

# **Tomorrow's Utility Today**

By

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## **Abstract**

With deregulation on the horizon, there have been countless articles and endless speculation that the regulated utilities will not be able to adequately serve their customer's needs. Utilities have launched major advertising campaigns to explain the benefits they bring. Many of these campaigns have consisted of new logos, and flashy media advertisements, but the exact differences between the companies that Edison began and what they are becoming has not been evident. In Raleigh, North Carolina the local utility is going a step further. Carolina Power and Light has, under its regulated operations, begun to look for innovative ways to serve its customers. This spring CP&L began rolling out their "Premier Power" program. This program offers standby power to customers in hurricane alley at a fixed monthly fee. It combines the joint efforts of an automatic transfer switch manufacturer, Cutler-Hammer; a generator set dealer, Gregory Poole CAT; a controls and software provider, Encorp; and the utility. The customer has no capital outlay and only is required to sign up for a five year lease. All of the installation, maintenance, and fueling of the engines is included in the single monthly fee.

This paper details the cooperation between the utility, generator set manufacturer, switchgear provider, control system manufacturer, and the customer. It shows the economic benefits to all parties, specifically addressing:

- How a Premier quality O&M package is provided at a minimum cost.
- The added reliability of the system by out-sourcing O&M
- The economic benefits to the customer based on lease vs. purchase.
- The value of standby power to customer.
- The economic value of providing standard equipment.
- The value of customer/utility cooperation in speed of delivery, quality of service, overall cost.
- The value to the utility of forging long term customer relationships.

The "Premier Power" program is an example of how teamwork within the industry can bring value-added features to customers. Forward thinking utilities are already finding ways to tailor their product lines to serve a variety of customer needs. As closing, the possibilities for future expansion of the scope of the program are discussed.



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With deregulation on the horizon, there have been countless articles and endless speculation that the regulated utilities will not be able to adequately serve their customer's needs. Utilities have launched major advertising campaigns to explain the benefits they bring. Many of these campaigns have consisted of new logos, and flashy advertisements, but the exact differences between the companies that Edison began and what they are becoming has not been evident to the consumer. In Raleigh, North Carolina the local utility is going a step further. Carolina Power and Light (CP&L) has, under its regulated operations, begun introducing innovative ways to serve its customers.

CP&L is a traditional utility which serves approximately 3.75 million people over 30,000 square miles throughout both North and South Carolina. As with most regulated utilities, it owns generation, transmission, and distribution lines throughout its service area. It has successfully traded a duty to serve for a fixed rate of return on capital investments as determined by the Public Utilities Commission. But, the winds of deregulation have been persistently blowing throughout the utility industry. This spring, as part of the company's adjustment to the future deregulated market, CP&L began rolling out their "Premier Power Service". This program brings CP&L into a new business: financing, installing, and maintaining standby generation.

CP&L's service area is ideal for the marketing of standby generation. Although the utility has an outstanding record of providing reliable power, every fall mother nature churns up powerful tropical storms and hurricanes, and every winter ice and wind take their toll on the company's distribution system. With the pace of business today and the globalization of customer bases, a week without power can be the difference between success and economic death. It is becoming more apparent to business owners every year

that even unavoidable, natural power outages are not tolerable. As a result, CP&L chose standby power as a logical new business opportunity.

Stand-by power is certainly not a new concept. It has been a common feature in buildings for many years. In many cases the National Fire Protection Agency (NFPA) or other regulatory groups have mandated it. A traditional standby power installation has consisted of a diesel generator set and an open transition,<sup>1</sup> automatic transfer switch. Usually, due to cost, the standby set has been selected to be the absolute minimum size required by regulations (See Figure 1: Traditional Standby One Line Diagram). The loads picked up by the standby set, typically lights and systems that allow egress, remain energized, while most systems that actually produce revenue lose power during a utility outage. As a result, even though public safety is assured during an outage, most commercial and light industrial buildings are not able to function in any semblance of their normal capacity. After the devastation from Hurricane Fran<sup>2</sup>, some commercial customers in CP&L's service area were without power for over five business days. Although many businesses are insured for the loss of stock as a result of a natural disaster, there is usually no insurance for lost revenue or worse, lost customers, from not being able to operate. For light industrial companies the inability to feed parts into a larger manufacturer's "just in time" system can result in the loss of future and current contracts. Still, many industrial and commercial customers have avoided backing up their buildings with on-site generation.

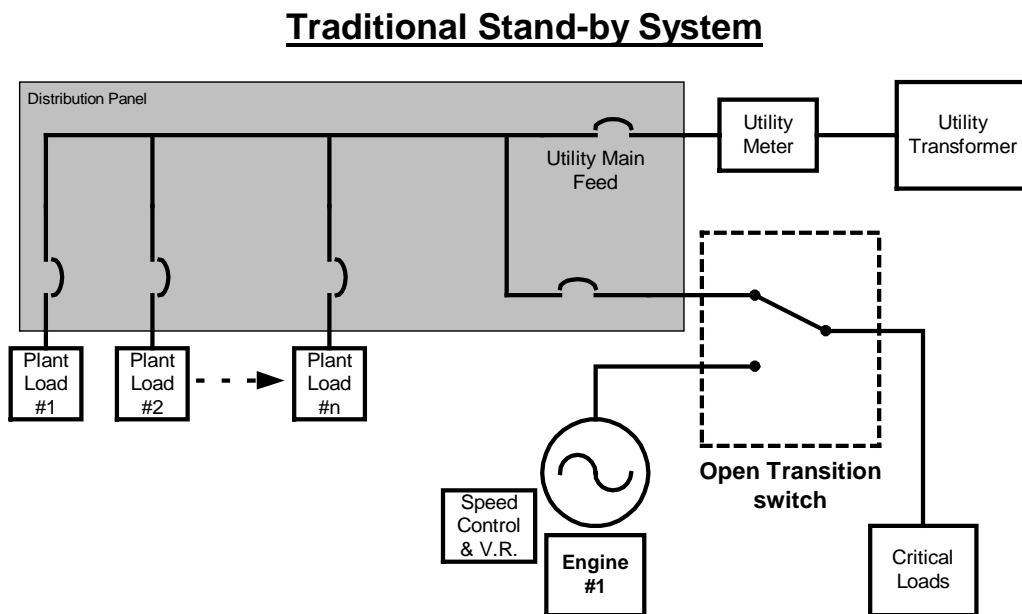
One of the main reasons companies have avoided this investment is the capital expenditure traditionally associated with siting and commissioning a generator set. Most manufacturing companies are judged by a net profit to capital ratio. From an accounting standpoint, a standby generator is a non-revenue producing capital expenditure, and therefore is viewed as undesirable. Another factor preventing many businesses from installing on-site generation has been the way they treat the use and purchase of electrical power. There are very few businesses in the United States that are not totally dependent on electricity, and yet few businesses employ anyone whose main job is to ensure the

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<sup>1</sup> "Open transition" refers to a "break-before-make" mode of operation. This results in an intentional power disruption even when transferring between two good, reliable sources.

<sup>2</sup> Hurricane Fran plowed into the North Carolina coast line in early September 1996. It caused disruption throughout North Carolina, including in Raleigh, more than 110 miles from the coast.

reliability of their electrical system. The inherent reliability, which utilities like CP&L have provided, has made this seem unnecessary. If you are a grocery store owner, you will know every nuance of the grocery business, but what do you know about frequency or voltage regulation when operating on an isolated bus? (What's an isolated bus?) By bringing the utility and its partners into the equation, the consumer need not answer these questions. They need simply quantify the cost of an outage. How long did the meat in grocery store freezers last during the sustained outage after Hurricane Fran? What was the cost of the lost inventory? What is the cost of being closed for business for four days while your nearest competitor is open? Will the customers that were so hard to land, stay when deliveries are missed? Remember, not all of your customers or your competitors, are subject to the same weather patterns or power outages.



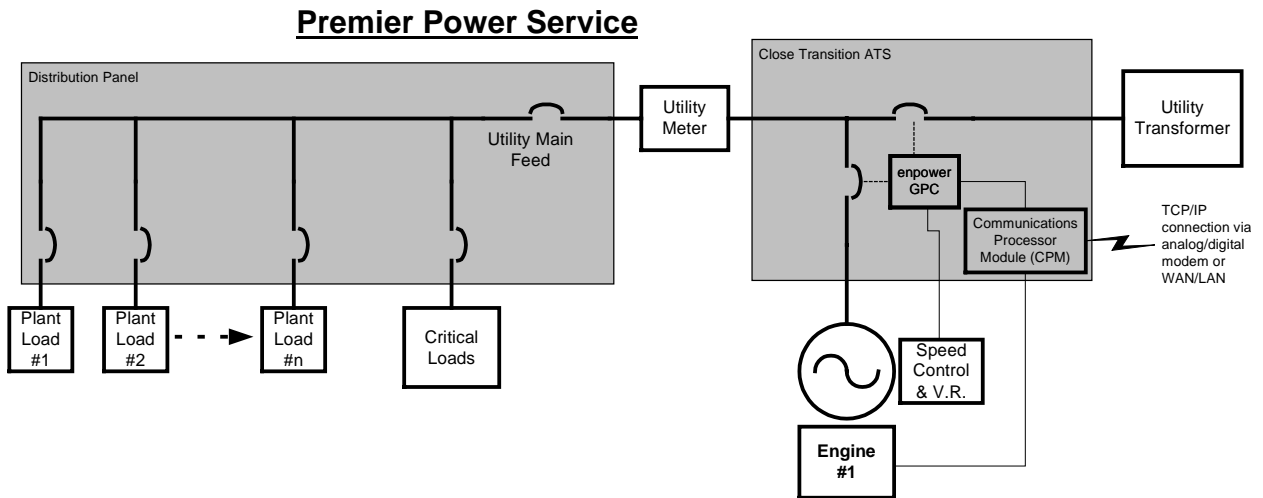
**Figure 1: Traditional Standby One Line Diagram**

At the end of the day, a standby generator is simply an insurance policy. A business must make a financial decision whether or not to make the investment, to purchase the insurance. But, unlike other insurance policies to which businesses are accustomed, standby generation has rarely been presented as a simple monthly payment.

The only way standby generation has resembled an insurance policy is that it is usually forgotten once purchased. Only after a disaster, is the worth of the insurance evaluated.

**A new solution:**

The Premier Power Service offered by CP&L differs in many ways from traditional stand-by systems. First, the units installed for the service are located on the utility side of the meter, and carry the entire facility (See Figure 2: Premier Power Service One Line Diagram). This means that a grocery store subscribing to the Premier Power Service will not only be able to keep its perishables fresh during an outage, but will be able to function as if the outage had not occurred. The economic advantage to this can be enormous. The average business loses 0.4% of its annual production for each day it is without power.<sup>3</sup> Even if production time can be made up, it is often made up using overtime at a higher labor rate.



**Figure 2: Premier Power Service One Line Diagram**

Another benefit of the Premier Power Service is the maintenance and reliability of the units in the program. Many standby generator installations have been treated like car insurance policies. They are tucked away out of site and ignored. Many receive preventative maintenance only at the maximum periodicity required to comply with

<sup>3</sup> Number based on 250 working days per year (5 working days per week, 52 weeks per year minus 10 holidays)

regulations. The result is that many standby generators are in poor or inoperable working condition, and do not provide power when called upon. The Premier Power Service does not allow this to happen. It contracts out the maintenance of the unit to the local experts, the Caterpillar dealer. This premier service program includes routine and preventative maintenance, weekly load tests, and fueling.

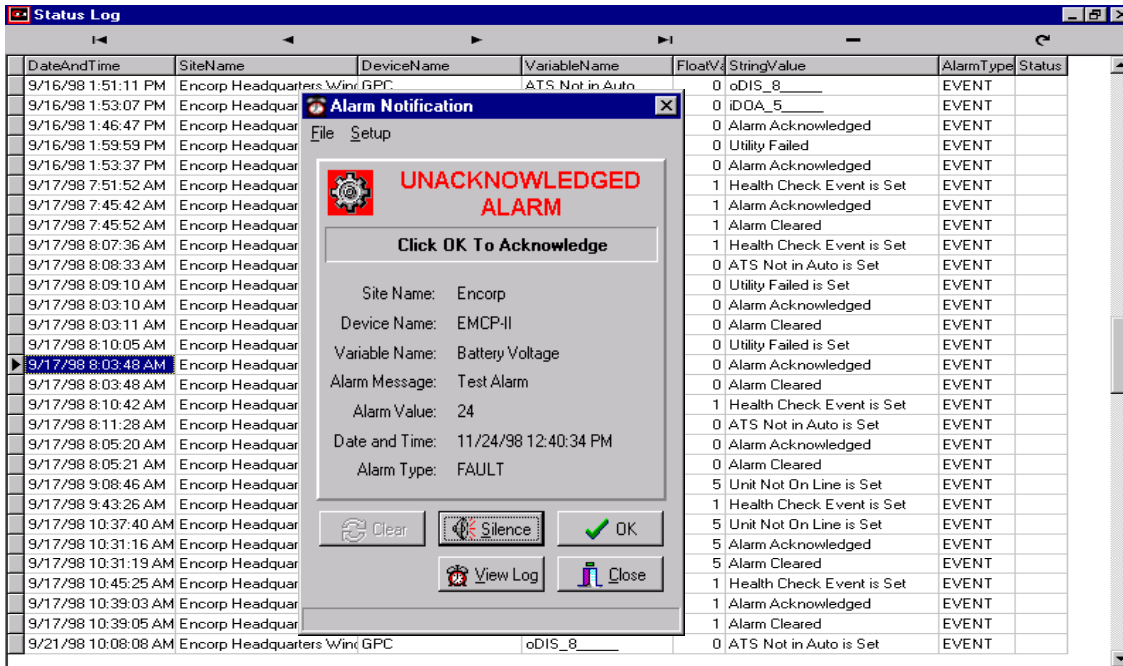


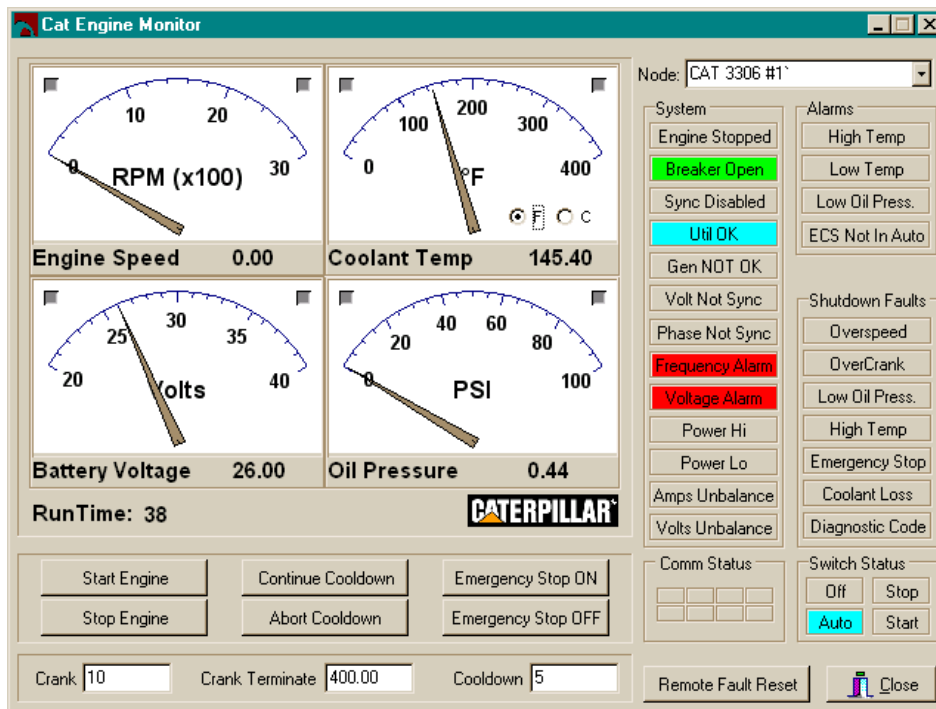
Figure 3: Dispatcher's Event Log

Unlike traditional maintenance services each site is equipped with a communications processor module, which pulls data from both the electronic generator and engine controls. This allows trained technicians to simply dial in once a week and load test the unit remotely. Because the generator is brought on line using a closed transition<sup>4</sup>, automatic transfer switch, the customer does not even know a test is underway unless he hears the generator set running. Furthermore, the advanced electronics<sup>5</sup> continuously monitor the engine-generator set and transfer switch. Each site automatically calls back to the maintenance provider every day for a health check.

<sup>4</sup> Closed Transition refers to a “make-before-break” transfer where both the normal and the emergency breakers remain closed while load is transferred from the utility to the on-site generator.

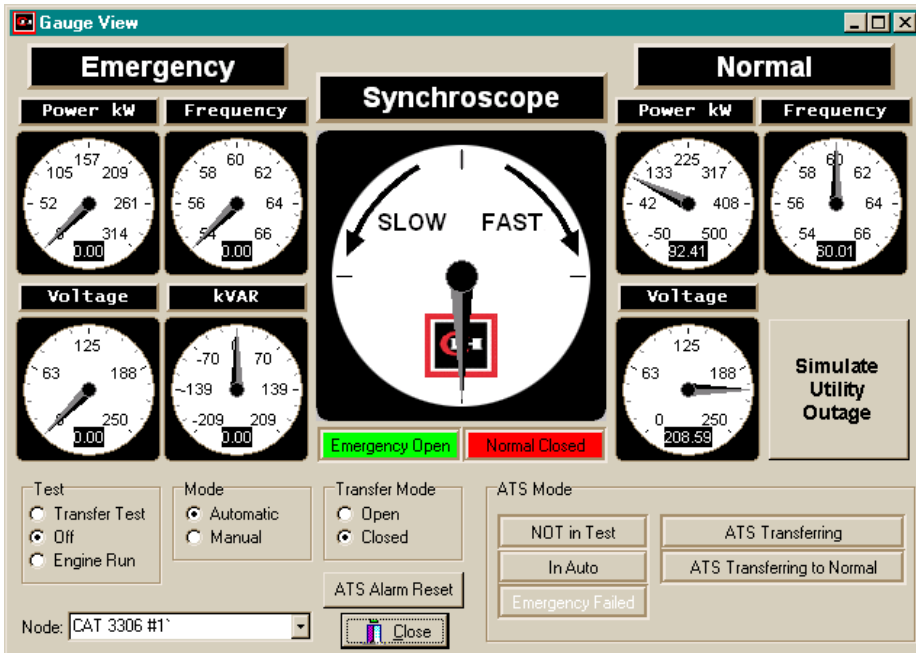
<sup>5</sup> The on board electronics consist of state of the art generator controls from Caterpillar, breaker control and power monitoring from Cutler-Hammer, and generator control and remote monitoring from Encorp.

Should any unit experience a problem it will propagate an error message back to the dealer's dispatcher (See Figure 3: Dispatcher's Event Log). Error messages include insufficient battery voltage, the most common failure mode of a standby generator. If the unit can not contact the maintenance provider it will page an on-call technician. In addition, once a warning is received at the dispatcher's computer station, and if it is not acknowledged within a specified time, a page is also sent. This ensures twenty-four hours, seven days a week coverage.



**Figure 4: Engine Monitor Screen**

The monitoring software is also portable to any PC based laptop. This allows any technician to dial into the site and investigate problems associated with a received page (See Figure 4: Engine Monitor Screen and Figure 5: System Electrical Screen). The end result is a very well maintained, reliable generator at a minimum cost. Technicians only make site visits when required, and can check in advance to ensure they have the necessary equipment when they do go to the site.



**Figure 5: System Electrical Screen**

Possibly the most important benefit of Premier Power Service is that the customers do not own the generators. A consumer signs up for a lease period of five to ten years. There is no capital outlay required.<sup>6</sup> From an accounting stand point the generator is merely an increase in operating expenses. The cost of the generator as well as the operations and maintenance are included as part of the customers' monthly utility bill. There is also no need to hire additional personnel to monitor the equipment, since the entire operation is transparent to the consumer. The installation itself is either done directly by CP&L employees or contracted to qualified providers, by CP&L. Gregory Poole, the local Caterpillar dealer provides the follow up maintenance for the life of the contract. The end result is a simple monthly expense for increased reliability.

Additional cost savings are generated as a result of a close coordination between the utility and the equipment providers. The generator sizes and designs for the Premier Power Service are set directly around the standard transformer sizes and impedances used in the CP&L's distribution system. Traditionally, one of the greatest costs of paralleling standby systems with the grid has been the design effort to coordinate the site with the rest of the grid during an outage condition. CP&L engineers worked with Gregory Poole

<sup>6</sup> The actual rider for this rate is included at the end of this document. This rider is for the state of North Carolina. There is a separate rider for CP&L service territory within South Carolina.

and Cutler-Hammer's Generation Systems product line to develop a standardized approach that allows the installer to customize the switchgear for a specific application at the site. The integration of PC programmable controls into the transfer switch minimizes custom wiring typically required in this style of equipment. In addition, since the switchgear and gensets being used utilize the same basic components regardless of the application, the installation process becomes repeatable. This allows new sites to be implemented without long drawn out approval or design processes.

### **A winning proposition for consumer and utility**

The discussion above illustrates the benefits to the customer in signing up for "Premier Power Service". The remaining question is, "What does CP&L get out of the program?" Its benefits are two-fold. CP&L expands their scope of supply and service to the customers within its region. This yields a monetary stream that they have not realized in the past without stepping outside of the company's core competency, electrical power. At the same time it forges deeper relationships with its customers. The better CP&L serves its customer base today – the better position it will be in to retain its customers when deregulation is fully implemented.

With the continued success of this program, CP&L has plans to expand it to include Uninterruptible Power Supplies (UPS) as an additional option for their Premier Power sites. This would provide bumpless transfers from the grid to the standby generator even during utility outages<sup>7</sup>. Another possible future expansion for the program is its integration into a short duration peaking system<sup>8</sup>. The advanced electronics currently installed at each site allow the automatic transfer switches to be easily modified, through software, to enable the generator set to be used as an interruptible or peaking resource. This could provide a hedge for CP&L should it begin to experience the drastic spot market fluctuations seen in the Midwest last summer<sup>9</sup>.

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<sup>7</sup> The UPS system would act as bridge power between disturbances on the grid and the ability to bring the generator up to speed and voltage. Many batch manufacturing processes, communication systems, and data centers can not stand even momentary fluctuations in supplied power.

<sup>8</sup> Most North American utilities experience very short duration peaks of less than 100 hours during hot summer days. If the standby units in the Premier Power system were to be used for more than 100 hours, they would have to be derated to ensure reliability and might have to undergo separate permitting.

<sup>9</sup> The spot market price for power in the Midwest rose from a normal summertime price of 35 – 55 \$/MWh to over 7500 \$/MWh during late June 1998.

Whatever the future of the system, CP&L has already proven that by teaming with industry experts it can offer unique and valuable services. By expanding its scope and diversity of supply it has begun the transition to a customer-focussed utility. By adopting the business practices that will be required to compete in tomorrow's deregulated market today, CP&L is positioning itself to be a strong competitor.



Carolina Power & Light Company  
(North Carolina Only)

PREMIER POWER SERVICE  
(EXPERIMENTAL)  
RIDER PPS-1A

**AVAILABILITY**

This Rider is available on a voluntary basis in conjunction with any of Company's general service schedules when the Customer contracts with Company to furnish certain Services related to the supply of on-site generation for the sole purpose of providing an alternate supply of electric service in the event normal electric supply is interrupted. The rate schedule with which this Rider is used is modified only as shown herein. This Rider shall be available to new applicants until December 31, 2001.

**DEFINITION OF SERVICES**

Services provided under the terms of this Rider shall be provided by an on-site generator supplied by Company for the purpose of continuing the supply of electricity to the Customer's site in the event the normal electric supply is interrupted. In cases where Customer's total electric requirement exceeds the generation capability, Customer shall arrange its electrical requirements to ensure that the electrical requirement to be supplied when normal service is interrupted will not be greater than the generation capacity. The minimum generator capacity supplied by Company under this Rider shall be not less than 200 kW; the maximum generation capacity supplied by Company under this rider at a single site shall not exceed 3,500 kW.

Customer agrees that any equipment installed on the Customer's premises for the express purpose of providing this Service is and will remain the sole property of Company during the Contract Term, or any subsequent extension thereof, or until such time as the Customer exercises the Early Termination Provision, shown below. Company reserves the right to exchange or upgrade equipment as necessary for the continued supply of these Services. Such generation shall be owned, maintained and operated solely by Company. Company reserves the right to operate the generation at all times it deems appropriate for purposes of, but not limited to, testing of the generation to verify that it will operate within required parameters. The generation and appropriate transfer switching shall be located on Company's side of the billing meter, therefore, billing under the applicable general service schedule shall continue to be based solely upon consumption registered on Company's billing meter.

**MONTHLY RATE**

The Monthly Rate shall be an amount computed under the applicable general service schedule and other riders, if applicable, for the Billing Demand and kilowatt-hours registered or computed by or from Company's metering facilities during the current month plus the following:

Monthly Services Payment = Capital Cost + Expenses

where:

Capital Cost equals a carrying cost times the levelized plant investment based upon the estimated installed cost of facilities. The carrying cost includes the cost of capital, reflecting current capital structure and debt and preferred rates and the most recent approved return on common equity; income taxes; property taxes; general plant; administrative and general plant-related expenses; and intangible plant. Any replacement cost expected to be incurred during the Contract Period would also be included.

Expenses shall be levelized over the Contract Term and shall include: Company operations and maintenance (O&M) expenses times a carrying cost that is inclusive of administrative and general and labor expenses related to O&M and cash working capital; Third-party expenses for operations and maintenance, warranties or insurance; Fuel expense, based upon an annual estimate of fuel consumption cost, less a credit based upon the system average cost of energy included in retail tariffs; Inventory cost associated with fuel, materials, and supplies times a carrying cost that recovers the cost of capital and income taxes; Depreciation Expense, adjusted

for the estimated salvage value at the end of the Contract Period; Deferred Income Taxes; and Customer Accounting, Customer Service and Information, Program Administration, and Sales expenses.

Customer shall be liable to Company for any attorney fees or other costs incurred due to Customer's failure to pay the Monthly Rate due under this Rider. Installation cost will be recovered over the initial Contract Term. Pricing of capital-related costs and expenses shall be based upon no shorter than 10 years from the equipment's original in-service date and the resulting Monthly Rate shall include an upward adjustment for Contract Terms that expire prior to 10 years from this in-service date.

### **PREMIER POWER SERVICE AGREEMENT**

Company and Customer shall execute a Premier Power Service Contract that will further state the amount of the Monthly Services Payment, as established in accordance with the Monthly Rate provision above, and the Contract Term. This Rider, in conjunction with the Premier Power Service Contract, embodies the Agreement between Company and Customer. The parties shall not be bound by or liable for any statement, writing, representation, promise, inducement or understanding not set forth therein. In the event of any conflict between these writings and the terms of this Agreement, this Agreement shall control. No changes, modifications or amendments to any terms and conditions in this Contract are valid or binding unless agreed to by the parties in writing by their authorized representatives.

### **CONTRACT TERM**

The Contract Term shall be the period of time specified in the Premier Power Service Contract and shall commence with the first day service is provided under this Rider. At the end of the Contract Term the Customer shall have the option to a) extend the terms of this Contract or b) terminate this Contract which entails removal of equipment owned by Company for the purpose of supplying the Services.

### **EARLY TERMINATION OF CONTRACT TERM**

The Customer has the right to terminate this Contract before the entire Contract Term has expired. In order to terminate Contract before the end of Contract Term, the Customer must a) notify Company in writing a minimum of 60 days prior to termination of Services and b) pay a Termination Fee. The Termination Fee will be calculated by taking the sum of the Customer's payments remaining in the Contract Term, adding an estimated removal cost, and subtracting therefrom the difference between the current salvage value and the salvage value used in setting the Monthly Rate. In the event of any termination of the Contract before the end of the Contract Term, Company shall be compensated for all Services provided to Customer prior to the effective date of termination.

### **PROVISIONS OF SERVICES AND INSTALLATION SCHEDULE**

Company agrees to furnish labor, supervision, equipment, materials and transportation. Company shall be entitled to rely on the accuracy of any information provided by Customer, which is warranted by Customer to be accurate and correct. In the event of any unforeseen difficulties in performance of the Services due to conditions at the work site or due to the inaccuracy of any information relied upon by Company, the Monthly Rate, description of Services and Contract Term shall be equitably adjusted to compensate for any additional work. Company shall exercise reasonable efforts to complete the Services within any schedule specified in the Premier Power Service Contract. Any schedule that is specified in the Contract is only an estimate of the time it will take to complete the Services. In the event of any unforeseen difficulties in performance of the Services due to conditions at the work site or due to the inaccuracy of any information relied upon by Company, the Customer shall indemnify Company for any costs or expenses incurred by Company and the compensation payable to Company, the

description of Services, and the schedule for the subject Services shall be equitably adjusted to compensate for any additional work Company may be required to perform.

### **CUSTOMER'S RESPONSIBILITIES**

Customer shall provide a location on premise for installation of Company's facilities and any necessary access to the work site, as well as reasonable lay-down area to perform the Services. Any additional services that become necessary because of inadequate access to the work site shall be grounds for an equitable adjustment in the schedule and the Monthly Rate. Company shall have the right to suspend Services or adjust the schedule accordingly in the event that there is inadequate access to the work site, or if any required information is not promptly provided, or in the event that the safety of any person or property might be jeopardized by continuing with the Services. Customer shall provide, at no cost to Company, any plans, specifications, drawings or information that may be necessary or useful in the performance of the Services. Customer will ensure that all Occupational Safety and Health Act requirements are adhered to for the area where any Company equipment, in support of the Services, is to be stored. In the event of damage to Company-owned equipment that is caused by the Customer or Customer's agents, Customer agrees to pay all repair or replacement costs associated with the damage.

### **PERMITS AND REGULATORY REQUIREMENTS**

Company shall be responsible for obtaining any license or permit required of Company in Company's name to enable it to provide the Services. Customer assumes the risk and responsibility for such compliance or change, or for securing such permits, licenses, and approvals from the proper authorities, and for paying any associated costs or fees should compliance with any laws, rules, regulations, or ordinances of any federal, state, or local authority, or of any agency thereof (including, but not limited to, certification to do business as a foreign corporation) require any changes in the Services; or should any permits, licenses or approvals of plans and specifications for the Services or should any permits, licenses or approvals for the installation or use thereof be required.

### **LIMITATION OF LIABILITY**

Neither Company nor its employees, its subcontractors or suppliers shall be liable for any direct, indirect, general, special, incidental, exemplary, or consequential loss or damage of any nature arising out of their performance or non-performance hereunder. This provision shall apply whether such liability arises in contract, tort (including negligence), strict liability or otherwise.

### **INSURANCE**

Company represents and warrants that it has met all requirements under North Carolina law with regard to workers' compensation and automobile liability coverage. Company is self-insured for workers' compensation, automobile liability and general liability coverage.

### **FORCE MAJEURE**

In no event shall Company be responsible for any damages arising out of any failure to perform or delay due to any cause beyond Company's reasonable control. In such event, Company shall be entitled to an extension of time as necessary to overcome the cause of the failure to perform or delay.

### **USE OF SUBCONTRACTORS**

Company shall be permitted to use subcontractors to perform the Services. Notwithstanding the use of subcontractors, Company shall continue to be responsible for the quality of the Services.

**NON-WAIVER**

The failure of either party to insist upon the performance of any term or condition of this Agreement or to exercise any right hereunder on one or more occasions shall not constitute a waiver or relinquishment of its right to demand future performance of such term or condition, or to exercise such right in the future.

**WARRANTY**

Company warrants that Services shall be performed in accordance with generally accepted industry practices. The Warranty set forth above is exclusive, and no other warranty or remedy of any kind, whether statutory, written, oral, express, or implied, including without limitation warranties of merchantability and fitness for a particular purpose, or warranties arising from course of dealing or usage of trade shall apply. Except as provided in the Use of Subcontractors provision above, Company shall not be responsible for any work done by others or for any loss, damage, cost, or expense arising out of or resulting from such work, unless authorized in advance by Company.

**REGULATORY AUTHORITY AND GOVERNING LAW**

Services rendered under this Agreement are subject to the authority of the North Carolina Utilities Commission and any changes or other modifications lawfully made thereto. This Agreement shall also be governed by the laws of the State of North Carolina, except that the North Carolina conflict-of-laws provisions shall not be invoked in order to apply the laws of another state or jurisdiction.

**SALES AND OTHER TAXES**

To the above stated charges will be added any applicable North Carolina Sales Tax. The Monthly Rate for the Services are subject to revision for future changes in sales or use tax, or any future tax upon or measured by the gross receipts for any transaction hereunder or any allocated portion thereof, or similar charge with respect to the Services. If Company is required by applicable law or regulation to pay or collect any such tax or taxes on account of these Services rendered under this Agreement, then such amount of tax and any penalties and interest thereon shall be reimbursed to Company. Any such change in the Monthly Rate shall be subject to prior approval by the North Carolina Utilities Commission.

Effective for Services rendered on and after \_\_\_\_\_  
NCUC Docket No. E-2, Sub XXX