Animal Manure and Related Biomass Feedstock Market Assessment and Preliminary Feasibility Study for a Papermill Biomass/CoGen Facility

Task 7 Summary Report

for

Southern States Energy Board SERBEP Program

with

South Carolina Energy Office

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Task 7 Summary:

The Task 7 workscope involved providing a rudimentary energy market assessment and a preliminary market analysis and evaluation to determine the Biomass/Cogen facility's regional impact and fit into existing regional energy markets. The work also involved a determination of the opportunity to oversize the facility to provide additional energy or steam to local or regional markets, including application for other biomass based energy users such as ethanol or biorefinery production. The Biomass/Cogen project's main focus is to provide biogas to replace natural gas. The Biomass/Cogen facility has three basic scenarios or options for use with regard to the biogas, and as it relates to the energy markets:

- produce biogas as a substitute for natural gas in current boiler operations.
- produce biogas for cogeneration, supplying steam and electricity to the mill.
- produce biogas for cogeneration, supplying steam to the mill end electricity to the grid.

The price of natural gas has been climbing to new pricing highs in recent months. This rise in the price of natural gas has been very detrimental to the competitiveness of industrial sites dependent on natural gas for energy requirements, as well as significantly increasing utility bills to residential and commercial applications. South Carolina would tend to have higher than average natural gas costs than the other SERBEP states, and thus would represent a good regional area for placement of a anaerobic digestion facility to produce biogas to substitute for natural gas. The data shows the revenue value placed on the natural gas via the current and expected future pricing levels tentatively represents a good biogas pricing basis for development of a Biomass/Cogen facility.

The opportunity to sell excess electrical power to regional utilities or the grid represents a good alternative for the Biomass/Cogen facility. Generally, the expected electricity pricing forecast is for electrical pricing to remain stable over the long term. South Carolina and the adjoining SERBEP states of North Carolina and Georgia are along the I-85 corridor, an area that has shown tremendous growth in recent years. This has provided for large electrical capability and generation needs with good electricity demand growth. The growth rates of the region and the utilities show that excess electricity could readily be absorbed by the current and expected markets.

South Carolina currently has relatively low energy costs compared to the rest of the country. Deregulation will have significant effects over the long term. It is generally expected that South Carolina should see higher energy costs due to deregulation. With regard to promoting renewable energy, there are currently four main policy approaches to encouraging renewable energy development and act as incentives for green power packages:

Renewable Portfolio Standards: Renewable Portfolio Standards (RPS), are a mechanism for creating demand. Utilities are required to have a minimum amount of renewable energy generation capacity within their systems.

Renewable Electricity Funds: Renewable Electricity Funds (REF) provide predictable funding sources for the development of renewable energy sources. Utilities are required to contribute to a fund that promotes renewable energy.

Net Metering: Net Metering allows customer-generators to sell back electricity to the utility when they are generating more than they need. In essence using the grid to "store" electricity.

Disclosure: Disclosure of the fuel mix on electricity bills helps educate the public and create demand for green pricing programs.

Many of the SERBEP states have draft policy that is being evaluated and reviewed for use based on the above models. This new policy activity when implemented can provide new incentives to renewable energy and green power generation such as represented by the Biomass/Cogen facility. The energy market analysis provides for the following conclusions:

- Current and future natural gas pricing is at a level that is reasonable for basing a Biomass/Cogen facility development effort on, with the goal of replacing the natural gas with lower cost biogas on a cost per Btu basis.

- The growth of the regional electricity market and deregulation effects provides for reasonable electrical pricing both now and in the future that represents a good potential for offsite sales of excess electrical production to utilities or the grid, particularly as green power.

- While the South Carolina and the SERBEP states are behind the nation in renewable energy policy, future policy developments to promote renewable energy that could develop in these states would tend to improve the energy situation for a Biomass/Cogen facility.

Energy Markets

The energy markets represented by natural gas and electricity have been very volatile of late, with prices increasing dramatically in recent quarters in many regional areas across the nation. Natural gas prices have spiked in many areas of the country, and have hit the Pulp and Paper Industry particularly hard. Many mills that are dependent on natural gas to generate steam and/or electricity have had to shut down due to energy costs eroding the margins and sustainability of the mill. The ongoing California energy crisis, as well as forecasted summer electrical energy shortages in the eastern New York and some other eastern United States regions could be an indication of the need to develop alternate energy sources, such as the Biomass/Cogen project represents.

The Linpac Biomass/Cogen project's main focus is the production of biogas to replace natural gas. Currently Linpac uses natural gas to produce steam to the linerboard mill operations. Natural gas and electrical production are intertwined due to the natural gas being the most environmentally friendly fuel for fast paced electric power facility permitting, and for use for in electric peak power generation or industrial generation facilities. Appendix A provides Department of Energy (DOE) consumption forecast figures for natural gas. Note that the consumption of natural gas for electricity generators is projected to grow dramatically. The Biomass/Cogen facility has three basic scenarios or options for use with regard to the biogas, and as it relates to the energy markets:

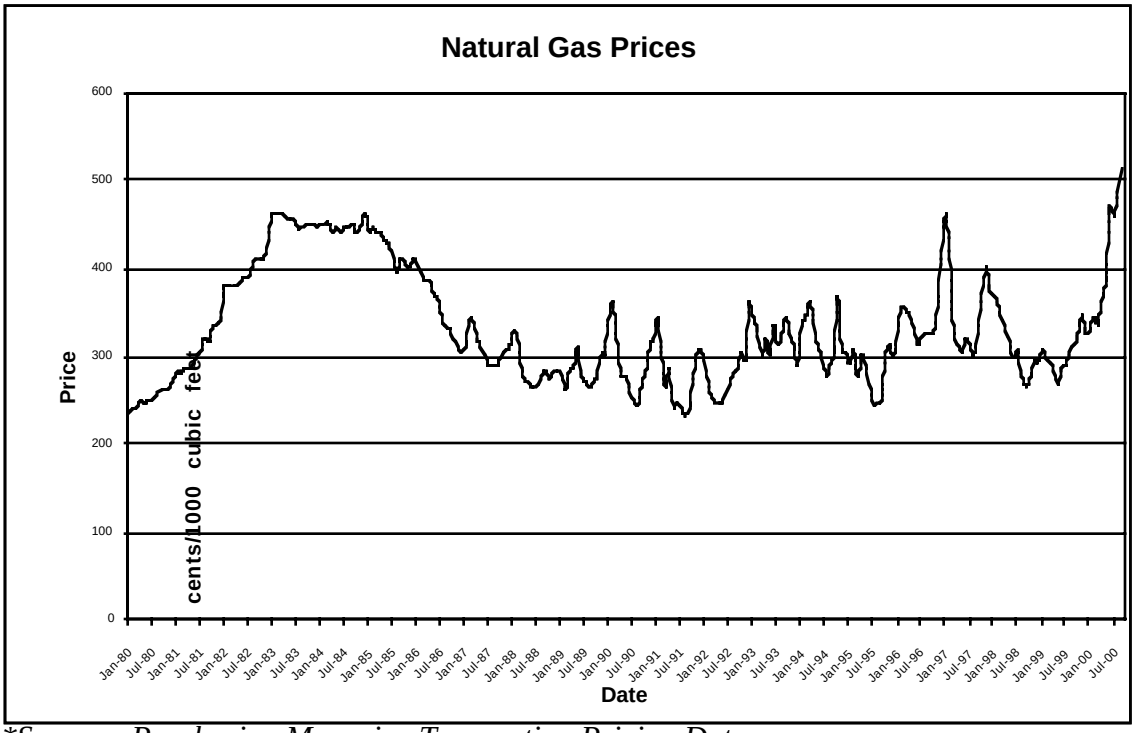
- produce biogas as a substitute for natural gas in current boiler operations.
- produce biogas for cogeneration, supplying steam and electricity to the mill.
- produce biogas for cogeneration, supplying steam to the mill end electricity to the grid.

The opportunity to use cogeneration technology to produce biogas for natural gas substitution, or for in a cogeneration mode to produce both steam and electricity, means a preliminary assessment of both the natural gas and electric markets is prudent. The natural gas pricing is expected to remain at the a high level over the long term, this even with expected new natural gas production and capacity becoming available.

Natural Gas Markets

The price of natural gas has been climbing to new pricing highs in recent months. This rise in the price of natural gas has been very detrimental to the competitiveness of industrial sites dependent on natural gas for energy requirements, as well as significantly increasing utility bills to residential and commercial applications. Figure 1 below provides a graph of the historical fluctuations in natural gas pricing, showing the pricing increases.

Figure 1: Historical Natural Gas Pricing



**Source: Purchasing Magazine Transaction Pricing Data*

The price increases have been due to increased demand for natural gas for heavy industrial applications to produce on site steam and/or electricity, increased utility electrical generation applications required by permitting concerns or for peak power facilities use, and increased commercial and residential use. As shown in Table 1, the natural gas pricing has increase over 100% in the last 8 quarters.

Table 1: Natural Gas Recent Quarterly Transaction Pricing

Year & Quarter	1999 Q1	1999 Q2	1999 Q3	1999 Q4	2000 Q1	2000 Q2	2000 Q3	2000 Q4
Natural Gas Price (cents/mcf)	231	235	240	266	357	391	407	502

**Source: Purchasing.com*

The natural gas pricing is expected to remain at the a high level over the long term, this even with expected new natural gas production and capacity becoming available. Table 2 provides forecasted pricing for natural gas for the next 8 quarters, showing the pricing remaining high.

Table 2: Natural Gas Forecast Quarterly Transaction Pricing

Year & Quarter	2001 Q1	2001 Q2	2001 Q3	2001 Q4	2002 Q1	2002 Q2	2002 Q3	2002 Q4
Natural Gas Price (cents/mcf)	552	480	452	468	533	475	498	522

**Source: Purchasing.com*

Appendix B provides the SERBEP State's natural gas pricing data for the DOE, with natural gas pricing data for industrial, commercial and other sectors. Ranking the States by highest to lowest cost, the data shows that the State of South Carolina has industrial natural gas costs that are ranked 9th out of 13, and commercial gas costs that are ranked 3rd out of 13.

Table 3: SERBEP State Natural Gas Cost Rankings (Highest to Lowest Cost)

Commercial	Industrial
D. C.	D. C.
Alabama	Missouri
South Carolina	Florida
Florida	North Carolina
West Virginia	Tennessee
North Carolina	Arkansas
Tennessee	Alabama
Louisiana	Georgia
Missouri	South Carolina
Arkansas	Kentucky
Kentucky	Mississippi
Mississippi	West Virginia
Georgia	Louisiana

South Carolina would tend to have higher than average natural gas costs than the other SERBEP states, and thus would represent a good regional area for placement of a anaerobic digestion facility to produce biogas to substitute for natural gas. Since the Biomass/Cogen facility will produce biogas, which has between 65% and 70% methane, an 'apples to apples' comparison of natural gas pricing to biogas pricing reflecting each gas source's $/Btu cost is required. To achieve this, it is important to provide an indication of what the typical regional pricing would be in dekatherms (DT) to reflect the actual cost per Btu provided. Table 4 provides natural gas costs in DT based on rates that reflect some typical residential, commercial and industrial rates.

Table 4: Typical Natural Gas Pricing for South Carolina

Rate	Residential	Commercial	Industrial
Natural Gas Price target and range (dollar/dekatherm)	target: $12.260 range: $12.910 to $11.600	target: $12.230 range: $12.980 to $11.660	target: $11.148 range: na

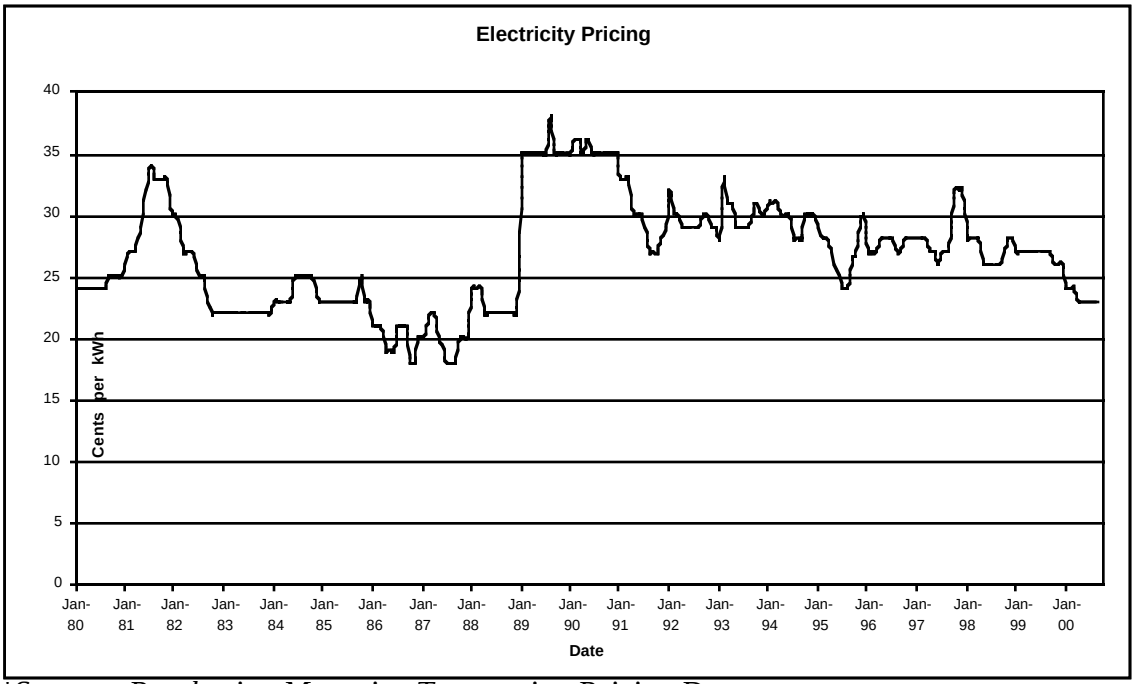
**Source: South Carolina Gas & Electric Rate Sheets*

The revenue value placed on the natural gas via the current and expected future pricing levels above tentatively represents a good biogas pricing basis for development of a Biomass/Cogen facility. The biogas produced would be used by the Linpac mill for substitution of natural gas and a cost savings against the expected natural gas pricing.

Electrical Market

The opportunity to sell excess electrical power to regional utilities or the grid represents a good alternative for the Biomass/Cogen facility. Appendix C provides national and SERBEP electricity generation data, with graphical representation of the national electrical generation service grid framework as well as state by state averages for electricity cost in cents per kilowatt hour (cents/kwh). The electrical generation utility service across the nation is divided into three regional interconnections or grids. South Carolina is part of the Eastern Interconnection, and has some of the lowest electrical energy costs in the nation as well as in the SERBEP region. Figure 2 shows the average national transaction pricing of electricity.

Figure 2: Historical Electricity Pricing



**Source: Purchasing Magazine Transaction Pricing Datat*

Although the average national price has been dropping, in certain regional areas (i.e. California, East Coast) the price has risen sharply. Recent national averages have been relatively stable, with only slight increases in price. Table 5 provides recent electrical pricing by quarter.

Table 5: Electricity Recent Quarterly Transaction Pricing

Year & Quarter	1999 Q1	1999 Q2	1999 Q3	1999 Q4	2000 Q1	2000 Q2	2000 Q3	2000 Q4
Electricity Price (cents/kwh)	4.38	4.25	4.31	4.14	4.16	4.40	4.80	4.72

**Source: Purchasing.com*

Generally, the expected forecast is for electrical pricing to remain stable over the long term. Table 6 provides forecasted pricing by quarter through 2002.

Table 6: Electricity Forecast Quarterly Transaction Pricing

Year & Quarter	2001 Q1	2001 Q2	2001 Q3	2001 Q4	2002 Q1	2002 Q2	2002 Q3	2002 Q4
Electricity Price (cents/kwh)	5.19	4,52	4,25	4,40	5.02	4.46	4.68	4.91

**Source: Purchasing.com*

Appendix C provides DOE electricity pricing data for all SERBEP States for residential, commercial and industrial sectors. South Carolina rates as the 5th out or 13 highest SERBEP State with regard to residential electricity pricing, the 7th out or 13 highest SERBEP State with regard to commercial electricity pricing, and the 10th out or 13 SERBEP State with regard to industrial pricing. South Carolina industrial customers, such as Linpac, have low electrical energy costs comparatively. This would indicate that substitution of Linpac's current electrical supply with the Biomass/Cogen generated electricity may not be as advantageous as providing it to the grid.

Table 7: SERBEP State Electricity Cost Rankings by Sector (Highest to Lowest Cost)

Residential	Commercial	Industrial	All Sectors
Louisiana	Louisiana	Louisiana	Louisiana
North Carolina	Dist. of Columbia	Dist. of Columbia	Dist. of Columbia
Florida	Georgia	Florida	Florida
Georgia	North Carolina	North Carolina	North Carolina
South Carolina	Mississippi	Tennessee	Georgia
Arkansas	Florida	Mississippi	Mississippi
Mississippi	South Carolina	Arkansas	Arkansas
Dist. of Columbia	Tennessee	Georgia	Tennessee
Alabama	Alabama	Alabama	Missouri
Missouri	Arkansas	West Virginia	Alabama
Tennessee	West Virginia	Missouri	South Carolina
West Virginia	Missouri	South Carolina	West Virginia
Kentucky	Kentucky	Kentucky	Kentucky

The above provide for a reasonable assumption that a cogeneration unit to produce electricity would have a well placed market. The likelihood of being able to sell excess electricity back to the utility

and grid is increased by the fact that the electricity produce would be "green power", and in certain instance command a premium price.

Factors Affecting Electrical Power Generation and Facility Sizing

The Biomass/Cogen facility size target per electricity generation capability, based on the CCI Newmarket Ontario facility as a template, is a 4 - 5 MW facility. The future facility size is limited or dependent on the following design basis criteria and market parameters:

- biomass raw material feedstock availability
- facility scale issues per implementing the technology and operations
- regional markets for compost and other facility by-products
- linerboard mill natural gas and electrical supply requirements
- offsite electrical sales to utilities or the grid, particularly green power packages
- local industrial or commercial market development of industrial parks

The increase in facility sizing as it relates to available offsite electrical markets is best evaluated via its utility growth and their dependence on the expected growth in the electrical demand in the regional area. Secondarily, the potential for state or regional deregulation effects and/or green power incentive programs or market development, that are already in place or may develop.

Regional Utility Service Providers Growth

South Carolina and the adjoining SERBEP states of North Carolina and Georgia are along the I-85 corridor, an area that has shown tremendous growth in recent years. This has provided for large electrical capability and generation needs with good electricity demand growth. Table 8 provides the South Carolina, North Carolina and Georgia electricity capability and generation data.

Table 8: South Carolina Regional Electricity Capability and Generation

Parameter/State	South Carolina	North Carolina	Georgia
Capability(MW)	18,116	22,845	25,082
Generation((MWh)	87,244,314	121,371,988	115,327,447
Annual Growth Rate [1988-98](%)	1.9	0.5	2.0

The regional area electricity services are provided by various utilities. Table 9 provides a listing of the major regional utilities based on their retail sales volume

Table 9: Utility Retail Sales Revenue 1998 (Million Dollars)

Utility/State	South Carolina	North Carolina	Georgia
Duke Energy Corp.	1,070	2,963	
South Carolina Electric & Gas	1,128		
Carolina Power & Light	415	2,117	
Virginia Electric & Power		204	
Georgia Power Company			4298

The major facilities serving South Carolina are Duke Energy and South Carolina Electric and Gas. Tables 10 and 11 provide the forecasted growth for each of these utilities.

Table 9: Duke Energy Corporation Electrical Market Forecast

Year	Peak MW Summer	Peak MW Winter	Annual Energy MWH	Annual % Change
1999	18,693	16,484	98,016,330	
2000	18,335	15,866	98,568,300	0.6
2001	18,737	16,162	100,962,420	2.4
2002	19,122	16,399	103,230,280	2.2
2003	19,543	16,658	105,506,560	2.2
2004	19,951	16,934	107,757,910	2.1
2005	20,156	17,160	109,703,850	1.8
2006	20,540	17,431	111,912,760	2.0
2007	20,946	17,711	114,092,770	1.9
2008	21,364	17,954	116,126,390	1.8

Table 10: South Carolina Electric and Gas Electrical Market Forecast

Year	Peak MW Summer	Peak MW Winter	Annual Energy MWH	Annual % Change
2,000	4,288	4,063	21,934,000	
2,001	4,400	4,184	22,588,000	2.9
2,002	4,494	4,282	23,120,000	2.3
2,003	4,599	4,382	23,663,000	2.3
2,004	4,684	4,463	24,096,000	1.8
2,005	4,791	4,563	24,648,000	2.2
2,006	4,883	4,652	25,129,000	1.9
2,007	4,968	4,733	25,572,000	1.7
2,008	5,069	4,832	26,106,000	2.0
2,009	5,175	4,935	26,667,000	2.1

The growth rates of the region and the utilities show that excess electricity could readily be absorbed by the current and expected markets.

Deregulation Effects

Deregulation will affect the energy markets significantly. Under the traditional method of regulation a utility's rate of return was limited. Out of a belief that this system did not provide sufficient incentive for the efficient operation of utilities, regulators at the state and federal level began to move the system to a more competitive structure. Utilities are being broken up into generators, distributors and transmitters of electricity. Changes are effecting every aspect of the industry and even creating new types of players in the energy market. Investor-owned utilities are reducing staff and reorganizing and in some cases expanding to remain competitive. Publicly owned utilities, though typically with lower costs, are also preparing for increased competition. New entities called Power Marketers are buying and reselling electric energy, transmission and other services. They are still small but are growing fast.

South Carolina currently has relatively low energy costs compared to the rest of the country. In 1998 the average cost of electricity for the U. S. was 6.7 cents per kilowatt hour. South Carolina businesses should not expect to continue to enjoy such low energy costs. In addition South Carolina and regional SERBEP generators can expect to see price increases as deregulation proceeds. Several additional opportunities exist for Green Electricity generated at cogeneration facilities such as a Biomass/Cogen Facility. Facilities meeting criteria set forth by FERC qualify under the Public Utility Regulatory Policies Act (PURPA) and as such utilities are required to buy back their extra electricity at the avoided cost. The potential to provide electrical energy to the grid improved with the use of a cogeneration facility, particularly if the Biomass/Cogen facility is a Cogenerator Qualifying Facility, as follows:

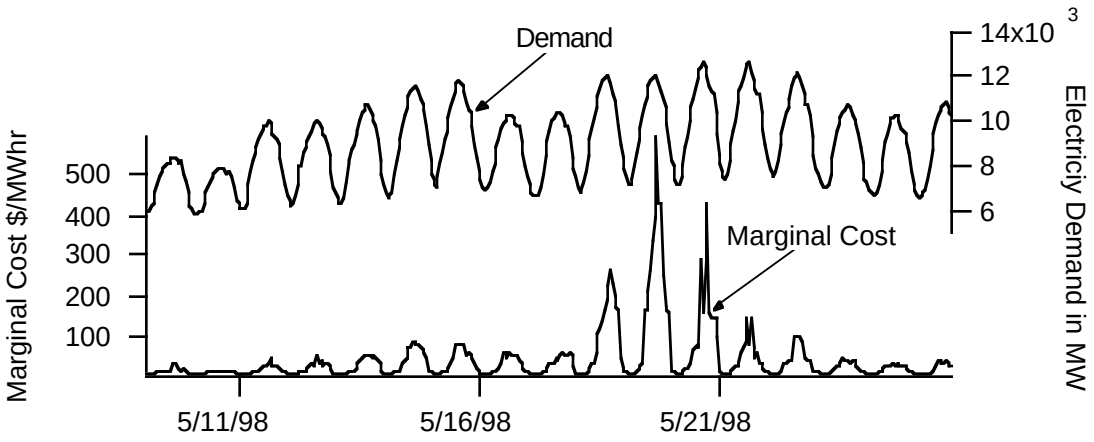
> Cogenerator Qualifying Facility (Cogen QF): (Facilities that) sequentially produce electric energy and another form of energy, such as heat or steam, using the same fuel source; are qualified under the Public Utility Regulatory Policies Act (PURPA) by meeting certain criteria set forth by FERC and, therefore, are guaranteed that utilities will purchase their output.

In addition there are new ways to buy, sell and market electric power. Spot markets have been set up and are providing an alternative source for wholesale electricity. At the retail level the marketing of "Green Power" is rapidly growing particularly in the states that are farthest ahead in their efforts to deregulate. All of these will exert forces on the market. Currently the cost of electricity varies by almost 260% across the country and differences greater that 200% exist between near by states. In a competitive market place large differences in price over short distances will attract the interest of both buyers and sellers of electric power.

Those costs vary widely within the South Carolina, North Carolina, Georgia region. Peak power demand also is becoming a significant factor in some areas, particularly due to some seasonal effects. Based on available data, in 1999 the hourly average marginal cost for Duke Energy and South Carolina Electric were estimated at $14.5 and $20.8 per megawatt hour respectively. In 1998 (the latest year for which data is available) the hourly average marginal cost to generate a megawatt hour of energy for Georgia Power was estimated at $27.3. Table 11 provides an example of the relationship between peak demand and marginal cost.

Table 11: Peak Power Demand and Marginal Cost Example

The Relationship between marginal cost and demand for Georgia Power



An example of how strongly the marginal cost can depend on the demand. During periods of peak demand the marginal cost can increase very rapidly with demand.

In addition to varying across the region the cost varies dramatically throughout the year. The cost varies because the demand varies. Typically for the Southeast the average electricity demand is only about 60% of the peak demand. During periods of peak demand the ability of the system to supply energy can be severely taxed. At these times utilities are forced to operate all of their facilities even the least efficient ones and may be forced to buy electricity on the wholesale market right at the time that price is the highest. In 1999 during just a handful of days the marginal cost of power at Duke energy spiked to $30, $50 and $100 per MWhr. If Duke Power had additional resources available to supply their extra needs at their average marginal cost for these periods in 1999 they could have saved millions of dollars. This peak power need could represent an opportunity for the Biomass/Cogen facility.

The biomass cogeneration facility need not only sell power to the grid during peak times. The previous example was only to demonstrate the dramatic relationship between marginal cost and peak demand. In order to be profitable a facility need only generate electricity below the market rate and have a near-by buyer. The marketing of the Biomass/Cogen energy generated from biomass in a cogeneration facility may even bring a premium if the "green power" energy market continues to develop as it has.

Renewable Energy Policy Incentives

Across the nation, new policy is being developed and implemented to promote renewable energy and green power generation. There are currently four main policy approaches to encouraging renewable energy development and act as incentives for green power packages:

Renewable Portfolio Standards: Renewable Portfolio Standards (RPS), are a mechanism for creating demand. Utilities are required to have a minimum amount of renewable energy generation capacity within their systems.

Renewable Electricity Funds: Renewable Electricity Funds (REF) provide predictable funding sources for the development of renewable energy sources. Utilities are required to contribute to a fund that promotes renewable energy.

Net Metering: Net Metering allows customer-generators to sell back electricity to the utility when they are generating more than they need. In essence using the grid to "store" electricity.

Disclosure: Disclosure of the fuel mix on electricity bills helps educate the public and create demand for green pricing programs.

Nationally, only a few states have adopted all four of these policies, while 11 states have adopted 3 of the 4. Only 19 states have fail to adopted any of these four policies, more than half of those states are in the SERBEP region. The SERBEP region is far behind the nation in renewable energy policy. However, this may represent a future opportunity as SERBEP States catch up with national trends. Table 12 provides a summary of the renewable energy programs adopted in the SERBEP States.

Table 12: A Summary of Renewable Energy Policy Adopted by SERBEP States

Type	RPS	REF	Net Metering	Disclosure
Alabama	No	No	No	No
Arkansas	No	No	No	No
DC	No	No	Yes	No
Florida	No	No	2 local	No
Georgia	No	No	No	No
Kentucky	No	No	No	No
Louisiana	No	No	No	No
Mississippi	No	No	No	No
Missouri	No	No	No	No
N. Carolina	No	No	No	No
S. Carolina	No	No	No	No
Tennessee	No	No	No	No
West Virginia	No	No	No	No
Other States	11	15	31	11

All of the programs in the SERBEP region are net metering programs. Both Florida Net metering programs are local. One is in Jacksonville and the other is in New Smyrna Beach. The Jacksonville utility will buy back customer generated electricity. Customers are required to purchase (from the utility) a second meter to measure energy deliveries to the utility. In New Smyrna Beach Utilities Commission will allow customers-generators to connect their own net metering equipment to the grid as long as it meets certain industry standards. District of Columbia also has a Net Metering program that allows residential and commercial customers to connect renewables, fuel cells, and microturbine systems up to the electrical grid. Each generation system is limited to 100 kW in capacity.

Much can be learned from non SERBEP states with regard to programs that promote renewable energy. Some states have adopted programs that address all four of these areas but by no means do

these few states have the corner on renewable policy advances. A wide range of programs exist in states in the East Coast, the HeartLand and the West. For example:

Massachusetts - Massachusetts is one of the states with the most renewable electricity sold (as a share of total). In fact Massachusetts has adopted policies to encourage renewables in all four of the main categories. As part of electric utility deregulation Massachusetts adopted the out line of a Renewables Portfolio Standard (Chapter 164 of the Acts of 1997). The Division of Energy Resources (DOER) just completed a series of 12 meeting to work on the policy details.

Connecticut - Connecticut has some of the highest long-term funding (per kilowatt-hour) for renewables. One mechanism for that funding is a very strong public benefits program. Over the next five years this program will generate almost $120 million through a per kwh charge (increasing from 0.5 to 1 mill/kwh over the next five years). There are very few restrictions on the uses of this money. The law, CT Public Act No. 98-28, Section 44(c) includes "grants, direct or equity investments, contracts or other actions which support research, development, manufacture, commercialization, deployment and installation of renewable energy technologies, and actions which expand the expertise of individuals, businesses and lending institutions with regard to renewable energy technologies."

Texas - Texas is creating one of the nations largest Renewables Markets which is driven by the Renewables Energy Mandate Rule. The Mandate calls for 2,000 MW of new renewables to be installed by 2009. Beginning in 2002 each retailer will be required to meet a portion of this goal. Retailers may either generate electricity from renewable sources or purchase Renewable Energy Credits (REC) from other retailers that have RECs for sale. Qualifying electricity must be both generated and metered in Texas. For details see Section 39.904 of Texas Utilities Code; PUCT Substantive Rule 25.173.

Ohio - Ohio has one of the best Net Metering Policies in the nation. In 1999 Ohio passed legislation (Ohio Legislature, SB 3) as part of the electric utility restructuring bill that allowed customer-generators to sell electricity back to the utilities. The electricity must come from a qualifying source (most renewables) and be intended to offset the customers electricity needs. The customer-generator's net metering equipment is only required to meet standard electrical safety requirements. Utilities are not allowed to require additional safety standards.

Illinois - Illinois provides an example of one of the nation's strongest Disclosure Rules (1997 House Bill 362). Each customer's electric bill includes a pie chart showing the percentage of electricity supplied by source (i.e. biomass, coal, hydro, natural gas, nuclear, oil, solar, wind, other). In addition, the utilities have to report emissions (i.e. carbon dioxide, nitrous oxide, sulfur dioxide, and nuclear waste).

Iowa - Iowa has made one of the strongest commitments to renewables outside of electric utility restructuring legislation (Code of Iowa 476.41-476.45). The Iowa Utilities Board requires the three state's three utilities to purchase a total of 105 MW generated of renewable and small hydropower. Currently the majority of this requirement is being met with wind and biomass generation.

Minnesota - Minnesota has made the biggest commitment to Biomass. A state grant program (MS2000 41A.09) provides up to $37 million for biomass and alternative fuels. Industries can receive 1.5 cent/kwh or up to 20 cents/gallon from the grant program.

The examples of non SERBEP states policies that have developed, and the successful renewable energy programs they promote, could become key policy components in whole or in part for SERBEP State who desire to sponsor renewable energy programs in the future. Many of the SERBEP states have draft policy that is being evaluated and reviewed for use based on the above models. This new policy activity when implemented can provide new incentives to renewable energy and green power generation such as represented by the Biomass/Cogen facility.

Conclusions

The above energy market analysis provides for the following conclusions:

- Current and future natural gas pricing is at a level that is reasonable for basing a Biomass/Cogen facility development effort on, with the goal of replacing the natural gas with lower cost biogas on a cost per Btu basis.

- The growth of the regional electricity market and deregulation effects provides for reasonable electrical pricing both now and in the future that represents a good potential for offsite sales of excess electrical production to utilities or the grid, particularly as green power.

- While the South Carolina and the SERBEP states are behind the nation in renewable energy policy, future policy developments to promote renewable energy that could develop in these states would tend to improve the energy situation for a Biomass/Cogen facility.

Appendix A
DOE Natural Gas Consumption Forecasts by Sector

Appendix B
SERBEP States Natural Gas Pricing Data

Appendix C
SERBEP States and National Electricity Generation Data