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December 13, 2019

VIA ELECTRONIC FILING

Ms. Kimberley A. Campbell
Chief Clerk
North Carolina Utilities Commission
4325 Mail Service Center
Raleigh, North Carolina 27699-4300

**RE: Duke Energy Carolinas, LLC and Duke Energy Progress, LLC's
Compliance Filing on 2018 Smart Grid Technology Plans
Docket No. E-100, Sub 157**

Dear Ms. Campbell:

Pursuant to the Commission's July 22, 2019 *Order Accepting Smart Grid Technology Plans and Requiring Additional Information* and the November 13, 2019 *Order Amending Commission Rule R8-60, Eliminating Rule R8-60.1, and Requiring Compliance Filing*, I enclose Duke Energy Carolinas, LLC and Duke Energy Progress, LLC's Discussion of Grid Integrated Water Heater Technology and Updated Answers to the Commission's August 23, 2013 Questions from Docket No. E-100, Sub 137, for filing in connection with the referenced matter.

Thank you for your attention to this matter. If you have any questions, please let me know.

Sincerely,

Lawrence B. Somers

Enclosures

cc: Parties of Record

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CERTIFICATE OF SERVICE

I certify that a copy of Duke Energy Progress, LLC and Duke Energy Carolinas, LLC's Compliance Filing on 2018 Smart Grid Technology Plans, in Docket No. E-100, Sub 157, has been served by electronic mail, hand delivery or by depositing a copy in the United States mail, postage prepaid to the following parties of record:

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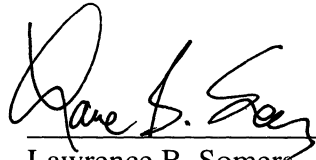
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This is the 13th day of December, 2019.

A handwritten signature in black ink, appearing to read "Lawrence B. Somers", is written over a horizontal line.

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Grid Interactive Water Heating Discussion

Introduction

Grid interactive water heating (GIWH) adds two-way bi-directional control to electric resistance or heat pump water heaters allowing a utility and/or third-party aggregator to rapidly and repeatedly turn them on and off, or incrementally ramp their power up and down. Bi-directional control is a tool that allows a fleet of water heaters to act as a block of flexible load. A fleet of GIWHs can be powered down in times of under-generation, to help relieve a capacity shortage on the grid, or powered up in times of over-generation, to help absorb excess generation. Water heaters are unique because they're one of the only appliances in a home that can store energy without negatively impacting the amenity of the appliance or the customer experience. Turning a tank-type water heater on or off has hardly any immediate impact on the comfort of a customer, whereas turning other appliances on or off (such as air conditioning, refrigerators, electric dryers, or ovens) will directly affect its intended use and customer interaction with it.

Traditional batteries supply power when generation is low and absorb power when generation is high. In this way, they help generation follow the load. GIWHs can provide similar functionality, but in reverse, by allowing their load to follow (or be controlled by) generation. When aggregated and coupled with highly fluctuating renewable resources (like solar photovoltaic and wind), GIWHs can act as virtual power plant to quickly and effectively control the amount of power on the grid. Moreover, these fleets are completely scalable and can perform this functionality relatively quickly. Electric resistance water heaters (ERWH) are well suited to fast-responding energy storage because they can be modulated on a second-by-second basis. Heat pump water heaters (HPWH), on the other hand, can't be modulated at the speed of an ERWH, and are less suited to fast-responding energy storage. HPWHs do, however, consume significantly less energy than ERWHs, and are well suited as an energy efficiency measure.

Potential Benefits to the Utility

GIWHs have the potential to shift customer load, optimize revenue via arbitrage of wholesale electricity, and provide grid stabilization via ancillary services. A detailed description of these benefits follows:

Load Shifting

Pre- or post- charging of water heaters during off peak times can later help flatten on-peak loads, all while maintaining the customer's supply of hot water. This is known as load shifting, or intelligent load control. Instead of simply shedding the peak load, the energy consumption can be redistributed or shifted to times of lesser demand.

Grid Interactive Water Heating Discussion

Energy Arbitrage

Utilities or aggregators can perform arbitrage on the wholesale market price of electricity, charging the water heaters when the price is low and discharging them when the price is high, saving themselves and their customer's money. This can be especially useful for electric cooperatives and municipal utilities where coincident demand cost savings can be passed along directly to the customer.

Frequency Regulation

On a more advanced level, utilities can use GIWHs for frequency regulation or other ancillary services. Frequency regulation is the instantaneous matching of generation to the load. Depending on the market, there can be some operational benefits and revenue potential from regulation. Furthermore, the need for regulation will only increase as more intermittent renewables are put on the grid. Solar and wind power inherently fluctuate with the availability of sun and wind, and cause generation to spike and dip unexpectedly. Frequency regulation smooths out those fluctuations and keeps generation matched to the load.

Heat pump water heaters (HPWHs), on the other hand, can't provide frequency regulation nearly as well as electric resistance water heaters can. Although they're a great energy-efficiency technology and are gaining market share, HPWHs can't be cycled off and on nearly as quickly or reliably as electric resistance water heaters. They also don't draw or store as much energy as electric resistance water heaters (about half). As such, Duke Energy doesn't view HPWHs as a reliable or cost-effective regulation resource.

Grid Stabilization

Another service that GIWHs provide is the ability to respond to grid interruption events within minutes and sometimes seconds. If a transformer or generator trips or another unexpected event occurs on the grid, GIWHs allow the utility to shed load very quickly. Duke Energy Florida has a large fleet of more than 398,000 water heaters (built over the last 35 years) and currently uses them today for this purpose to meet their obligation in a unique reserve sharing agreement with other electric utilities in the state of Florida.

Duke Energy's Perspective & Position on GIWHs in Today's Market

Grid-interactive water heating has potential benefits, but the technology & industry itself is still emerging, and it takes the right set of business and regulatory circumstances to make them a cost-effective resource. Apart from a few large or mid-size programs in G&T (generation & transmission) companies in wholesale markets, electric cooperatives, and Hawaii, most GIWH programs or projects today are small or just in pilot phase.

Here are some of the circumstances and issues that exist today in the industry and in the North Carolina service territory that cause us to take a more conservative and thoughtful approach to GIWH:

Grid Interactive Water Heating Discussion

- GIWHs can provide some value at the distribution level where a high concentration of renewables might exist, but determining or monetizing that future value is difficult. Duke continues to work internally to analyze and quantify that distribution level value stream, if and where it might be applicable.
- Grid-interactive water heating must be fast responding to offer any kind of benefit or value. While HPWHs are a good energy efficiency measure (and one that Duke Energy offers today), their lower demand impact, growth in the market (displacing electric resistance water heating), and operational limitations with respect to response time and reliability are counter-intuitive to the purpose of a grid-interactive resource.
- Electric resistance water heaters today are restricted to 55 gallons. To provide more value, a larger tank size is desirable, but they are only available in HPWHs, and their limitations have been noted above.
- Grid-interactive water heating must also be bi-directional (both charging and discharging). This requirement adds a level of design complexity to water heating applications and raises safety concerns associated with heating hot water above typical temperature setpoints. Either a mixing valve is required, or a special tank design with sophisticated controls is needed to meet this requirement. Without these design elements, a standard 50-gallon water heater held at a setpoint of 120 degrees F has limited value in terms of storage.
- The bi-directional control requirement also requires two-way communication technology. The least-cost way of doing that in a residential home today is customer Wi-Fi, but it too has some limitations that can degrade the aggregated resource quickly. That limitation is internet connectivity. Unless there is strong customer awareness and engagement, Wi-Fi appliances in the home can go off line frequently and sometimes permanently. There are several reasons for this including, but not limited to, home network reliability, control device reliability, customer move outs, changes in router settings, or router replacements. A recent customer pilot conducted by Southern Company for Georgia Power experienced a 65% connectivity rate with Wi-Fi connected water heaters (35 out of 100 water heaters went off line in less than a year).
- To address customer Wi-Fi connectivity issues, Duke Energy is currently evaluating two-way AMI mesh communications for demand response control in Duke Energy Florida. Should this prove to be effective and reliable, it could be the two-way communication of choice for water heaters and other load types and would virtually eliminate the connectivity issues associated with customer Wi-Fi.
- Getting GIWH technology in residential homes cost-effectively and at a meaningful scale has historically been a challenge. Duke Energy has looked at a water heater leasing program model for GIWHs but didn't find it to be cost-effective and couldn't get it to the lease price point that would be attractive to customers. Duke Energy believes a BYOD (Bring Your Own Device) model is currently the most cost-effective. It does not include cost of the water heater or control device, and if the customer installs it themselves, they

Grid Interactive Water Heating Discussion

tend to be more engaged with the appliance, and therefore it stays online and is a more reliable resource. This model is like the BYOT (Bring Your Own Thermostat) program that Duke Energy is launching with EnergyHub in 2019. The water heating industry is just starting to move in a similar direction as the “smart” thermostat market. Rheem Corporation is great example of that with their Gladiator™ Water Heater and EcoNet® control platform. Duke Energy is interested in a model like this and possibly integrating it with EnergyHub’s Mercury platform for “smart” thermostats, but it’s still early, and we’ll continue to research and evaluate this approach as the market grows and matures.

Duke Energy’s Current Water Heater Programs

Duke Energy does have some traditional demand response water heater programs today in some jurisdictions. They continue to be a cost-effective peak-shifting resource at a system level and could possibly be leveraged at a distribution level sometime in the future.

Duke Energy Progress EnergyWise Home Program (DEP Western Region)

- Historically, Winter Peaking Region DLC Switch Program, 10 Years Old, 1-way paging communication
- 11,000+ Electric Resistance Water Heaters, Winter Resource Capacity = 6 MW
- Used for traditional peak load reduction during periods of high system load, low reserve margin, or system emergencies. Can be used year-round.

Duke Energy Florida EnergyWise Home Program (Entire Florida Service Territory)

- Historically, Winter Peaking Service Territory DLC Switch Program, 30+ Years Old, 1-way paging communication
- 398,000+ Electric Resistance Water Heaters, Winter Resource Capacity = 245 MW, Summer Resource Capacity = 75 MW
- Used for a number of situations: Used year-round as a short-term, intermittent resource (typically 30 minutes or less) to support the state’s unique reserve share agreement. Because of the size of the resource, it is also used year-round to eliminate combustion turbine starts during high peak periods, when is feasible to do so. Traditional peak load reduction during periods of high system load, low reserve margin, or system emergencies. Since it is large and a fast-start resource, it is included in the operating reserve in the load forecast through the year.

Duke Energy’s Commitment to the Future

Duke Energy remains committed to a “Smarter Energy Future” by staying close to developments in GIWH industry. With regards to this topic, Duke Energy is constantly in conversation with

Grid Interactive Water Heating Discussion

water heater manufacturers, other utilities, and numerous industry associations. Duke Energy will continue to look for business models and potential value streams now and in the future that can make this technology cost-effective and beneficial to our customer base in the Carolinas.

**Duke Energy Carolinas, LLC and Duke Energy Progress, LLC's
Updated Responses to August 23, 2013 Order Requesting Additional Information
Docket No. E-100, Sub 157
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1. **State the details of all historical customer usage information that is regularly provided on retail customers' bills, including the time periods or blocks in which the information is provided and the data that is provided.**

Response:

Currently, Duke Energy Carolinas' (DEC's) electric bills show a comparison of the total kWh used for the same month the previous year, number of days in the bill, average kWh per day, and average dollar amount per day. Currently, Duke Energy Progress' (DEP's) electric bills show a graph depicting usage history of the preceding 12 months of service.

In Spring 2020, the bill formats for DEC and DEP will be updated to provide the billing information in a more customer friendly format that will include a comparison chart of the average kWh usage per day for the preceding twelve months.

2. **Describe in detail all customer usage information that is available to your retail customers.**

Response:

Each billing statement for DEC and DEP shows the dates of service, number of days in the bill, meter readings at the beginning and end of the period, kWh, and kW (actual and billing) values used in the calculation of the bill.

DEC and DEP customers with certified smart meters can view their energy interval usage information online by hour, day, week, month, bill cycle, and even their average day-of-week energy usage. Additionally, eligible DEC and DEP customers can participate in Usage Alerts and receive an alert at the midpoint of their billing cycle showing their accumulated charges and a forecast of their month-end bill.

DEC and DEP customers can access a minimum of 12 months of previous bills via the Company's online services and/or the business portal, depending on the rate structure. DEC customers seeking more detailed usage information (i.e., interval meter data) can subscribe to the Company's Remote Meter Reading and Usage Data Service (see # 6 below. Non-residential DEP customers seeking more detailed usage information (i.e., interval meter data) can subscribe to the Energy Profiler Online program on DEP's Meter Related Optional Program Rider MROP.

3. **State the details of the modes (internet, email, telephone, letter) that retail**

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customers can utilize to request and receive their usage information.

Response:

Both DEC and DEP customers can directly access monthly usage information via the internet at <https://www.duke-energy.com/home>, by using the Duke Energy customer mobile app, via registration in e-bill which allows the customer to access and view their bill online anytime, via monthly mailed paper statements, or by sending a letter to the correspondence address on the monthly bill.

DEC customers can directly access monthly usage information by telephone to 844-378-6352 (residential) or 800-653-5307 (business).

DEP customers can directly access monthly usage information via telephone by calling 844-388-7425 (residential) or 866-582-6345 (business).

- 4. State the details of the modes by which retail customers can authorize the release of their usage information to a third party and the modes by which the third party can receive the information.**

Response:

Customers must provide explicit and informed written consent prior to DEC or DEP disclosing "Customer Information" (as defined in the Code of Conduct) to a third party. The written consent may be submitted to Duke Energy via email, postal service, fax or other means.

Third parties have the same avenues to access data as the customer by receiving the Customer Information via postal service, fax, file transfer protocol (ftp), email, DVD, etc. If we provide Customer Information via electronic means (e.g., email, ftp, DVD), then we encrypt the data set and provide the third party a password to enable decryption.

- 5. Does your company have a standard form that retail customers can sign to authorize the release of their usage information to a third party? If so, please attach a copy of the form to your responses.**

Response:

DEC and DEP use standard templates for customer consent; see Question 5, Attachment 1. However, understanding that some third parties have their own standard consent forms, we will accept other formats, as long as the third-party form contains the key elements

**Duke Energy Carolinas, LLC and Duke Energy Progress, LLC's
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DEC/DEP require to verify the customer's account and determine exactly which set of data the customer has authorized DEC/DEP to disclose.

6. **State whether your company provides real time pricing and/or real time data streaming to its retail customers. If so, provide the details of the customer classes to which this information is provided, the applicable tariffs, the data that is available, the modes that customers can utilize to request and receive such data, the frequency with which the data is available (every minute, 15 minutes, hour, etc.), and the time periods or blocks in which the data is provided.**

Response:

Neither DEC nor DEP offer standard real-time pricing and/or real-time data streaming programs to its retail customers; however, both DEC and DEP will begin piloting a Smart Meter Usage App in 2020 that will offer real-time data streaming to residential pilot participants. DEC currently offers nine dynamic pricing pilot rates to residential and small nonresidential customers that identify days with higher rates on the prior business day. Additionally, both utilities offer voluntary nonresidential curtailable load programs. Both utilities offer hourly pricing based upon a day-ahead forecast of marginal cost.

For DEP, the Large General Service Real Time Pricing Schedule, LGS-RTP, is available to nonresidential Customer accounts with a Contract Demand that equals or exceeds 1,000 kW. The Company provides day-ahead hourly prices to participants via a web-based tool called Energy Profiler Online (EPO). Customers can use this tool to view day-ahead prices by 4:00 pm each day and to view their hourly loads on a one-day lag basis. Hourly rates are also applicable to customer with self-generation that request standby or back-up service when their generation is not operating (Supplementary and Firm Standby Service Rider SS and Supplementary and Non-firm Standby Service Rider NFS).

For DEC, the Hourly Pricing Schedule HP is available to nonresidential Customer accounts with a minimum Contract Demand of 1000 kW for service under rate schedules LGS, I, OPT-V, or PG. The Company provides day-ahead hourly prices to participants via a web-based tool called Energy Profiler Online (EPO). Customers can use this tool to view day-ahead prices by 4:00 pm each day and to view their hourly loads on a one-day lag basis. Load data is available the following day, for 30-minute intervals.

Real Time Data –

Interval meter data is available on a one-day lag basis to participants requesting the Energy Profiler On-line service:

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- DEC offers the Remote Meter Reading and Usage Data Service program; see Question 6, Attachment 1.
- DEP offers the EPO program for non-residential customers in the Meter Related Optional Programs Rider (MROP); see Question 6, Attachment 2.



DUKE ENERGY CUSTOMER DATA RELEASE FORM

Unless required by law, Duke Energy's regulated utilities are unable to disclose customer information to any person or company without the customer's consent and then only to the extent specified by the customer.

I authorize Duke Energy to release my energy data to _____

beginning _____ and ending _____.

The following data elements will be included:

- Customer Name
- Customer Type (Ex. Residential or Non-Residential)
- Rate Schedule
- Billing Account Number
- Service Address
- Bill Month and Year
- KWH Usage & Charges
- Gas Usage & Charges
- Reading Date

I understand that Duke Energy will provide this information to the named third party only once. I agree to release Duke Energy from all legal liability from the disclosure of my data. Specifically, I hereby release Duke Energy from, and waive and agree not to sue Duke Energy for, any losses, liabilities, claims, damages, costs or expenses which I may have under any theory of law including, but not limited to, negligence, gross negligence, contract, and/or intentional tort, arising out of or in any way connected to the disclosure of my data. MY SIGNATURE BELOW INDICATES THAT I HAVE READ AND VOLUNTARILY SIGNED THIS RELEASE AND WAIVER OF LIABILITY.

Please print:

Account Number: _____

Account Name: _____

Duke Energy Service Address: _____

Note: The Account Name and Customer Signature must both match the customer of record for the account.

I realize that under the rules and regulations of the North Carolina Utilities Commission, the Public Service Commission of South Carolina, the Public Utilities Commission of Ohio, the Florida Public Service Commission, the Indiana Utility Regulatory Commission, and the Kentucky Public Service Commission, I may refuse to allow Duke Energy to release the information set forth above. By my signature, I freely give Duke Energy permission to release the information designated above.

Customer Signature:

Date:

Please ensure that the account number, service address (city and state) and account name are clearly shown on the form. All of these items are on the customer's monthly bill.

Duke Energy Carolinas, LLC

Electricity No. 4
North Carolina Twenty-Eighth Revised Leaf No. 54
Superseding North Carolina Twenty-Seventh Revised Leaf No. 54

SCHEDULE HP (NC) HOURLY PRICING FOR INCREMENTAL LOAD

AVAILABILITY (North Carolina Only)

Available to non-residential establishments with a minimum Contract Demand of 1000 kW who qualify for service under the Company's rate schedules LGS, I, OPT-V, or PG, at the Company's option on a voluntary basis. The maximum number of customers on the system to be served under this schedule is one hundred fifty (150).

Service under this Schedule shall be used solely by the contracting Customer in a single enterprise, located entirely on a single, contiguous premises.

This Schedule is not available for a customer who qualifies for a residential schedule, nor for auxiliary or breakdown service. Power delivered under this schedule shall not be used for resale or as a substitute for power contracted for or which may be contracted for, under any other schedule of the Company, except at the option of the Company, under special terms and conditions expressed in writing in the contract with the Customer.

The obligations of the Company in regard to supplying power are dependent upon its securing and retaining all necessary rights-of-way, privileges, franchises and permits, for the delivery of such power. The Company shall not be liable to any customer or applicant for power in the event it is delayed in, or is prevented from, furnishing the power by its failure to secure and retain such rights-of-way, rights, privileges, franchises and permits.

The Company may cancel this schedule at any time it deems necessary.

TYPE OF SERVICE

The Company will furnish 60 Hertz service through one meter, at one delivery point, at one of the following approximate voltages, where available:

Single-phase, 120/240 volts; or
3-phase, 208Y/120 volts, 460Y/265 volts, 480Y/277 volts; or
3-phase, 3-wire, 240, 460, 480, 575, or 2300 volts; or
3-phase, 4160Y/2400, 12470Y/7200, or 24940Y/14400 volts; or
3-phase voltages other than those listed above may be available at the Company's option if the size of the Customer's contract warrants a substation solely to serve that Customer, and if the Customer furnishes suitable outdoor space on the premises to accommodate a ground-type transformer installation, or substation, or a transformer vault built in accordance with the Company's specifications.

The type of service supplied will depend upon the voltage available. Prospective customers should determine the available voltage by contacting the nearest office of the Company before purchasing equipment.

Motors of less than 5 H.P. may be single-phase. All motors of more than 5 H.P. must be equipped with starting compensators. The Company reserves the right, when in its opinion the installation would not be detrimental to the service of the Company, to permit other types of motors.

BILL DETERMINATION

The monthly bill under this schedule shall be the sum of the Baseline Charge, Rationing Charge, Incremental Demand Charge, Standby Charge (if applicable), Energy Charge, Power Factor Charge (if applicable), Minimum Bill (if applicable), and Riders.

Where:

Baseline Charge = \$ amount calculated from CBL
Rationing Charge = Sum of [(New Load kWh per hour – Reduced Load kWh per hour) X Hourly Rationing Charge]
Incremental Demand Charge = Incremental Demand kW x 52.99¢ per kW
Standby Charge = (see Provision for Customers Operating in Parallel with the Company)
Energy Charge = (a) + (b)
Power Factor Charge = (see Power Factor Adjustment below)
Minimum Bill = (see Minimum Bill below)
Riders = (see Riders below)

Where:

- a) = Sum of [(New Load kWh per hour – Reduced Load kWh per hour) X Hourly Energy Charge]
- b) = Net New Load kWh x .5 ¢ per kWh Incentive Margin, but not less than zero.

Duke Energy Carolinas, LLC

Electricity No. 4
North Carolina Twenty-Eighth Revised Leaf No. 54
Superseding North Carolina Twenty-Seventh Revised Leaf No. 54

SCHEDULE HP (NC) HOURLY PRICING FOR INCREMENTAL LOAD

DEFINITIONS

Customer Baseline Load (CBL): The CBL (kWh per hour) is one full year (365 days) of the individual Customer's hourly loads representing the Customer's energy use and load pattern on the applicable qualifying rate schedule. The CBL, as agreed to by the Customer and the Company, is used to define the level of kWh in each hour, above which all kWh will be billed at the hourly energy prices described under Schedule HP.

Baseline Contract Demand: The maximum monthly billing demand of the CBL.

New Load: New Load (kWh per hour) is the amount by which actual kWh in any hour exceeds the CBL kWh for the same hour.

Reduced Load: Reduced Load (kWh per hour) is the amount by which actual kWh in any hour is less than the CBL kWh for the same hour.

Net New Load: Net New Load (kWh per month) is the sum of New Load kWh per hour during the month less the sum of Reduced Load kWh per hour during the month.

Incremental Demand: The Incremental Demand for local distribution facilities (kW per month) is the amount by which the maximum integrated 30-minute demand during the month for which the bill is rendered exceeds billing demand plus standby demand used in determining the baseline charge for the same period.

Month: The term "month" as used in the Schedule means the period intervening between readings of electronic pulse data for the purpose of monthly billings. Such data will be collected each month at intervals of approximately thirty (30) days.

Contract Demand: The Company will require contracts to specify a Contract Demand which will be the maximum demand to be delivered under normal conditions.

RATE:

Baseline Charge: The Baseline Charge (\$/month) is determined each month by calculating a bill on the current revision of the Customer's qualifying rate schedule using Customer Baseline Load for the month to arrive at the appropriate monthly demand and energy amounts. Provisions of the qualifying rate schedule, including Determination of Billing Demand, Applicable Riders, Extra Facilities Charge, Interconnection Facilities Charge, etc. will apply to the bill calculation used to determine the Baseline Charge.

Rationing Charge: The Rationing Charge (¢/kWh) consists of a generation component and/or a transmission component and/or a distribution component and will be determined on an hourly basis during the month. The components apply to any hour of the month when reserve margins are expected to be below 1,800 mWhs. The deficit reserve amount is equal to 1,800 less the expected reserve amount. Each deficit mWh will be priced by the appropriate component. The generation and transmission components apply to all customers. The distribution component applies only to distribution-served customers. If the above condition does not occur during the month, the Rationing Charge will be zero. The Rationing Price will be communicated as described in Energy Price Determination

Incremental Demand Charge 52.99 ¢ per kW per month

Energy Charge: The Energy Charge (¢/kWh) is the hourly charge equal to expected marginal production cost including line losses, and other directly-related costs. The Energy Charge will be communicated as described in Energy Price Determination.

Incentive Margin: .5¢ per kWh which is applied to Net New Load, but shall not be less than zero.

RIDERS

The Renewable Energy Portfolio Standard (REPS) Rider charge as shown on Leaf No. 68 will be added to the monthly bill for each agreement for service under this schedule.

The following Riders are applicable to service supplied under this schedule. The currently approved cents/kWh rider increment or decrement must be added to the cents/kWh rates shown above to determine the monthly bill.

Leaf No. 59	EDIT-1 Rider
Leaf No. 60	Fuel Cost Adjustment Rider (applicable to Baseline Charge only)
Leaf No. 62	Energy Efficiency Rider
Leaf No. 64	Existing DSM Program Costs Adjustment Rider
Leaf No. 105	BPM Prospective Rider
Leaf No. 106	BPM True-Up Rider
Leaf No. 341	Job Retention Recovery Rider

North Carolina Twenty-Eighth Revised Leaf No. 54
Effective for service rendered on and after December 1, 2018
NCUC Docket No. E-7 Sub 1146, Order dated June 22, 2018

SCHEDULE HP (NC)
HOURLY PRICING FOR INCREMENTAL LOAD

MINIMUM BILL

The monthly bill shall be calculated as specified above under Bill Determination. The Minimum Bill component of the monthly bill is calculated by comparing the sum of the charges listed in 1. below and the charges listed in 2. below. (See exception below.) If the sum of the charges listed in 2. below exceeds the charges listed in 1. below, the Minimum Bill is the difference between the two amounts. Otherwise, the Minimum Bill is zero.

1.
 - (a) The monthly Demand Charges included in the Baseline Charge
 - (b) Standby Charges, if applicable
 - (c) Incremental Demand Charges
 - (d) Incentive Margin applied to Net New Load
2.
 - (a) the total of \$2.15 per kW per month of Baseline Contract Demand
 - (b) \$ 0.578 per month multiplied by the difference between Contract Demand and Baseline Contract Demand.

DETERMINATION OF PRICING PERIODS

Each hour of the day is a distinct pricing period. The initial pricing period of the day is a one-hour period beginning at 12:00:01 a.m. and ending at 1:00:00 a.m. The last pricing hour of the day begins at 11:00:01 p.m. and ends at 12:00 midnight.

ENERGY PRICE DETERMINATION

Each business day by 4:00 p.m., the hourly Energy Charges, and Rationing Charges, if applicable, for the 24 hours of the following day will be communicated to the Customer. Prices for weekends and Company holidays will be communicated to the Customer by 4:00 p.m. on the last business day before the weekend or holiday. The customer is responsible for notifying the company if he fails to receive the price information.

PROVISION FOR CUSTOMERS OPERATING IN PARALLEL WITH THE COMPANY

If a customer has power generating facilities operated in parallel with the Company and the Baseline Charge is not calculated under Schedule PG, the Standby Charge, Determination of Standby Charges and Interconnection Facilities Charge provisions of Schedule PG shall be applicable to service under this schedule. The Incremental Demand Charge does not apply to any incremental demand that is less than Standby Demand. In addition, customers operating a generator in parallel with the Company's system, must comply with the provisions outlined in the North Carolina Interconnection Procedures, Forms, and Agreements for State-Jurisdictional Generator Interconnections (hereinafter "Interconnection Procedures") as approved by the North Carolina Utilities Commission.

PROVISION FOR CUSTOMERS SERVED UNDER RIDER IS

For customers served under Rider IS, the Interruptible Contract Demand shall be the same as that contracted for during the baseline period. Further, the calculation of the Effective Interruptible Demand (EID) each month will exclude all energy consumed above the CBL. The Rationing Charge will not apply to reduced load above Firm Contract Demand during the hours of interruption periods.

PROVISION FOR CUSTOMERS SERVED UNDER RIDER PS

For customers served under PowerShare, Rider PS, the Maximum Curtailable Demand shall be the same as that contracted for during the baseline period and the PowerShare Firm Demand must be at least 100 kW less than the Customer Baseline (CBL). Further, the calculation of the Effective Curtailable Demand (ECD) each month will exclude all energy consumed above the CBL. The PowerShare Curtailed Energy Credit will apply to only the load curtailed between the Firm Demand and the smaller of the Forecasted Demand and the CBL, provided the Forecasted Demand is greater than the Firm Demand. The Hourly Energy Charge and Hourly Rationing Charge will not apply to HP Reduced Load above the PowerShare Firm Demand during a Curtailment Period.

POWER FACTOR ADJUSTMENT

The Company will adjust, for power factor, the kWh for any customer operating in parallel, and may adjust the kWh for any other customer served under this schedule. The power factor adjustment may result in a Power Factor Charge, if applicable, as follows:

Power Factor Charge = Sum of Hourly Load Correction Amounts for all hours in the billing period, but not less than zero,

Where:

Hourly Load Correction Amount = Hourly Load Correction kWh X Hourly Price

Hourly Load Correction kWh = [total hourly kWh X (.85 ÷ hourly power factor)] – total hourly kWh

SCHEDULE HP (NC)
HOURLY PRICING FOR INCREMENTAL LOAD

EXTRA FACILITIES CHARGE

A monthly "Extra Facilities Charge" equal to 1.0% of the installed cost of extra facilities necessary for service under Schedule HP, but not less than \$25, shall be billed to the Customer in addition to the bill under Schedule HP described under Bill Determination and any applicable Extra Facilities Charge included in the Baseline Charge.

MODIFICATIONS OF THE CBL

The CBL will normally represent a full year under the same rate design or structure, and may be reestablished every four years. Modifications to the CBL may be allowed at the option of the Company under certain situations. These situations may include, but are not limited to, the following:

- Adjustments of load patterns associated with annual plant shutdowns, or to smooth random variations in the load pattern, provided the modifications result in revenue neutrality
- One-time permanent modifications to the physical establishment capacity completed prior to initiating service on this schedule
- Adjustments to reflect any Company-sponsored load management program

For a Customer operating an electric dual-fuel boiler under this Schedule, the rate schedule used to calculate the baseline charges will be OPT-G, OPT-H or OPT- I as appropriate with all on-peak energy above the baseline billed at the hourly price under this Schedule. The off-peak baseline (CBL) will be determined based on one of the following at the customer's option.

1. The off-peak CBL will be established as provided for this schedule except that the baseline may be adjusted during any month during which the Net New Load divided by the Baseline Energy is within plus or minus 25% of the CBL, except that any period during the month for which a Rationing Charge is imposed will be excluded from this criteria.
2. The off-peak CBL may be reestablished each month based on the Customer's actual load.

PAYMENT

Bills under this Schedule are due and payable on the date of the bill at the office of the Company. Bills are past due and delinquent on the fifteenth day after the date of the bill. If any bill is not so paid, the Company has the right to suspend service. In addition, all bills not paid by the twenty-fifth day after the date of the bill shall be subject to a one percent (1%) late payment charge on the unpaid amount. This late payment charge shall be rendered on the following month's bill and it shall become part of and be due and payable with the bill on which it is rendered.

CONTRACT PERIOD

Each Customer shall enter into a contract to purchase electricity under this schedule for a minimum original term of one (1) year, and thereafter from year to year upon the condition that either party can terminate the contract at the end of the original term, or at any time thereafter, by giving at least sixty (60) days previous notice of such termination in writing.

If the Customer requests an amendment to or termination of the service agreement before the expiration of the initial term of the agreement, the Customer shall pay to the Company an early termination charge as set forth in the Company's Service Regulations.

REMOTE METER READING AND USAGE DATA SERVICE (NC)

AVAILABILITY (North Carolina only)

Remote meter reading and usage data service are available for establishments receiving service on a Duke Energy Carolinas retail rate schedule. This service is available for purposes including, but not limited to summary billing, customer selected meter reading dates, inaccessible meters, and customer requested usage data.

RATE

- | | | |
|----|----------------------|---|
| A. | Remote Meter Reading | \$ 25.00 per meter per month |
| | | \$ 20.00 per communication line per month |

The Company will provide a metering device that will allow remote meter reading. When used for billing purposes, such meters will be read each month at intervals of approximately thirty (30) days. For customers served under this program prior to March 17, 2009 who provide a dedicated telephone line, the communication line charge above will not apply until such time as a meter change is required. When the meter is changed, the Company will provide the communication line at the rate set forth above and the customer may discontinue the dedicated telephone line.

- ### B. Remote Meter Reading and Usage Data Services

The Company will provide a communication line and metering device that will allow remote meter reading, and will provide usage data to the Customer, using internet based technology, or other methods as available and utilized at the Company's discretion, under one of the following options based on frequency of the data provided.

- | | | |
|----|--|--|
| 1. | Monthly Data | \$45.00 per meter per month for the meter and communication line, plus
\$ 5.00 per month per meter for data |
| 2. | Next Business Day Data | \$45.00 per meter per month for the meter and communication line, plus
\$10.00 per month per meter for data |
| 3. | Remote Meter Reading and Usage Data Service - Real-Time Data | |

$$\text{Monthly Service Payment} = \text{Levelized Capital Cost} + \text{Expenses}$$

Where:

Levelized Capital Cost is equal to the present value of all estimated capital related cash flows for a period corresponding to the depreciable life of the equipment, adjusted to a pre-tax amount and converted to a uniform monthly payment. The estimated capital cash flows shall include installed cost of equipment, salvage value, contingency allowances, property taxes, adjustment to reflect supporting investment of general plant nature, and income tax impacts.

Expenses shall equal the present value of estimated expenses associated with the support and maintenance of the equipment, adjusted to a pre-tax amount and converted to a uniform monthly payment for a period corresponding to the depreciable life of the equipment. The estimated expenses shall include administrative and general expenses, expenses for labor and materials related to operations and maintenance, third party expenses for operations and maintenance, warranties, insurance, annual costs associated with energy information storage and retrieval, other costs related to the operation and support of the equipment installation and income tax impacts.

The after-tax cost of capital from the Company's most recent general rate case will be used to convert present values to uniform monthly payments.

Charges for remote metering and a communication line will not apply under this program when the Company, at its own option, has determined that remote metering facilities are necessary for the Company's own use. These charges, as well as charges for data if applicable, will not apply under this program when provided under another rate schedule or rider.

REMOTE METER READING AND USAGE DATA SERVICE (NC)

PAYMENT

Bills for this service are due and payable on the date of the bill at the office of the Company. Bills are past due and delinquent on the fifteenth day after the date of the bill. If any bill is not so paid, the Company has the right to suspend service. In addition, all bills not paid by the twenty-fifth day after the date of the bill shall be subject to a one percent (1%) late payment charge on the unpaid amount. This late payment charge shall be rendered on the following month's bill and it shall become part of and be due and payable with the bill on which it is rendered.

CONTRACT

The original term of this contract shall be three (3) years, however, the Company may offer or require an agreement under Option B. 3. with an original term of up to ten (10) years, and all contracts under this program shall continue thereafter from year to year upon the condition that either party can terminate the contract at the end of the original term, or at any time thereafter, by giving at least thirty (30) days previous notice of such termination in writing. In the event of early termination of a contract under this program, the Customer will be required to pay the Company a termination charge which shall be the net present value of monthly charge, less the monthly ongoing costs for the communications, for the remainder of the term of contract. However, if any successor customer has requested service at the premises under this program prior to the effective date of the termination, the termination charge will be waived or reduced based on the contract term of the successor customer.

Duke Energy Progress, LLC
(North Carolina Only)

G-11

**LARGE GENERAL SERVICE
(REAL TIME PRICING)
SCHEDULE LGS-RTP-56**

AVAILABILITY

This Schedule is available for electric service to a maximum of eighty-five (85) nonresidential Customer accounts with a Contract Demand that equals or exceeds 1,000 kW.

This Schedule is not available: (1) for short-term or temporary service; (2) for electric service in conjunction with Incremental Power Service Rider IPS or Dispatched Power Rider No. 68; (3) for electric service in conjunction with Economic Development Rider ED and Large Load Curtailable Rider LLC, except as provided for in the RTP Base Charge; or (4) for any new Customer with a Contract Demand in excess of 50,000 kW.

Power delivered under this Schedule shall not be used for resale, or as a substitute for power contracted for or which may be contracted for under any other schedule of Company, except at the option of Company, under special terms and conditions expressed in writing in the contract with Customer. Customer shall be required to furnish and maintain a communication link and equipment suitable to support remote reading of Company's meter serving Customer and to support daily receipt of the Hourly Real Time Pricing (RTP) rates. Customer may use emergency or back-up generation to respond to RTP hourly rates without receiving standby service.

APPLICABILITY

This Schedule is applicable to all electric service of the same available type supplied to Customer's premises at one point of delivery through one meter.

TYPE OF SERVICE

The types of service to which this Schedule is applicable are alternating current, 60 hertz, three-phase 3 or 4 wires, at Company's standard voltages of 480 volts or higher. When Customer desires two or more types of service, which types can be supplied from a three-phase 4 wire type, without voltage transformation, only the type of service necessary for Customer's requirements will be supplied under this Schedule.

CONTRACT DEMAND

The Contract Demand shall be the kW of demand specified in the Service Agreement.

CUSTOMER BASELINE LOAD (CBL)

Company shall establish a Customer Baseline Load (CBL), expressed in kilowatt-hours, using one complete year of Customer-specific hourly load data that, in Company's opinion, represents Customer's electricity consumption pattern and is typical of Customer's operation for billing under the otherwise applicable tariffs and from which to measure changes in consumption for billing pursuant to this Schedule. For situations in which hourly load data are not available, a CBL will be constructed by Company using load shapes of Customers with similar usage patterns and from relevant information provided by Customer and verified by Company. The initial CBL shall consider verifiable changes in Customer's operation such as (1) installation of permanent energy efficiency measures; (2) permanent removal or addition of Customer's equipment; (3) one-time extraordinary events such as natural disasters; (4) annual plant shutdowns or other random variations in the load patterns; and (5) other on-going changes in demand. The CBL for new Customers will be calculated in the same manner as the CBL for existing Customers. Establishment of a CBL is a precondition for use of this Schedule.

SUBSEQUENT CBL ADJUSTMENT

After the initial CBL is established, it shall only be subject to an adjustment at Customer's request by providing 30-days advance written notice. Any downward adjustment is subject to Company's concurrence and will be consistent with the principles of initial CBL establishment.

CBL CALENDAR MAPPING

To provide Customer with the appropriate CBL for the RTP Service Year, the hourly consumptions established by the CBL shall be calendar-mapped to the corresponding day of the RTP Service Year. Calendar-mapping is a day-matching method to ensure that Mondays are matched to Mondays, holidays to holidays, etc.

The CBL shall be established by first identifying holidays and then grouping the remaining days (i.e., Mondays, Tuesdays, etc.) and averaging over the calendar month to result in hourly consumption for a typical week in each calendar month. The CBL result shall then be adjusted for each calendar month to reflect annual plant shutdowns, holidays, or other known work stoppages during the next RTP Service Year. Calendar-mapping is performed prior to each annual renewal of service under this Schedule after adjustments, if any, are made to the CBL.

MONTHLY RATE

The monthly rate shall consist of the following charges:

I. RTP Administrative Charge:

\$165.00

II. RTP Base Charge:

RTP Base Charge = Monthly Bill for the CBL consumption and monthly billing demand of the current billing month pursuant to the conventional LGS Class tariffs under which Customer either previously received service or would have elected to receive service prior to electing this Schedule. When the conventional tariffs include Economic Development Rider ED or Large Load Curtailable Rider LLC, the provisions of these Riders shall only apply to the CBL usage.

III. RTP Hourly Energy Charge Adjustment:

RTP Hourly Energy Charge = $\Sigma\{\text{Hourly RTP Rate} \times (\text{Hourly Consumption} - \text{CBL Consumption})\}$

where:

Σ = The summation of the RTP charges and credits for each hour of the current billing month.

The Hourly RTP Rate shall be determined based upon the following formula:

Hourly RTP Rate = $(\text{MENERGY} + \text{CAP} + \text{ADDER}) \times (1 + \text{TAXES})$

where:

MENERGY = Marginal Energy Cost per kilowatt-hour including marginal fuel, variable operating and maintenance expenses, and delivery losses

CAP = Tiered Capacity Charge per kilowatt-hour applicable whenever the day-ahead forecast of the ratio of hourly available generation to hourly demand is equal or less than 1.15

ADDER = $\beta \times (\text{Class Rate-Hourly Marginal Cost})$, but not less than zero

where:

β = a fixed value equal to 0.20

Class Rate = the prior calendar year average rate per kilowatt-hour under the conventional tariffs applicable to the LGS class, as updated annually effective with the February billing

Hourly Marginal Cost = the sum of the specific hour's kilowatt-hour price for MENERGY and CAP, all as defined above

TAXES = NC Regulatory Fee (currently 0.14%)

IV. Facilities Demand Charge:

per kW of Facilities Demand for service provided from:

Transmission System (voltage of 69 kV or higher) without transformation	\$1.63/kW
Transmission System (voltage of 69 kV or higher) with one transformation	\$2.13/kW
Distribution System (voltage below 69 kV) without transformation	\$2.62/kW
Distribution System (voltage below 69 kV) with one transformation	\$3.05/kW

The kW of Facilities Demand shall be the greater of (1) the Contract Demand or (2) the maximum demand registered or recorded by Company's meter during a 15-minute interval in the current billing month, in excess of the maximum 15-minute billing demand included in the CBL applicable to the current billing month. The Contract Demand used to determine the Facilities Demand shall exclude any Standby Service kW, when applicable.

V. Rider Adjustments:

DSM/EE/JRRR Incremental Charge = $(\text{Actual Consumption} - \text{CBL Consumption}) \times \text{Rider Adjustment}$

where:

Actual Consumption = kWh consumed during the billing month

CBL Consumption = kWh billed as the CBL during the billing month

Rider Adjustment = Sum of the DSM/EE and DSM/EE EMF rate adjustments during the current billing month

VI. Renewable Energy Portfolio Standard (REPS) Adjustment:

The monthly bill shall include a REPS Adjustment based upon the revenue classification:

Commercial/Governmental Classification - \$7.96/month
Industrial/Public Authority Classification - \$73.17/month

Upon written request, only one REPS Adjustment shall apply to premises serving the same customer for all accounts of the same revenue classification. If a customer has accounts which serve in an

auxiliary role to a main account on the same premises, no REPS charge should apply to the auxiliary accounts regardless of their revenue classification (see Annual Billing Adjustments Rider BA).

PROVISION OF STANDBY SERVICE

If service is received under a standby or back-up service tariff prior to service under this Schedule, the use of standby service shall be excluded from initial determination of the CBL. The RTP Base Charge, as set forth in the Monthly Rate provision above, shall include billing of Supplementary Service but shall not include charges related to use of Standby Service. The Monthly Rate provisions of the applicable standby or back-up service tariff shall be calculated assuming no standby or back-up service was used with any actual use of Standby Service being billed pursuant to the RTP Hourly Energy Charge provisions of this Schedule. All other provisions of the applicable standby or back-up service tariff apply.

POWER FACTOR ADJUSTMENT

When the power factor in the current billing month is less than 85%, the monthly bill will be increased by a sum equal to \$0.32 multiplied by the difference between the maximum reactive kilovolt-amperes (kVAR) registered by a demand meter suitable for measuring the demand used during a 15-minute interval and 62% of the maximum kW demand registered in the current billing month.

CUSTOMER RATE NOTIFICATION

Company will notify Customer of the hourly prices via electronic mail, or other method of communications acceptable to Company, by 4 p.m. of the preceding business day. Prices for Saturday, Sunday, and Monday will generally be available on the preceding Friday. For a recognized holiday and the day following the holiday, prices will be available the preceding Company business day. Whenever prices are provided in excess of a day ahead and updated projections would result in significantly different prices, Company reserves the right to issue revised prices provided such prices are conveyed no later than 4 p.m. on the preceding calendar day.

Company is not responsible or liable for Customer's failure to receive and act upon the hourly prices. If Customer does not receive these prices, it is Customer's responsibility to inform Company so that future prices may be supplied.

SALES TAX

To the above charges will be added any applicable North Carolina Sales Tax.

PAYMENTS

Bills are due when rendered and are payable within 15 days from the date of the bill. If any bill is not so paid, Company has the right to suspend service in accordance with its Service Regulations. In addition, any bill not paid on or before the expiration of twenty-five (25) days from the date of the bill is subject to an additional charge of 1% per month as provided in Rule R12-9 of the Rules and Regulations of the North Carolina Utilities Commission.

CONTRACT PERIOD

The Contract Period shall be monthly and will be automatically renewed unless terminated by either party by giving not less than thirty (30) days written notice of termination.

GENERAL

Service rendered under this Schedule is subject to the provisions of the Service Regulations and any changes therein, substitutions therefore, or additions thereto lawfully made.

Where Customer's other source of power is connected electrically or mechanically to equipment which may be operated concurrently with service supplied by Company, Customer shall install and maintain at his expense such devices as may be necessary to protect his equipment and service and to automatically disconnect his generating equipment, which is operated in parallel with Company, when service used by Customer is affected by electrical disturbances on Company's or Customer's systems. Should Company determine that Customer's facilities are not adequate to protect Company's facilities, Company may install the necessary facilities and Customer shall pay for the extra facilities in accordance with Company's Service Regulations.

Company makes no representation regarding the benefits of Customer subscribing to this Schedule. Customer, in its sole discretion, shall determine the feasibility and benefits of Customer subscribing to this Schedule.

Supersedes Schedule LGS-RTP-53
Effective for service rendered on and after September 1, 2019
NCUC Docket No. E-2, Sub 1142 and 1153

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Dec 13 2019

Duke Energy Progress, LLC
(North Carolina Only)

RR-15

SUPPLEMENTARY AND FIRM STANDBY SERVICE RIDER SS-60

AVAILABILITY

This Rider is available to customers in conjunction with any of Company's general service rate schedules to permit Supplementary and Standby Service to Customer having generation equipment not held solely for emergency use and for which Company's service may be substituted either directly or indirectly or used as an additional power supply. Customer shall execute (1) a Service Agreement specifying separately the requirements for both Supplementary Service and Standby Service and (2) an Interconnection Agreement in accordance with the North Carolina Interconnection Procedures, Forms, and Agreements for State-Jurisdictional Generation Interconnections.

This Rider is not available (1) for temporary or supplementary seasonal service, (2) for use in conjunction with any of Company's other standby service riders, (3) for use in conjunction with Company's Dispatched Power Rider No. 68 or Incremental Power Service Rider IPS, or (4) for Standby Service in excess of 50,000 kW. The provisions of the rate schedule with which this Rider is used are modified only as shown herein.

DEFINITIONS

Contract Demand

The Contract Demand is the total maximum kW that Customer desires Company to supply for both Supplementary and Standby Service combined, as specified in the Service Agreement. It shall be increased by the amount of the excess when the sum of the Supplementary Service Contract Demand and Standby Service Contract Demand exceeds the previously established Contract Demand. The increase shall be effective with the following billing month unless Company requests Customer to reduce such demand to a specified amount but not less than the previously established Contract Demand.

Standby Service

Standby Service is the service which Company supplies to replace Customer's generation. This includes breakdown and maintenance periods. For generation with a planning capacity factor of less than 60%, the Standby Service Contract Demand shall be the nameplate kW capacity of Customer's installed generation. For generation with a planning capacity factor of 60% or greater, the Standby Service Contract Demand shall be the maximum increased demand Company is requested to serve whenever Customer's generation is not operating, which may be less than the generator nameplate rating. The Standby Service Contract Demand may be increased by mutual agreement.

Supplementary Service

Supplementary Service is the service which Company continuously supplies to replace Customer's generation. The Contract Demand of Supplementary Service shall be the established Contract Demand minus the Standby Service Contract Demand; however, whenever the established Contract Demand is exceeded, the Supplementary Service Contract Demand shall increase effective with the following billing month by the amount the established Contract Demand exceeds the Standby Service Contract Demand. However, in all events, Company may within 30 days request Customer to reduce such demand to a specified amount, but not less than the previously established Supplementary Service Contract Demand.

MONTHLY BILLING

The Monthly Bill shall be the sum of the following amounts:

1. Availability to Serve Charges:

- a. Generation Reservation Charge applicable customers both less than 60% and 60% or greater planning capacity factor - \$0.75/kW of Standby Service Contract Demand.
- b. Standby Service Delivery Charge (applicable to customer generation with a planning capacity factor 60% or greater):

Per kW of Standby Service Contract Demand for Customer served from:

Transmission System (voltage of 69 kV or higher) \$1.63/kW

Distribution System (voltage below 69 kV) \$2.62/kW

- c. Extra Facilities Billing applicable to both less than 60% and 60% or greater planning capacity factor customers: An amount equal to the monthly facilities charge, as specified in Company's Service Regulations, times the difference between the installed cost of (1) the facilities required by Company to supply the Contract Demand, including any protective or other equipment deemed necessary to accommodate Customer's parallel operation, and (2) the facilities required by Company to supply the contract kW of Supplementary Service.

2. Supplementary and Standby Service Usage Charges:

- a. For generation with a planning capacity factor of less than 60%:

Supplementary and Standby Service billing for the established demand and kilowatt-hours consumed during the month is under the rate schedule and rider(s) with which this Rider is used.

- b. For generation with a planning capacity factor of 60% or greater:

- i. Supplementary Service billing for the Billing Demand established and the kilowatt-hours consumed associated with the Supplementary Service Contract Demand is under the rate schedule and rider(s) with which this Rider is used.
- ii. Standby Service billing for the kilowatt-hours consumed in excess of the Supplementary Service Contract Demand shall be at the sum of the (1) Standby Service RTP Hourly Energy Rate, as shown below, plus (2) the Rider Adjustment applicable during the current billing month. The Rider Adjustment shall include the sum of the DSM/EE and DSM/EE EMF rate adjustments during the current billing month. This amount shall be computed on an hourly basis.

STANDBY SERVICE RTP HOURLY ENERGY RATE

The Real Time Pricing (RTP) Hourly Energy Rate applicable to all usage in excess of the Supplementary Service Contract Demand shall be calculated as follows:

$$\text{Hourly RTP Rate} = (\text{MENERGY} + \text{CAP} + \text{ADDER}) \times (1 + \text{TAXES})$$

where:

MENERGY = Marginal Energy Cost per kilowatt-hour including marginal fuel, variable operating and maintenance expenses, and delivery losses

CAP = Tiered Capacity Charge per kilowatt-hour applicable whenever the day-ahead forecast of the ratio of hourly available generation to hourly demand is equal or less than 1.15

ADDER	=	$\beta \times (\text{Class Rate-Hourly Marginal Cost})$, but not less than zero
where:		
β	=	a fixed value equal to 0.20
Class Rate	=	the prior calendar year average rate per kilowatt-hour under the conventional tariffs applicable to the LGS class, as updated annually effective with the February billing
Hourly Marginal Cost	=	the sum of the specific hour's kilowatt-hour price for MENERGY and CAP, all as defined above
TAXES	=	NC Regulatory Fee (currently 0.14%)

CONTRACT PERIOD

As specified in the Application for the Supply of Electricity, but not less than one year.

SALES TAX

To the above charges will be added any applicable North Carolina Sales Tax.

GENERAL

Where Customer's generation equipment is connected either electrically or mechanically to equipment which may be operated concurrently with service supplied by Company, Customer shall install and maintain at his expense such devices as may be necessary to protect his equipment and service and to automatically disconnect his generating equipment, which is operated in parallel with Company, when service used by Customer is affected by electrical disturbances on Company's or Customer's systems.

Service rendered under this Rider is subject to the provisions of the Service Regulations and any changes therein, substitutions therefore, or additions thereto lawfully made.

Supersedes Riders SS-57
Effective for service rendered on and after September 1, 2019
NCUC Docket No. E-2, Subs 1142 and 1153

Duke Energy Progress, LLC
(North Carolina Only)

RR-16

SUPPLEMENTARY AND NON-FIRM STANDBY SERVICE RIDER NFS-12

AVAILABILITY

This Rider is available to customers in conjunction with any of Company's General Service rate schedules to permit Supplementary and Non-Firm Standby Service to Customer having generation equipment with a planning capacity factor of 60% or greater not held solely for emergency use and for which Company's service may be substituted either directly or indirectly or used as an additional power supply. Customer shall execute (1) a Service Agreement specifying separately the requirements for both Supplementary Service and Non-Firm Standby Service and (2) an Interconnection Agreement in accordance with the North Carolina Interconnection Procedures, Forms, and Agreements for State-Jurisdictional Generation Interconnections.

This Rider is not available (1) for temporary or supplementary seasonal service, (2) for use in conjunction with any of Company's other standby or generation service riders, (3) for Customer's with nameplate generation capacity below 200 kW, (4) for a customer who is not currently receiving service under this Rider but had previously received service under the Rider in the preceding twelve months, (5) in conjunction with curtailable service schedules or riders, or (6) for Non-Firm Standby Service in excess of 50,000 kW. The provisions of the rate schedule with which this Rider is used are modified only as shown herein.

DEFINITIONS

Contract Demand

The Contract Demand is the maximum kW that Customer desires Company to supply for Supplementary and Non-Firm Standby Service combined, as specified in the Service Agreement, and shall be increased by the amount of the excess when the sum of the Supplementary Service Contract Demand and Non-Firm Standby Service Contract Demand exceeds the previously established Contract Demand, unless and until Company within 60 days requests Customer to reduce such demand to a specified amount but not less than the established Contract Demand.

During a Non-Firm Period, the Contract Demand is subject to curtailment by Customer to not exceed the Supplementary Service Contract Demand.

Non-Firm Standby Service

Non-Firm Standby Service is the service which Company supplies to replace Customer's generation. This includes breakdown and maintenance periods approved by Company. The amount of Non-Firm Standby Service shall not exceed the nameplate kW capacity of Customer's installed generation. The amount of Non-Firm Standby Service initially contracted will automatically be increased whenever the established Contract Demand is exceeded, unless Company within 60 days requests Customer to reduce such demand to a specified amount. The Non-Firm Standby Service Demand shall increase by the amount the established demand exceeds the Supplementary Service Contract Demand.

Supplementary Service

Supplementary Service is service continuously available to supplement Customer's other power sources and is the kW of demand to which Customer shall reduce his requirement during a Non-Firm period specified by Company. The Supplementary Service Contract Demand shall be specified in the contract and shall only change based upon mutual consent of the parties, but in no case can it be less than the minimum contained in the rate schedule with which this Rider is used.

MONTHLY BILLING

The Monthly Billing shall be the sum of the following amounts:

1. Supplementary Service Billing:

An amount computed under the rate schedule with which this Rider is used for the Billing Demand established and the kilowatt-hours consumed associated with the Supplementary Service Contract Demand.

2. Non-Firm Standby Service Billing:

An amount computed as the kilowatt-hours consumed in excess of the Supplementary Service Contract Demand times the sum of the (a) Non-Firm Standby Service Hourly RTP Energy Rate, as shown below, plus (b) the Rider Adjustment applicable during the current billing month. The Rider Adjustment shall include the sum of the DSM/EE and DSM/EE EMF rate adjustments during the current billing month. This shall be computed on an hourly basis.

3. Non-Firm Standby Notification Customer Charge: \$50.00

4. Non-Firm Standby Service Delivery Charge:

Per kWh of Non-Firm Standby Service Usage for Customer served from:

Transmission System (voltage of 69 kV or higher)	\$0.00307/kWh
Distribution System (voltage below 69 kV)	\$0.00481/kWh

Non-Firm Standby Service Usage shall be all kilowatt-hours consumed in excess of the Supplementary Service Contract Demand in the current billing month.

5. Extra Facilities Billing:

An amount equal to the monthly facilities charge as specified in Company's Service Regulations times the difference between the installed cost of (1) the facilities required by Company to supply the Contract Demand, including any protective or other equipment deemed necessary to accommodate Customer's parallel operation, and (2) the facilities required by Company to supply the contract kW of Supplementary Service.

NON-FIRM STANDBY SERVICE RTP HOURLY ENERGY CHARGE

The Real Time Pricing (RTP) Hourly Rate applicable to all usage in excess of the Supplementary Service contract kW shall be calculated as follows:

$$\text{Hourly RTP Rate} = (\text{MENERGY} + \text{CAP} + \text{ADDER}) \times (1 + \text{TAXES})$$

where:

$$\text{MENERGY} = \text{Marginal Energy Cost per kilowatt-hour including marginal fuel, variable operating and maintenance expenses, and delivery losses}$$

$$\text{CAP} = \text{Tiered Capacity Charge per kilowatt-hour applicable whenever the day-ahead forecast of the ratio of hourly available generation to hourly demand is equal or less than 1.15}$$

$$\text{ADDER} = \beta \times (\text{Class Rate-Hourly Marginal Cost}), \text{ but not less than zero}$$

where:

$$\beta = \text{a fixed value equal to 0.20}$$

Class Rate = the prior calendar year average rate per kilowatt-hour under the conventional tariffs applicable to the LGS class, as updated annually effective with the February billing

Hourly

Marginal Cost = the sum of the specific hour's kilowatt-hour price for MENERGY and CAP, all as defined above

TAXES = NC Regulatory Fee (currently 0.14%)

During Non-Firm Periods, the applicable Non-Firm Standby Service Hourly RTP Energy Rate shall be the greater of the Hourly RTP Rate, as calculated above, or the PJM price during the hour, plus 5%, plus any applicable transmission charges to deliver the electricity from PJM plus the North Carolina regulatory fee. The applicable PJM rate shall be final settlement hourly rate for the PJM Western Hub.

NON-FIRM PERIOD

The Non-Firm Period shall be a fifteen-hour period, unless Company specifies a shorter period at the time the Customer is notified. Customer shall be given a minimum of 30-minutes notice before the requested Non-Firm Period is to take place. Company shall use reasonable diligence to notify Customer of an impending Non-Firm Period and having used reasonable diligence shall not be liable to Customer should Customer not receive notification. To assist Customer in reviewing the financial impact of Non-Firm Standby Service usage, Company will provide its Hourly RTP Rates on a password-secured website. A forecast of PJM hourly rates is available from the PJM website; however, the final settlement rate will be used for billing which may differ from the PJM forecast.

SUPPLEMENTARY SERVICE BILLING DEMAND

The Billing Demand of Supplementary Service shall be the maximum kW registered or computed, by or from Company's metering facilities, during a 15-minute interval within the current billing month, but not greater than the Billing Demand determined in accordance with the schedule with which this Rider is used for the contract kW of Supplementary Service.

FAILURE TO COMPLY WITH NON-FIRM STANDBY SERVICE REQUIREMENTS

Customer shall undertake all reasonable steps to ensure that Customer's load does not exceed the Supplementary Service kW during all Non-Firm Periods. Continual failure to limit usage to the Supplementary Service kW or less during Non-Firm Periods shall constitute grounds for either increasing the Supplementary Service contract demand or removal from this Rider.

CONTRACT PERIOD

The Contract Period shall not be less than five years, and shall automatically extend thereafter for successive periods of two years unless terminated by either party at the end of any contract period by giving not less than sixty (60) days' written notice to the other party prior to the end of the contract period.

SALES TAX

To the above charges will be added any applicable North Carolina Sales Tax.

GENERAL

Where Customer's generation equipment is connected either electrically or mechanically to equipment which may be operated concurrently with service supplied by Company, Customer shall install and maintain at his expense such devices as may be necessary to protect his equipment and service and to automatically disconnect his generating equipment, which is operated in parallel with Company, when service used by Customer is affected by electrical disturbances on Company's or Customer's systems.

Service rendered under this Rider is subject to the provisions of the Service Regulations and any changes therein, substitutions therefore, or additions thereto lawfully made.

Supersedes Rider NFS-10

Effective for service rendered on and after September 1, 2019

NCUC Docket No. E-2, Subs 1142 and 1153

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Dec 13 2019

Duke Energy Progress, LLC
(North Carolina)

RR-23

METER-RELATED OPTIONAL PROGRAMS RIDER MROP-13

AVAILABILITY

These programs are available upon request and on a voluntary basis to those customers as described below, subject to the availability of appropriate metering and meter-related equipment.

I. TOTALMETER PROGRAM

Metering equipment to allow remote automated meter reading by Company will be provided upon execution of an application for TotalMeter. The application describes the conditions of service, states all charges, and provides for a termination charge should the TotalMeter option be discontinued prior to 24 consecutive months of service. Customer receiving the TotalMeter option may select a desired meter-reading day. Monthly rates and other charges related to the TotalMeter are as follows:

Monthly Rate for TotalMeter

Option 1: Customer-supplied suitable telephone communications line ¹	\$ 3.00
Option 2: Company-supplied wireless telephone communications circuit ²	\$13.20

Charge for Customer-requested termination of TotalMeter	
Option prior to 24 consecutive months of service	\$50.00

¹ Option 1 is not available to new applicants on and after October 1, 2013. Existing participants may continue under this option until such time that the metering equipment requires replacement.

² Option 2 is not available to new applicants on and after January 23, 2019. Existing participants may continue under this option until such time that the metering equipment requires replacement.

TotalMeter charges shall not apply when Company, at its option, determines that remote automated meter reading is necessary for Company's own use. Receipt of the TotalMeter option shall in no way restrict or otherwise limit Company's right of ingress and egress to read meters and inspect, maintain, repair and replace the meters and other facilities installed to serve Customer whenever necessary.

II. ENERGY PROFILER ONLINE

The Energy Profiler Online (EPO) program is available to any non-residential customer with a registered or contract demand of 30 kW or greater. EPO is an Internet-based program permitting Customer access to historic meter data from any internet-capable location. Access to meter data is both identification/name and password restricted. Monthly rates and other charges related to EPO are as follows:

Monthly Rate for EPO

Rate for totalized meter data only (updated monthly) ³	\$20.00 per totalized account
Rate for meter data per individual meter (updated each business day)	\$20.00 per meter
Set-up fee per meter	\$85.00
Set-up fee for totalized meter data only	\$85.00

³ The rate applicable for totalized meter data only is not available to new applicants on and after July 1, 2017.

Provision of EPO requires that the standard meter, as determined solely by Company based upon the Customer's electrical requirement, have the capability of recording electrical consumption information on

a 15-minute interval basis. Additional monthly rates and other charges, as described in Section III below, will apply if the standard meter based upon customer's electrical requirement does not have interval data capability.

III. MANUALLY READ METERING (MRM)

Customers served under residential Schedules RES, R-TOU or R-TOUD or nonresidential Schedule SGS (only without a demand meter) may request metering that either does not utilize radio frequency communications to transmit data, or is otherwise required to be read manually. This service is not available when service is requested in conjunction with any net metering rider. At the Company's option, meters to be read manually may be either an advanced meter with the radio frequency communication capability disabled or other non-communicating meter. The meter manufacturer and model chosen to service the customer's premise are at the discretion of the Company and are subject to change at the Company's option, at any time. Customers choosing this option are responsible for the payment of the rates shown below and will not be eligible for any current or future services or offerings that require the use of an advanced or other communicating meter.

Monthly Rate for MRM Service⁴:

1. Initial Set-up Fee	\$170.00
2. Monthly Rate For MRM	\$14.75
3. Early Termination Charge (Prior to 12 consecutive months of service only)	\$50.00

Upon request, the one-time Initial Set-up Fee may be paid in six installments included as a part of the Customer's first six monthly electric service bills following installation of the manually read meter. The contract term shall be a minimum of 12 months and may be terminated by either party with thirty (30) days written notice. The Company may refuse to provide service under this option under the following conditions: (1) the Customer has a history of meter tampering or unauthorized use of electricity at the current or any prior location, (2) provision of such service creates a safety hazard to consumers or their premises, the public or the electric utility's personnel or facilities, or (3) the customer fails to provide the Company satisfactory access to the Customer's facilities for the purpose of obtaining meter readings or maintaining its equipment.

⁴ The Initial Set-up Fee and Monthly Rate shall be waived and not apply for customers providing a notarized statement from a medical physician fully licensed by the North Carolina Medical Board stating that the customer must avoid exposure to radio frequency emissions, to the extent possible, to protect their health. All such statements shall be retained in Company records on a secure and confidential basis. The Company will provide the customer with a medical release form, to identify general enrollment information, and a physician verification statement. At the physician's option, a comparable physician verification statement may be submitted.

IV. CUSTOMER REQUESTS INSTALLATION OF NON-STANDARD METERING

Company, in its sole determination, shall establish appropriate meter standards based upon Customer's electrical requirement. If a non-residential customer desires additional meter services that require the installation of a non-standard meter, Company will comply for the following monthly rate and other charges:

Monthly Rate for non-standard meter with interval data capability	\$0.33 per month
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The following fees apply when the non-standard meter will not be remotely read:

Meter Set-up Fee	\$15.00
Meter Exchange Fee	\$77.00

A charge shall apply if Customer requests termination prior to 24 consecutive months of operation of a non-standard meter option that provides interval data. The charge shall equal the monthly rate times the sum of 24 minus the number of months the non-standard meter service has been received, not to exceed 24 months.

GENERAL

Company agrees to seek Commission approval if it determines that the provision of the meter-related program can no longer be offered due to equipment obsolescence or the availability of a more efficient alternative to provide the same or improved level of service. Company does not guarantee continuous provision of these meter-related programs but shall use reasonable diligence at all times to provide the program without interruption and having used reasonable diligence shall not be liable to Customer for damages, for failure in, or for interruptions or suspension of the same. Company further agrees to provide Customer with at least 30-day advanced notice prior to any changes to their service under this rider.

Service rendered under this Rider is subject to the provisions of the Service Regulations of the Company on file with the state regulatory commission. The provisions of this Rider are subject to change upon approval of the North Carolina Utilities Commission.

Supersedes Meter-Related Optional Programs Rider MROP-12
Effective on and after January 23, 2019
NCUC Docket No. E-2, Sub 834