

GENERAL MANAGER REGULAR ITEM #070685

GRU Wholesale Contracts

November 26, 2007

Objective of Wholesale Contracts

- Wholesale contracts should be priced above the incremental costs of serving wholesale loads
- Wholesale revenues above the incremental costs of serving wholesale loads provide:
 - Rate relief to retail customers
 - Transfers to the General Fund
 - Offsets against unavoidable fixed costs (i.e., spreading overhead)
 - Revenues from utilization of otherwise idle resources
 - More efficient usage of existing capacity

Embedded vs. Incremental Costs

- Embedded costs

- Costs incurred to fulfill a utility's "obligation to serve" native load/retail customers
- Utility operating expenses
 - Fuel and purchased power
 - Operations and maintenance
 - Depreciation expense
 - Interest expense
- Capital investment and return

- Incremental costs

- The costs of producing an additional quantity of output
- Typically include variable operating expenses such as fuel, purchased power, and operations and maintenance
- The "incremental generating unit" is the **discretionary** generating unit available to produce an additional quantity of output

Wholesale Contract Pricing

- Wholesale sales are discretionary and are served with existing unused resources
- Contracts are priced to recover the ***incremental*** costs of serving the wholesale load plus a margin
- Contracts are competitive and pricing is constrained by the market price for electricity
- Pricing is based on negotiated contracts (i.e., not tariff-based)
- Unlike retail rate design cost causation is not the guiding principle

Wholesale Contract Pricing (continued)

- For a **system** product, the standard industry practice is to state the monthly fuel charge as the “system average cost of fuel”
 - Allows the flow through of some fuel cost volatility
 - Not intended to recover actual incremental fuel costs incurred by the wholesale customer
- Why do wholesale contracts specify “system average cost of fuel” as opposed to the actual incremental cost of fuel?
 - Utilities calculate and audit system average fuel costs on a monthly basis
 - Required audit trail for actual incremental unit and incremental fuel cost data would make monthly settlements extremely difficult and contentious

Wholesale Contract Pricing (continued)

- Demand charges are set at levels sufficient to:
 - Recover incremental fuel and other costs above the system average cost of fuel
 - Generate net income (i.e., profit margin) for the utility for:
 - Transfers to the General Fund
 - Offsets to other utility costs, i.e., debt service, fixed personnel, fuel, etc., that benefit retail customers
- Contracts may contain energy charges for O&M and other costs

How Are Incremental Costs Determined?

- Incremental costs are estimated using production cost models
- Run the production cost model to simulate system economic dispatch with and without the wholesale loads
- Calculate production costs under both scenarios
- The difference is the incremental cost of supplying the wholesale loads

Production Cost Models

- Production cost models simulate and optimize a utility system's economic dispatch
- Economic Dispatch
 - Objective is to minimize the total cost of generation subject to the operational constraints of the available generating resources
 - Dispatch discretionary units hourly from lowest to highest incremental cost until required load is met
 - Operational constraints and limits to pure economic dispatch are reflected in the production cost model assumptions

Production Cost Model Inputs

- Unit operating characteristics and constraints
 - Heat rate curves
 - Maximum and minimum dispatch limits
 - Spinning reserve requirements and capabilities
 - Minimum and maximum up and down times
 - Maintenance schedules
 - Forced outage rates
 - Startup costs and profiles
 - Ramp rates
 - Operation and maintenance costs
- Fuel prices and volume limits
- Hourly loads

Why Production Cost Modeling?

- The incremental costs of wholesale loads cannot always be calculated from the average cost of the highest cost unit operating on the system
 - To be the “incremental unit” the unit must be discretionary
 - Units often must be dispatched out of economic order for reasons such as spinning reserve requirements, minimum and maximum load limitations, must-run units, voltage or frequency support, reactive power, etc.
 - The highest cost unit operating on the system may not be discretionary
- Most generating units operate more efficiently as output increases

Example of Economic Dispatch with Constraints

- Retail Load = 220 MW
- Wholesale Load = 20 MW
- Generation Requirement = 240 MW
- Unit 1: Coal Plant
 - Net Capacity = 220 MW
 - Incremental Cost = \$35/MWh
- Unit 2: Natural Gas Combined Cycle Combustion Turbine (CCCT)
 - Net Capacity = 110 MW
 - Incremental Cost = \$80/MWh
- Units 3 and 4: Natural Gas Combustion Turbines (CT)
 - Net Capacity = 20 MW
 - Incremental Cost = \$175/MWh

Scenario 1: No constraints

- Coal Plant at 220 MW, Gas CCCT at 20 MW
 - $220 \text{ MW} \times \$35/\text{MWh} = \$7,700$
 - $20 \text{ MW} \times \$80/\text{MWh} = \$1,600$
 - Average Cost = $\$9,300 \div 240 \text{ MW} =$
 $\$38.75/\text{MWh}$
 - Incremental cost of 20 MW wholesale load is
 $\$80/\text{MWh}$

Scenario 2: Low dispatch limits

- Low Dispatch Limits
 - Coal Plant = 80 MW
 - Natural Gas CCCT = 40 MW
 - Natural Gas CTs = 1 MW
- **Option 1:** Coal Plant at 220 MW, Gas CT at 20 MW
 - $220 \text{ MW} \times \$35/\text{MWh} = \$7,700$
 - $20 \text{ MW} \times \$175/\text{MWh} = \$3,500$
 - Avg. Cost = $\$11,200 \div 240 \text{ MW} = \mathbf{\$46.67/\text{MWh}}$
 - Incremental cost of 20 MW wholesale load is **\$175/MWh**
- **Option 2:** Coal Plant at 200 MW, Gas CCCT at 40 MW
 - $200 \text{ MW} \times \$35/\text{MWh} = \$7,000$
 - $40 \text{ MW} \times \$80/\text{MWh} = \$3,200$
 - Avg. Cost = $\$10,200 \div 240 \text{ MW} = \mathbf{\$42.50/\text{MWh}}$
 - Incremental cost of 20 MW wholesale load is **\$80/MWh**

Scenario 3: Add 20 MW of wholesale load

- Generation requirement now 260 MW (220 MW retail plus 40 MW wholesale)
- Coal Plant at 220 MW, Gas CCCT at 40 MW,
 - $220 \text{ MW} \times \$35/\text{MWh} = \$7,700$
 - $40 \text{ MW} \times \$80/\text{MWh} = \$3,200$
 - Avg. Cost = $\$10,900 \div 260 \text{ MW} = \mathbf{\$41.92/\text{MWh}}$
 - Adding 20 MW of wholesale load decreased average system fuel costs by \$0.58/MWh
 - Incremental cost of 40 MW wholesale load
 - $20 \text{ MW} \times \$80/\text{MWh} = \$1,600$
 - $20 \text{ MW} \times \$35/\text{MWh} = \700
 - Incremental Cost = $\$2,300 \div 40 \text{ MW} = \mathbf{\$57.50}$

Scenario 4: Instantaneous spinning reserve requirement

- Instantaneous spinning reserves equal to 5% of the capacity of the largest unit online must be supplied by an idle unit
- Generation requirement now 271 MW (260 MW plus 11 MW spinning reserves, i.e., 5% of the coal plant's 220 MW capacity)
- Coal Plant at 220 MW, Gas CCCT at 40 MW, and Gas CT3 providing the equivalent of 11 MW of spinning reserves
 - $220 \text{ MW} \times \$35/\text{MWh} = \$7,700$
 - $40 \text{ MW} \times \$80/\text{MWh} = \$3,200$
 - $11 \text{ MW} \times \$175/\text{MWh} = \$1,925$
 - Avg. Cost = $\$12,825 \div 260 \text{ MW} = \mathbf{\$49.33/\text{MWh}}$
 - Incremental cost of 40 MW wholesale load
 - $20 \text{ MW} \times \$80/\text{MWh} = \$1,600$
 - $20 \text{ MW} \times \$35/\text{MWh} = \700
 - Incremental Cost = $\$2,300 \div 40 \text{ MW} = \mathbf{\$57.50}$

Recent Wholesale Contract Performance

Includes both City of Alachua and Seminole Electric Cooperative

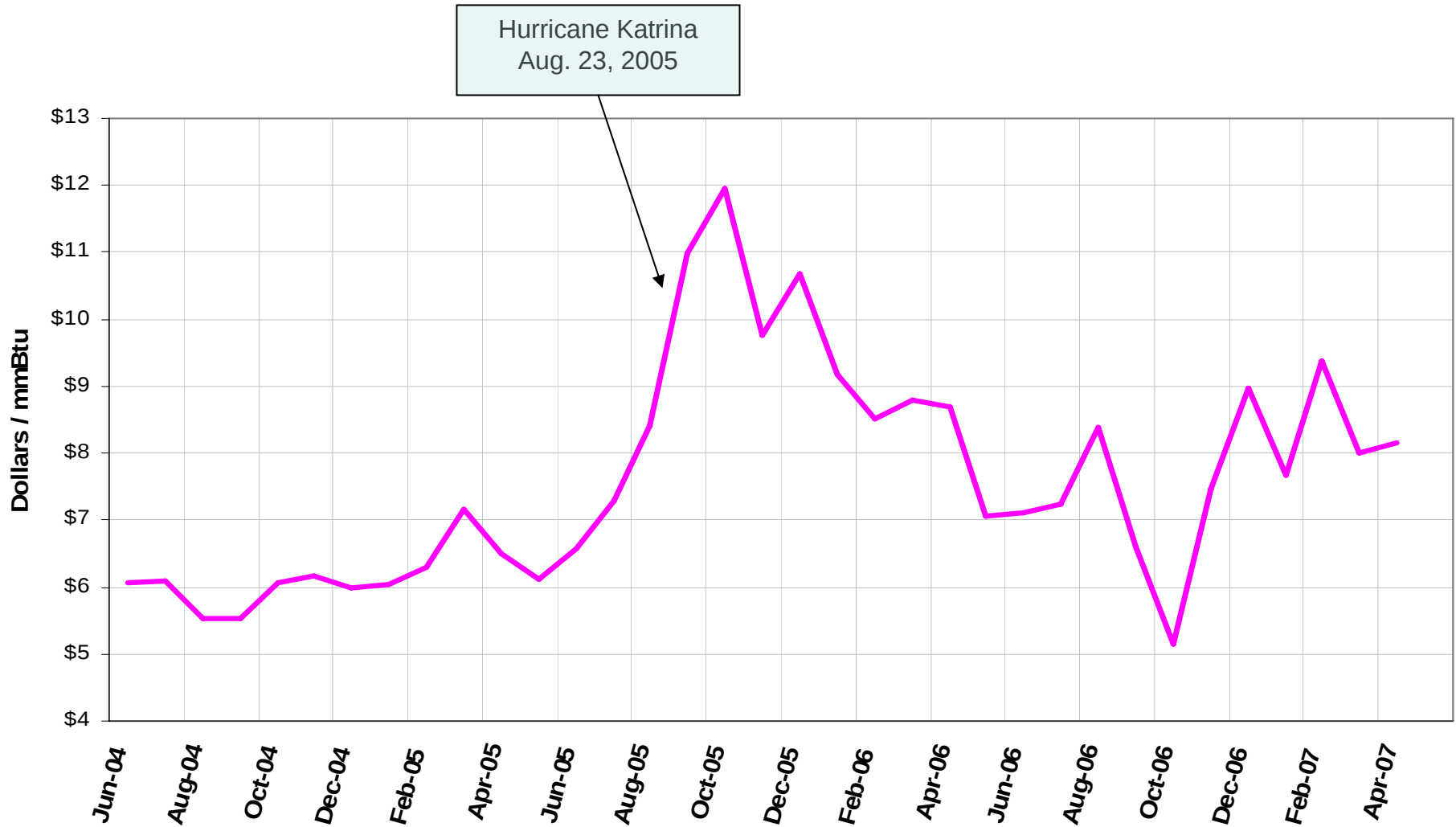
Fiscal Year	Billed Energy (kWh)	Billed Revenues	Incremental Costs	Net Revenues
2005	161,264,105	\$ 10,251,696	\$ 9,168,619	\$ 1,083,077
2006	173,013,216	\$ 13,158,937	\$ 12,330,585	\$ 828,352
2007*	106,718,470	\$ 7,340,203	\$ 5,762,789	\$ 1,577,414
Totals	440,995,791	\$ 30,750,836	\$ 27,261,993	\$ 3,488,843

* Partial year through May 2007

FY 2006 Monthly Wholesale Contract Performance

Month	Billed Energy (kWh)	Billed Revenues	Incremental Costs	Net Revenues
Oct-05	13,470,038	\$ 992,914	\$ 1,171,752	\$ (178,838)
Nov-05	11,249,689	\$ 936,019	\$ 792,768	\$ 143,251
Dec-05	13,907,906	\$ 1,021,961	\$ 967,028	\$ 54,934
Jan-06	12,741,403	\$ 819,161	\$ 820,604	\$ (1,443)
Feb-06	12,170,538	\$ 813,130	\$ 770,917	\$ 42,214
Mar-06	11,901,787	\$ 911,297	\$ 714,249	\$ 197,048
Apr-06	12,471,766	\$ 1,412,016	\$ 1,264,618	\$ 147,398
May-06	15,064,597	\$ 911,642	\$ 873,256	\$ 38,386
Jun-06	16,601,497	\$ 1,261,607	\$ 963,942	\$ 297,665
Jul-06	18,204,441	\$ 1,484,676	\$ 1,272,739	\$ 211,937
Aug-06	18,959,499	\$ 1,417,170	\$ 1,603,841	\$ (186,671)
Sep-06	16,270,055	\$ 1,177,343	\$ 1,114,871	\$ 62,472
Total FY 2006	173,013,216	\$ 13,158,937	\$ 12,330,585	\$ 828,352

GRU Historical Cost of Natural Gas



Conclusions and Recommendations

- GRU's wholesale power contracts with the City of Alachua and Seminole Power Cooperative have provided benefits to the utility system, the City of Gainesville, and GRU ratepayers
- The City of Alachua recently issued a RFP for power supply
- Considerations for extension or renewal of existing agreements, or whether to bid in the RFP for new wholesale contracts:
 - Projected fuel prices and incremental costs
 - Contract structure
 - Contract pricing
 - Terms and conditions
 - Risks to GRU
 - GRU's future resource needs