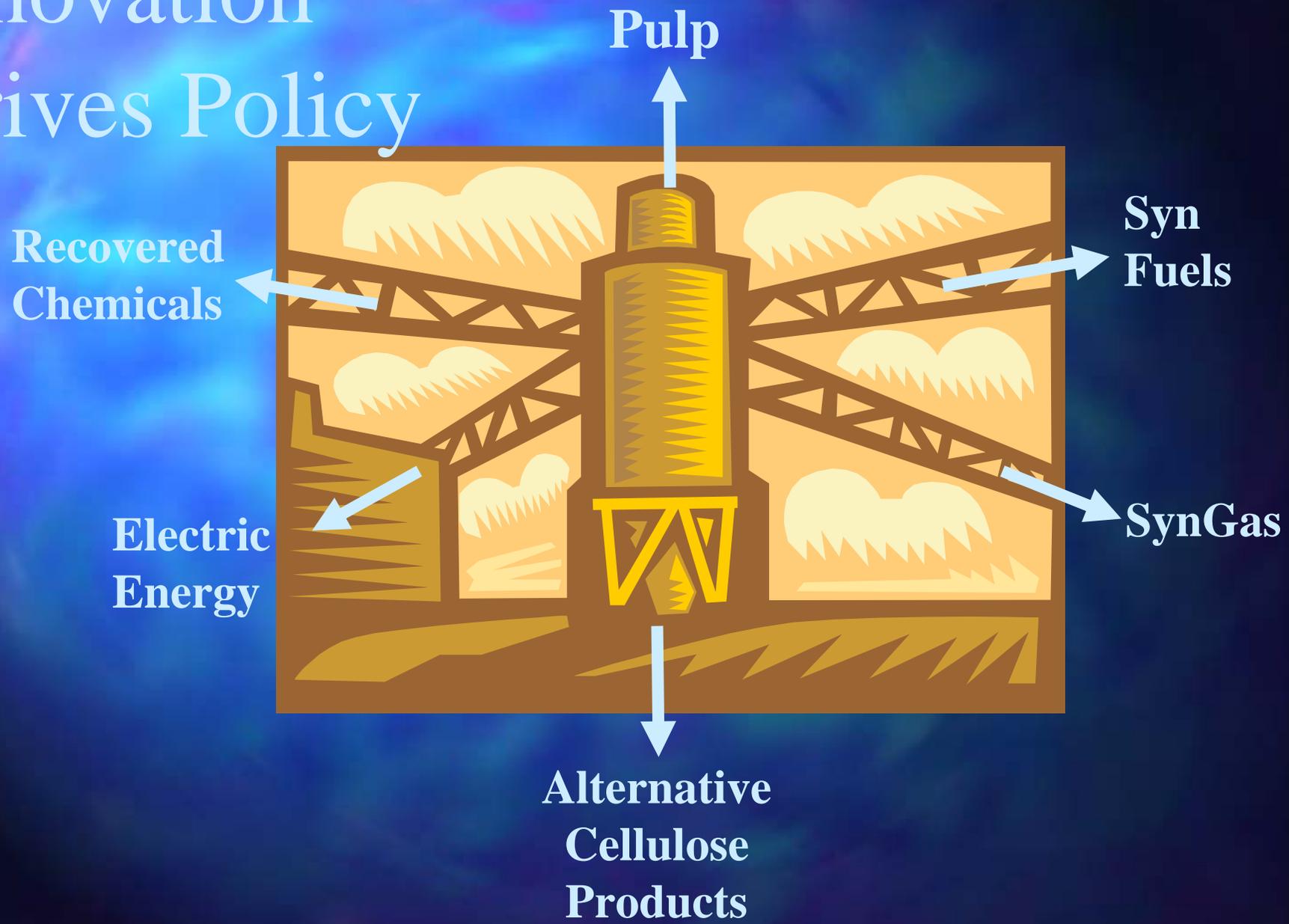
Innovation Incentive Trade-off

Reward true. Break-through

vs.

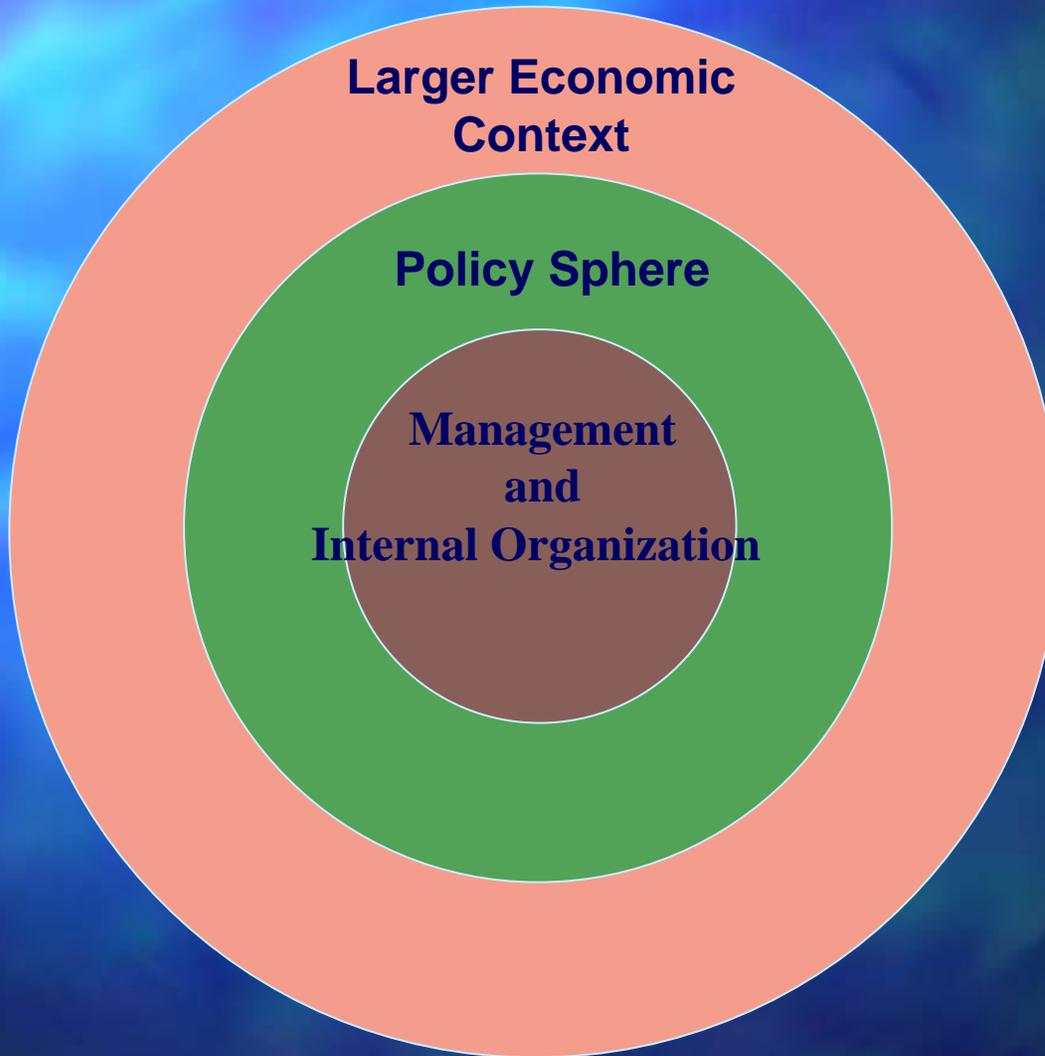
Race to Hemorrhage Loss

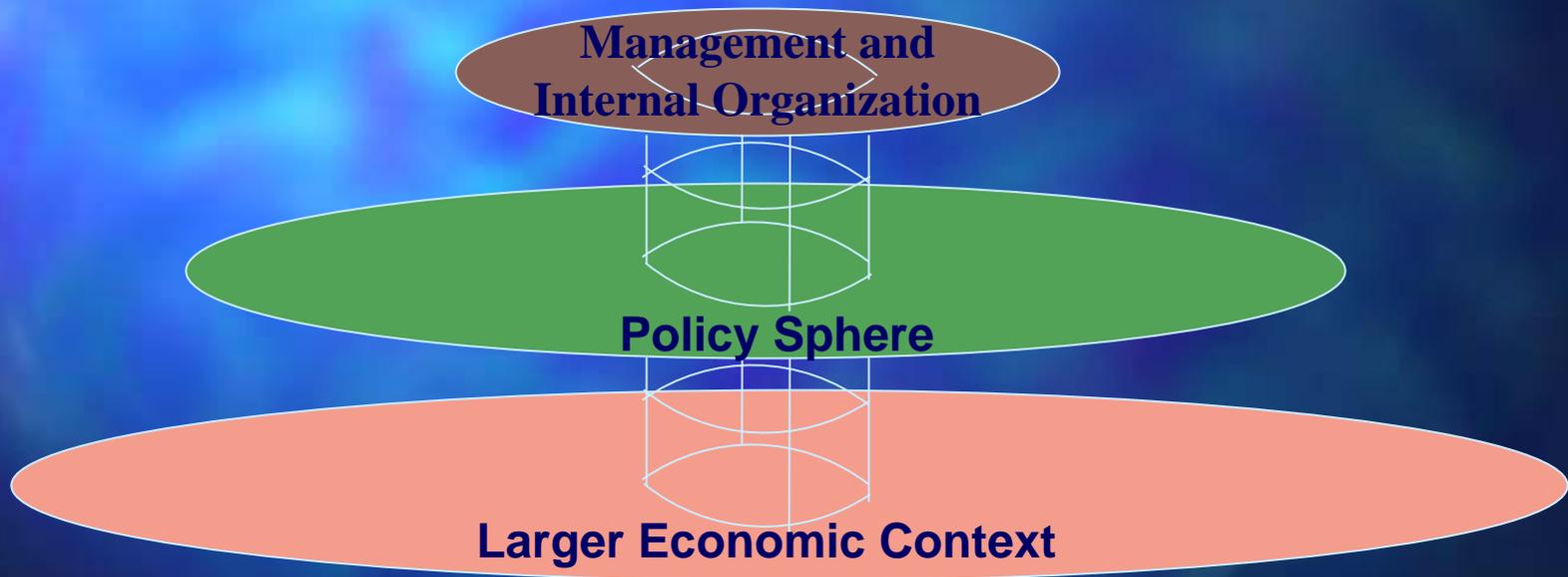
Innovation Drives Policy



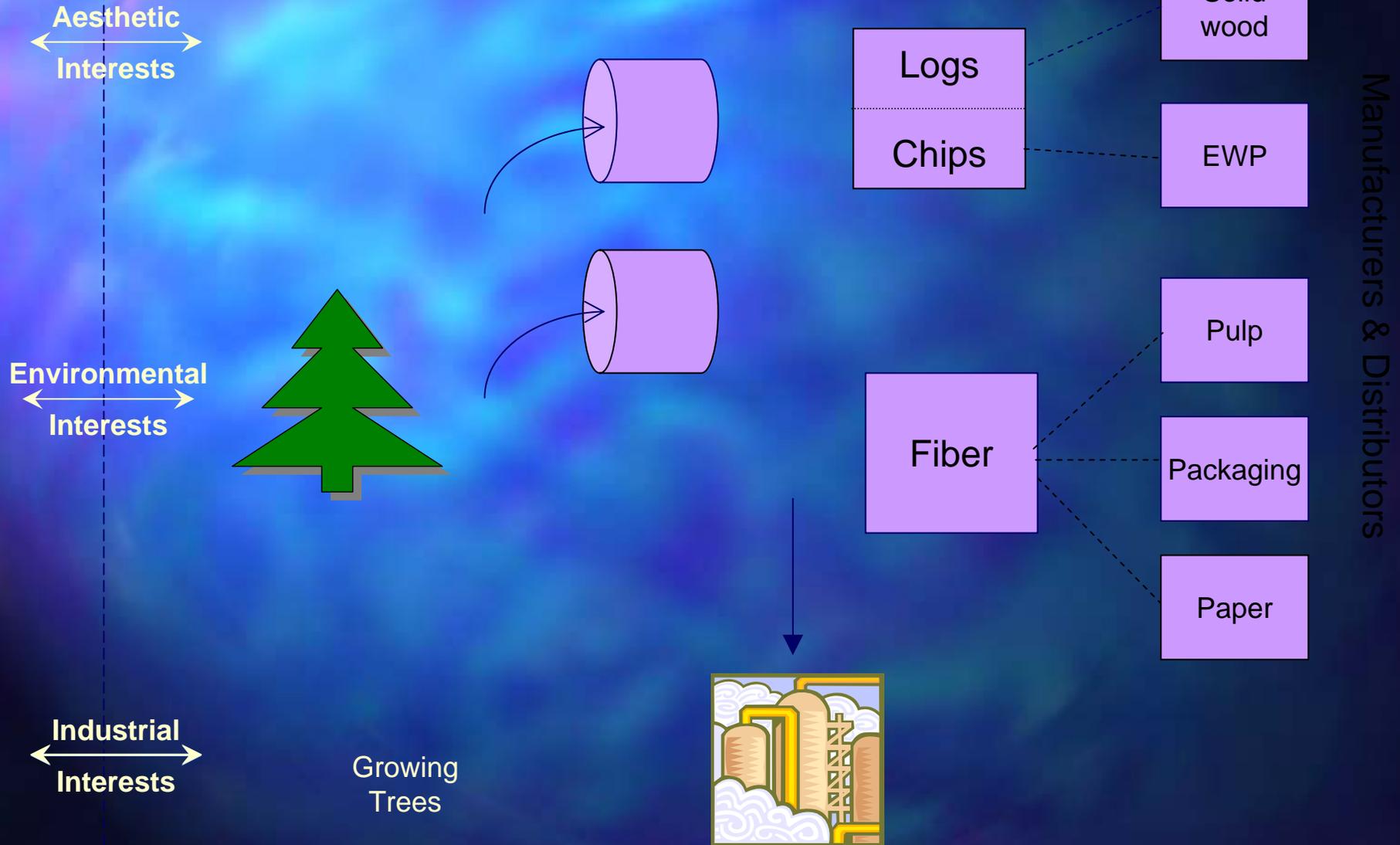
Policy Concerns

- **We are not a Corporatist National Government**
 - **Cannot do what the Europeans do**
 - **Can however be more creative in what solutions as structures can be affected**
 - **Can design contract structures**
 - **Need to work from the inspired national agenda**
 - ***Through* state and local enterprises (extension one good connector, but will have to be engaged).**





From: Ownership of Resources

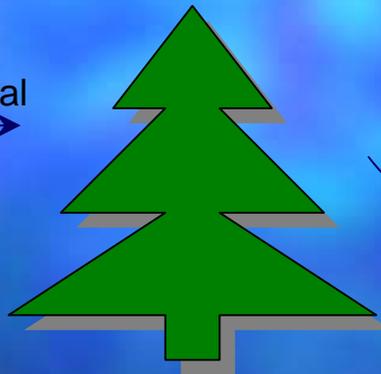


To: Stewardship

Aesthetic
Values
(Interests)

Environmental
Values
(Interests)

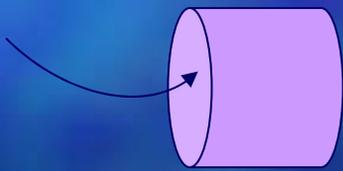
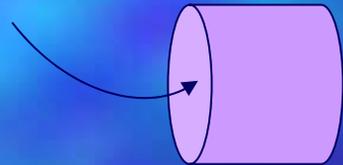
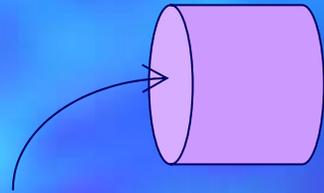
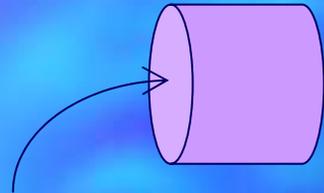
Production
Resource
(Industrial
Interests)



Society's
Sustainable
Resource

Sustaining
Forest Land

Form | Conv.
Processes



Materials

Logs
Chips/
Strands

Fiber

Bio-
"Chem"
(as in petro-chem)

Energy



Penultimate
Products

Lumber

EWP

Paper
Communication

Pkging
Shipping
Protecting

Pulp
Absorbent



Solid

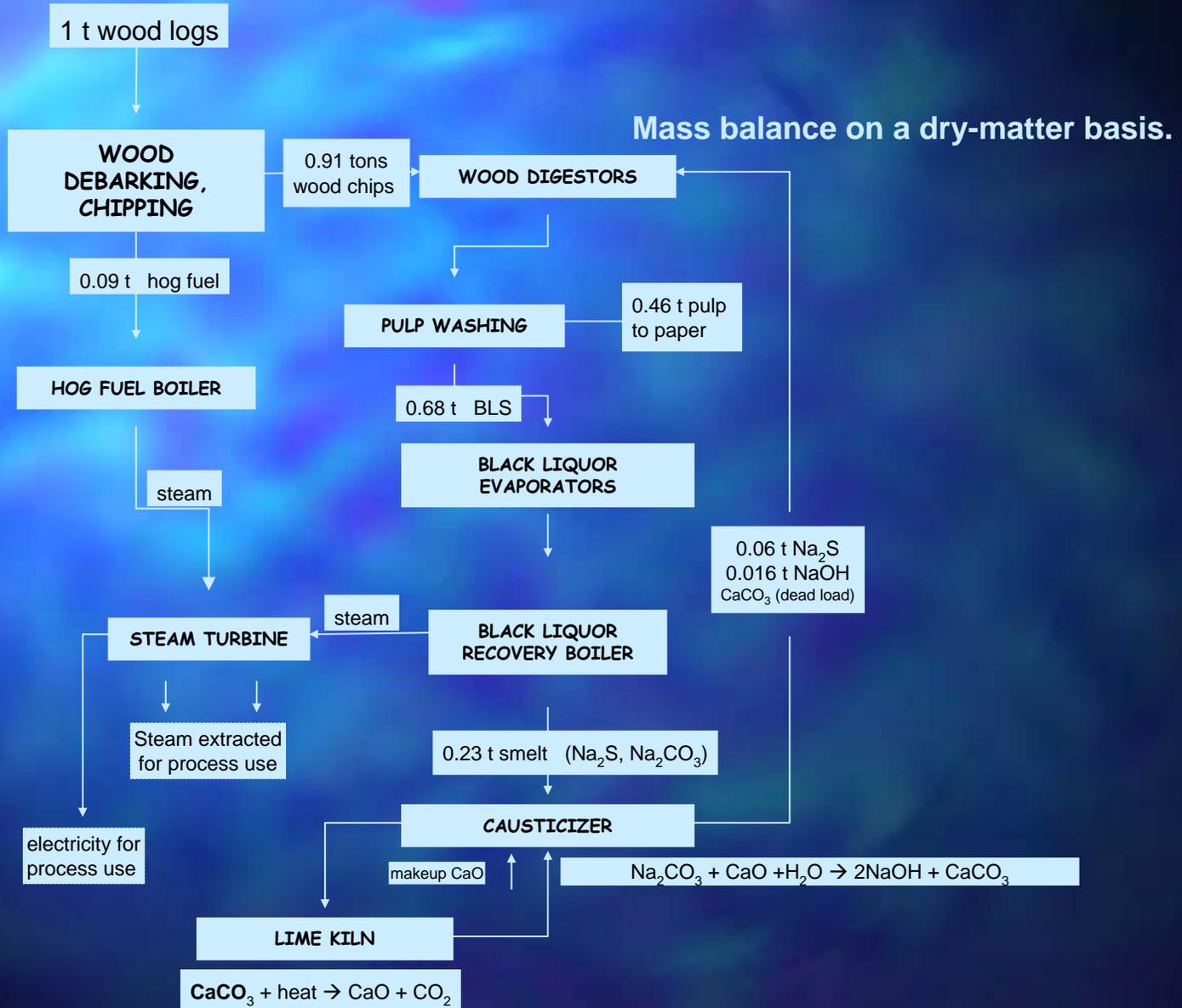
Liquid

End-Products
Mfgs./Mrkts.

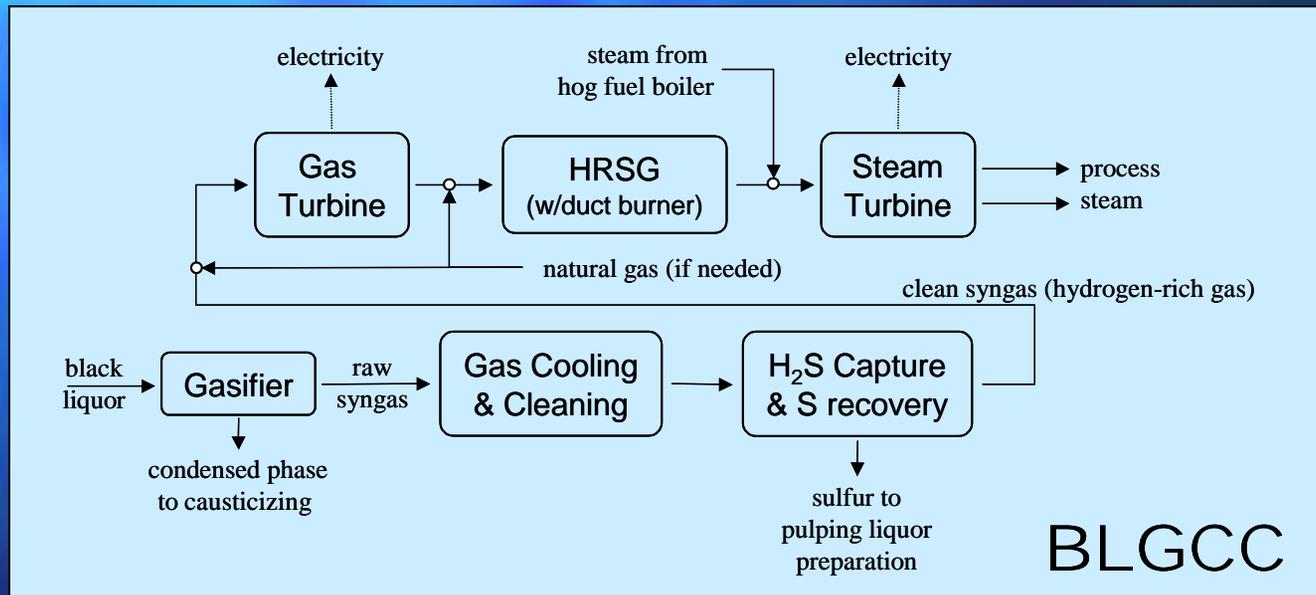
Consumers &
End-Users

Benefits: Jobs that consumers need doing

Conventional Kraft Pulp Production



Integrated Gasification Combined Cycle Power Plant / Recovery



Three Major Problems

- Causticization of residual liquors
- Tar Cracking for Gas Clean-up
- Shortages of both steam for mill and cellulose supply
- Technically complete enough to feed gas turbine or blend to NG in home furnaces
- Already done. Tests on Big Island and New Bern Gasifiers
- Need more trees and added efficiency steam

Forestry Issues

- Helps to solve the cellulose shortage need.
- Demand supporting added cover
 - Especially marginal decision of small holder
 - Especially if larger cellulose harvest per acre
 - Biolistic Transgenic methods less controversial (or less environmentally threatening).
 - Tracking land use changes and sensitivity to different laws

Western Forest Benefits

- Refer to Map
- Fires most serious in Oregon / Washington
- More than \$5 billion annually
- Most within 40 miles of a pulp mill

Policy Effects and Implications

- **CO₂ balance.** Transition to new stock and use of fiber output (paper and lumber) might increase net sequestration for half a century.
- **Laws make a difference:** Property Taxes, Harvesting Rules, 'corn meal nuisances,' federal lands objectives, net subsidy balances may disfavor forestry.

Complementary Fuel Stocks

- **Two Problems To Gasification on Farm Residuals: Transportation and multiple value streams.**
- **With an active utility scale gasifier:**
 - ✓ *Make syngas not blendably clean for steam*
 - ✓ *Make syngas blendable / clean-up feasible*
 - ✓ *Make gas and pulp the agricultural material*

National Priorities

- Energy Security
 - ✓ *Distributed production*
- Environmental security
- Competitive Workforce
Below collegiate level
- Innovation and Rural
Economic Development
- Non-Trivial Domestic
production source
 - ✓ *Mills in many places*
- Slows CO₂ atmospheric
accumulation
- Higher tech jobs for this
labor force
- High Tech solution to
sustain traditional rural
industry