

Biomass Energy in the Southeast



Three Questions

1. Is there enough to make a big difference?
2. Can it be cost-effective and profitable?
3. Can it contribute to economic development?

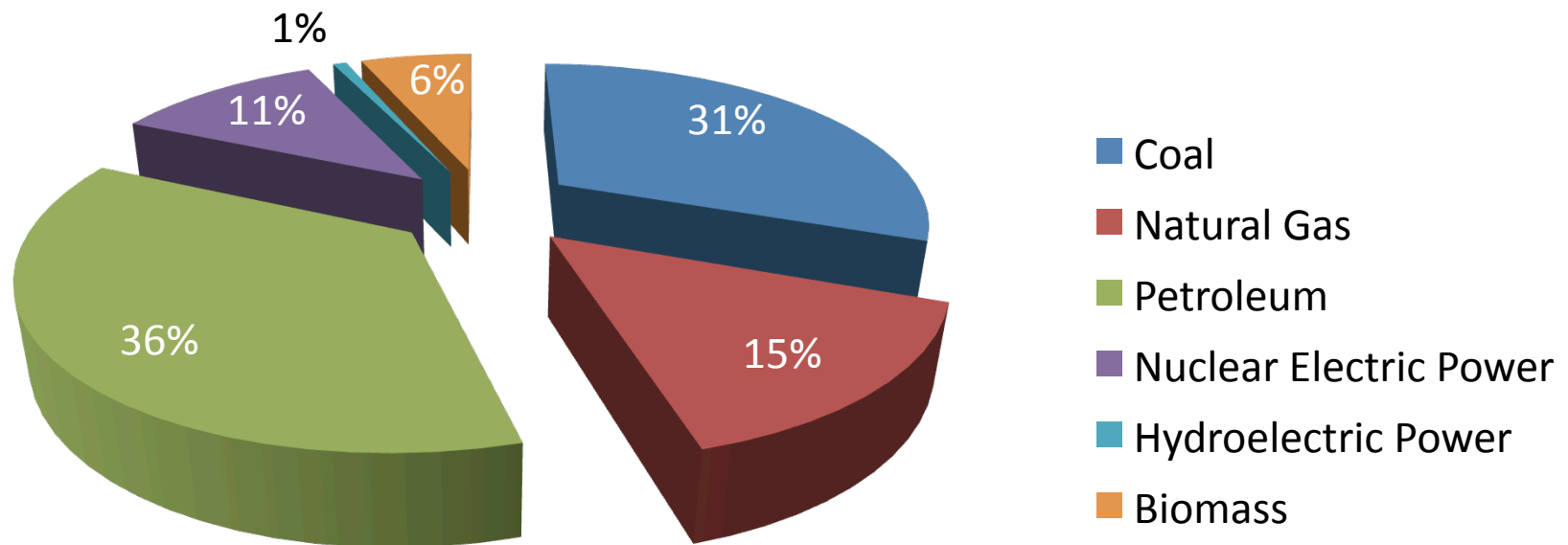
Is there enough?



Biomass has ~ 15 MJ/kg

Georgia Energy Consumption

3.3 EJ (3100 TBtu), 2007

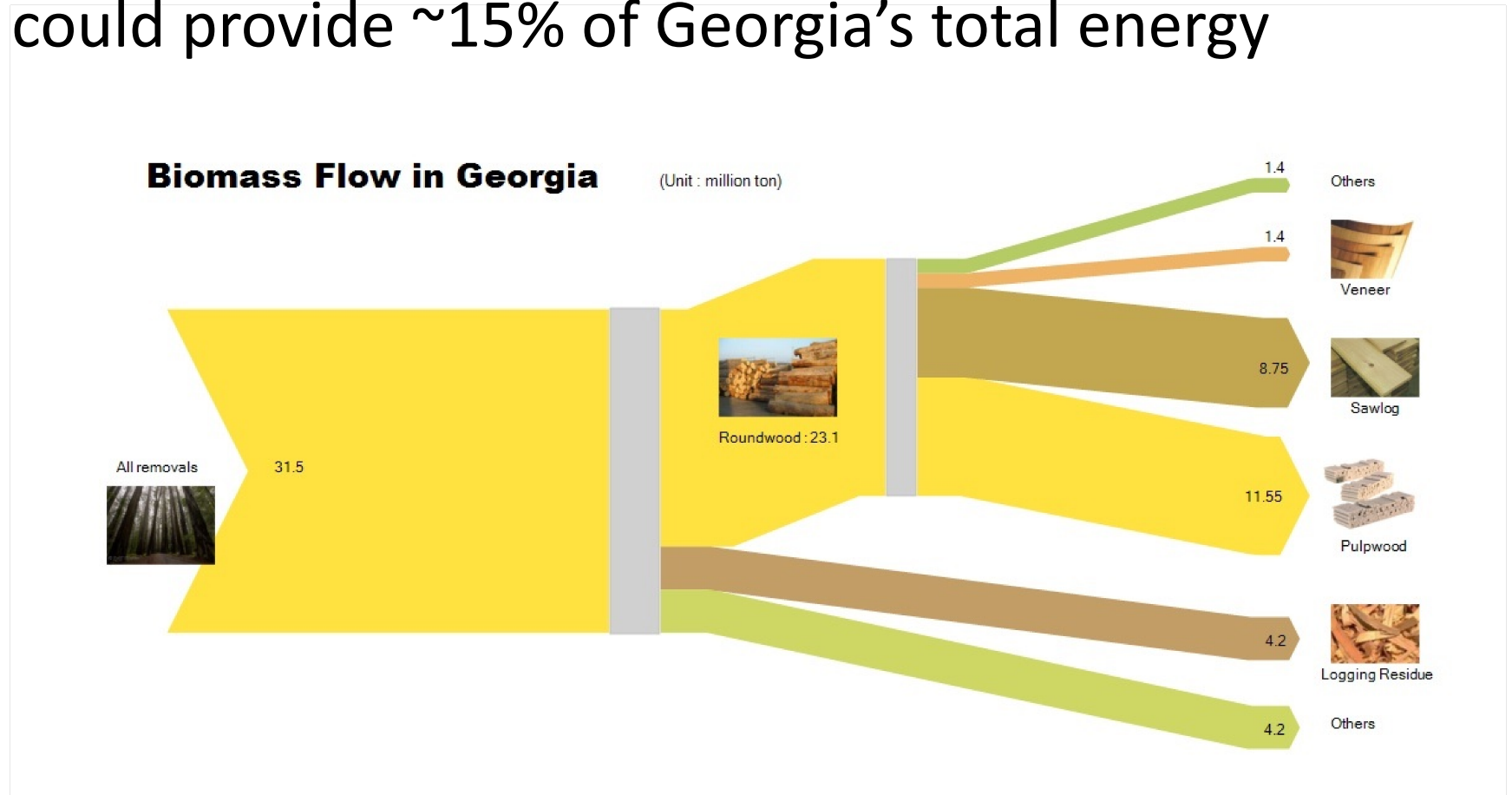


(Equivalent to 220 million tons of dry biomass)

Source: U.S. Energy Information Administration: http://tonto.eia.doe.gov/state/state_energy_profiles.cfm?sid=GA#Datum

How Much More Logging?

Current removals ~ 30 million t/y.
Doubling removals, or equivalent,
could provide ~15% of Georgia's total energy



High Yield Biomass Crops (Miscanthus) can provide a comparable additional biomass



Can bioenergy be cost-effective?

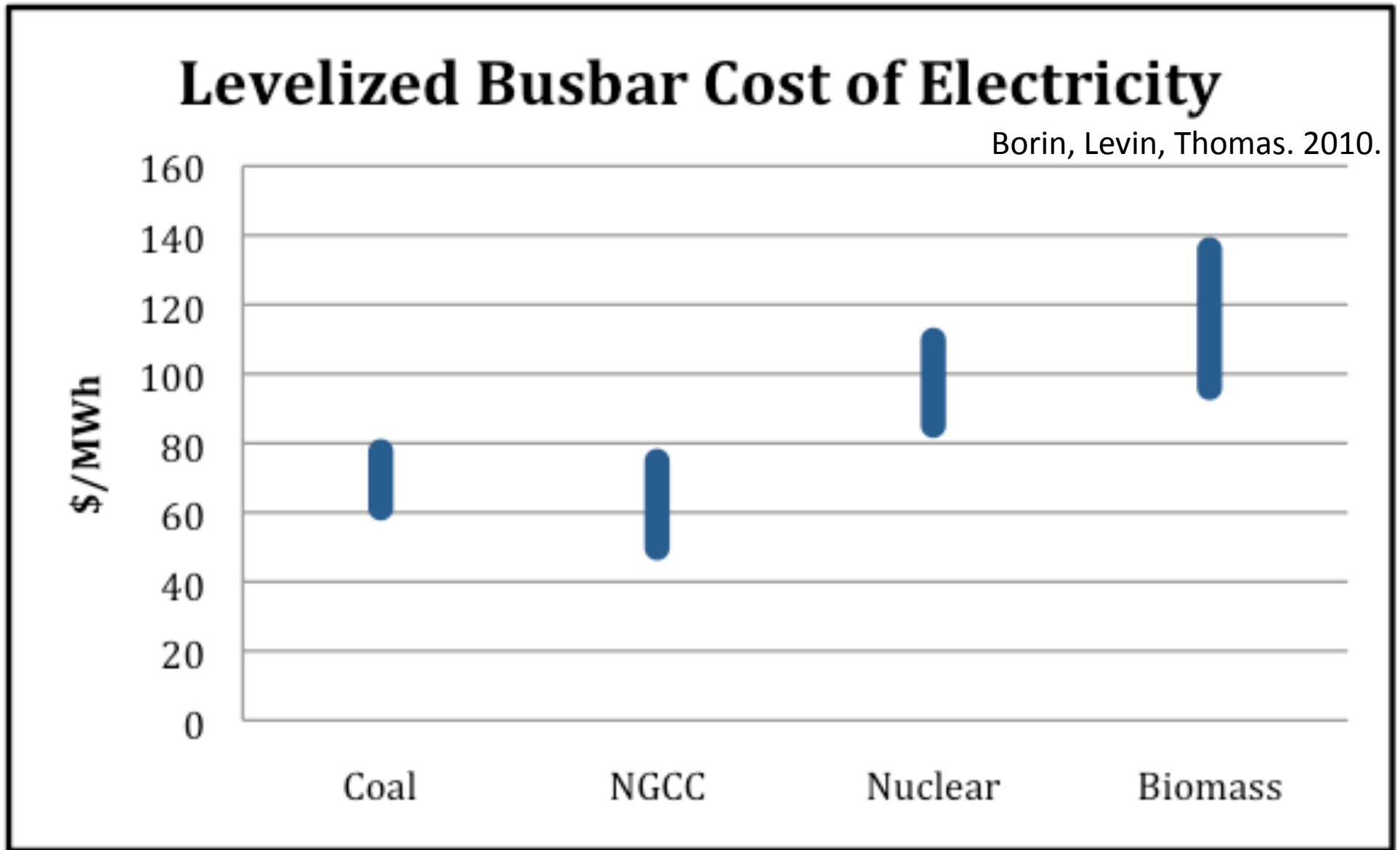


Cost of Fuel for Electricity

	(\$/MMBtu)
Coal	2.30
Biomass	~ 3 - 4



New Electricity Plants

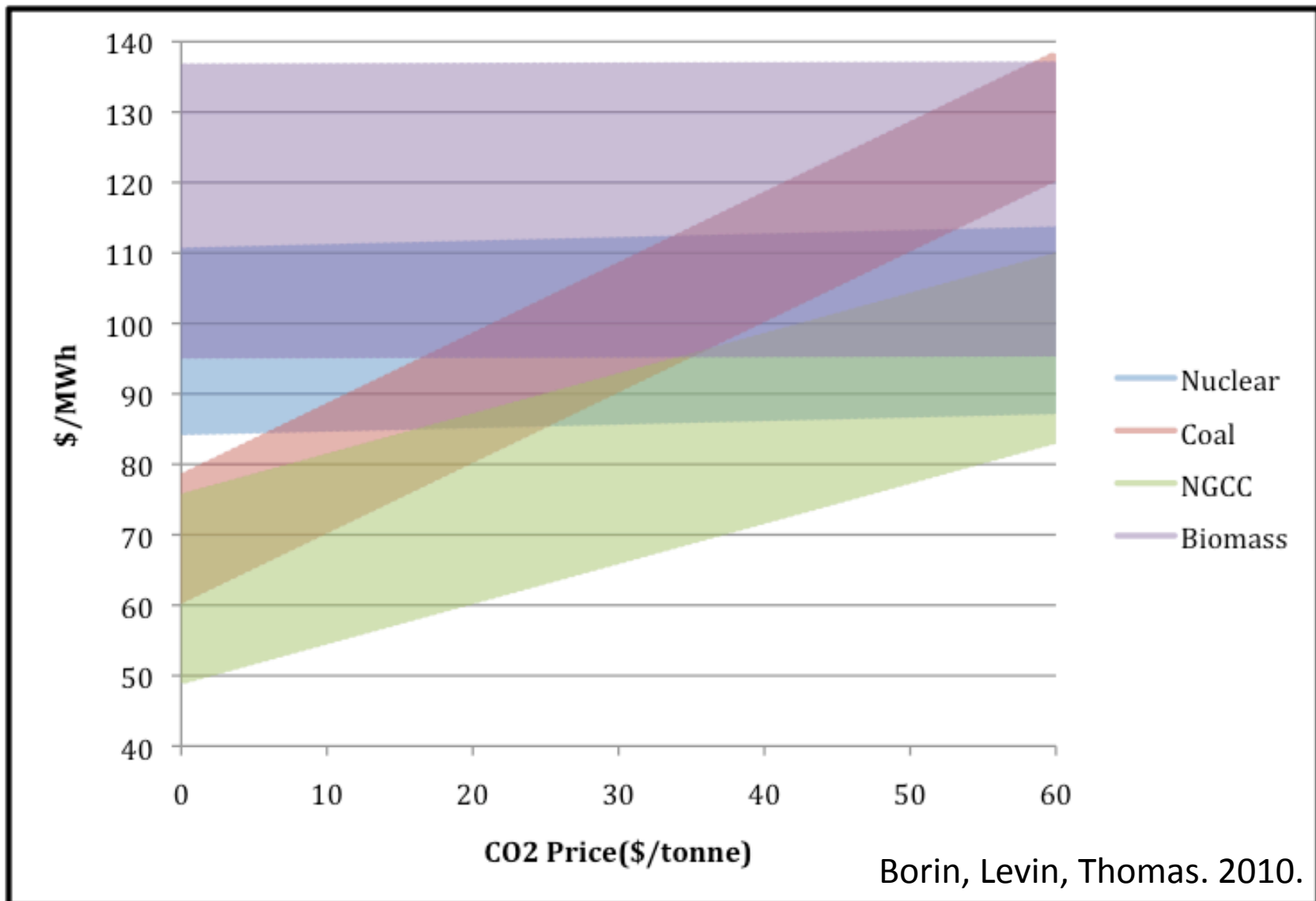


Biomass in existing plants has less of a cost differential.

Cost of Fuel and Generation

Technology	Levelized Cost of Energy (\$2010/MWh)	Overnight Capital Cost (\$2010/kW)	Fuel Cost (\$2010/MMBtu)
Nuclear	80 - 103	3,800 – 5,200	0.75
Coal	59 - 75	2,000 – 3,000	2.30
NGCC	49 - 74	600 – 1,300	5 - 7
Biomass	92 - 131	4,650 – 4,900	0.75 – 4.0

Carbon price makes biomass and nuclear more cost effective



Cost of Fuel for Residential Heat (\$/MMBtu)

Natural Gas ~ 13

Wood Pellets ~ 15



Cost of Transport Fuel

Biomass to fuel: 10 kg/gal

Biomass price of \$45/ton means
45¢ per gallon of fuel cost





Can bioenergy contribute to economic development?

Think Small

Bioelectricity has
diseconomies of scale

- Coal is transported by rail
- Natural gas is transported by pipeline
- Biomass is transported by truck
- Other biomass users are already distributed throughout the southeast

Neighborhood scale energy

1 MW = 1000 homes

2000 tons/yr

Reaching 15% of Georgia's
electricity requires 15,000 such
facilities



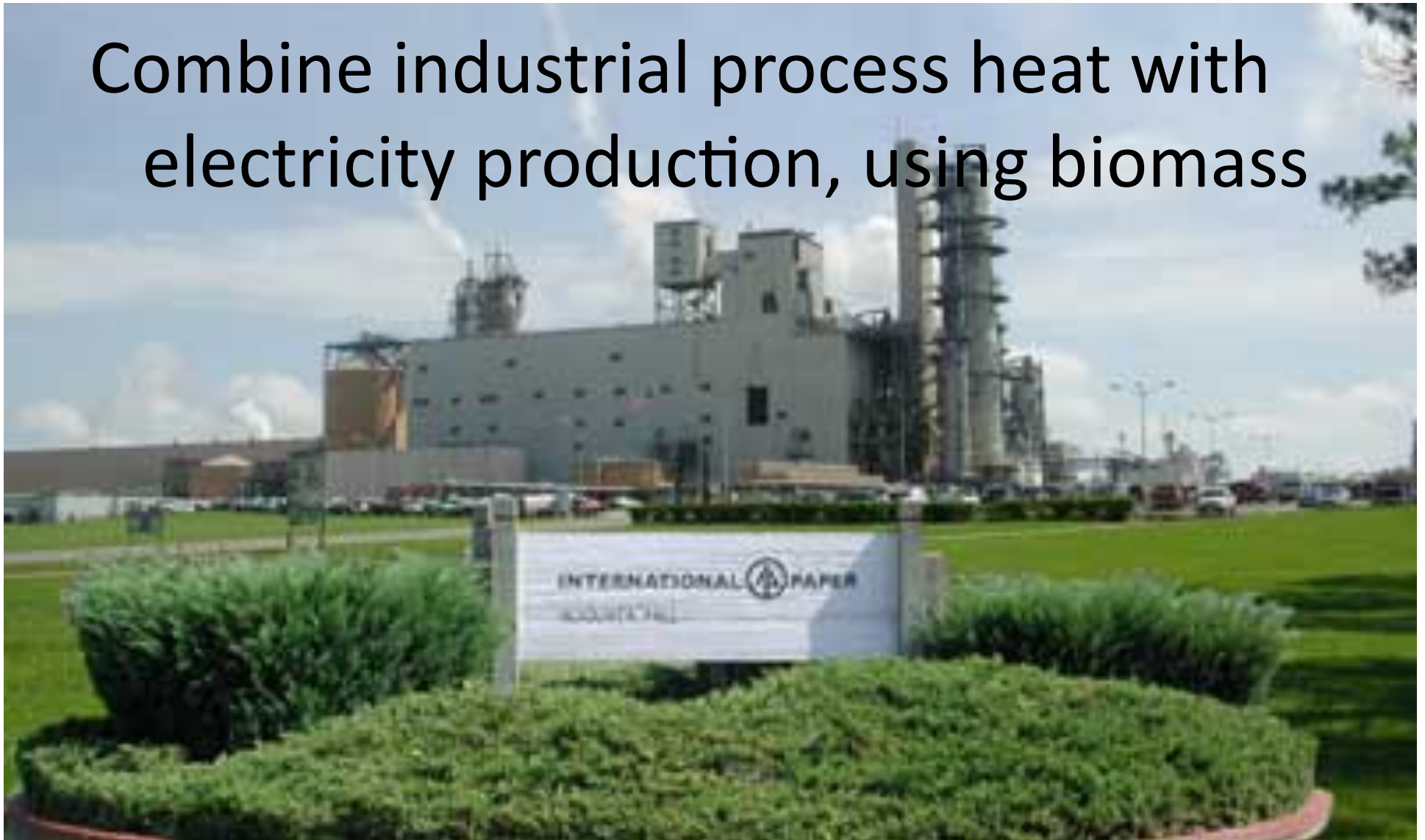
Combine
Heat
and
Power

~1 MW

~50 MW

Use existing biomass infrastructure

Combine industrial process heat with electricity production, using biomass



Biomass Electricity to Grid in Georgia

Facility	Location	Biomass MW	Biomass %
Waste Management Inc	Gwinnett	2	100
Brunswick Cellulose Inc	Glynn	48	89
Weyerhaeuser Co	Macon	29	98
Georgia Pacific	Early	47	68
Temple-Inland Inc	Floyd	31	72
International Paper Co	Richmond	37	69
International Paper Co	Chatham	56	59
Interstate Paper LLC	Liberty	10	100
Weyerhaeuser Co	Chatham	31	99
Rabun Apparel Inc	Rabun	2	100
Plummer Forest Products Inc	Wayne	46	81
Riverwood Intl USA Inc	Bibb	20	72
Montenay Power Corp	Chatham	1	53
Georgia Pacific	Effingham	0	0
SP Newsprint Co	Laurens	5	20

eGRID 2007, <http://www.epa.gov/cleanenergy/energy-resources/egrid/index.html>

365 MW.

Example

- **PCA Valdosta** – new recovery boiler, new turbine generator, evaporator upgrades.
- \$93M, completion in 2011
- 50 MW additional electricity
- No new biomass use
- \$1860/kW

