



BIOMASS FUEL SUPPLY AND RESOURCE DEVELOPMENT

California Biomass Collaborative
Forum

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OUTLINE OF TODAY'S PRESENTATION



- ◆ A Brief History of California's Biomass Power Plant Industry
- ◆ The Current Status of CA's Biomass Power Plants
- ◆ Biomass Economics 101
- ◆ Biomass Fuel Supplies Today
- ◆ Waste Optionality
- ◆ Developing Future Fuel & Generating Resources

The Life Cycle of CA's Biomass Industry

- ◆ “The Honeymoon” – PURPA enactment in 1978, mandating IOU's pay independent power producers their avoided cost of power.
- ◆ “The Industry's Birth” – early '80's, built predominantly around waste disposal at food processing or sawmill operations. Fuel prices at \$0 - 6/ton
- ◆ “The Toddler Years” – mid-'80's saw over 30 new plants open up. Fuel supplies were created through infrastructure development. Prices at \$12.50 – 15.50/ton

The Life Cycle of CA's Biomass Industry (cont.)

- ◆ “The Teenage Years” – early '90's, MWs nearly double. Full out competition for fuel; prices escalate to \$25-32/ton; spot scarcities cause plants to import out of state fuel. Demand at +/-9.5MM tons/yr
- ◆ “The Early Adult Years” – the mid '90's; CA deregulation, PPA buyouts, AB 939 permits biomass to count in diversion, steep decline in sawmill residues. Demand drops to 5.5 MM tons/yr, and prices to \$19-25/ton.
- ◆ “Adulthood” – 2000 to present; “Relative stability punctuated by moments of sheer terror.” 4 plants restart, Gov. Ag Grant Program, fuel shifting, new fixed prices. Demand at 7.6MM tons/yr. Fuel prices at \$15-20/ton.



CA's Biomass Power Plant Industry Today



- ◆ 31 Operating Power Plants
- ◆ 626 MW of combined capacity, ranging in size from 3 MW to 50 MW, from Mecca to Eureka.
- ◆ Total Annual Usage of +/- 7.1 MM BDT/yr

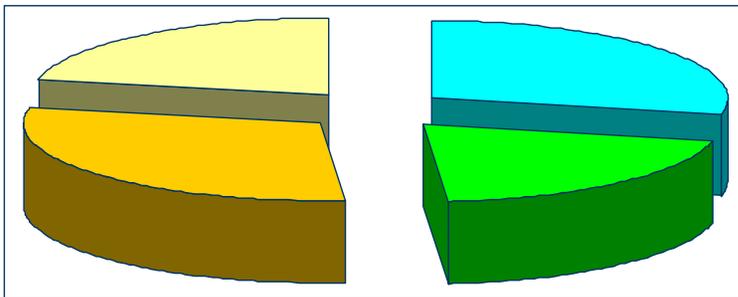
“Biomass Economics 101”

Energy Revenues (thru 2006)(incl.SB1038 funds)	5.37 cents/kWh
Capacity (If under SO-4 PPA)	<u>2.00 cents/kWh</u>
Total Revenues	5.37 - 7.37 cents/kWh
Fixed O&M Costs	2.5 – 3.0 cents/kWh
Variable O&M Costs	0.2 – 0.5 cents/kWh
Fuel Costs	2.0 – 3.0 cents/kWh
Debt Service/Capital Expenditures	<u>1.5 – 2.5 cents/kWh</u>
Total Costs	6.2 – 9.0 cents/kWh

Low Cost Producers: Facilities co-sited at sawmills using internal wastes

High Cost Producers: Stand-alone facilities using 100% open market wastes

CA Biomass Fuel Supplies Today



- ◆ Urban Fuel: 2.1 MM tons/yr, \$3.50-17.50/ton
- ◆ Ag Fuels: 1.6 MM tons/yr, \$17.50-24.50/ton
- ◆ Sawmill Fuels: 2.2 MM BDT/yr, \$0-16.50/ton
- ◆ Inforest Fuels: 1.7 MM tons/yr, \$15-24/ton

“Waste Optionality”

The majority of CA biomass fuels are the result of a diversion of a waste stream to a power plant; i.e., “Somebody somewhere is paying something to get rid of it.”

That said, the question becomes what is the waste producer’s cost of disposal as compared to what the power plant is willing/able to pay for it.

Examples:

(1) Agricultural Prunings:

Farmer’s cost for annual orchard prunings of 1 ton/acre is about \$20/acre. Hassle free solution. For supplier to convert to fuel at \$20/acre requires \$20-\$25/ton payment by power plant. If \$0 State subsidy to power plant = power plant buys cheaper fuel = farmer burns = add’l air pollutants

“Waste Optionality”(cont.)

(2) Urban Fuels:

Cost driven by local landfill tipping fees. AB 939 v. ADC, impact of recycling. Orange County bankruptcy “fix”. Shipping CA waste to Nevada.

(3) Inforest Chips:

USFS - No \$ for precommercial thinning, and gutted timber program.

Private timberland owners - Competing against world market.

Can & will burn forest slash (lower cost) if power plant won't pay full cost of conversion to fuel.

Developing Future Fuel & Generating Resources

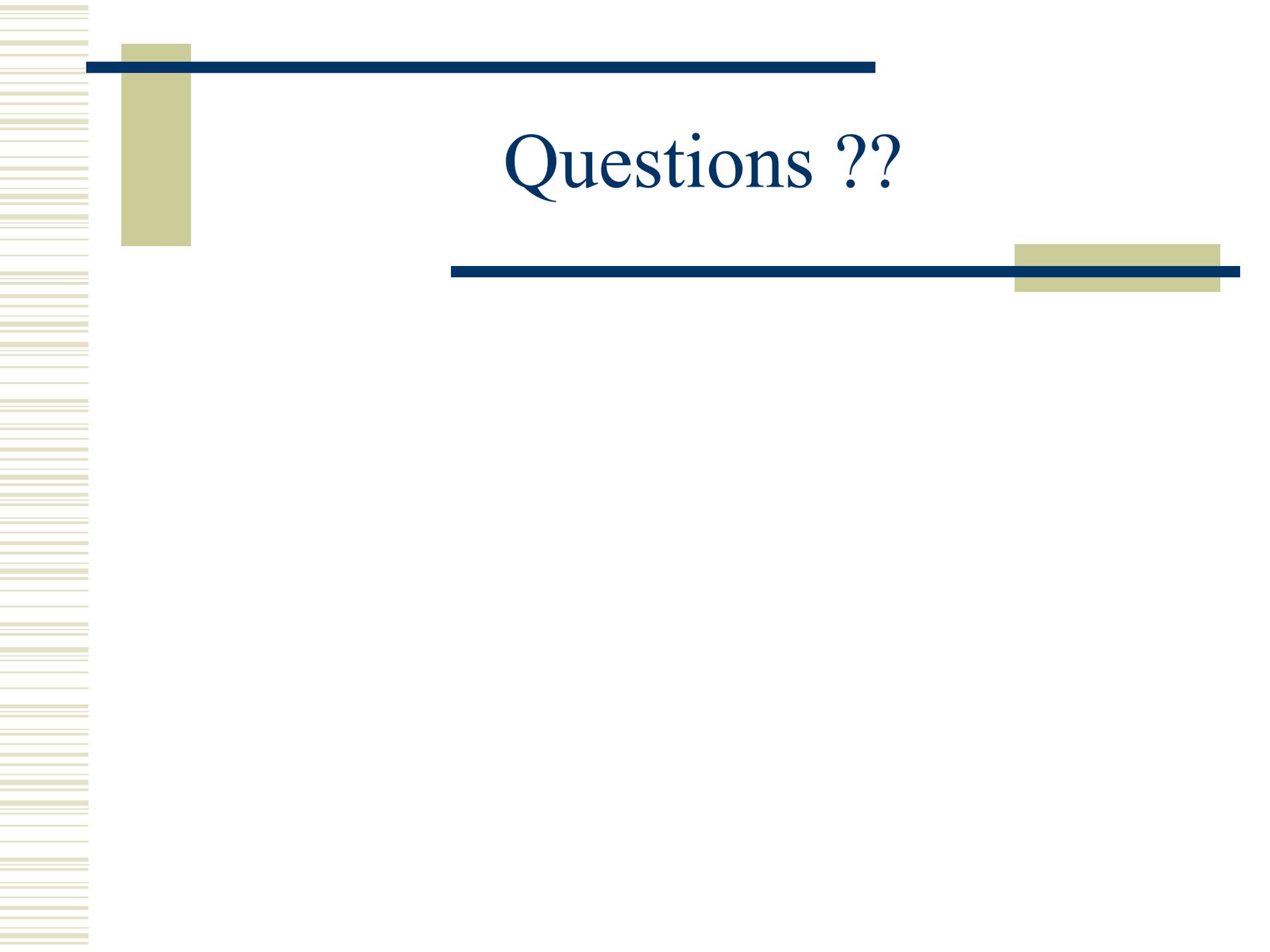
- ◆ Existing plants will be focusing on cutting fuel costs in coming years as they are forced to compete with natural gas generation on price alone. They'll be adapting to poorer grades of existing fuels, or using new alternative fuels (e.g., railroad ties, waste paper, petroleum coke, green yard wastes, etc.)
- ◆ “First time shame on you, second time shame on me.” Financial community will be skittish to invest in new biomass renewables if existing plants are abandoned.

Developing Future Fuel & Generating Resources (cont.)

- ◆ The future success of an expanded biomass generation program in CA depends on the successful implementation of LONG TERM State policies wherein the externalities of biomass generation (i.e., cleaner air, reduced landfills, forest fire protection, energy diversity, jobs, etc.) are recognized.

Conclusions

- ◆ CA's existing biomass power plants have been an effective solution to the disposal of various in-state waste streams, and new plants could add to that success story.
- ◆ Existing plants are preparing today for the end of their current fixed energy prices. Steps they take now may not be reversible.
- ◆ New plants, like the existing plants, will require the impetus of State policy to remain successful.



Questions ??