

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

DOCKET NO. E-2, SUB 1251

In the Matter of)
)
Application of Duke Energy Progress, LLC)
for Approval of Renewable Energy and)
Energy Efficiency Portfolio Standard (REPS))
Compliance Report and Cost Recovery Rider)
Pursuant to N.C. Gen. Stat. 62-133.8 and)
Commission Rule R8-67)

**DIRECT TESTIMONY OF
MEGAN W. JENNINGS**

1 **Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

2 A. My name is Megan W. Jennings, and my business address is 400 South
3 Tryon Street, Charlotte, North Carolina.

4 **Q. PLEASE STATE YOUR POSITION WITH DUKE ENERGY AND**
5 **DESCRIBE YOUR CURRENT RESPONSIBILITIES.**

6 A. In my capacity as Renewable Compliance Manager, I am responsible for the
7 development and implementation of renewable energy compliance strategies
8 for Duke Energy Progress, LLC (“Duke Energy Progress,” “DEP” or “the
9 Company”), Duke Energy Carolinas, LLC (“Duke Energy Carolinas” or
10 “DEC”) and Duke Energy Ohio, LLC. My responsibilities include
11 compliance with North Carolina’s Renewable Energy and Energy
12 Efficiency Portfolio Standard (“REPS”), compliance with Ohio’s
13 Renewable Portfolio Standard and evaluation of renewable generation
14 initiatives and customer programs that relate to renewable compliance.

15 **Q. PLEASE BRIEFLY SUMMARIZE YOUR EDUCATIONAL**
16 **BACKGROUND.**

17 A. I received a Bachelor of Science in Mathematical Sciences from Clemson
18 University and a Master of Financial Mathematics from North Carolina
19 State University.

20 **Q. PLEASE DESCRIBE YOUR BUSINESS BACKGROUND AND**
21 **EXPERIENCE.**

22 A. I joined Progress Energy, Inc. in 2008, where I held positions in Investor
23 Relations and Regulatory Planning. Following the merger of Progress

1 Energy, Inc. with Duke Energy Corporation, I worked in the Rates and
2 Regulatory Strategy Department until June of 2015, when I moved to my
3 current position as Renewable Compliance Manager in the Distributed
4 Energy Technology Department.

5 **Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE NORTH**
6 **CAROLINA UTILITIES COMMISSION?**

7 A. Yes, I most recently provided testimony in Docket No. E-7, Sub 1229 on
8 DEC's 2019 REPS compliance report and application for approval of its
9 REPS cost recovery rider.

10 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

11 A. The purpose of my testimony is to describe Duke Energy Progress'
12 activities and the costs it has incurred, or will incur, in support of
13 compliance with North Carolina's Renewable Energy and Energy
14 Efficiency Portfolio Standard ("REPS") under N.C. Gen. Stat. ("G.S.") §
15 62-133.8 during the twelve months beginning on April 1, 2019 and ending
16 on March 31, 2020 ("Test Period"), as well as during the twelve months
17 beginning on December 1, 2020 and ending on November 30, 2021
18 ("Billing Period").

19 **Q. PLEASE DESCRIBE THE EXHIBITS TO YOUR TESTIMONY.**

20 A. My testimony includes seventeen exhibits: Jennings Confidential Exhibit
21 No. 1 is the Company's 2019 REPS Compliance Report, and Jennings
22 Confidential Exhibit No. 2 provides actual and forecasted REPS compliance
23 costs, by resource, that the Company has incurred during the Test Period

1 and projects to incur during the Billing Period in support of compliance with
2 REPS. Jennings Confidential Exhibit No. 3 is a worksheet detailing the
3 other incremental costs included in this filing, listing separately labor and
4 non-labor costs, as directed by the Commission in its January 17, 2017
5 *Order Approving REPS and REPS EMF Rider and REPS Compliance*
6 *Report* in Docket No. E-2, Sub 1109. Jennings Exhibit Nos. 4-17 are the
7 results of studies the costs of which the Company is recovering via the
8 REPS Rider.

9 **Q. WERE THESE EXHIBITS PREPARED BY YOU OR AT YOUR**
10 **DIRECTION AND UNDER YOUR SUPERVISION?**

11 A. Jennings Confidential Exhibit Nos. 1-3 were prepared by me or under my
12 supervision. Jennings Exhibit Nos. 4-17 include the results of studies not
13 prepared under my supervision. However, in my role at Duke Energy, I am
14 familiar with the studies.

15 **Compliance with REPS Requirements**

16 **Q. WHAT ARE DUKE ENERGY PROGRESS' REPS**
17 **REQUIREMENTS UNDER G.S. § 62-133.8?**

18 A. Pursuant to G.S. § 62-133.8,¹ as an electric power supplier, Duke Energy
19 Progress is required to comply with the overall REPS requirement (“Total
20 Requirement”) by submitting for retirement a total volume of renewable

¹ In its *Order Clarifying Electric Power Suppliers' Annual REPS Requirements*, Docket No. E-100, Sub 113 (November 26, 2008), the Commission clarified that the calculation of these requirements for each year shall be based upon the electric utility's North Carolina retail sales for the prior year.

1 energy certificates (“RECs”) equivalent to the following percentages of its
2 North Carolina retail sales in the prior year:

- 3 ▪ Beginning in 2012, three percent (3%);
- 4 ▪ In 2015, six percent (6%);
- 5 ▪ In 2018, ten percent (10%); and
- 6 ▪ In 2021 and thereafter, twelve point five percent (12.5%).

7 Furthermore, each electric power supplier must comply with the
8 requirements of G.S. §§ 62-133.8 (d), (e), and (f) (individually referred to
9 as the “Solar Set-Aside,” “Swine Waste Set-Aside,” and “Poultry Waste
10 Set-Aside,” respectively). That is, within the Total Requirement described
11 above, each electric power supplier is to ensure that specific quantities of
12 qualifying solar RECs, swine waste RECs, and poultry waste RECs are also
13 submitted for retirement. The Company generally refers to its Total
14 Requirement net of the three set-asides as its “General Requirement.”

15 Specifically, each electric power supplier is to comply with the Solar
16 Set-Aside by submitting for retirement a volume of qualifying solar RECs
17 equivalent to the following percentages of its North Carolina retail sales in
18 the prior year:

- 19 ▪ Beginning in 2010, two-hundredths of one percent (0.02%);
- 20 ▪ In 2012, seven-hundredths of one percent (0.07%);
- 21 ▪ In 2015, fourteen-hundredths of one percent (0.14%); and
- 22 ▪ In 2018 and thereafter, two-tenths of one percent (0.2%).

1 Each electric power supplier is also to comply with the Swine Waste
2 Set-Aside by submitting for retirement a volume of qualifying swine waste
3 RECs equivalent to its pro-rata share of total retail electric power sold in
4 North Carolina multiplied by the statewide, aggregate swine waste set-aside
5 requirement.² Duke Energy Progress' Swine Waste Set-Aside
6 requirements, as modified by the Commission,³ are as follows:

- 7 ▪ In 2018, its pro-rata share of two-hundredths of one percent (0.02%)
8 of the total retail electric power sold in North Carolina in the year
9 prior;
- 10 ▪ In 2019, its pro-rata share of four-hundredths of one percent (0.04%)
11 of the total retail electric power sold in North Carolina in the year
12 prior;
- 13 ▪ In 2020, its pro-rata share of seven-hundredths of one percent
14 (0.07%) of the total retail electric power sold in North Carolina in
15 the year prior;

² In its *Order on Pro Rata Allocation of Aggregate Swine and Poultry Waste Set-Aside Requirements and Motion for Clarification* in Docket No. E-100, Sub 113 (March 31, 2010), the Commission approved the electric power suppliers' proposed pro-rata allocation of the statewide aggregate swine and poultry waste set-aside requirements, such that the aggregate requirements will be allocated among the electric power suppliers based on the ratio of each electric power supplier's prior year retail sales to the total statewide retail sales.

³ In its *Order Modifying the Swine and Poultry Waste Set-Aside Requirements And Providing Other Relief* (December 16, 2019) and its *Errata Order* (February 13, 2020), Docket No. E-100, Sub 113, the Commission modified the 2019 Swine Waste Set-Aside requirement for electric public utilities to 0.04% and delayed by one year the scheduled increases to the requirement. The Commission also modified the 2019 Poultry Waste Set-Aside requirement to 500,000 MWh and delayed by one year the scheduled increases in the requirement.

- 1 ▪ In 2022, its pro-rata share of fourteen-hundredths of one percent
2 (0.14%) of total retail electric power sold in North Carolina in the
3 year prior; and
- 4 ▪ In 2025 and thereafter, its pro-rata share of two-tenths of one percent
5 (0.2%) of total retail electric power sold in North Carolina in the
6 year prior.

7 Finally, each electric power supplier is also to submit for retirement
8 a volume of qualifying poultry waste RECs equivalent to its pro-rata share
9 of the aggregate state-wide poultry waste set-aside requirement. Duke
10 Energy Progress' Poultry Waste Set-Aside requirements, as modified by the
11 Commission, are as follows:

- 12 ▪ Beginning in 2014, its pro-rata share of 170,000 megawatt-hours
13 ("MWh");
- 14 ▪ In 2018, its pro-rata share of 300,000 MWh;
- 15 ▪ In 2019, its pro-rata share of 500,000 MWh;
- 16 ▪ In 2020, its pro-rata share of 700,000 MWh; and
- 17 ▪ In 2021 and thereafter, its pro-rata share of 900,000 MWh.

18 The requirements that are described in this testimony and
19 accompanying exhibits reflect the aggregation of the REPS requirements of
20 Duke Energy Progress' retail customers.

21 **Q. PLEASE DISCUSS DUKE ENERGY PROGRESS' REPS**
22 **REQUIREMENTS FOR THE TEST AND BILLING PERIODS.**

1 A. For the Test Period, the Company submitted for retirement 3,863,083 RECs,
2 which included 2,822 Senate Bill 886 (S.L. 210-195, “SB 886”) RECs, each
3 of which counts for two poultry waste and one general REC, to meet its
4 Total Requirement of 3,868,727 RECs. Within this total, the Company
5 submitted for retirement 77,375 RECs to meet the Solar Set-Aside
6 requirement, 134,105 RECs, along with 2,822 SB 886 RECs (which count
7 as 5,644 Poultry Waste Set-Aside RECs), to meet the Poultry Waste Set-
8 Aside requirement of 139,749 RECS, and 15,475 RECs to meet the Swine
9 Waste Set-Aside requirement. During the prospective Billing Period,
10 which spans two calendar years, with different requirements in each year,
11 the Company’s estimated requirements are as follows⁴:

12 In 2020, the Company estimates that it will be required to submit for
13 retirement 3,793,823 RECs to meet its Total Requirement. Within this total,
14 the Company is also required to retire the following: 75,877 solar RECs,
15 26,557 swine waste RECs and 195,649 poultry waste RECs.

16 In 2021, the Company estimates that it will be required to submit for
17 retirement 4,690,561 RECs to meet its Total Requirement. Within this total,
18 the Company estimates that it will be required to retire approximately
19 75,049 solar RECs, 26,268 swine waste RECs and 251,548 poultry waste
20 RECs.

21 **Q. HAS THE COMPANY COMPLIED WITH ITS GENERAL**
22 **REQUIREMENT FOR 2019?**

⁴ The Company’s projected requirements are based upon retail sales estimates and will be subject to change based upon actual prior year North Carolina retail sales data.

1 A. Yes, the Company has met its 2019 General Requirement of 3,636,128
2 RECs. Specifically, the RECs to be used for 2019 compliance have been
3 transferred from the North Carolina Renewable Energy Tracking System
4 (“NC-RETS”) Progress Energy Electric Power Supplier account to the
5 Progress Energy Compliance Sub-Account. Upon completion of this
6 regulatory proceeding, the Commission will finalize retirement of the
7 RECs.

8 **Q. WILL THE COMPANY COMPLY WITH ITS GENERAL REPS**
9 **REQUIREMENT IN 2020?**

10 A. Yes, the Company is well positioned to comply with its General REPS
11 Requirement in 2020.

12 **Q. WHAT ACTIONS HAS THE COMPANY TAKEN DURING THE**
13 **TEST PERIOD TO SATISFY ITS CURRENT AND FUTURE REPS**
14 **REQUIREMENTS?**

15 A. During the Test Period, Duke Energy Progress has continued to produce
16 and procure RECs to satisfy its REPS requirements. Specifically, the
17 Company has taken the following actions: (1) executed and continued
18 negotiations for additional REC purchase agreements with renewable
19 facilities; (2) solicited renewable energy proposals of various types; (3)
20 continued operations of its solar facilities; (4) continued to fully utilize
21 energy savings generated by its energy efficiency programs, that can be
22 counted towards the Company’s REPS requirement; (5) performed research
23 studies, both directly and through strategic partnerships, to enhance the

1 Company's ability to comply with its future REPS requirements; and (6)
2 issued a second Request for Proposals as part of the Competitive
3 Procurement of Renewable Energy ("CPRE") Program of North Carolina
4 House Bill 589 (S.L. 2017-192, "NC HB 589"), the RECs from which will
5 be used to meet the Company's future REPS requirements.

6 **Q. IS THE COMPANY ABLE TO USE RECS GENERATED FROM**
7 **NET METERING FACILITIES TO SATISFY ITS FUTURE REPS**
8 **REQUIREMENTS?**

9 A. Yes. Under the current Net Metering for Renewable Energy Facilities Rider
10 offered by DEP (Rider NM-4B), a customer receiving electric service under
11 a schedule other than a time-of-use schedule with demand rates ("NMNTD
12 customer") shall provide any RECs to DEP at no cost. Per the Commission's
13 June 5, 2018 *Order Approving Rider and Granting Waiver Request*
14 ("NMNTD Order") in Docket Nos. E-2, Sub 1106 and E-7, Sub 1113, for
15 NMNTD customers, DEP may use the PVWattsTM Solar Calculator
16 developed by the National Renewable Energy Laboratory ("NREL") for
17 estimating the generation from NMNTD customers' solar facilities, as
18 permitted by Commission Rule R8-67(g)(2). Commission Rule R8-67(g)(2)
19 allows the use of a scalable conversion factor for estimating annual
20 generation from program participants. DEP shall then report the total
21 amount of electricity produced by facilities under the Rider directly into
22 NC-RETS in a separately identified generation project. DEP has complied
23 with these requirements and reported generation from NMNTD customers

1 to NC-RETS. The RECs from these facilities are currently in DEP's REC
2 inventory and available for use for future compliance requirements.

3 **Q. ARE THERE OTHER COMPLIANCE REQUIREMENTS IN THE**
4 **NMNTD ORDER WITH WHICH DEP MUST COMPLY?**

5 A. Yes. The NMNTD Order also requires that DEP shall provide NC-RETS on
6 a monthly basis with a list of participating customers, including location
7 and the kW capacity of their installations, to be made available on the NC-
8 RETS website. DEP has complied, and continues to comply, with this
9 requirement. In addition, the NMNTD Order requires that, for two years,
10 DEP shall verify through site visits to a statistically significant number of
11 participating residences that the solar installations covered by this Rider
12 continue to be operating and shall include the findings of its site visits in its
13 annual REPS compliance filing.

14 **Q: HAS DEP PERFORMED THE SITE VISITS REQUIRED BY THE**
15 **NMNTD ORDER?**

16 A. Yes, DEP hired a third-party contractor, Pure Power Contractors, Inc., to
17 perform the required site visits. A total of seventy-four site visits took place
18 between February 12, 2019 and May 1, 2019, with inspections taking place
19 in Raleigh, Cary, Asheville and Lumberton. The inspection process
20 consisted of a visual inspection of the facility equipment, with the following
21 data points collected at each facility:

- 22 • Energy production readings were taken from the inverter displays or
23 monitoring equipment;

- 1 • Equipment make and model numbers;
- 2 • Weather conditions;
- 3 • Array tilt, azimuth and insolation readings; and
- 4 • Meter numbers.

5 **Q. THROUGH THESE SITE VISITS, WAS IT DETERMINED THAT**
6 **PRODUCTION FROM INSTALLED SYSTEMS MET**
7 **EXPECTATIONS?**

8 A. Yes, the site visits determined that production from installed systems has
9 met expectations. For the net metering facilities included in the sample, the
10 PVWatts™ Solar Calculator produced an average generation estimate of
11 9.64 MWh/yr. The historical production data collected from inverter
12 readings during the site visits demonstrated an average production for the
13 sample group of 9.13 MWh/yr. This resulted in an overall average
14 realization rate of 95%, which is calculated by dividing the verified annual
15 production by the expected annual production for each customer and taking
16 the sample average. These findings indicate that the PVWatts™ production
17 estimate methodology remains reasonable for predicting future MWh/yr.
18 for program participants.

19 **Q. HOW WILL THE CPRE PROGRAM OF NC HB 589 IMPACT DEP'S**
20 **COMPLIANCE WITH ITS GENERAL REQUIREMENT?**

21 A. Under G.S. § 62-110.8(a), DEC and DEP (the “Companies”) are responsible
22 for procuring renewable energy and capacity through a competitive
23 procurement program with the purpose of adding renewable energy to the

1 state's generation portfolio in a manner that allows the Companies to
2 continue to reliably and cost-effectively serve their customers' future
3 energy needs. To meet the CPRE Program requirements, the Companies
4 must issue requests for proposals to procure energy and capacity from
5 renewable energy facilities in the aggregate amount of 2,660 MW (subject
6 to adjustment in certain circumstances) reasonably allocated over a term of
7 45 months beginning on February 21, 2018, when the Commission
8 approved the CPRE Program.

9 Renewable energy facilities eligible to participate in the CPRE
10 solicitation(s) include those facilities that use renewable energy resources
11 identified in G.S. § 62-133.8(a)(8), the REPS statute. The renewable energy
12 facilities to be developed or acquired by the Companies, or procured from
13 a third party through a power purchase agreement under the CPRE Program,
14 must also deliver to the Companies the environmental and renewable
15 attributes, or RECs, associated with the power. The Company's annual
16 CPRE Program Plan, filed on September 3, 2019 in Docket No. E-100, Sub
17 157, includes a planned allocation of ~1,230 to ~1,880 MWs between the
18 DEC and DEP service territories, as well as a planned timeline for each
19 solicitation. Additional details regarding DEP's CPRE compliance
20 activities for the current Test Period are being filed concurrently with this
21 REPS filing and may be reviewed in Docket No. E-2, Sub 1254. DEP plans
22 to use the RECs acquired through the CPRE RFP solicitations for its future
23 REPS compliance requirements and has therefore included the planned MW

1 allocation and timeline in its REPS compliance planning process. The
2 Company intends to recover the reasonable and prudent costs incurred to
3 implement the CPRE Program through the CPRE Rider as contemplated
4 under Commission Rule R8-71(j). However, absent recovery of any such
5 costs to implement the CPRE program in future CPRE proceedings, the
6 Company would propose to recover the costs in a future REPS proceeding
7 as an incremental cost of procuring RECs to meet its REPS compliance
8 requirement. In the Public Staff's May 18, 2020 testimony in the DEC
9 REPS cost recovery proceeding, Docket No. E-7, Sub 1229, witness Jay B.
10 Lucas stated that CPRE costs should not be recovered through REPS
11 proceedings, but that it is difficult to definitively make such a conclusion
12 before the Commission has fully considered CPRE costs in CPRE Program
13 Rider filings or other proceedings. There are no CPRE program
14 implementation costs in this current REPS proceeding, so the issue again
15 requires no immediate decision to complete the review and approval of the
16 currently proposed REPS rider.

17 **Q. HAS THE COMPANY COMPLIED WITH ITS SOLAR SET-ASIDE**
18 **REQUIREMENT FOR 2019?**

19 A. Yes, the Company has met the 2019 Solar Set-Aside requirement of 77,375
20 solar RECs. Pursuant to the NC-RETS Operating Procedures, the Company
21 has submitted for retirement 77,375 solar RECs. Specifically, the RECs to
22 be used for 2019 compliance have been transferred from the NC-RETS
23 Progress Energy Electric Power Supplier account to the Progress Energy

1 Compliance Sub-Account. Upon completion of this regulatory proceeding,
2 the Commission will finalize retirement of the RECs.

3 **Q. WILL THE COMPANY COMPLY WITH ITS SOLAR SET-ASIDE**
4 **REQUIREMENT IN 2020?**

5 A. Yes, the Company is well positioned to comply with its Solar Set-Aside
6 requirement in 2020.

7 **Q. PLEASE PROVIDE AN UPDATE ON THE COMPANY'S EFFORTS**
8 **TO COMPLY WITH ITS SOLAR SET-ASIDE REQUIREMENT.**

9 A. The Company is well positioned to comply with its Solar Set-Aside
10 Requirement in 2020 through a diverse and balanced portfolio of solar
11 resources. The Company's efforts to comply with the Solar Set-Aside
12 Requirement include REC generation and procurement from solar
13 renewable energy facilities.

14 The Company continues to operate the following Company-owned
15 solar facilities, the RECs from which are used for REPS compliance:

- 16 • Camp Lejeune Solar Facility – 13MW, located in Onslow County;
- 17 • Warsaw Solar Facility – 65MW, located in Duplin County;
- 18 • Fayetteville Solar Facility – 23MW, located in Bladen County; and
- 19 • Elm City Solar Facility – 40MW, located in Wilson County.

20 **Q. HAS THE COMPANY COMPLIED WITH ITS POULTRY WASTE**
21 **SET-ASIDE REQUIREMENT FOR 2019?**

22 A. Yes, the Company has met the 2019 Poultry Waste requirement of 139,749
23 RECs. Pursuant to NC-RETS Operating Procedures, the Company has

1 submitted for retirement 134,105 poultry RECs and 2,822 SB 886 RECs
2 (which count as 5,644 Poultry Waste Set-Aside RECs). Accordingly, the
3 Company has submitted the equivalent of 139,749 poultry RECs for
4 compliance. Specifically, the RECs to be used for 2019 compliance have
5 been transferred from the NC-RETS Progress Energy Electric Power
6 Supplier account to the Progress Energy Compliance Sub-Account. Upon
7 completion of this regulatory proceeding, the Commission will finalize
8 retirement of the RECs.

9 **Q. WILL THE COMPANY COMPLY WITH ITS POULTRY WASTE**
10 **SET-ASIDE REQUIREMENT IN 2020?**

11 A. The Company is in a position to comply with its Poultry Waste Set-Aside
12 requirement in 2020. Future compliance is dependent on the performance
13 of poultry waste-to-energy developers on current contracts, including two
14 that are expected to ramp up and increase production over the next few
15 years.

16 **Q. WHAT ACTIONS HAS THE COMPANY TAKEN DURING THE**
17 **TEST PERIOD TO PROCURE OR DEVELOP POULTRY WASTE-**
18 **TO-ENERGY RESOURCES TO SATISFY ITS POULTRY WASTE**
19 **SET-ASIDE REQUIREMENTS?**

20 A. In the Test Period, the Company (1) continued direct negotiations for
21 additional supplies of both in-state and out-of-state resources with multiple
22 counterparties; (2) secured contracts for additional poultry waste-to-energy
23 resources; (3) worked diligently to understand the technological, permitting,

1 and operational risks associated with various methods of producing
2 qualifying poultry RECs to aid developers in overcoming those risks; when
3 those risks could not be overcome, the Company worked with developers
4 via contract amendments to adjust for more realistic outcomes; (4) explored
5 leveraging current biomass contracts by working with developers to add
6 poultry waste to their fuel mix; (5) explored adding thermal capabilities to
7 current poultry sites to bolster REC production; (6) explored poultry-
8 derived directed biogas at facilities located in North Carolina and directed
9 such biogas to combined cycle plants for combustion and electric
10 generation; and (7) utilized the Company's REC trader to search the broker
11 market for out-of-state poultry RECs available in the market. Additional
12 information on the Company's compliance with the Poultry Waste Set-
13 Aside requirement can be found in the Company's Joint Semiannual
14 Progress Report, filed on June 1, 2020 in Docket No. E-100, Sub 113A.

15 The Company remains committed to satisfying its statutory
16 requirements for the Poultry Waste Set-Aside and will continue to
17 reasonably and prudently pursue procurement of these resources.

18 **Q. HAS THE COMPANY COMPLIED WITH ITS SWINE WASTE**
19 **SET-ASIDE REQUIREMENT FOR 2019?**

20 A. Yes. The Company has met the 2019 Swine Waste Set-Aside requirement
21 of 15,475 swine RECs. Pursuant to the NC-RETS Operating Procedures,
22 the Company has submitted for retirement 15,475 swine RECs.
23 Specifically, the RECs to be used for 2019 compliance have been

1 transferred from the NC-RETS Progress Energy Electric Power Supplier
2 account to the Progress Energy Compliance Sub-Account. Upon
3 completion of this regulatory proceeding, the Commission will finalize
4 retirement of the RECs.

5 **Q. WILL THE COMPANY COMPLY WITH ITS SWINE WASTE SET-
6 ASIDE REQUIREMENT IN 2020?**

7 A. The Company's compliance with the 2020 Swine Waste Set-Aside is
8 uncertain, as existing contracts have not been able to reach contracted levels
9 of production, and new contracts have not come online in the timeframe
10 originally planned and have taken longer than expected to ramp up
11 production. One new swine waste-to-energy project is under construction
12 and is scheduled to come online over the next couple of years. The ability
13 of this new facility to come online and for all facilities to produce their full
14 contracted RECs will determine the levels of compliance that DEP is able
15 to meet in the near term. The Company understands that current swine
16 waste-to-energy projects have encountered difficulties in achieving the full
17 REC output of their contracts due to issues including local opposition to
18 siting of the facilities, the inability to secure firm and reliable sources of
19 swine waste feedstock from waste producers in North Carolina, difficulties
20 securing project financing and technological challenges encountered when
21 ramping up production. In addition, the outbreak of the COVID-19
22 pandemic has adversely impacted swine and poultry farms and processing
23 plants in North Carolina through staff shortages, personal protective

1 equipment supply issues, and delivery challenges. According to the N.C.
2 Department of Health and Human Services, through May 7, at least 982
3 meat-processing workers had tested positive for the virus, and the Assistant
4 Agriculture Commissioner stated that the state's processing-plant
5 production has slowed by roughly 35% to 45%.⁵ Although industry
6 representatives and state and federal authorities are working to ensure
7 continuity of operations, uncertainty remains about the magnitude of the
8 pandemic's impact in North Carolina and its corresponding effect on
9 poultry and swine waste-to-energy production.

10 **Q. WHAT ACTIONS HAS THE COMPANY TAKEN DURING THE**
11 **TEST PERIOD TO PROCURE OR DEVELOP SWINE WASTE-TO-**
12 **ENERGY RESOURCES TO MEET ITS SWINE WASTE SET-ASIDE**
13 **REQUIREMENT?**

14 A. In the Test Period, the Company (1) continued direct negotiations for
15 additional supplies of both in-state and out-of-state resources; (2) secured
16 contracts for additional swine waste-to-energy resources; (3) worked
17 diligently to understand the technological, permitting, and operational risks
18 associated with various methods of producing qualifying swine waste RECs
19 to aid developers in overcoming those risks; when those risks could not be
20 overcome, the Company worked with developers via contract amendments
21 to adjust for outcomes that the developers believe are achievable based on

⁵ Grubb, Tammy, *States are Killing Pigs, Chickens that COVID-19 Keeps from the Market. Could NC be Next?*, News and Observer, May 8, 2020, available at <https://www.newsobserver.com/news/business/article242562301.html>

1 new experience; (4) explored and is engaging in modification of current
2 biomass and set-asides contracts by working with developers to add swine
3 waste to their fuel mix; (5) continued pursuit of swine-derived directed
4 biogas from North Carolina facilities; (6) utilized the Company's REC
5 trader to search the broker market for out-of-state swine RECs available in
6 the market; and (7) engaged the North Carolina Pork Council ("NCPC") in
7 a project evaluation collaboration effort that will allow the Company and
8 the NCPC to discuss project viability, as appropriate, with respect to the
9 Company's obligations to keep certain sensitive commercial information
10 confidential. Additional information on the Company's compliance with the
11 Swine Waste Set-Aside requirement can be found in the Company's Joint
12 Semiannual Progress Report, filed on June 1, 2020 in Docket No. E-100,
13 Sub 113A.

14 The Company remains committed to satisfying its statutory
15 requirements for the Swine Waste Set-Aside and will continue to reasonably
16 and prudently pursue procurement of these resources.

17 **Q. IS DUKE ENERGY PROGRESS CONTINUING TO EXECUTE**
18 **ADDITIONAL REC PURCHASE AGREEMENTS?**

19 A. Yes, the Company continues to execute additional REC purchase
20 agreements and maintains an open solicitation for proposals from
21 developers of renewable energy resources.

22 **Q. DID THE COMPANY SELL ANY RECS DURING THE TEST**
23 **PERIOD?**

1 A. No, it did not.

2 **Costs of REPS Compliance**

3 **Q. WHAT ARE THE COMPANY’S COSTS ASSOCIATED WITH REPS**
4 **COMPLIANCE DURING THIS TEST PERIOD AND THE**
5 **UPCOMING BILLING PERIOD?**

6 A. Duke Energy Progress’ costs associated with REPS compliance are
7 reflected in Jennings Confidential Exhibit No. 2 and are categorized by
8 actual costs incurred during the Test Period and projected costs for the
9 Billing Period.

10 **Q. IN ADDITION TO RENEWABLE ENERGY AND REC COSTS,**
11 **WHAT OTHER COSTS OF REPS COMPLIANCE DOES THE**
12 **COMPANY SEEK TO RECOVER IN THIS PROCEEDING?**

13 A. Jennings Confidential Exhibit Nos. 2 and 3 identify “Other Incremental
14 Cost,” “Solar Rebate Program Cost” and “Research Cost” that the Company
15 has incurred, and estimates it will incur, in association with REPS
16 compliance.

17 **Other Incremental Costs and Solar Rebate Program Costs**

18 **Q. PLEASE EXPLAIN THE OTHER INCREMENTAL COSTS**
19 **INCLUDED FOR RECOVERY IN THIS PROCEEDING.**

20 A. Other Incremental Costs include labor costs associated with REPS
21 compliance activities and non-labor costs associated with administration of
22 REPS compliance. Among the non-labor costs associated with REPS
23 compliance are the Company’s subscription to NC-RETS, and accounting,

1 and tracking tools related to RECs, reduced by agreed-upon liquidated
2 damages paid by sellers for failure to meet contractual milestones, and
3 amounts paid for administrative contractual amendments requested by
4 sellers.

5 **Q. PLEASE PROVIDE INFORMATION ON THE NC HB 589 SOLAR**
6 **REBATE PROGRAM (“SOLAR REBATE PROGRAM”).**

7 A. As required by G.S. § 62-155(f), DEP developed a Solar Rebate Program
8 offering reasonable incentives to residential and nonresidential customers
9 for the installation of small customer owned or leased solar energy facilities
10 participating in the Company’s net metering tariff. The incentive is limited
11 to 10 kilowatts alternating current (“kW AC”) for residential solar
12 installations and 100 kW-AC for nonresidential solar installations. HB 589
13 limited the program incentive to 10,000 kW of installed capacity annually
14 starting January 1, 2018 and continuing until December 31, 2022.

15 Consistent with the Commission’s April 3, 2018 order and
16 subsequent orders in Docket Nos. E-7, Sub 1166 and E-2, Sub 1167, the
17 Solar Rebate Program launched on July 9, 2018. In every year since its
18 launch, the Solar Rebate Program’s annual participation limits for the
19 residential and non-residential class have been met, although the two
20 thousand five hundred kW of capacity limit for nonprofit organizations has
21 not been met. On January 3, 2020, DEP filed a notice that the 2020 annual
22 participation limits for residential and non-residential customers under the

1 Solar Rebate Program, exclusive of the non-profit participation set-aside,
2 had been reached.

3 Beginning in 2019, for a residential customer who obtains a rebate
4 reservation prior to installation, the installation must be completed no later
5 than December 31 in the year in which the reservation was obtained. For a
6 nonresidential customer, with a project size under 20 kW-AC, who obtains
7 a rebate reservation prior to installation, the installation must be completed
8 no later than 365 days from the date the rebate reservation was obtained.
9 For a nonresidential customer, with a project size over 20kW-AC, who
10 obtains a rebate reservation prior to installation, the installation must be
11 completed no later than 365 days from the date of an executed
12 interconnection agreement. Therefore, rebate payments for the 2018
13 program year continued into 2019, and the same principle will apply for
14 subsequent program years, with payments continuing into 2023 after the
15 final program year of 2022.

16 **Q. ARE COSTS RELATED TO THE NC HB 589 SOLAR REBATE**
17 **PROGRAM INCLUDED FOR RECOVERY IN THIS FILING?**

18 A. Yes. Pursuant to G.S. § 62-155(f), each public utility required to offer a
19 solar rebate program “shall be authorized to recover all reasonable and
20 prudent costs of incentives provided to customers and program
21 administrative costs by amortizing the total program incentives distributed
22 during a calendar year and administrative costs over a 20-year period,
23 including a return component adjusted for income taxes at the utility's

1 overall weighted average cost of capital established in its most recent
2 general rate case, which shall be included in the costs recoverable by the
3 public utility pursuant to G.S. § 62-133.8(h).” G.S. § 62-133.8(h) provides
4 for an electric power supplier’s cost recovery and customer charges under
5 the REPS statute; NC HB 589 amended it by adding a provision to allow
6 for the recovery of incremental costs incurred to “provide incentives to
7 customers, including program costs, incurred pursuant to G.S. § 62-155(f).”
8 Therefore, DEP has included for recovery in this filing costs incurred during
9 the EMF period, and projected to be incurred in the Billing Period related
10 to the implementation of the NC HB 589 Solar Rebate Program. As detailed
11 on Jennings Confidential Exhibit No. 3, these costs include the annual
12 amortization of incentives paid to customers and program administration
13 costs, which include labor, information technology and marketing costs.
14 Projected incentive costs for the Billing Period are within the capacity limits
15 established by G.S. § 62-155(f).

16 **Q. PLEASE PROVIDE DETAIL ON THE INTERNAL LABOR COSTS**
17 **THAT ARE ASSOCIATED WITH REPS COMPLIANCE AND**
18 **SOLAR REBATE PROGRAM ACTIVITIES THAT ARE**
19 **INCLUDED IN DEP’S CURRENT APPLICATION FOR REPS COST**
20 **RECOVERY.**

21 A. DEP charges only the incremental cost of REPS compliance and the Solar
22 Rebate Program to the REPS cost recovery rider. Consistent with that policy
23 and DEP’s practices in previous applications for cost recovery for REPS

1 compliance, internal employees who work to comply with G.S. § 62-133.8
2 and G.S. § 62-155(f) charge only that portion of their labor to REPS. The
3 departments/functions that charged labor to REPS during the Test Period
4 are detailed in Jennings Confidential Exhibit No. 3.

5 **Q. HOW DO EMPLOYEES CHARGE THEIR REPS-RELATED AND**
6 **SOLAR REBATE PROGRAM-RELATED LABOR COSTS TO**
7 **REPS?**

8 A. Employees positively report their time, which means that each employee is
9 required to submit a timesheet every two weeks in DEP's time reporting
10 system. The hours reported for the period are split according to the
11 accounting entered in the time reporting system for that specific employee.
12 The division of hours is updated for the reporting period as necessary, as
13 the nature of the employee's work changes.

14 To educate employees to account for their time properly, DEP
15 annually provides instructions for charging time to REPS to affected
16 employees and the management of the employee groups performing REPS
17 work. Additionally, every year prior to filing for approval of the DEP REPS
18 Compliance Report and Cost-Recovery Rider, the labor hours charged are
19 carefully reviewed and confirmed.

20 **Research Costs**

21 With respect to Research activities during the Test Period and projected for
22 the Billing Period, the Company has incurred or projects to incur costs

1 associated with the support of various pilot projects and studies related to
2 distributed energy technology and the Company's REPS compliance.

3 **Q. THE COMMISSION'S ORDER APPROVING REPS AND REPS EMF**
4 **RIDERS AND 2012 REPS COMPLIANCE REQUIRES DUKE**
5 **ENERGY PROGRESS TO FILE WITH ITS 2019 REPS RIDER**
6 **APPLICATION STUDY RESULTS FOR ANY STUDIES THE**
7 **COSTS OF WHICH IT HAS RECOVERED VIA THE REPS RIDER.**
8 **IS THE COMPANY SUPPLYING SUCH STUDIES IN THIS**
9 **FILING?**

10 A. Yes. The Company's Research efforts are an integral part of its REPS
11 compliance efforts. The following summary outlines efforts undertaken by
12 the Company in the test period and specifies the availability of applicable
13 study results.

- 14 • Center for Advanced Power Engineering Research ("CAPER") –
15 Combined T&D System Model Study – In the first quarter of 2020,
16 the Company started a project with North Carolina State University
17 ("NCSU") and the University of North Carolina Charlotte
18 ("UNCC") through CAPER, to develop a combined system model
19 and simulation process for integrated planning and operations across
20 transmission and distribution systems. The description of the project
21 can be found in Jennings Confidential Exhibit No. 4.
- 22 • CAPER Photovoltaic Synchronous Generator ("PVSG") – Started
23 in 2017, the Company worked with NCSU and Clemson University,

1 through CAPER, on a project to develop and demonstrate a 40 kW
2 three-phase PVSG system. This project concluded in 2019. The
3 results of this project can be found in Jennings Exhibit No. 5.

- 4 • Coalition for Renewable Natural Gas – The Company renewed its
5 membership to the Coalition for Renewable Natural Gas in 2019, to
6 add a valuable resource of knowledge and public policy advocacy
7 in this growing sector of potential animal waste supply. The
8 Coalition for Renewable Natural Gas provides its members with
9 exclusive whitepapers, support on model pipeline gas specifications
10 and access to other members for discussions on current and future
11 projects.
- 12 • Eos Energy Storage Technology Development – The Company and
13 Eos Services started a collaborative technology development
14 program to validate, demonstrate, and quantify the benefits of an
15 Eos Aurora Battery System that is DC coupled to a PV facility at the
16 McAlpine Creek Substation 50 kW Solar Facility. The installation
17 of the Eos Aurora Battery System was completed in 2019, and
18 operational tests will continue in 2020. The progress report of this
19 project can be found in Jennings Confidential Exhibit No. 6.
- 20 • Electric Power Research Institute (“EPRI”) – In the EMF period the
21 Company subscribed to the following EPRI programs, the costs of
22 which were recovered via the REPS rider: Program 174 –
23 Integration of Distributed Energy Resources, and Program 94 –

1 Energy Storage and Distributed Generation. The Company
2 participated in a supplemental project under Program 174 – “DER
3 Interconnection Standards & Practices.” The Company also
4 extended the support of the “EPRI - PV monitoring project” which
5 originally started in 2017. EPRI designates such study results
6 as proprietary or as trade secrets and licenses such results to EPRI
7 members, including Duke Energy Progress. As such, the Company
8 may not disclose the information publicly. Non-members may
9 access these studies for a fee. Information regarding access to this
10 information can be found at
11 <http://www.epri.com/Pages/Default.aspx>.

12 • Emerging Technology Office (“ETO”) – Mitigation of Transformer
13 High Inrush Current – In 2019, the Company continued working
14 with multiple vendors on a project to test and evaluate different
15 options to mitigate the transformer high inrush current.
16 Transformers are very expensive components of the electric power
17 system. The transformers installed in the utility-scale solar
18 generating facilities are experiencing high inrush current during
19 energization. Transformer inrush currents are short duration currents
20 that flow into the transformer primary every time the transformer is
21 energized. These currents are typically high magnitude (up to 20
22 times the nominal current), harmonic currents with some DC
23 component. These high inrush currents can cause numerous

1 problems on the electrical system, such as breaker tripping, voltage
2 sags, voltage flicker, mechanical stress on the transformer windings,
3 oscillatory torque in motors and system resonance. The results of
4 this project can be found in Jennings Confidential Exhibit No. 7.

5 • NCSU – Adopting DVAR to Mitigate PV Impacts on a Distribution
6 System – In 2019, the Company started a project with NC State to
7 assess the effectiveness of the American Superconductor Corp.
8 Dynamic Volt-Amp Reactive Compensation Solution (“mini-
9 DVAR”) in mitigating various power quality issues on distribution
10 circuits due to increasing penetration of PV. The scope of the project
11 also includes the optimal placement of mini-DVAR and its optimal
12 volt-var control. The project is expected to continue in 2020. The
13 progress report of this project can be found in Jennings Confidential
14 Exhibit No. 8.

15 • NCSU – DER Cost of Service Study – In the first quarter of 2020,
16 the Company started a project with North Carolina State University
17 and Advanced Energy through a collaborative effort to investigate
18 the impact of DG on a utility distribution system from the cost-of-
19 service perspective and to develop a methodology to quantify those
20 costs. The project is expected to complete by the end of 2020.

21 • NCSU – ETO – Feeder Anti-islanding Detection Using HIL
22 Modeling and Simulation – In 2019, the Company started a project
23 with NC State to evaluate the challenge from increasing penetration

1 of PV and installation of mini-DVAR to the islanding protection
2 scheme. The scope of this project is to use a Hardware-in-the-loop
3 (“HIL”) setup to simulate different fault conditions with Schweitzer
4 Engineering Laboratories (“SEL”) relays at PV sites and different
5 operating conditions. The progress report of this project can be
6 found in Jennings Confidential Exhibit No. 9.

7 • NCSU – ETO – Grid-forming Battery Energy Storage System
8 Characterization and Testing – Starting from late 2018, the
9 Company worked with NC State on a project to install and
10 commission a Battery Energy Storage System (“BESS”) and to
11 study the loading capabilities of the BESS operating in grid-forming
12 mode. A BESS may need to power up a microgrid after an outage,
13 thus supplying all of the magnetizing currents to line-start machines
14 as well as isolation transformers in the microgrid. There is a need to
15 understand the capabilities of the state-of-the art BESS inverters to
16 support these loads. Though simulating such behavior is feasible,
17 experimental validation is required to guarantee that the system will
18 operate as expected, and the BESS inverter protection will not trip.
19 The project continued in 2019, and the progress report can be found
20 in Jennings Confidential Exhibit No. 10.

21 • NCSU – Interactions of PV Installations with Distribution Systems
22 – Starting from late 2018, the Company worked with NC State on a
23 project to construct a testbed and analysis framework for

1 investigating how large PV penetration on a feeder affects the
2 operation of the distribution system. The project continued in 2019,
3 and the progress report can be found in Jennings Confidential
4 Exhibit No. 11.

5 • NCSU’s Future Renewable Electric Energy Delivery and
6 Management (“FREEDM”) Systems Center – Duke Energy
7 supports NC State’s FREEDM Center through annual membership
8 dues. The FREEDM partnership provides Duke Energy with the
9 ability to influence and focus research on materials, technology, and
10 products that will enable the utility industry to transform the electric
11 grid into a two-way power flow system supporting distributed
12 generation.

13 • NREL – Carbon-Free Resource Integration Study – In 2019, the
14 Company contracted with NREL, an industry-respected, leading
15 research institution, to conduct a study of the Carolinas’ system to
16 help us understand the operational impacts, benefits and limitations
17 of solar. The study will also inform other fleet transformation
18 analyses, including how different clean energy technologies can
19 contribute to a carbon-free future. The study will be conducted in
20 two phases. Phase 1 was completed in 2019, and Phase 2 has started
21 and will continue in 2020. The results of the Phase 1 study of this
22 project can be found in Jennings Exhibit Nos. 12-14.

- 1 • Research Triangle Institute – Biogas Utilization in North Carolina –
2 In 2019, the Company continued support of the Research Triangle
3 Institute project for the NC Energy Policy Council to determine the
4 potential bioenergy/biogas resources available in North Carolina,
5 and to identify the most beneficial and optimum utilization of
6 resources to maximize economic, environmental and societal
7 advantages. An overview of the project can be found in Jennings
8 Confidential Exhibit No. 15.
- 9 • Rocky Mountain Institute (“RMI”) – The Company participates in
10 eLab, a forum sponsored by RMI, composed of several North
11 Carolina and nationally based entities, and organized to overcome
12 barriers to economic deployment of distributed energy resources in
13 the U.S. electric sector. Specifically, the Company seeks to gauge
14 customer desires related to distributed resources and provide ideas
15 of potential long-term solutions for distributed energy resources and
16 microgrids. Please visit RMI’s website at <http://www.rmi.org/elab>
17 for more information on eLab.
- 18 • Swine Extrusion/Poultry Mortality – The Animal and Poultry Waste
19 Management Center (“APWMC”) at NC State University – In 2019,
20 the Company continued support of the various projects being
21 undertaken by the APWMC. This work is centered around drying
22 swine lagoon solids, bagged lagoon sludge and lagoon sludge mixed
23 with agricultural wastes at a farm-based level to create a higher

1 MMBtu fuel that can be safely and easily transported to a central
2 plant for combustion. An update on the project can be found in
3 Jennings Confidential Exhibit No. 16. Note that there are no costs
4 related to this project included in the test period, but the Company
5 continues to support the project and has included projected costs in
6 the billing period.

7 • UNCC – Marshall Solar Site Algorithm – In 2019, the Company
8 continued to work with the UNCC on a project to utilize the
9 operational data to design and implement an autonomous active and
10 reactive power dispatch algorithm with PV farms and/or Battery
11 Energy Storage system on any feeder considering Distribution
12 Management System (DMS) coordination. The work in 2019 was
13 on utilizing energy storage as an Uninterruptible Power Supply
14 (“UPS”) solution for customers with sensitive loads and providing
15 grid ancillary services. The Phase V results of this project can be
16 found in Jennings Confidential Exhibit No. 17. The Company is
17 continuing to support the next phase of this project in 2020.

18 **Q. ARE YOU SATISFIED THAT THE ACTUAL COSTS INCURRED**
19 **IN THE TEST PERIOD HAVE BEEN, AND THAT THE**
20 **PROJECTED COSTS OF THE BILLING PERIOD WILL BE,**
21 **PRUDENTLY INCURRED?**

22 A. Yes. Duke Energy Progress believes it has incurred and projects to incur
23 these costs associated with REPS compliance in a prudent manner. The

1 Company continues to exercise thorough and rigorous technical and
2 economic analysis to evaluate all options for compliance with its REPS
3 requirements. Duke Energy Progress has developed strong foundational
4 market knowledge related to renewable resources. The Company continues
5 to enhance and develop expertise in this field through the Company's
6 various solicitations for renewable energy and the operation of its
7 unsolicited bid process, its participation in industry research, and daily
8 interaction with developers of renewable energy facilities. As a result of
9 these efforts, the Company has been able to identify, procure, and develop
10 a diverse portfolio of renewable resources to meet its REPS requirements in
11 a prudent, reasonable and cost-effective manner.

12 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

13 **A. Yes.**

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

DOCKET NO. E-2, SUB 1251

In the Matter of)	
)	
Application of Duke Energy Progress, LLC for)	DUKE ENERGY PROGRESS,
Approval of Renewable Energy and Energy)	LLC 2019 RENEWABLE
Efficiency Portfolio Standard Compliance Report)	ENERGY & ENERGY
and Rider Pursuant to N.C. Gen. Stat. § 62-133.8)	EFFICIENCY PORTFOLIO
and Commission Rule R8-67(c))	STANDARD COMPLIANCE
)	REPORT

**DUKE ENERGY PROGRESS, LLC
RENEWABLE ENERGY AND ENERGY EFFICIENCY
PORTFOLIO STANDARD (“REPS”)
COMPLIANCE REPORT**

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(A) **INTRODUCTION**

Duke Energy Progress, LLC (“Duke Energy Progress” or the “Company”) submits its Renewable Energy and Energy Efficiency Portfolio Standard (“REPS”) Compliance Report (“Compliance Report”) in accordance with N.C. Gen. Stat. § 62-133.8 and Commission Rule R8-67(c). This Compliance Report provides the required information for the calendar year 2019.¹

(B) **REPS COMPLIANCE REPORT**

I. **RENEWABLE ENERGY CERTIFICATES:**

The table below reflects the renewable energy certificates (“RECs”) used to comply with N.C. Gen. Stat. § 62-133.8(d) for the year 2019.

[BEGIN CONFIDENTIAL]

Source	Number of Certificates	Incremental Costs
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]

¹ Pursuant to NCUC Rule R8-67(c)(1), this Compliance Report reflects Duke Energy Progress’ efforts to meet the REPS requirements for the previous calendar year.

Source	Number of Certificates	Incremental Costs
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]

Totals may not foot due to rounding

[END CONFIDENTIAL]

II. ACTUAL 2019 TOTAL NORTH CAROLINA RETAIL SALES AND YEAR-END NUMBER OF ACCOUNTS, BY CUSTOMER CLASS:

	2019
NC Retail MWh Sales	37,938,229

Account Type	2019 year-end number of retail REPS accounts
Residential	1,242,912
General	200,154
Industrial	1,801

III. AVOIDED COST RATES

The avoided cost rates below, applicable to energy received pursuant to power purchase agreements, represent the annualized avoided cost rates in Schedule CSP/PP (NC), Distribution Interconnection, approved in the 2016 avoided cost proceeding Docket E-100, Sub 148, the 2014 avoided cost proceeding Docket No. E-100, Sub 140; the 2012 avoided cost proceeding Docket No. E-100, Sub 136; the 2010 avoided cost proceeding Docket No. E-100, Sub 127; the 2008 avoided cost proceeding Docket No. E-100, Sub 117; and the 2006 avoided cost proceeding Docket No. E-100, Sub 106.

ANNUALIZED CAPACITY AND ENERGY RATES						
(CENTS PER KWH)						
Docket No.:	E-100 Sub 148	E-100 Sub 140	E-100 Sub 136	E-100 Sub 127	E-100 Sub 117	E-100 Sub 106
Variable Rate	3.35	4.29	4.76	5.79	5.69	4.54
5 Year	n/a	4.42	4.97	6.18	5.82	4.67
10 Year	3.79	5.08	5.47	6.82	6.05	4.85
15 Year	n/a	5.53	5.88	7.29	6.11	4.98

IV. ACTUAL TOTAL AND INCREMENTAL COSTS INCURRED IN 2019

REPS compliance costs incurred for calendar year 2019 comprise the cost of renewable energy purchases, the cost of purchases of various types of RECs, and other reasonable and prudent costs incurred to meet the requirements of the REPS statute. In addition, annual Solar Rebate Program costs incurred pursuant to N.C. Gen. Stat. § 62-155 are recovered in the REPS rider as directed in N.C. Gen. Stat. § 62-133.8(h)(1)d.

Actual Costs Incurred	Energy and REC Costs	Other	Total Costs
REPS compliance - avoided cost	\$190,780,066	\$ 0	\$190,780,066
REPS compliance – incremental cost	\$ 35,429,563	\$2,619,674	\$38,049,237 (a)
REPS compliance - total cost	\$226,209,629	\$ 2,619,674	\$228,829,303
Solar Rebate Program cost	\$ 0	\$ 876,158	\$ 876,158 (b)
Incremental REPS compliance costs and Solar Rebate Program costs for REPS rider recovery		(a) + (b) above	\$38,925,395

V. ACTUAL INCREMENTAL COSTS COMPARISON TO THE ANNUAL COST CAP

Account Type	Total 2018 year-end number of retail REPS accounts	Annual per-account cost cap	Total annual cost cap
Residential	1,210,740	\$27	\$32,689,980
General	195,967	\$150	\$29,395,050
Industrial	1,810	\$1,000	\$1,810,000
Total annual REPS compliance cost cap – 2019			\$63,895,030
Incremental REPS compliance costs incurred – 2019			\$38,049,237

VI. STATUS OF COMPLIANCE WITH REPS REQUIREMENTS

Pursuant to N.C. Gen. Stat. § 62-133.8(b) for Duke Energy Progress Retail customers, the REPS requirement for calendar year 2019 is set at 10% of 2018 North Carolina retail sales. In order to comply with the REPS obligation for Duke Energy Progress Retail customers, the Company submitted 3,863,083 RECs, which included 2,822 Senate Bill 886 (“SB886”) RECs, each of which counts for two poultry waste RECs and

one general REC. Accordingly, the Company submitted the equivalent of 3,868,727 RECs for compliance, representing 10% of 2018 retail megawatt-hour sales of 38,687,268.

Pursuant to N.C. Gen. Stat. § 62-133.8(d), the REPS requirement for calendar year 2019 is at least 0.20% of the total electric power in kilowatt hours sold to retail electric customers in the prior calendar year in the State, or an equivalent amount of energy, shall be supplied by a combination of new solar electric facilities and new metered solar thermal energy facilities. As a result, 77,375 solar RECs were used to meet the Solar Set-Aside Requirement. An additional 2,159,374 solar RECs were submitted for retirement toward compliance with the general requirement (the total REPS requirement net of solar, poultry and swine set-aside obligations).

In its December 16, 2019 *Order Modifying the Swine and Poultry Waste Set-Aside Requirements and Providing Other Relief* and its February 13, 2020 *Errata Order* (“2019 Delay Orders”) issued in Docket No. E-100, Sub 113, the Commission modified the swine waste set-aside requirement for 2019 to 0.04% of total NC retail sales, and specified that the requirement applies to electric public utilities only, not to electric membership cooperatives or municipalities (which were excused from the swine waste set-aside requirement for 2019). To comply with the swine waste set-aside requirement applicable to DEP’s NC retail sales, the Company submitted for retirement 15,475 swine RECs.

The 2019 Delay Orders also reduced the 2019 poultry waste set-aside requirement to 500,000 MWh state-wide, and set the 2020 and 2021 levels at 700,000 MWh and 900,000 MWh, respectively. In its December 16, 2019 *Order Establishing 2019, 2020, and 2021 Poultry Waste Set-Aside Requirement Allocation* issued in Docket No. E-100, Sub 113, the Commission directed the annual aggregate poultry waste set-aside requirement to be allocated among electric power suppliers and utility compliance aggregators according to the load ratio share calculations shown on Appendix A to the order. These percentages were applied to the 2019 state-wide requirement to determine the poultry waste set-aside requirements applicable to DEP NC retail for reporting year 2019. The Company submitted for retirement 134,105 poultry waste RECs along with 2,822 SB886 RECs, which count as 5,644 poultry waste set-aside RECs. Accordingly, the Company submitted the equivalent of 139,749 poultry RECs for compliance, and met its 2019 poultry waste set-aside requirement.

VII. IDENTIFICATION OF RECs CARRIED FORWARD

The table below reflects RECs generated through year-end 2019, excluding those RECs that have already been retired to meet compliance, that the Company has banked for use in future compliance years.

[BEGIN CONFIDENTIAL]

Source	Number of Certificates
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]

[REDACTED]

[END CONFIDENTIAL]

VIII. DATES AND AMOUNTS OF ALL PAYMENTS MADE FOR RENEWABLE ENERGY CERTIFICATES

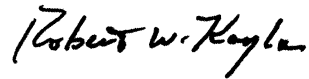
Confidential Appendix 1 illustrates the dates and amounts of all payments made for renewable energy certificates during calendar year 2019.

(C) METHODOLOGY FOR DETERMINING NUMBER OF CUSTOMERS AND CUSTOMER CAP

Consistent with the Commission’s order issued November 12, 2009 in Docket No. E-2, Sub 948, for purposes of REPS billing, the Company defines as a single customer all accounts (metered and unmetered) serving the same customer of the same revenue classification located on the same or contiguous properties. If a customer has accounts which serve in an auxiliary role to a main account on the

same premises, no REPS charge applies to the auxiliary accounts, regardless of their revenue classification.

Respectfully submitted this the 9th day of June, 2020.



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Counterparty and Payment Dates	REC Cost
[BEGIN CONFIDENTIAL]	
Apr-2019	\$ 2,349.76
Aug-2019	\$ 4,772.95
Dec-2019	\$ 2,202.90
Feb-2019	\$ 1,321.74
Jan-2019	\$ 2,202.90
Jul-2019	\$ 4,993.24
Jun-2019	\$ 4,846.38
Mar-2019	\$ 3,084.06
May-2019	\$ 4,185.51
Nov-2019	\$ 3,377.78
Oct-2019	\$ 4,185.51
Sep-2019	\$ 4,258.94
Apr-2019	\$ 3,686.04
Dec-2019	\$ 4,709.94
Feb-2019	\$ 2,662.14
Jan-2019	\$ 3,481.26
Jul-2019	\$ 6,962.52
Jun-2019	\$ 5,836.23
Mar-2019	\$ 3,583.65
May-2019	\$ 5,631.45
Nov-2019	\$ 3,378.87
Oct-2019	\$ 5,221.89
Sep-2019	\$ 12,491.58
Apr-2019	\$ 206.86
Aug-2019	\$ 413.72
Dec-2019	\$ 310.29
Feb-2019	\$ 310.29
Jan-2019	\$ 310.29
Jul-2019	\$ 310.29
Jun-2019	\$ 413.72
Mar-2019	\$ 310.29
May-2019	\$ 413.72
Nov-2019	\$ 310.29
Oct-2019	\$ 413.72
Sep-2019	\$ 413.72
Apr-2019	\$ 73.43
Aug-2019	\$ 73.43
Dec-2019	\$ 146.86
Feb-2019	\$ 73.43
Jan-2019	\$ 73.43
Jul-2019	\$ 146.86
Jun-2019	\$ 73.43
Mar-2019	\$ 73.43
May-2019	\$ 146.86
Nov-2019	\$ 73.43
Oct-2019	\$ 73.43
Sep-2019	\$ 146.86

Counterparty and Payment Dates	REC Cost
Apr-2019	\$ 1,010.00
Aug-2019	\$ 1,870.00
Dec-2019	\$ 1,435.00
Feb-2019	\$ 1,165.00
Jan-2019	\$ 1,200.00
Jul-2019	\$ 2,250.00
Jun-2019	\$ 1,990.00
Mar-2019	\$ 1,520.00
May-2019	\$ 1,685.00
Nov-2019	\$ 1,440.00
Oct-2019	\$ 1,820.00
Sep-2019	\$ 2,110.00
██	
Apr-2019	\$ 4,300.00
Aug-2019	\$ 5,090.00
Dec-2019	\$ 2,930.00
Feb-2019	\$ 3,120.00
Jan-2019	\$ 2,640.00
Jul-2019	\$ 4,795.00
Jun-2019	\$ 5,360.00
Mar-2019	\$ 2,630.00
May-2019	\$ 4,655.00
Nov-2019	\$ 3,560.00
Oct-2019	\$ 3,880.00
Sep-2019	\$ 4,300.00
██	
Apr-2019	\$ 1,577.25
Aug-2019	\$ 1,881.00
Dec-2019	\$ 1,149.75
Feb-2019	\$ 1,176.75
Jan-2019	\$ 922.50
Jul-2019	\$ 1,689.75
Jun-2019	\$ 1,896.75
Mar-2019	\$ 956.25
May-2019	\$ 992.25
Nov-2019	\$ 1,325.25
Oct-2019	\$ 1,638.00
Sep-2019	\$ 1,635.75
██	
Apr-2019	\$ 380.25
Aug-2019	\$ 679.50
Dec-2019	\$ 537.75
Feb-2019	\$ 427.50
Jan-2019	\$ 339.75
Jul-2019	\$ 825.75
Jun-2019	\$ 702.00
Mar-2019	\$ 526.50
May-2019	\$ 659.25
Nov-2019	\$ 618.75
Oct-2019	\$ 650.25
Sep-2019	\$ 787.50
██	
Apr-2019	\$ 3,516.62

**Information in italics is confidential*

Duke Energy Progress, LLC
Docket No. E-2, Sub 1251
2019 REPS Compliance Report
Dates and Amounts of Payments for RECs - Calendar Year 2019

Redacted Version
Jennings Exhibit No. 1, Appendix I
June 9, 2020

Counterparty and Payment Dates		REC Cost
Aug-2019	\$	7,860.68
Dec-2019	\$	5,481.79
Feb-2019	\$	3,309.76
Jan-2019	\$	3,102.90
Jul-2019	\$	6,412.66
Jun-2019	\$	6,722.95
Mar-2019	\$	4,033.77
May-2019	\$	6,205.80
Nov-2019	\$	5,378.36
Oct-2019	\$	6,722.95
Sep-2019	\$	8,170.97
[REDACTED]		
Apr-2019	\$	1,101.45
Aug-2019	\$	2,276.33
Dec-2019	\$	1,395.17
Feb-2019	\$	954.59
Jan-2019	\$	1,101.45
Jul-2019	\$	2,496.62
Jun-2019	\$	2,202.90
Mar-2019	\$	1,321.74
May-2019	\$	1,909.18
Nov-2019	\$	1,762.32
Oct-2019	\$	2,276.33
Sep-2019	\$	2,202.90
[REDACTED]		
Apr-2019	\$	6,975.85
Aug-2019	\$	5,874.40
Dec-2019	\$	3,010.63
Feb-2019	\$	1,982.61
Jan-2019	\$	2,570.05
Jul-2019	\$	5,874.40
Jun-2019	\$	10,280.20
Mar-2019	\$	2,863.77
Nov-2019	\$	3,377.78
Oct-2019	\$	10,206.77
[REDACTED]		
Apr-2019	\$	2,230.41
Aug-2019	\$	3,639.09
Dec-2019	\$	2,934.75
Feb-2019	\$	1,291.29
Jan-2019	\$	1,408.68
Jul-2019	\$	1,056.51
Jun-2019	\$	3,052.14
Mar-2019	\$	1,760.85
May-2019	\$	3,169.53
Nov-2019	\$	3,639.09
Oct-2019	\$	3,521.70
Sep-2019	\$	4,108.65
[REDACTED]		
Apr-2019	\$	3,384.00
Aug-2019	\$	3,908.00
Dec-2019	\$	2,372.00
Feb-2019	\$	2,516.00

**Information in italics is confidential*

Counterparty and Payment Dates	REC Cost
Jan-2019	\$ 2,004.00
Jul-2019	\$ 3,600.00
Jun-2019	\$ 4,188.00
Mar-2019	\$ 2,180.00
May-2019	\$ 3,564.00
Nov-2019	\$ 2,688.00
Oct-2019	\$ 3,300.00
Sep-2019	\$ 3,232.00
REDACTED	
Apr-2019	\$ 2,457.00
Aug-2019	\$ 2,850.00
Dec-2019	\$ 1,746.00
Feb-2019	\$ 1,797.00
Jan-2019	\$ 1,449.00
Jul-2019	\$ 2,493.00
Jun-2019	\$ 3,021.00
Mar-2019	\$ 1,590.00
May-2019	\$ 2,703.00
Nov-2019	\$ 1,992.00
Oct-2019	\$ 2,403.00
Sep-2019	\$ 2,496.00
REDACTED	
Apr-2019	\$ 146.86
Aug-2019	\$ 146.86
Dec-2019	\$ 73.43
Jan-2019	\$ 73.43
Jul-2019	\$ 73.43
Jun-2019	\$ 146.86
Mar-2019	\$ 73.43
May-2019	\$ 73.43
Nov-2019	\$ 73.43
Oct-2019	\$ 73.43
Sep-2019	\$ 73.43
REDACTED	
Apr-2019	\$ 73.43
Aug-2019	\$ 146.86
Dec-2019	\$ 73.43
Feb-2019	\$ 73.43
Jul-2019	\$ 146.86
Jun-2019	\$ 73.43
Mar-2019	\$ 73.43
May-2019	\$ 146.86
Nov-2019	\$ 73.43
Oct-2019	\$ 146.86
Sep-2019	\$ 73.43
REDACTED	
Apr-2019	\$ 3,232.00
Aug-2019	\$ 3,892.00
Dec-2019	\$ 2,364.00
Feb-2019	\$ 2,376.00
Jan-2019	\$ 1,796.00
Jul-2019	\$ 3,612.00
Jun-2019	\$ 3,972.00

Counterparty and Payment Dates	REC Cost
Mar-2019	\$ 1,960.00
May-2019	\$ 3,320.00
Nov-2019	\$ 2,704.00
Oct-2019	\$ 3,416.00
Sep-2019	\$ 3,488.00
[REDACTED]	
Jan-2019	\$ 368.92
[REDACTED]	
Apr-2019	\$ 234.78
Aug-2019	\$ 352.17
Dec-2019	\$ 234.78
Feb-2019	\$ 234.78
Jan-2019	\$ 117.39
Jul-2019	\$ 469.56
Jun-2019	\$ 352.17
Mar-2019	\$ 234.78
May-2019	\$ 469.56
Nov-2019	\$ 234.78
Oct-2019	\$ 352.17
Sep-2019	\$ 469.56
[REDACTED]	
Apr-2019	\$ 234.78
Aug-2019	\$ 469.56
Dec-2019	\$ 206.86
Feb-2019	\$ 117.39
Jan-2019	\$ 117.39
Jul-2019	\$ 352.17
Jun-2019	\$ 352.17
Mar-2019	\$ 234.78
May-2019	\$ 352.17
Nov-2019	\$ 310.29
Oct-2019	\$ 310.29
Sep-2019	\$ 352.17
[REDACTED]	
Apr-2019	\$ -
Aug-2019	\$ 8,955.14
Dec-2019	\$ -
Feb-2019	\$ -
Jan-2019	\$ -
Jul-2019	\$ 4,831.47
Jun-2019	\$ -
Mar-2019	\$ -
May-2019	\$ -
Nov-2019	\$ 7,145.81
Oct-2019	\$ 12,068.40
Sep-2019	\$ 11,374.20
[REDACTED]	
Apr-2019	\$ 2,056.04
Aug-2019	\$ 5,213.53
Dec-2019	\$ 2,790.34
Feb-2019	\$ 1,835.75
Jan-2019	\$ 1,982.61
Jul-2019	\$ 5,140.10

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 Dates and Amounts of Payments for RECs - Calendar Year 2019

Redacted Version
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 June 9, 2020

Counterparty and Payment Dates	REC Cost
Jun-2019	\$ 4,626.09
Mar-2019	\$ 2,570.05
May-2019	\$ 4,038.65
Nov-2019	\$ 3,451.21
Oct-2019	\$ 4,112.08
Sep-2019	\$ 5,066.67
[REDACTED]	
Apr-2019	\$ 13,834.50
Aug-2019	\$ 16,577.25
Dec-2019	\$ 10,591.50
Feb-2019	\$ 9,608.25
Jan-2019	\$ 7,400.25
Jul-2019	\$ 15,628.50
Jun-2019	\$ 16,974.00
Mar-2019	\$ 8,573.25
May-2019	\$ 14,524.50
Nov-2019	\$ 11,764.50
Oct-2019	\$ 15,111.00
Sep-2019	\$ 15,456.00
[REDACTED]	
Apr-2019	\$ 3,328.00
Aug-2019	\$ 4,284.00
Dec-2019	\$ 2,356.00
Feb-2019	\$ 2,404.00
Jan-2019	\$ 1,952.00
Jul-2019	\$ 3,820.00
Jun-2019	\$ 4,296.00
Mar-2019	\$ 2,136.00
May-2019	\$ 3,560.00
Nov-2019	\$ 2,724.00
Oct-2019	\$ 3,452.00
Sep-2019	\$ 3,636.00
[REDACTED]	
Apr-2019	\$ 116,847.06
Aug-2019	\$ 106,514.76
Dec-2019	\$ 108,397.08
Feb-2019	\$ 117,890.52
Jan-2019	\$ 113,772.00
Jul-2019	\$ 107,558.22
Jun-2019	\$ 96,468.90
Mar-2019	\$ 110,975.04
May-2019	\$ 100,704.12
Nov-2019	\$ 109,195.02
Oct-2019	\$ 97,410.06
Sep-2019	\$ 115,394.40
[REDACTED]	
Apr-2019	\$ 4,000.00
Aug-2019	\$ 5,085.00
Dec-2019	\$ 3,040.00
Feb-2019	\$ 3,140.00
Jan-2019	\$ 2,500.00
Jul-2019	\$ 4,615.00
Jun-2019	\$ 5,105.00

**Information in italics is confidential*

Counterparty and Payment Dates	REC Cost
Mar-2019	\$ 2,715.00
May-2019	\$ 4,500.00
Nov-2019	\$ 3,520.00
Oct-2019	\$ 4,580.00
Sep-2019	\$ 4,445.00
Apr-2019	\$ 3,300.00
Aug-2019	\$ 4,176.00
Dec-2019	\$ 2,408.00
Feb-2019	\$ 2,496.00
Jan-2019	\$ 2,068.00
Jul-2019	\$ 3,664.00
Jun-2019	\$ 4,096.00
Mar-2019	\$ 2,148.00
May-2019	\$ 3,484.00
Nov-2019	\$ 2,692.00
Oct-2019	\$ 3,532.00
Sep-2019	\$ 3,548.00
Apr-2019	\$ 3,236.00
Aug-2019	\$ 2,948.00
Dec-2019	\$ 2,116.00
Feb-2019	\$ 1,996.00
Jan-2019	\$ 1,100.00
Jul-2019	\$ 3,768.00
Jun-2019	\$ 4,120.00
Mar-2019	\$ 2,048.00
May-2019	\$ 3,428.00
Nov-2019	\$ 2,644.00
Oct-2019	\$ 3,384.00
Sep-2019	\$ 3,404.00
Apr-2019	\$ 4,020.00
Aug-2019	\$ 4,715.00
Dec-2019	\$ 2,975.00
Feb-2019	\$ 2,945.00
Jan-2019	\$ 2,340.00
Jul-2019	\$ 4,305.00
Jun-2019	\$ 4,955.00
Mar-2019	\$ 2,625.00
May-2019	\$ 4,295.00
Nov-2019	\$ 3,370.00
Oct-2019	\$ 4,305.00
Sep-2019	\$ 4,105.00
Aug-2019	\$ 12,714.20
Dec-2019	\$ 5,858.80
Feb-2019	\$ 6,458.40
Jan-2019	\$ 5,474.49
Jun-2019	\$ 6,462.80
Mar-2019	\$ 3,941.10
May-2019	\$ 13,748.55
Nov-2019	\$ 5,587.00

<u>Counterparty and Payment Dates</u>	<u>REC Cost</u>	
Oct-2019	\$	6,311.80
Sep-2019	\$	6,085.30
Apr-2019	\$	3,184.00
Aug-2019	\$	3,896.00
Dec-2019	\$	2,308.00
Feb-2019	\$	2,360.00
Jan-2019	\$	1,912.00
Jul-2019	\$	3,564.00
Jun-2019	\$	3,860.00
Mar-2019	\$	2,036.00
May-2019	\$	3,204.00
Nov-2019	\$	2,592.00
Oct-2019	\$	3,228.00
Sep-2019	\$	3,512.00
Apr-2019	\$	3,521.70
Dec-2019	\$	2,582.58
Feb-2019	\$	2,582.58
Jan-2019	\$	1,995.63
Jul-2019	\$	3,756.48
Jun-2019	\$	4,343.43
Mar-2019	\$	2,113.02
May-2019	\$	3,639.09
Nov-2019	\$	3,052.14
Oct-2019	\$	3,991.26
Sep-2019	\$	8,217.30
Apr-2019	\$	15,027.86
Aug-2019	\$	17,779.44
Dec-2019	\$	6,561.46
Feb-2019	\$	10,794.66
Jan-2019	\$	6,807.57
Jul-2019	\$	16,297.82
Jun-2019	\$	18,202.76
Mar-2019	\$	9,524.70
May-2019	\$	15,451.18
Nov-2019	\$	11,429.64
Oct-2019	\$	15,451.18
Sep-2019	\$	16,086.16
Apr-2019	\$	1,643.46
Aug-2019	\$	3,873.87
Dec-2019	\$	5,047.77
Feb-2019	\$	1,408.68
Jan-2019	\$	2,347.80
Jul-2019	\$	4,578.21
Jun-2019	\$	3,756.48
Mar-2019	\$	2,347.80
May-2019	\$	3,521.70
Nov-2019	\$	3,052.14
Oct-2019	\$	3,756.48
Sep-2019	\$	3,756.48

Counterparty and Payment Dates	REC Cost
Apr-2019	\$ 328.50
Aug-2019	\$ 740.25
Dec-2019	\$ 630.00
Feb-2019	\$ 380.25
Jan-2019	\$ 504.00
Jul-2019	\$ 931.50
Jun-2019	\$ 873.00
Mar-2019	\$ 589.50
May-2019	\$ 648.00
Nov-2019	\$ 702.00
Oct-2019	\$ 821.25
Sep-2019	\$ 981.00
Apr-2019	\$ 3,172.00
Aug-2019	\$ 3,968.00
Dec-2019	\$ 2,300.00
Feb-2019	\$ 2,452.00
Jan-2019	\$ 1,964.00
Jul-2019	\$ 3,704.00
Jun-2019	\$ 4,184.00
Mar-2019	\$ 2,200.00
May-2019	\$ 3,608.00
Nov-2019	\$ 2,768.00
Oct-2019	\$ 3,632.00
Sep-2019	\$ 3,552.00
Apr-2019	\$ 3,040.10
Aug-2019	\$ 3,778.41
Dec-2019	\$ 5,124.74
Feb-2019	\$ 2,084.64
Jan-2019	\$ 3,995.56
Jul-2019	\$ 3,430.97
Jun-2019	\$ 3,561.26
Mar-2019	\$ 2,866.38
May-2019	\$ 3,344.11
Nov-2019	\$ 6,340.78
Oct-2019	\$ 5,559.04
Sep-2019	\$ 3,561.26
Apr-2019	\$ 3,328.00
Aug-2019	\$ 3,984.00
Dec-2019	\$ 2,412.00
Feb-2019	\$ 2,496.00
Jan-2019	\$ 2,012.00
Jul-2019	\$ 3,616.00
Jun-2019	\$ 4,248.00
Mar-2019	\$ 2,188.00
May-2019	\$ 3,592.00
Nov-2019	\$ 2,548.00
Oct-2019	\$ 3,444.00
Sep-2019	\$ 3,424.00

Counterparty and Payment Dates	REC Cost
Apr-2019	\$ 1,822.50
Aug-2019	\$ 2,004.75
Dec-2019	\$ 1,300.50
Feb-2019	\$ 1,044.00
Jan-2019	\$ 749.25
Jul-2019	\$ 1,818.00
Jun-2019	\$ 2,119.50
Mar-2019	\$ 1,129.50
May-2019	\$ 1,847.25
Nov-2019	\$ 1,428.75
Oct-2019	\$ 1,728.00
Sep-2019	\$ 1,829.25
[REDACTED]	
Apr-2019	\$ 4,010.00
Aug-2019	\$ 4,830.00
Dec-2019	\$ 2,815.00
Feb-2019	\$ 2,820.00
Jan-2019	\$ 2,175.00
Jul-2019	\$ 4,620.00
Jun-2019	\$ 5,160.00
Mar-2019	\$ 2,535.00
May-2019	\$ 4,255.00
Nov-2019	\$ 3,000.00
Oct-2019	\$ 3,745.00
Sep-2019	\$ 4,290.00
[REDACTED]	
Apr-2019	\$ 3,955.00
Aug-2019	\$ 4,780.00
Dec-2019	\$ 2,930.00
Feb-2019	\$ 2,985.00
Jan-2019	\$ 2,255.00
Jul-2019	\$ 4,370.00
Jun-2019	\$ 4,810.00
Mar-2019	\$ 2,505.00
May-2019	\$ 4,085.00
Nov-2019	\$ 3,300.00
Oct-2019	\$ 4,080.00
Sep-2019	\$ 4,265.00
[REDACTED]	
Apr-2019	\$ 234.78
Aug-2019	\$ 469.56
Dec-2019	\$ 352.17
Feb-2019	\$ 234.78
Jan-2019	\$ 117.39
Jul-2019	\$ 586.95
Jun-2019	\$ 352.17
Mar-2019	\$ 234.78
May-2019	\$ 469.56
Nov-2019	\$ 352.17
Oct-2019	\$ 352.17
Sep-2019	\$ 469.56
[REDACTED]	
Apr-2019	\$ 2,580.00

Counterparty and Payment Dates	REC Cost
Aug-2019	\$ 3,288.00
Dec-2019	\$ 1,860.00
Feb-2019	\$ 1,839.00
Jan-2019	\$ 1,422.00
Jul-2019	\$ 2,925.00
Jun-2019	\$ 3,249.00
Mar-2019	\$ 1,620.00
May-2019	\$ 2,691.00
Nov-2019	\$ 2,163.00
Oct-2019	\$ 2,784.00
Sep-2019	\$ 2,883.00
REDACTED	
Apr-2019	\$ 3,184.00
Aug-2019	\$ 3,884.00
Dec-2019	\$ 2,500.00
Feb-2019	\$ 2,444.00
Jan-2019	\$ 1,748.00
Jul-2019	\$ 3,548.00
Jun-2019	\$ 4,136.00
Mar-2019	\$ 2,176.00
May-2019	\$ 3,396.00
Nov-2019	\$ 2,828.00
Oct-2019	\$ 3,512.00
Sep-2019	\$ 3,612.00
REDACTED	
Apr-2019	\$ 170,622.25
Aug-2019	\$ 226,428.00
Dec-2019	\$ 302,205.25
Feb-2019	\$ 210,351.50
Jan-2019	\$ 199,606.50
Jul-2019	\$ 204,850.75
Jun-2019	\$ 238,923.00
Mar-2019	\$ 173,728.00
May-2019	\$ 193,834.00
Nov-2019	\$ 164,027.00
Oct-2019	\$ 216,218.75
Sep-2019	\$ 179,691.00
REDACTED	
Apr-2019	\$ 237,496.00
Aug-2019	\$ 352,669.25
Dec-2019	\$ 400,327.75
Feb-2019	\$ 325,183.75
Jan-2019	\$ 298,012.25
Jul-2019	\$ 376,499.50
Jun-2019	\$ 351,484.00
Mar-2019	\$ 277,057.00
May-2019	\$ 266,524.00
Nov-2019	\$ 357,401.75
Oct-2019	\$ 313,455.50
Sep-2019	\$ 303,245.25
REDACTED	
Apr-2019	\$ 359,462.50
Aug-2019	\$ 605,634.00

Counterparty and Payment Dates	REC Cost
Dec-2019	\$ 828,742.00
Jan-2019	\$ 1,292,312.00
Jul-2019	\$ 615,477.00
Jun-2019	\$ 612,292.50
Mar-2019	\$ 767,659.50
May-2019	\$ 1,010,258.50
Nov-2019	\$ 1,327,647.00
Sep-2019	\$ 658,419.50
[REDACTED]	
Apr-2019	\$ 3,240.00
Aug-2019	\$ 3,876.00
Dec-2019	\$ 2,284.00
Feb-2019	\$ 2,160.00
Jan-2019	\$ 1,316.00
Jul-2019	\$ 3,700.00
Jun-2019	\$ 4,084.00
Mar-2019	\$ 2,100.00
May-2019	\$ 3,352.00
Nov-2019	\$ 2,772.00
Oct-2019	\$ 3,520.00
Sep-2019	\$ 3,584.00
[REDACTED]	
Apr-2019	\$ 3,970.00
Aug-2019	\$ 5,045.00
Dec-2019	\$ 2,905.00
Feb-2019	\$ 2,850.00
Jan-2019	\$ 2,345.00
Jul-2019	\$ 4,570.00
Jun-2019	\$ 5,155.00
Mar-2019	\$ 2,510.00
May-2019	\$ 4,360.00
Nov-2019	\$ 3,300.00
Oct-2019	\$ 4,150.00
Sep-2019	\$ 4,260.00
[REDACTED]	
Apr-2019	\$ 2,334.00
Aug-2019	\$ 2,877.00
Dec-2019	\$ 1,710.00
Feb-2019	\$ 1,770.00
Jan-2019	\$ 1,215.00
Jul-2019	\$ 2,637.00
Jun-2019	\$ 2,955.00
Mar-2019	\$ 1,536.00
May-2019	\$ 2,496.00
Nov-2019	\$ 1,953.00
Oct-2019	\$ 2,559.00
Sep-2019	\$ 2,586.00
[REDACTED]	
Feb-2019	\$ 1,448.02
[REDACTED]	
Apr-2019	\$ 815.00
Aug-2019	\$ 230.00
Dec-2019	\$ 450.00

Counterparty and Payment Dates	REC Cost
Feb-2019	\$ 930.00
Jan-2019	\$ 1,090.00
Jul-2019	\$ 485.00
Jun-2019	\$ 455.00
Mar-2019	\$ 745.00
May-2019	\$ 845.00
Nov-2019	\$ 25.00
Oct-2019	\$ 45.00
Sep-2019	\$ 405.00
Apr-2019	\$ 3,960.00
Aug-2019	\$ 4,435.00
Dec-2019	\$ 2,960.00
Feb-2019	\$ 2,980.00
Jan-2019	\$ 2,355.00
Jul-2019	\$ 4,135.00
Jun-2019	\$ 4,740.00
Mar-2019	\$ 2,545.00
May-2019	\$ 4,165.00
Nov-2019	\$ 3,205.00
Oct-2019	\$ 3,980.00
Sep-2019	\$ 3,865.00
Jan-2019	\$ 403,650.00
Apr-2019	\$ 117.39
Aug-2019	\$ 352.17
Dec-2019	\$ 117.39
Feb-2019	\$ 117.39
Jan-2019	\$ 117.39
Jul-2019	\$ 234.78
Mar-2019	\$ 234.78
May-2019	\$ 586.95
Nov-2019	\$ 234.78
Oct-2019	\$ 352.17
Sep-2019	\$ 352.17
Apr-2019	\$ 4,045.00
Aug-2019	\$ 4,025.00
Dec-2019	\$ 2,810.00
Feb-2019	\$ 2,890.00
Jan-2019	\$ 2,360.00
Jul-2019	\$ 3,885.00
Jun-2019	\$ 4,140.00
Mar-2019	\$ 2,585.00
May-2019	\$ 3,845.00
Nov-2019	\$ 2,845.00
Oct-2019	\$ 3,420.00
Sep-2019	\$ 3,460.00
Apr-2019	\$ 1,833.75
Aug-2019	\$ 2,083.50
Dec-2019	\$ 1,280.25

Counterparty and Payment Dates	REC Cost
Feb-2019	\$ 1,406.25
Jan-2019	\$ 1,149.75
Jul-2019	\$ 1,887.75
Jun-2019	\$ 2,171.25
Mar-2019	\$ 1,176.75
May-2019	\$ 1,928.25
Nov-2019	\$ 1,428.75
Oct-2019	\$ 1,827.00
Sep-2019	\$ 1,820.25
<hr/>	
Apr-2019	\$ 468.00
Aug-2019	\$ 830.25
Dec-2019	\$ 632.25
Feb-2019	\$ 528.75
Jan-2019	\$ 501.75
Jul-2019	\$ 897.75
Jun-2019	\$ 828.00
Mar-2019	\$ 643.50
May-2019	\$ 810.00
Nov-2019	\$ 681.75
Oct-2019	\$ 769.50
Sep-2019	\$ 886.50
<hr/>	
Apr-2019	\$ 117.39
Aug-2019	\$ 352.17
Feb-2019	\$ 117.39
Jul-2019	\$ 117.39
Jun-2019	\$ 234.78
Mar-2019	\$ 117.39
May-2019	\$ 117.39
Nov-2019	\$ 234.78
Oct-2019	\$ 234.78
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Apr-2019	\$ 3,920.00
Aug-2019	\$ 4,425.00
Dec-2019	\$ 3,175.00
Feb-2019	\$ 3,095.00
Jan-2019	\$ 2,460.00
Jul-2019	\$ 4,165.00
Jun-2019	\$ 4,620.00
Mar-2019	\$ 2,515.00
May-2019	\$ 4,120.00
Nov-2019	\$ 3,360.00
Oct-2019	\$ 4,175.00
Sep-2019	\$ 4,195.00
<hr/>	
Apr-2019	\$ -
Aug-2019	\$ -
Dec-2019	\$ -
Feb-2019	\$ -
Jan-2019	\$ -
Jul-2019	\$ -
Jun-2019	\$ -

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Counterparty and Payment Dates	REC Cost
Mar-2019	\$ -
May-2019	\$ -
Nov-2019	\$ -
Oct-2019	\$ -
Sep-2019	\$ 8,893.80

Apr-2019	\$ 3,268.00
Aug-2019	\$ 3,988.00
Dec-2019	\$ 1,292.00
Feb-2019	\$ 2,480.00
Jan-2019	\$ 1,916.00
Jul-2019	\$ 3,668.00
Jun-2019	\$ 4,044.00
Mar-2019	\$ 2,056.00
May-2019	\$ 3,440.00
Nov-2019	\$ 2,776.00
Oct-2019	\$ 3,464.00
Sep-2019	\$ 3,564.00

Apr-2019	\$ 3,280.00
Aug-2019	\$ 3,955.00
Dec-2019	\$ 2,245.00
Feb-2019	\$ 2,435.00
Jan-2019	\$ 1,960.00
Jul-2019	\$ 3,550.00
Jun-2019	\$ 4,045.00
Mar-2019	\$ 2,025.00
May-2019	\$ 3,435.00
Nov-2019	\$ 2,655.00
Oct-2019	\$ 3,485.00
Sep-2019	\$ 3,530.00

Apr-2019	\$ 3,975.00
Aug-2019	\$ 4,270.00
Dec-2019	\$ 2,895.00
Feb-2019	\$ 3,085.00
Jan-2019	\$ 2,490.00
Jul-2019	\$ 4,245.00
Jun-2019	\$ 4,775.00
Mar-2019	\$ 2,550.00
May-2019	\$ 4,195.00
Nov-2019	\$ 3,115.00
Oct-2019	\$ 3,745.00
Sep-2019	\$ 4,080.00

Apr-2019	\$ 2,129.47
Aug-2019	\$ 4,626.09
Feb-2019	\$ 1,615.46
Jan-2019	\$ 2,643.48
Jul-2019	\$ 5,507.25
Mar-2019	\$ 2,202.90
May-2019	\$ 8,738.17
Nov-2019	\$ 6,682.13

Counterparty and Payment Dates	REC Cost
Oct-2019	\$ 4,699.52
Sep-2019	\$ 4,626.09
[REDACTED]	
Apr-2019	\$ 684.00
Aug-2019	\$ 948.00
Dec-2019	\$ 716.00
Feb-2019	\$ 740.00
Jan-2019	\$ 844.00
Jul-2019	\$ 1,472.00
Jun-2019	\$ 1,272.00
Mar-2019	\$ 960.00
May-2019	\$ 1,080.00
Nov-2019	\$ 936.00
Oct-2019	\$ 1,000.00
Sep-2019	\$ 1,260.00
[REDACTED]	
Apr-2019	\$ 3,970.00
Aug-2019	\$ 4,905.00
Dec-2019	\$ 2,850.00
Feb-2019	\$ 3,040.00
Jan-2019	\$ 2,465.00
Jul-2019	\$ 4,465.00
Jun-2019	\$ 4,975.00
Mar-2019	\$ 2,580.00
May-2019	\$ 4,215.00
Nov-2019	\$ 3,135.00
Oct-2019	\$ 4,075.00
Sep-2019	\$ 3,995.00
[REDACTED]	
Apr-2019	\$ 9,737.83
Aug-2019	\$ 34,534.16
Feb-2019	\$ 9,772.56
Jan-2019	\$ 17,218.25
Jun-2019	\$ 17,969.81
May-2019	\$ 24,997.11
Nov-2019	\$ 11,243.68
Oct-2019	\$ 30,920.12
[REDACTED]	
Apr-2019	\$ 117.39
Aug-2019	\$ 469.56
Dec-2019	\$ 234.78
Feb-2019	\$ 234.78
Jan-2019	\$ 117.39
Jul-2019	\$ 469.56
Jun-2019	\$ 469.56
Mar-2019	\$ 234.78
May-2019	\$ 352.17
Nov-2019	\$ 234.78
Oct-2019	\$ 469.56
Sep-2019	\$ 469.56
[REDACTED]	
Apr-2019	\$ 3,036.11
Aug-2019	\$ 6,072.22

Counterparty and Payment Dates	REC Cost
Dec-2019	\$ 4,810.46
Feb-2019	\$ 2,586.81
Jan-2019	\$ 2,622.96
Jul-2019	\$ 6,111.65
Jun-2019	.\$ 6,348.23
Mar-2019	\$ 3,588.13
May-2019	\$ 5,638.49
Nov-2019	\$ 5,086.47
Oct-2019	\$ 5,756.78
Sep-2019	\$ 6,348.23
[REDACTED]	
Apr-2019	\$ 7,043.40
Aug-2019	\$ 6,808.62
Dec-2019	\$ 5,517.33
Feb-2019	\$ 5,634.72
Jan-2019	\$ 4,108.65
Jul-2019	\$ 6,691.23
Jun-2019	\$ 7,512.96
Mar-2019	\$ 4,108.65
May-2019	\$ 5,752.11
Nov-2019	\$ 5,399.94
Oct-2019	\$ 6,808.62
Sep-2019	\$ 6,926.01
[REDACTED]	
Apr-2019	\$ 1,372.50
Aug-2019	\$ 1,615.50
Dec-2019	\$ 1,008.00
Feb-2019	\$ 857.25
Jan-2019	\$ 83.25
Jul-2019	\$ 1,500.75
Jun-2019	\$ 1,642.50
Mar-2019	\$ 888.75
May-2019	\$ 1,451.25
Nov-2019	\$ 1,165.50
Oct-2019	\$ 1,494.00
Sep-2019	\$ 1,453.50
[REDACTED]	
Apr-2019	\$ 364.50
Aug-2019	\$ 654.75
Dec-2019	\$ 528.75
Feb-2019	\$ 364.50
Jan-2019	\$ 452.25
Jul-2019	\$ 846.00
Jun-2019	\$ 679.50
Mar-2019	\$ 519.75
May-2019	\$ 643.50
Nov-2019	\$ 636.75
Oct-2019	\$ 724.50
Sep-2019	\$ 690.75
[REDACTED]	
Apr-2019	\$ 925.00
Aug-2019	\$ 1,820.00
Dec-2019	\$ 1,410.00

Counterparty and Payment Dates	REC Cost
Feb-2019	\$ 1,100.00
Jan-2019	\$ 1,090.00
Jul-2019	\$ 1,895.00
Jun-2019	\$ 1,765.00
Mar-2019	\$ 1,240.00
May-2019	\$ 1,615.00
Nov-2019	\$ 1,470.00
Oct-2019	\$ 1,635.00
Sep-2019	\$ 1,850.00
[REDACTED]	
Apr-2019	\$ 206.86
Aug-2019	\$ 1,344.59
Dec-2019	\$ 103.43
Feb-2019	\$ 517.15
Jan-2019	\$ 206.86
Jul-2019	\$ 1,344.59
Jun-2019	\$ 1,137.73
Mar-2019	\$ 206.86
May-2019	\$ 1,034.30
Nov-2019	\$ 206.86
Oct-2019	\$ 1,137.73
Sep-2019	\$ 1,241.16
[REDACTED]	
Apr-2019	\$ 1,418.31
Aug-2019	\$ 3,003.48
Dec-2019	\$ 2,002.32
Feb-2019	\$ 1,334.88
Jan-2019	\$ 1,668.60
Jul-2019	\$ 3,504.06
Mar-2019	\$ 2,085.75
May-2019	\$ 5,589.81
Nov-2019	\$ 2,336.04
Oct-2019	\$ 2,669.76
Sep-2019	\$ 3,420.63
[REDACTED]	
Apr-2019	\$ 22.50
Aug-2019	\$ 62.50
Feb-2019	\$ 15.00
Jan-2019	\$ 20.00
Jul-2019	\$ 30.00
Mar-2019	\$ 12.50
May-2019	\$ 55.00
Nov-2019	\$ 22.50
Oct-2019	\$ 60.00
[REDACTED]	
Apr-2019	\$ 2,605.00
Aug-2019	\$ 3,055.00
Dec-2019	\$ 2,010.00
Feb-2019	\$ 2,105.00
Jan-2019	\$ 1,655.00
Jul-2019	\$ 3,115.00
Jun-2019	\$ 3,415.00
Mar-2019	\$ 1,790.00

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Counterparty and Payment Dates		REC Cost
May-2019	\$	3,090.00
Nov-2019	\$	2,365.00
Oct-2019	\$	2,955.00
Sep-2019	\$	3,010.00
██		
Apr-2019	\$	3,915.00
Aug-2019	\$	4,750.00
Dec-2019	\$	2,705.00
Feb-2019	\$	2,930.00
Jan-2019	\$	2,375.00
Jul-2019	\$	4,275.00
Jun-2019	\$	4,955.00
Mar-2019	\$	2,500.00
May-2019	\$	4,200.00
Nov-2019	\$	2,800.00
Oct-2019	\$	3,910.00
Sep-2019	\$	3,995.00
██		
Apr-2019	\$	4,070.00
Aug-2019	\$	4,415.00
Dec-2019	\$	2,950.00
Feb-2019	\$	2,980.00
Jan-2019	\$	2,335.00
Jul-2019	\$	2,880.00
Mar-2019	\$	2,610.00
May-2019	\$	9,260.00
Nov-2019	\$	2,940.00
Oct-2019	\$	4,340.00
Sep-2019	\$	4,260.00
██		
Apr-2019	\$	352.17
Aug-2019	\$	821.73
Dec-2019	\$	586.95
Feb-2019	\$	352.17
Jan-2019	\$	352.17
Jul-2019	\$	1,056.51
Jun-2019	\$	821.73
Mar-2019	\$	352.17
May-2019	\$	821.73
Nov-2019	\$	586.95
Oct-2019	\$	821.73
Sep-2019	\$	939.12
██		
Apr-2019	\$	4,110.00
Aug-2019	\$	5,060.00
Dec-2019	\$	3,240.00
Feb-2019	\$	3,150.00
Jan-2019	\$	2,420.00
Jul-2019	\$	4,770.00
Mar-2019	\$	2,645.00
May-2019	\$	9,580.00
Nov-2019	\$	3,670.00
Oct-2019	\$	4,520.00

**Information in italics is confidential*

Counterparty and Payment Dates	REC Cost
Sep-2019	\$ 4,560.00
Apr-2019	\$ 546.75
Aug-2019	\$ 816.75
Dec-2019	\$ 636.75
Feb-2019	\$ 447.75
Jan-2019	\$ 517.50
Jul-2019	\$ 868.50
Jun-2019	\$ 879.75
Mar-2019	\$ 510.75
May-2019	\$ 580.50
Nov-2019	\$ 774.00
Oct-2019	\$ 909.00
Sep-2019	\$ 938.25
Apr-2019	\$ 3,735.00
Aug-2019	\$ 5,235.00
Dec-2019	\$ 3,165.00
Feb-2019	\$ 2,835.00
Jan-2019	\$ 2,235.00
Jul-2019	\$ 4,680.00
Jun-2019	\$ 5,280.00
Mar-2019	\$ 2,325.00
May-2019	\$ 4,360.00
Nov-2019	\$ 3,625.00
Oct-2019	\$ 4,680.00
Sep-2019	\$ 4,600.00
Apr-2019	\$ 4,000.00
Aug-2019	\$ 5,565.00
Dec-2019	\$ 2,825.00
Feb-2019	\$ 3,085.00
Jan-2019	\$ 2,440.00
Jul-2019	\$ 5,090.00
Jun-2019	\$ 5,530.00
Mar-2019	\$ 2,765.00
May-2019	\$ 4,525.00
Nov-2019	\$ 3,510.00
Oct-2019	\$ 4,590.00
Sep-2019	\$ 4,815.00
Apr-2019	\$ 3,750.00
Aug-2019	\$ 4,930.00
Dec-2019	\$ 3,205.00
Feb-2019	\$ 2,770.00
Jan-2019	\$ 1,745.00
Jul-2019	\$ 4,755.00
Jun-2019	\$ 5,235.00
Mar-2019	\$ 2,335.00
May-2019	\$ 4,440.00
Nov-2019	\$ 3,600.00
Oct-2019	\$ 4,670.00
Sep-2019	\$ 4,565.00

Counterparty and Payment Dates	REC Cost
Apr-2019	\$ 3,300.00
Aug-2019	\$ 3,856.00
Dec-2019	\$ 2,012.00
Feb-2019	\$ 2,308.00
Jan-2019	\$ 1,568.00
Jul-2019	\$ 3,512.00
Jun-2019	\$ 3,896.00
Mar-2019	\$ 1,996.00
May-2019	\$ 3,320.00
Nov-2019	\$ 2,732.00
Oct-2019	\$ 3,428.00
Sep-2019	\$ 3,564.00
Apr-2019	\$ 3,815.00
Aug-2019	\$ 4,890.00
Dec-2019	\$ 2,615.00
Feb-2019	\$ 2,530.00
Jan-2019	\$ 2,095.00
Jul-2019	\$ 4,365.00
Jun-2019	\$ 4,850.00
Mar-2019	\$ 2,375.00
May-2019	\$ 3,770.00
Nov-2019	\$ 2,905.00
Oct-2019	\$ 3,845.00
Sep-2019	\$ 4,105.00
Apr-2019	\$ 1,104.00
Aug-2019	\$ 1,504.00
Feb-2019	\$ 824.00
Jan-2019	\$ 1,988.00
Jul-2019	\$ 1,804.00
Jun-2019	\$ 1,508.00
May-2019	\$ 1,224.00
Nov-2019	\$ 1,264.00
Oct-2019	\$ 3,104.00
Sep-2019	\$ 1,628.00
Apr-2019	\$ 3,404.31
Aug-2019	\$ 6,808.62
Dec-2019	\$ 4,226.04
Feb-2019	\$ 2,699.97
Jan-2019	\$ 2,582.58
Jul-2019	\$ 5,869.50
Jun-2019	\$ 6,573.84
Mar-2019	\$ 3,286.92
May-2019	\$ 6,104.28
Nov-2019	\$ 5,634.72
Oct-2019	\$ 5,869.50
Apr-2019	\$ 8,792.09
Aug-2019	\$ 16,213.55
Dec-2019	\$ 12,402.53

Counterparty and Payment Dates	REC Cost
Feb-2019	\$ 6,294.42
Jan-2019	\$ 8,328.95
Jul-2019	\$ 19,924.28
Mar-2019	\$ 8,858.95
May-2019	\$ 29,618.98
Nov-2019	\$ 13,672.87
Oct-2019	\$ 16,648.14
Sep-2019	\$ 17,216.45
[REDACTED]	
Apr-2019	\$ 1,878.24
Aug-2019	\$ 3,873.87
Dec-2019	\$ 2,699.97
Feb-2019	\$ 1,760.85
Jan-2019	\$ 1,878.24
Jul-2019	\$ 4,343.43
Mar-2019	\$ 2,347.80
May-2019	\$ 7,512.96
Nov-2019	\$ 2,934.75
Oct-2019	\$ 3,169.53
Sep-2019	\$ 4,226.04
[REDACTED]	
Apr-2019	\$ 1,526.07
Aug-2019	\$ 3,756.48
Dec-2019	\$ 2,347.80
Feb-2019	\$ 1,526.07
Jan-2019	\$ 1,760.85
Jul-2019	\$ 3,286.92
Jun-2019	\$ 1,643.46
Mar-2019	\$ 1,995.63
May-2019	\$ 3,052.14
Nov-2019	\$ 2,465.19
Oct-2019	\$ 3,052.14
Sep-2019	\$ 3,052.14
[REDACTED]	
Apr-2019	\$ 2,400.00
Aug-2019	\$ 3,228.00
Dec-2019	\$ 1,860.00
Feb-2019	\$ 1,952.00
Jan-2019	\$ 1,584.00
Jul-2019	\$ 2,916.00
Mar-2019	\$ 1,512.00
May-2019	\$ 4,820.00
Nov-2019	\$ 2,080.00
Oct-2019	\$ 2,532.00
Sep-2019	\$ 2,796.00
[REDACTED]	
Apr-2019	\$ 2,445.00
Aug-2019	\$ 2,970.00
Dec-2019	\$ 1,764.00
Feb-2019	\$ 1,869.00
Jan-2019	\$ 1,584.00
Jul-2019	\$ 2,658.00
Mar-2019	\$ 1,608.00

Counterparty and Payment Dates		REC Cost
May-2019	\$	5,463.00
Nov-2019	\$	2,025.00
Oct-2019	\$	2,559.00
Sep-2019	\$	2,535.00
██		
Apr-2019	\$	856.00
Aug-2019	\$	1,440.00
Dec-2019	\$	1,044.00
Feb-2019	\$	880.00
Jan-2019	\$	840.00
Jul-2019	\$	1,560.00
Mar-2019	\$	1,088.00
May-2019	\$	2,588.00
Nov-2019	\$	1,024.00
Oct-2019	\$	1,376.00
Sep-2019	\$	1,408.00
██		
Apr-2019	\$	704.34
Aug-2019	\$	1,995.63
Dec-2019	\$	1,056.51
Feb-2019	\$	586.95
Jan-2019	\$	469.56
Jul-2019	\$	1,643.46
Mar-2019	\$	821.73
May-2019	\$	3,286.92
Nov-2019	\$	1,173.90
Oct-2019	\$	1,643.46
Sep-2019	\$	1,995.63
██		
Apr-2019	\$	587.44
Aug-2019	\$	1,248.31
Dec-2019	\$	660.87
Feb-2019	\$	440.58
Jan-2019	\$	440.58
Jul-2019	\$	1,101.45
Jun-2019	\$	1,248.31
Mar-2019	\$	587.44
May-2019	\$	1,028.02
Nov-2019	\$	807.73
Oct-2019	\$	954.59
Sep-2019	\$	1,321.74
██		
Apr-2019	\$	3,036.00
Aug-2019	\$	3,896.00
Dec-2019	\$	2,468.00
Feb-2019	\$	2,304.00
Jan-2019	\$	1,896.00
Jul-2019	\$	3,628.00
Mar-2019	\$	2,020.00
May-2019	\$	7,520.00
Nov-2019	\$	2,760.00
Oct-2019	\$	2,560.00
Sep-2019	\$	3,536.00

**Information in italics is confidential*

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Counterparty and Payment Dates		REC Cost
Apr-2019	\$	3,376.00
Aug-2019	\$	4,088.00
Dec-2019	\$	2,484.00
Feb-2019	\$	2,512.00
Jan-2019	\$	2,120.00
Jul-2019	\$	3,696.00
Mar-2019	\$	2,180.00
May-2019	\$	7,192.00
Nov-2019	\$	2,712.00
Oct-2019	\$	3,232.00
Sep-2019	\$	3,396.00
Apr-2019	\$	2,559.00
Aug-2019	\$	3,237.00
Dec-2019	\$	1,854.00
Feb-2019	\$	1,890.00
Jan-2019	\$	1,578.00
Jul-2019	\$	2,973.00
Jun-2019	\$	3,285.00
Mar-2019	\$	1,683.00
May-2019	\$	2,754.00
Nov-2019	\$	2,109.00
Oct-2019	\$	2,673.00
Sep-2019	\$	2,592.00
Apr-2019	\$	-
Aug-2019	\$	-
Dec-2019	\$	-
Feb-2019	\$	-
Jan-2019	\$	-
Jul-2019	\$	-
Jun-2019	\$	-
Mar-2019	\$	-
May-2019	\$	-
Nov-2019	\$	-
Oct-2019	\$	-
Sep-2019	\$	-
Apr-2019	\$	3,309.76
Aug-2019	\$	3,516.62
Dec-2019	\$	1,551.45
Feb-2019	\$	1,241.16
Jan-2019	\$	930.87
Jul-2019	\$	2,896.04
Jun-2019	\$	2,689.18
May-2019	\$	2,999.47
Nov-2019	\$	2,172.03
Oct-2019	\$	2,275.46
Sep-2019	\$	2,896.04
Apr-2019	\$	20,009.85
Aug-2019	\$	25,349.80

Counterparty and Payment Dates	REC Cost
Dec-2019	\$ 31,614.10
Feb-2019	\$ 24,465.35
Jan-2019	\$ 26,107.90
Jul-2019	\$ 24,671.50
Jun-2019	\$ 49,103.60
Mar-2019	\$ 25,196.85
Nov-2019	\$ 54,875.80
Sep-2019	\$ 24,744.65
[REDACTED]	
Apr-2019	\$ 408.00
Aug-2019	\$ 1,228.00
Feb-2019	\$ 276.00
Jan-2019	\$ 436.00
Jul-2019	\$ 624.00
Mar-2019	\$ 304.00
May-2019	\$ 484.00
Nov-2019	\$ 464.00
Oct-2019	\$ 1,276.00
Sep-2019	\$ 604.00
[REDACTED]	
Apr-2019	\$ 884.00
Aug-2019	\$ 2,728.00
Feb-2019	\$ 580.00
Jan-2019	\$ 944.00
Jul-2019	\$ 1,420.00
Mar-2019	\$ 644.00
May-2019	\$ 1,068.00
Nov-2019	\$ 1,032.00
Oct-2019	\$ 2,832.00
Sep-2019	\$ 1,336.00
[REDACTED]	
Apr-2019	\$ 408.00
Aug-2019	\$ 1,220.00
Feb-2019	\$ 268.00
Jan-2019	\$ 428.00
Jul-2019	\$ 624.00
Mar-2019	\$ 296.00
May-2019	\$ 1,080.00
Nov-2019	\$ 156.00
Oct-2019	\$ 476.00
[REDACTED]	
Apr-2019	\$ 700.00
Aug-2019	\$ 1,092.00
Dec-2019	\$ 728.00
Feb-2019	\$ 488.00
Jan-2019	\$ 556.00
Jul-2019	\$ 988.00
Jun-2019	\$ 996.00
Mar-2019	\$ 696.00
May-2019	\$ 1,040.00
Nov-2019	\$ 868.00
Oct-2019	\$ 988.00
Sep-2019	\$ 992.00

Counterparty and Payment Dates	REC Cost
Apr-2019	\$ 52,400.00
Aug-2019	\$ 44,534.26
Dec-2019	\$ 40,216.00
Feb-2019	\$ 36,904.00
Jan-2019	\$ 30,368.00
Jul-2019	\$ 24,551.32
Jun-2019	\$ 64,176.00
Mar-2019	\$ 33,832.00
May-2019	\$ 57,408.00
Nov-2019	\$ 43,916.00
Oct-2019	\$ 52,632.00
Sep-2019	\$ 74,726.96
Apr-2019	\$ 24,540.00
Aug-2019	\$ 29,156.00
Dec-2019	\$ 17,724.00
Feb-2019	\$ 18,644.00
Jan-2019	\$ 14,964.00
Jul-2019	\$ 26,716.00
Jun-2019	\$ 31,196.00
Mar-2019	\$ 16,568.00
May-2019	\$ 26,620.00
Nov-2019	\$ 20,728.00
Oct-2019	\$ 26,264.00
Sep-2019	\$ 25,596.00
Apr-2019	\$ 2,976.00
Aug-2019	\$ 3,492.00
Dec-2019	\$ 1,292.00
Feb-2019	\$ 2,236.00
Jan-2019	\$ 1,696.00
Jul-2019	\$ 3,284.00
Jun-2019	\$ 3,656.00
Mar-2019	\$ 1,892.00
May-2019	\$ 3,296.00
Nov-2019	\$ 2,432.00
Oct-2019	\$ 3,264.00
Sep-2019	\$ 3,168.00
Apr-2019	\$ -
Aug-2019	\$ -
Dec-2019	\$ -
Feb-2019	\$ -
Jan-2019	\$ -
Jul-2019	\$ -
Jun-2019	\$ -
Mar-2019	\$ -
May-2019	\$ -
Nov-2019	\$ -
Oct-2019	\$ -
Sep-2019	\$ -

Counterparty and Payment Dates	REC Cost
Apr-2019	\$ 3,072.00
Aug-2019	\$ 3,496.00
Dec-2019	\$ 2,304.00
Feb-2019	\$ 2,096.00
Jan-2019	\$ 1,836.00
Jul-2019	\$ 3,320.00
Jun-2019	\$ 3,664.00
Mar-2019	\$ 1,928.00
May-2019	\$ 3,284.00
Nov-2019	\$ 2,496.00
Oct-2019	\$ 3,212.00
Sep-2019	\$ 3,236.00
[REDACTED]	
Apr-2019	\$ 3,212.00
Aug-2019	\$ 3,656.00
Dec-2019	\$ 2,152.00
Feb-2019	\$ 2,224.00
Jan-2019	\$ 1,944.00
Jul-2019	\$ 3,264.00
Jun-2019	\$ 3,936.00
Mar-2019	\$ 2,040.00
May-2019	\$ 3,372.00
Nov-2019	\$ 2,576.00
Oct-2019	\$ 3,280.00
Sep-2019	\$ 3,320.00
[REDACTED]	
Apr-2019	\$ 3,172.00
Aug-2019	\$ 3,872.00
Dec-2019	\$ 2,264.00
Feb-2019	\$ 2,376.00
Jan-2019	\$ 1,920.00
Jul-2019	\$ 3,448.00
Jun-2019	\$ 4,012.00
Mar-2019	\$ 1,980.00
May-2019	\$ 3,432.00
Nov-2019	\$ 2,536.00
Oct-2019	\$ 3,160.00
Sep-2019	\$ 3,148.00
[REDACTED]	
Apr-2019	\$ 234.78
Aug-2019	\$ 469.56
Dec-2019	\$ 117.39
Feb-2019	\$ 234.78
Jan-2019	\$ 117.39
Jul-2019	\$ 352.17
Jun-2019	\$ 352.17
Mar-2019	\$ 117.39
May-2019	\$ 352.17
Nov-2019	\$ 234.78
Oct-2019	\$ 352.17
Sep-2019	\$ 352.17
[REDACTED]	
Apr-2019	\$ 288,520.54

Counterparty and Payment Dates	REC Cost
Aug-2019	\$ 206,870.36
Dec-2019	\$ 301,765.82
Feb-2019	\$ 343,229.34
Jan-2019	\$ 300,865.76
Jul-2019	\$ 733,283.10
Jun-2019	\$ 871.40
Mar-2019	\$ 381,237.50
May-2019	\$ 331,741.98
Nov-2019	\$ 583,489.44
Sep-2019	\$ 383,154.58
REDACTED	
Apr-2019	\$ 5,220.00
Aug-2019	\$ 10,380.00
Feb-2019	\$ 8,085.00
Jan-2019	\$ 2,160.00
Jul-2019	\$ 16,170.00
Jun-2019	\$ 8,865.00
Mar-2019	\$ 12,420.00
May-2019	\$ 13,515.00
Oct-2019	\$ 10,605.00
Sep-2019	\$ 20,250.00
REDACTED	
Apr-2019	\$ 234.78
Aug-2019	\$ 469.56
Dec-2019	\$ 234.78
Feb-2019	\$ 117.39
Jan-2019	\$ 117.39
Jul-2019	\$ 469.56
Jun-2019	\$ 352.17
Mar-2019	\$ 234.78
May-2019	\$ 352.17
Nov-2019	\$ 352.17
Oct-2019	\$ 352.17
Sep-2019	\$ 117.39
REDACTED	
Apr-2019	\$ 234.78
Aug-2019	\$ 469.56
Dec-2019	\$ 352.17
Feb-2019	\$ 234.78
Jan-2019	\$ 234.78
Jul-2019	\$ 352.17
Jun-2019	\$ 469.56
Mar-2019	\$ 234.78
May-2019	\$ 352.17
Nov-2019	\$ 234.78
Oct-2019	\$ 469.56
Sep-2019	\$ 352.17
REDACTED	
Apr-2019	\$ 3,168.00
Aug-2019	\$ 3,952.00
Dec-2019	\$ 2,292.00
Feb-2019	\$ 2,432.00
Jan-2019	\$ 1,980.00

Counterparty and Payment Dates	REC Cost
Jul-2019	\$ 3,532.00
Jun-2019	\$ 3,876.00
Mar-2019	\$ 2,024.00
May-2019	\$ 3,380.00
Nov-2019	\$ 2,556.00
Oct-2019	\$ 3,280.00
Sep-2019	\$ 3,428.00
[REDACTED]	
Apr-2019	\$ 591.00
Aug-2019	\$ 945.00
Dec-2019	\$ 732.00
Feb-2019	\$ 585.00
Jan-2019	\$ 666.00
Jul-2019	\$ 1,233.00
Jun-2019	\$ 1,008.00
Mar-2019	\$ 771.00
May-2019	\$ 948.00
Nov-2019	\$ 909.00
Oct-2019	\$ 969.00
Sep-2019	\$ 1,101.00
[REDACTED]	
Apr-2019	\$ 3,385.00
Aug-2019	\$ 4,055.00
Dec-2019	\$ 2,395.00
Feb-2019	\$ 2,240.00
Jan-2019	\$ 2,020.00
Jul-2019	\$ 3,720.00
Jun-2019	\$ 4,305.00
Mar-2019	\$ 2,175.00
May-2019	\$ 3,680.00
Nov-2019	\$ 2,670.00
Oct-2019	\$ 3,330.00
Sep-2019	\$ 3,490.00
[REDACTED]	
Apr-2019	\$ 1,708.00
Aug-2019	\$ 2,196.00
Dec-2019	\$ 1,264.00
Feb-2019	\$ 1,252.00
Jan-2019	\$ 812.00
Jul-2019	\$ 2,040.00
Jun-2019	\$ 2,232.00
Mar-2019	\$ 1,148.00
May-2019	\$ 1,888.00
Nov-2019	\$ 1,360.00
Oct-2019	\$ 1,796.00
Sep-2019	\$ 1,872.00
[REDACTED]	
Apr-2019	\$ 4,040.00
Aug-2019	\$ 4,895.00
Dec-2019	\$ 2,860.00
Feb-2019	\$ 2,890.00
Jan-2019	\$ 2,020.00
Jul-2019	\$ 4,475.00

Counterparty and Payment Dates	REC Cost
Jun-2019	\$ 5,030.00
Mar-2019	\$ 2,590.00
May-2019	\$ 3,900.00
Nov-2019	\$ 2,950.00
Oct-2019	\$ 4,075.00
Sep-2019	\$ 4,125.00
<hr/>	
Apr-2019	\$ 432.00
Aug-2019	\$ 807.75
Dec-2019	\$ 713.25
Feb-2019	\$ 533.25
Jan-2019	\$ 506.25
Jul-2019	\$ 897.75
Jun-2019	\$ 884.25
Mar-2019	\$ 630.00
May-2019	\$ 740.25
Nov-2019	\$ 704.25
Oct-2019	\$ 704.25
Sep-2019	\$ 933.75
<hr/>	
Apr-2019	\$ 3,320.00
Aug-2019	\$ 4,080.00
Dec-2019	\$ 2,356.00
Feb-2019	\$ 2,492.00
Jan-2019	\$ 2,032.00
Jul-2019	\$ 3,604.00
Jun-2019	\$ 4,048.00
Mar-2019	\$ 2,116.00
May-2019	\$ 3,528.00
Nov-2019	\$ 2,680.00
Oct-2019	\$ 3,488.00
Sep-2019	\$ 3,492.00
<hr/>	
Apr-2019	\$ 117.39
Aug-2019	\$ 117.39
Dec-2019	\$ 117.39
Feb-2019	\$ 117.39
Jul-2019	\$ 117.39
Jun-2019	\$ 117.39
Nov-2019	\$ 117.39
Oct-2019	\$ 117.39
Sep-2019	\$ 117.39
<hr/>	
Aug-2019	\$ 73.43
Dec-2019	\$ 73.43
Jan-2019	\$ 73.43
Jul-2019	\$ 73.43
Jun-2019	\$ 73.43
Mar-2019	\$ 73.43
May-2019	\$ 146.86
Nov-2019	\$ 73.43
Oct-2019	\$ 73.43
Sep-2019	\$ 73.43

Counterparty and Payment Dates	REC Cost
<hr/>	
Apr-2019	\$ 3,136.00
Aug-2019	\$ 3,896.00
Dec-2019	\$ 2,224.00
Feb-2019	\$ 2,336.00
Jan-2019	\$ 1,884.00
Jul-2019	\$ 3,452.00
Jun-2019	\$ 3,712.00
Mar-2019	\$ 1,984.00
May-2019	\$ 3,360.00
Nov-2019	\$ 2,508.00
Oct-2019	\$ 3,284.00
Sep-2019	\$ 3,400.00
<hr/>	
Apr-2019	\$ 2,695.00
Aug-2019	\$ 1,940.00
Dec-2019	\$ 1,560.00
Jan-2019	\$ 2,390.00
Jun-2019	\$ 1,965.00
Mar-2019	\$ 1,175.00
May-2019	\$ 1,945.00
Nov-2019	\$ 1,980.00
Oct-2019	\$ 1,860.00
Sep-2019	\$ 1,945.00
<hr/>	
Apr-2019	\$ 1,595.25
Aug-2019	\$ 2,045.25
Dec-2019	\$ 1,262.25
Feb-2019	\$ 1,201.50
Jan-2019	\$ 1,082.25
Jul-2019	\$ 1,584.00
Jun-2019	\$ 2,124.00
Mar-2019	\$ 965.25
May-2019	\$ 1,824.75
Nov-2019	\$ 1,365.75
Oct-2019	\$ 1,730.25
Sep-2019	\$ 1,716.75
<hr/>	
Apr-2019	\$ 1,633.50
Aug-2019	\$ 1,887.75
Dec-2019	\$ 1,239.75
Feb-2019	\$ 1,269.00
Jan-2019	\$ 1,044.00
Jul-2019	\$ 1,687.50
Jun-2019	\$ 2,002.50
Mar-2019	\$ 1,093.50
May-2019	\$ 1,550.25
Nov-2019	\$ 1,381.50
Oct-2019	\$ 1,710.00
Sep-2019	\$ 1,507.50
<hr/>	
Aug-2019	\$ 206.86
Dec-2019	\$ 103.43

Counterparty and Payment Dates		REC Cost
Jan-2019	\$	103.43
Jul-2019	\$	206.86
Jun-2019	\$	103.43
Mar-2019	\$	103.43
May-2019	\$	206.86
Nov-2019	\$	103.43
Oct-2019	\$	206.86
██		
Apr-2019	\$	206.86
Aug-2019	\$	310.29
Dec-2019	\$	206.86
Feb-2019	\$	103.43
Jan-2019	\$	206.86
Jul-2019	\$	827.44
Jun-2019	\$	310.29
Mar-2019	\$	206.86
May-2019	\$	206.86
Nov-2019	\$	310.29
Oct-2019	\$	310.29
██		
Apr-2019	\$	146.86
Aug-2019	\$	73.43
Dec-2019	\$	73.43
Jan-2019	\$	73.43
Jul-2019	\$	146.86
Jun-2019	\$	73.43
Mar-2019	\$	73.43
May-2019	\$	73.43
Nov-2019	\$	73.43
Oct-2019	\$	146.86
██		
Apr-2019	\$	3,360.00
Aug-2019	\$	4,128.00
Dec-2019	\$	2,424.00
Feb-2019	\$	2,456.00
Jan-2019	\$	2,028.00
Jul-2019	\$	3,684.00
Jun-2019	\$	4,292.00
Mar-2019	\$	2,084.00
May-2019	\$	3,588.00
Nov-2019	\$	2,796.00
Oct-2019	\$	3,084.00
Sep-2019	\$	3,576.00
██		
Aug-2019	\$	146.86
Dec-2019	\$	73.43
Feb-2019	\$	73.43
Jan-2019	\$	73.43
Jul-2019	\$	146.86
Jun-2019	\$	146.86
Mar-2019	\$	73.43
May-2019	\$	146.86
Nov-2019	\$	146.86

Counterparty and Payment Dates	REC Cost
Oct-2019	\$ 73.43
Sep-2019	\$ 73.43
[REDACTED]	
Apr-2019	\$ 3,730.00
Aug-2019	\$ 4,530.00
Dec-2019	\$ 2,985.00
Feb-2019	\$ 2,920.00
Jan-2019	\$ 2,275.00
Jul-2019	\$ 4,185.00
Jun-2019	\$ 4,605.00
Mar-2019	\$ 2,040.00
May-2019	\$ 4,105.00
Nov-2019	\$ 3,240.00
Oct-2019	\$ 3,720.00
Sep-2019	\$ 4,055.00
[REDACTED]	
Apr-2019	\$ 3,212.00
Aug-2019	\$ 4,068.00
Dec-2019	\$ 2,584.00
Feb-2019	\$ 2,512.00
Jan-2019	\$ 2,088.00
Jul-2019	\$ 3,780.00
Jun-2019	\$ 4,112.00
Mar-2019	\$ 2,108.00
May-2019	\$ 3,464.00
Nov-2019	\$ 2,896.00
Oct-2019	\$ 3,100.00
Sep-2019	\$ 3,588.00
[REDACTED]	
Apr-2019	\$ 1,892.25
Aug-2019	\$ 2,146.50
Dec-2019	\$ 1,388.25
Feb-2019	\$ 1,381.50
Jan-2019	\$ 1,102.50
Jul-2019	\$ 2,000.25
Jun-2019	\$ 2,286.00
Mar-2019	\$ 1,237.50
May-2019	\$ 1,986.75
Nov-2019	\$ 1,554.75
Oct-2019	\$ 1,741.50
Sep-2019	\$ 1,908.00
[REDACTED]	
Apr-2019	\$ 3,790.00
Aug-2019	\$ 4,020.00
Dec-2019	\$ 2,830.00
Feb-2019	\$ 2,840.00
Jan-2019	\$ 1,930.00
Jul-2019	\$ 4,150.00
Jun-2019	\$ 4,605.00
Mar-2019	\$ 2,425.00
May-2019	\$ 3,775.00
Nov-2019	\$ 3,055.00
Oct-2019	\$ 3,855.00

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Counterparty and Payment Dates		REC Cost
Sep-2019	\$	3,975.00
[REDACTED]		
Apr-2019	\$	3,880.00
Aug-2019	\$	3,585.00
Dec-2019	\$	2,900.00
Feb-2019	\$	2,865.00
Jan-2019	\$	2,000.00
Jul-2019	\$	4,640.00
Jun-2019	\$	2,630.00
Mar-2019	\$	2,470.00
May-2019	\$	3,725.00
Nov-2019	\$	2,855.00
Oct-2019	\$	4,210.00
Sep-2019	\$	4,210.00
[REDACTED]		
Apr-2019	\$	19,998.40
Aug-2019	\$	23,536.40
Dec-2019	\$	14,714.60
Feb-2019	\$	14,534.80
Jan-2019	\$	10,515.40
Jul-2019	\$	22,463.40
Jun-2019	\$	24,400.60
Mar-2019	\$	12,423.60
May-2019	\$	20,810.40
Nov-2019	\$	16,437.20
Oct-2019	\$	21,773.20
Sep-2019	\$	21,001.80
[REDACTED]		
Apr-2019	\$	3,252.00
Aug-2019	\$	4,096.00
Dec-2019	\$	2,368.00
Feb-2019	\$	2,436.00
Jan-2019	\$	1,768.00
Jul-2019	\$	3,732.00
Jun-2019	\$	4,200.00
Mar-2019	\$	2,132.00
May-2019	\$	3,504.00
Nov-2019	\$	2,628.00
Oct-2019	\$	3,364.00
Sep-2019	\$	3,632.00
[REDACTED]		
Apr-2019	\$	15,831.75
Aug-2019	\$	14,929.82
Dec-2019	\$	12,262.41
Feb-2019	\$	16,465.02
Jan-2019	\$	16,788.92
Jul-2019	\$	13,682.47
Jun-2019	\$	14,507.64
Mar-2019	\$	14,354.12
May-2019	\$	13,663.28
Nov-2019	\$	12,185.65
Oct-2019	\$	13,740.04
Sep-2019	\$	15,275.24

Counterparty and Payment Dates	REC Cost
Apr-2019	\$ 4,135.00
Aug-2019	\$ 5,470.00
Dec-2019	\$ 2,855.00
Feb-2019	\$ 3,150.00
Jan-2019	\$ 2,655.00
Jul-2019	\$ 4,755.00
Jun-2019	\$ 5,410.00
Mar-2019	\$ 2,705.00
May-2019	\$ 4,180.00
Nov-2019	\$ 3,430.00
Oct-2019	\$ 4,645.00
Sep-2019	\$ 4,355.00
Apr-2019	\$ 4,015.00
Aug-2019	\$ 4,280.00
Dec-2019	\$ 2,875.00
Feb-2019	\$ 3,040.00
Jan-2019	\$ 2,480.00
Jul-2019	\$ 4,460.00
Jun-2019	\$ 5,130.00
Mar-2019	\$ 2,570.00
May-2019	\$ 4,385.00
Nov-2019	\$ 3,150.00
Oct-2019	\$ 3,910.00
Sep-2019	\$ 2,630.00
Apr-2019	\$ 3,120.00
Aug-2019	\$ 3,920.00
Dec-2019	\$ 2,175.00
Feb-2019	\$ 2,270.00
Jan-2019	\$ 1,700.00
Jul-2019	\$ 3,555.00
Jun-2019	\$ 3,975.00
Mar-2019	\$ 1,730.00
May-2019	\$ 3,220.00
Nov-2019	\$ 2,535.00
Oct-2019	\$ 3,255.00
Sep-2019	\$ 3,485.00
Apr-2019	\$ 3,240.00
Aug-2019	\$ 4,200.00
Dec-2019	\$ 2,275.00
Feb-2019	\$ 1,930.00
Jan-2019	\$ 1,760.00
Jul-2019	\$ 3,715.00
Jun-2019	\$ 4,265.00
Mar-2019	\$ 2,020.00
May-2019	\$ 3,535.00
Nov-2019	\$ 2,585.00
Oct-2019	\$ 3,375.00
Sep-2019	\$ 3,625.00

Counterparty and Payment Dates	REC Cost
Apr-2019	\$ 3,348.00
Aug-2019	\$ 4,296.00
Dec-2019	\$ 2,356.00
Feb-2019	\$ 2,292.00
Jan-2019	\$ 1,756.00
Jul-2019	\$ 3,680.00
Jun-2019	\$ 3,820.00
Mar-2019	\$ 2,112.00
May-2019	\$ 3,568.00
Nov-2019	\$ 2,720.00
Oct-2019	\$ 3,460.00
Sep-2019	\$ 3,840.00
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Apr-2019	\$ 720.00
Aug-2019	\$ 1,376.00
Dec-2019	\$ 1,160.00
Feb-2019	\$ 840.00
Jan-2019	\$ 752.00
Jul-2019	\$ 1,676.00
Jun-2019	\$ 1,500.00
Mar-2019	\$ 1,068.00
May-2019	\$ 1,328.00
Nov-2019	\$ 1,316.00
Oct-2019	\$ 1,416.00
Sep-2019	\$ 1,624.00
<hr/>	
Apr-2019	\$ 352.17
Aug-2019	\$ 234.78
Dec-2019	\$ 117.39
Feb-2019	\$ 117.39
Jan-2019	\$ 117.39
Jul-2019	\$ 117.39
Jun-2019	\$ 234.78
May-2019	\$ 234.78
Nov-2019	\$ 117.39
Oct-2019	\$ 234.78
Sep-2019	\$ 117.39
<hr/>	
Apr-2019	\$ 256,123.36
Aug-2019	\$ 199,175.91
Dec-2019	\$ 245,599.89
Feb-2019	\$ 308,038.03
Jan-2019	\$ 328,345.62
Jul-2019	\$ 285,274.13
Jun-2019	\$ 399,917.94
Mar-2019	\$ 247,817.91
May-2019	\$ 321,128.53
Nov-2019	\$ 257,594.74
Oct-2019	\$ 208,801.91
Sep-2019	\$ 167,049.08
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Apr-2019	\$ 1,100.00
Aug-2019	\$ 370.00

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Counterparty and Payment Dates	REC Cost
Dec-2019	\$ 390.00
Feb-2019	\$ 1,245.00
Jan-2019	\$ 1,000.00
Jul-2019	\$ 660.00
Jun-2019	\$ 495.00
Mar-2019	\$ 955.00
May-2019	\$ 925.00
Nov-2019	\$ 170.00
Oct-2019	\$ 150.00
Sep-2019	\$ 550.00
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Apr-2019	\$ 10,682.49
Aug-2019	\$ 16,551.99
Dec-2019	\$ 15,965.04
Feb-2019	\$ 10,212.93
Jan-2019	\$ 6,926.01
Jul-2019	\$ 18,430.23
Jun-2019	\$ 20,660.64
Mar-2019	\$ 13,734.63
May-2019	\$ 16,904.16
Nov-2019	\$ 16,434.60
Oct-2019	\$ 15,143.31
Sep-2019	\$ 22,656.27
<hr/>	
Apr-2019	\$ 3,740.00
Aug-2019	\$ 3,315.00
Dec-2019	\$ 2,910.00
Feb-2019	\$ 2,605.00
Jan-2019	\$ 1,660.00
Jul-2019	\$ 3,160.00
Jun-2019	\$ 3,820.00
Mar-2019	\$ 2,570.00
May-2019	\$ 3,360.00
Nov-2019	\$ 1,890.00
Oct-2019	\$ 3,370.00
Sep-2019	\$ 3,360.00
<hr/>	
Apr-2019	\$ 10,032.33
Aug-2019	\$ 13,202.72
Feb-2019	\$ 7,035.66
Jan-2019	\$ 17,372.00
Jul-2019	\$ 27,664.91
May-2019	\$ 23,756.21
Nov-2019	\$ 10,075.76
Oct-2019	\$ 26,709.45
<hr/>	
Apr-2019	\$ 524.25
Aug-2019	\$ 697.50
Dec-2019	\$ 573.75
Jan-2019	\$ 918.00
Jul-2019	\$ 825.75
Jun-2019	\$ 726.75
Mar-2019	\$ 387.00

**Information in italics is confidential*

Counterparty and Payment Dates		REC Cost
May-2019	\$	580.50
Nov-2019	\$	614.25
Oct-2019	\$	756.00
Sep-2019	\$	720.00
██		
Apr-2019	\$	1,743.75
Aug-2019	\$	1,984.50
Dec-2019	\$	1,413.00
Feb-2019	\$	1,381.50
Jan-2019	\$	1,066.50
Jul-2019	\$	1,854.00
Mar-2019	\$	1,102.50
May-2019	\$	3,951.00
Nov-2019	\$	1,413.00
Oct-2019	\$	1,896.75
Sep-2019	\$	1,887.75
██		
Apr-2019	\$	3,240.00
Aug-2019	\$	4,460.00
Dec-2019	\$	2,460.00
Feb-2019	\$	2,408.00
Jan-2019	\$	1,868.00
Jul-2019	\$	3,912.00
Jun-2019	\$	4,332.00
Mar-2019	\$	2,144.00
May-2019	\$	3,352.00
Nov-2019	\$	2,780.00
Oct-2019	\$	3,612.00
Sep-2019	\$	3,892.00
██		
Apr-2019	\$	3,855.00
Aug-2019	\$	3,945.00
Dec-2019	\$	3,125.00
Feb-2019	\$	2,995.00
Jan-2019	\$	2,165.00
Jul-2019	\$	4,080.00
Jun-2019	\$	4,550.00
Mar-2019	\$	2,515.00
May-2019	\$	4,125.00
Nov-2019	\$	3,115.00
Oct-2019	\$	4,165.00
Sep-2019	\$	4,120.00
██		
Apr-2019	\$	1,449.00
Aug-2019	\$	1,768.50
Dec-2019	\$	1,689.75
Feb-2019	\$	1,469.25
Jan-2019	\$	1,597.50
Jul-2019	\$	1,532.25
Jun-2019	\$	1,347.75
Mar-2019	\$	780.75
May-2019	\$	1,302.75
Nov-2019	\$	1,723.50

**Information in italics is confidential*

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Counterparty and Payment Dates	REC Cost
Oct-2019	\$ 1,449.00
Sep-2019	\$ 1,748.25
[REDACTED]	
Jul-2019	\$ 75,000.00
Oct-2019	\$ 50,625.00
[REDACTED]	
Apr-2019	\$ 1,764.00
Aug-2019	\$ 2,047.50
Dec-2019	\$ 1,131.75
Feb-2019	\$ 1,332.00
Jan-2019	\$ 1,068.75
Jul-2019	\$ 1,885.50
Jun-2019	\$ 2,092.50
Mar-2019	\$ 1,109.25
May-2019	\$ 1,892.25
Nov-2019	\$ 1,422.00
Oct-2019	\$ 1,680.75
Sep-2019	\$ 1,815.75
[REDACTED]	
Apr-2019	\$ 11,673.48
Aug-2019	\$ 14,292.53
Dec-2019	\$ 8,755.11
Feb-2019	\$ 8,231.30
Jan-2019	\$ 5,986.79
Jul-2019	\$ 13,244.91
Jun-2019	\$ 14,591.85
Mar-2019	\$ 7,333.34
May-2019	\$ 12,122.46
Nov-2019	\$ 9,727.90
Oct-2019	\$ 12,646.27
Sep-2019	\$ 13,319.74
[REDACTED]	
Apr-2019	\$ 7,516.21
Aug-2019	\$ 10,041.90
Dec-2019	\$ 9,768.03
Feb-2019	\$ 6,481.93
Jan-2019	\$ 5,885.01
Jul-2019	\$ 11,502.54
Jun-2019	\$ 13,206.62
Mar-2019	\$ 8,459.54
May-2019	\$ 11,106.95
Nov-2019	\$ 10,133.19
Oct-2019	\$ 8,855.13
Sep-2019	\$ 10,041.90
[REDACTED]	
Apr-2019	\$ 3,855.00
Aug-2019	\$ 4,470.00
Dec-2019	\$ 2,665.00
Feb-2019	\$ 2,740.00
Jan-2019	\$ 2,240.00
Jul-2019	\$ 4,295.00
Jun-2019	\$ 4,840.00
Mar-2019	\$ 2,430.00

Counterparty and Payment Dates		REC Cost
May-2019	\$	4,240.00
Nov-2019	\$	3,035.00
Oct-2019	\$	3,750.00
Sep-2019	\$	3,790.00

Apr-2019	\$	2,863.77
Aug-2019	\$	4,258.94
Dec-2019	\$	2,716.91
Feb-2019	\$	1,909.18
Jan-2019	\$	1,909.18
Jul-2019	\$	5,433.82
Jun-2019	\$	4,405.80
Mar-2019	\$	2,716.91
May-2019	\$	4,699.52
Nov-2019	\$	3,304.35
Oct-2019	\$	3,744.93
Sep-2019	\$	4,846.38

Apr-2019	\$	1,344.00
Aug-2019	\$	2,932.00
Dec-2019	\$	1,884.00
Feb-2019	\$	996.00
Jan-2019	\$	804.00
Jul-2019	\$	2,456.00
Jun-2019	\$	1,404.00
Mar-2019	\$	832.00
May-2019	\$	1,396.00
Nov-2019	\$	2,112.00
Oct-2019	\$	2,772.00
Sep-2019	\$	2,664.00

Apr-2019	\$	3,930.00
Aug-2019	\$	4,465.00
Dec-2019	\$	3,140.00
Feb-2019	\$	3,100.00
Jan-2019	\$	2,445.00
Jul-2019	\$	4,175.00
Jun-2019	\$	4,580.00
Mar-2019	\$	2,545.00
May-2019	\$	4,155.00
Nov-2019	\$	3,410.00
Oct-2019	\$	4,235.00
Sep-2019	\$	4,195.00

Apr-2019	\$	4,145.00
Aug-2019	\$	5,155.00
Dec-2019	\$	3,145.00
Feb-2019	\$	2,940.00
Jan-2019	\$	2,550.00
Jul-2019	\$	4,660.00
Jun-2019	\$	5,105.00
Mar-2019	\$	2,610.00
May-2019	\$	4,510.00

Duke Energy Progress, LLC
Docket No. E-2, Sub 1251
2019 REPS Compliance Report
Dates and Amounts of Payments for RECs - Calendar Year 2019

Redacted Version
Jennings Exhibit No. 1, Appendix 1
June 9, 2020

Counterparty and Payment Dates		REC Cost
Nov-2019	\$	3,560.00
Oct-2019	\$	4,610.00
Sep-2019	\$	4,430.00
Apr-2019	\$	1,775.00
Aug-2019	\$	2,190.00
Dec-2019	\$	1,497.50
Feb-2019	\$	1,440.00
Jan-2019	\$	1,085.00
Jul-2019	\$	1,982.50
Jun-2019	\$	2,227.50
Mar-2019	\$	1,220.00
May-2019	\$	1,987.50
Nov-2019	\$	1,655.00
Oct-2019	\$	1,922.50
Sep-2019	\$	1,932.50
Apr-2019	\$	957.25
Aug-2019	\$	1,288.00
Dec-2019	\$	817.25
Feb-2019	\$	817.25
Jan-2019	\$	624.75
Jul-2019	\$	1,116.50
Jun-2019	\$	1,127.00
Mar-2019	\$	603.75
May-2019	\$	1,085.00
Nov-2019	\$	806.75
Oct-2019	\$	1,057.00
Sep-2019	\$	1,044.75
Apr-2019	\$	3,855.00
Aug-2019	\$	4,040.00
Dec-2019	\$	2,780.00
Feb-2019	\$	2,850.00
Jan-2019	\$	1,755.00
Jul-2019	\$	4,430.00
Jun-2019	\$	4,835.00
Mar-2019	\$	2,540.00
May-2019	\$	4,025.00
Nov-2019	\$	2,925.00
Oct-2019	\$	3,960.00
Sep-2019	\$	4,105.00
Aug-2019	\$	1,576.00
Dec-2019	\$	1,012.00
Feb-2019	\$	904.00
Jan-2019	\$	952.00
Jul-2019	\$	1,508.00
Jun-2019	\$	1,600.00
Mar-2019	\$	1,236.00
May-2019	\$	2,664.00
Nov-2019	\$	1,460.00
Oct-2019	\$	1,484.00

Counterparty and Payment Dates	REC Cost
Sep-2019	\$ 1,840.00
Apr-2019	\$ 4,033.77
Aug-2019	\$ 14,480.20
Dec-2019	\$ 4,240.63
Feb-2019	\$ 3,723.48
Jan-2019	\$ 7,033.24
Jun-2019	\$ 6,722.95
May-2019	\$ 11,377.30
Nov-2019	\$ 5,068.07
Oct-2019	\$ 6,412.66
Sep-2019	\$ 7,033.24
Aug-2019	\$ 3,991.26
Dec-2019	\$ 2,113.02
Feb-2019	\$ 1,995.63
Jan-2019	\$ 1,526.07
Jul-2019	\$ 2,347.80
Nov-2019	\$ 2,582.58
Oct-2019	\$ 3,404.31
Sep-2019	\$ 3,521.70
Aug-2019	\$ 5,352.00
Feb-2019	\$ 5,441.52
May-2019	\$ 8,058.96
Nov-2019	\$ 142.72
Apr-2019	\$ 3,328.00
Aug-2019	\$ 3,700.00
Dec-2019	\$ 2,660.00
Feb-2019	\$ 2,604.00
Jan-2019	\$ 2,108.00
Jul-2019	\$ 3,568.00
Jun-2019	\$ 3,860.00
Mar-2019	\$ 2,072.00
May-2019	\$ 3,524.00
Nov-2019	\$ 2,948.00
Oct-2019	\$ 3,572.00
Sep-2019	\$ 3,420.00
Apr-2019	\$ 3,975.00
Aug-2019	\$ 4,965.00
Dec-2019	\$ 2,390.00
Feb-2019	\$ 2,870.00
Jan-2019	\$ 2,345.00
Jul-2019	\$ 4,065.00
Jun-2019	\$ 4,915.00
Mar-2019	\$ 2,290.00
May-2019	\$ 4,250.00
Nov-2019	\$ 2,770.00
Oct-2019	\$ 4,395.00
Sep-2019	\$ 4,395.00

Counterparty and Payment Dates	REC Cost
Apr-2019	\$ 3,895.00
Aug-2019	\$ 3,685.00
Dec-2019	\$ 3,020.00
Feb-2019	\$ 2,920.00
Jan-2019	\$ 2,170.00
Jul-2019	\$ 4,225.00
Jun-2019	\$ 4,315.00
Mar-2019	\$ 2,435.00
May-2019	\$ 4,085.00
Nov-2019	\$ 2,880.00
Oct-2019	\$ 4,155.00
Sep-2019	\$ 4,005.00
[REDACTED]	
Apr-2019	\$ 788.00
Aug-2019	\$ 1,564.00
Dec-2019	\$ 1,268.00
Feb-2019	\$ 968.00
Jan-2019	\$ 936.00
Jul-2019	\$ 1,532.00
Jun-2019	\$ 1,668.00
Mar-2019	\$ 1,120.00
May-2019	\$ 1,416.00
Nov-2019	\$ 1,340.00
Oct-2019	\$ 1,212.00
Sep-2019	\$ 1,756.00
[REDACTED]	
Apr-2019	\$ 3,729.45
Aug-2019	\$ 6,713.01
Dec-2019	\$ 5,286.09
Feb-2019	\$ 3,950.00
Jan-2019	\$ 3,773.32
Jul-2019	\$ 6,842.73
Jun-2019	\$ 6,842.73
Mar-2019	\$ 4,832.07
May-2019	\$ 6,550.86
Nov-2019	\$ 4,669.92
Oct-2019	\$ 5,902.26
Sep-2019	\$ 7,004.88
[REDACTED]	
Apr-2019	\$ 3,780.00
Aug-2019	\$ 4,835.00
Dec-2019	\$ 2,640.00
Feb-2019	\$ 2,580.00
Jan-2019	\$ 1,680.00
Jul-2019	\$ 4,195.00
Jun-2019	\$ 4,800.00
Mar-2019	\$ 2,405.00
May-2019	\$ 4,075.00
Nov-2019	\$ 3,070.00
Oct-2019	\$ 3,870.00
Sep-2019	\$ 4,150.00
[REDACTED]	
Apr-2019	\$ 1,602.00

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2019 REPS Compliance Report
Dates and Amounts of Payments for RECs - Calendar Year 2019

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Jennings Exhibit No. 1, Appendix 1
June 9, 2020

<u>Counterparty and Payment Dates</u>		<u>REC Cost</u>
Aug-2019	\$	1,955.25
Dec-2019	\$	1,352.25
Feb-2019	\$	1,206.00
Jan-2019	\$	974.25
Jul-2019	\$	1,748.25
Jun-2019	\$	2,002.50
Mar-2019	\$	1,001.25
May-2019	\$	1,849.50
Nov-2019	\$	1,453.50
Oct-2019	\$	1,651.50
Sep-2019	\$	1,757.25
<hr/>		
Apr-2019	\$	438.75
Aug-2019	\$	787.50
Dec-2019	\$	636.75
Feb-2019	\$	1,012.50
Jul-2019	\$	823.50
Jun-2019	\$	864.00
Mar-2019	\$	639.00
May-2019	\$	733.50
Nov-2019	\$	708.75
Oct-2019	\$	776.25
Sep-2019	\$	852.75
<hr/>		
Apr-2019	\$	2,792.61
Aug-2019	\$	5,481.79
Dec-2019	\$	3,309.76
Feb-2019	\$	2,275.46
Jan-2019	\$	2,999.47
Jul-2019	\$	6,309.23
Jun-2019	\$	4,654.35
Mar-2019	\$	3,620.05
May-2019	\$	4,757.78
Nov-2019	\$	3,826.91
Oct-2019	\$	4,861.21
Sep-2019	\$	5,378.36
<hr/>		
Apr-2019	\$	1,759.50
Aug-2019	\$	2,144.25
Dec-2019	\$	1,345.50
Feb-2019	\$	1,379.25
Jan-2019	\$	1,107.00
Jul-2019	\$	1,919.25
Jun-2019	\$	2,155.50
Mar-2019	\$	1,143.00
May-2019	\$	1,894.50
Nov-2019	\$	1,440.00
Oct-2019	\$	1,928.25
Sep-2019	\$	1,908.00
<hr/>		
Apr-2019	\$	3,985.00
Aug-2019	\$	4,690.00
Dec-2019	\$	2,810.00

Counterparty and Payment Dates	REC Cost
Feb-2019	\$ 2,970.00
Jan-2019	\$ 2,335.00
Jul-2019	\$ 4,345.00
Jun-2019	\$ 4,845.00
Mar-2019	\$ 2,560.00
May-2019	\$ 4,290.00
Nov-2019	\$ 3,315.00
Oct-2019	\$ 3,110.00
Sep-2019	\$ 3,510.00
[REDACTED]	
Apr-2019	\$ 3,308.00
Aug-2019	\$ 4,248.00
Dec-2019	\$ 2,472.00
Feb-2019	\$ 2,548.00
Jan-2019	\$ 2,052.00
Jul-2019	\$ 3,856.00
Jun-2019	\$ 4,228.00
Mar-2019	\$ 2,116.00
May-2019	\$ 3,584.00
Nov-2019	\$ 2,592.00
Oct-2019	\$ 3,764.00
Sep-2019	\$ 3,716.00
[REDACTED]	
Apr-2019	\$ 3,332.00
Aug-2019	\$ 3,948.00
Dec-2019	\$ 2,492.00
Feb-2019	\$ 2,612.00
Jan-2019	\$ 2,228.00
Jul-2019	\$ 3,836.00
Jun-2019	\$ 4,364.00
Mar-2019	\$ 2,220.00
May-2019	\$ 3,388.00
Nov-2019	\$ 2,684.00
Oct-2019	\$ 3,448.00
Sep-2019	\$ 3,532.00
[REDACTED]	
Apr-2019	\$ 2,430.00
Aug-2019	\$ 2,780.00
Dec-2019	\$ 1,435.00
Feb-2019	\$ 1,770.00
Jan-2019	\$ 1,190.00
Jul-2019	\$ 2,660.00
Jun-2019	\$ 3,070.00
Mar-2019	\$ 1,595.00
May-2019	\$ 2,595.00
Nov-2019	\$ 1,970.00
Oct-2019	\$ 2,530.00
Sep-2019	\$ 2,430.00
[REDACTED]	
Apr-2019	\$ 3,885.00
Aug-2019	\$ 4,360.00
Dec-2019	\$ 2,995.00
Feb-2019	\$ 2,740.00

**Information in italics is confidential*

Counterparty and Payment Dates		REC Cost
Jan-2019	\$	2,070.00
Jul-2019	\$	4,060.00
Jun-2019	\$	4,520.00
Mar-2019	\$	2,460.00
May-2019	\$	4,065.00
Nov-2019	\$	3,270.00
Oct-2019	\$	4,140.00
Sep-2019	\$	3,755.00
[REDACTED]		
Apr-2019	\$	3,815.00
Aug-2019	\$	4,410.00
Dec-2019	\$	2,740.00
Feb-2019	\$	2,830.00
Jan-2019	\$	2,115.00
Jul-2019	\$	4,260.00
Jun-2019	\$	4,625.00
Mar-2019	\$	2,380.00
May-2019	\$	4,040.00
Nov-2019	\$	2,810.00
Oct-2019	\$	4,135.00
Sep-2019	\$	3,985.00
[REDACTED]		
Apr-2019	\$	3,875.00
Aug-2019	\$	4,915.00
Dec-2019	\$	2,840.00
Feb-2019	\$	2,815.00
Jan-2019	\$	1,915.00
Jul-2019	\$	4,480.00
Jun-2019	\$	4,990.00
Mar-2019	\$	2,540.00
May-2019	\$	4,005.00
Nov-2019	\$	3,205.00
Oct-2019	\$	4,125.00
Sep-2019	\$	4,320.00
[REDACTED]		
Apr-2019	\$	38,315.00
Aug-2019	\$	46,025.00
Dec-2019	\$	92,680.00
Feb-2019	\$	56,565.00
Jan-2019	\$	48,470.00
Jul-2019	\$	54,845.00
Jun-2019	\$	31,205.00
Mar-2019	\$	36,800.00
May-2019	\$	36,440.00
Nov-2019	\$	47,340.00
Sep-2019	\$	53,695.00
[REDACTED]		
Apr-2019	\$	3,104.00
Aug-2019	\$	3,820.00
Dec-2019	\$	2,288.00
Feb-2019	\$	2,264.00
Jan-2019	\$	1,624.00
Jul-2019	\$	3,688.00

Counterparty and Payment Dates	REC Cost
Jun-2019	\$ 3,980.00
Mar-2019	\$ 2,072.00
May-2019	\$ 3,100.00
Nov-2019	\$ 2,304.00
Oct-2019	\$ 2,924.00
Sep-2019	\$ 3,464.00
█	
Apr-2019	\$ 3,855.00
Aug-2019	\$ 4,885.00
Dec-2019	\$ 3,055.00
Feb-2019	\$ 2,985.00
Jan-2019	\$ 2,150.00
Jul-2019	\$ 4,355.00
Jun-2019	\$ 4,610.00
Mar-2019	\$ 2,440.00
May-2019	\$ 3,840.00
Nov-2019	\$ 3,395.00
Oct-2019	\$ 4,240.00
Sep-2019	\$ 4,455.00
█	
Apr-2019	\$ 4,175.00
Aug-2019	\$ 4,910.00
Dec-2019	\$ 2,875.00
Feb-2019	\$ 2,820.00
Jan-2019	\$ 2,450.00
Jul-2019	\$ 4,420.00
Jun-2019	\$ 5,070.00
Mar-2019	\$ 2,675.00
May-2019	\$ 4,575.00
Nov-2019	\$ 3,505.00
Oct-2019	\$ 4,425.00
Sep-2019	\$ 4,265.00
█	
Apr-2019	\$ 32,466.03
Aug-2019	\$ 39,496.89
Dec-2019	\$ 18,817.89
Feb-2019	\$ 16,543.20
Jan-2019	\$ 14,289.66
Jul-2019	\$ 37,635.78
Jun-2019	\$ 45,493.80
Mar-2019	\$ 19,851.84
May-2019	\$ 36,395.04
Nov-2019	\$ 24,814.80
Oct-2019	\$ 33,913.56
Sep-2019	\$ 36,188.25
█	
Apr-2019	\$ 3,815.00
Aug-2019	\$ 1,955.00
Dec-2019	\$ 2,810.00
Feb-2019	\$ 3,095.00
Jan-2019	\$ 2,305.00
Jul-2019	\$ 4,255.00
Jun-2019	\$ 4,275.00

Counterparty and Payment Dates	REC Cost
Mar-2019	\$ 2,440.00
May-2019	\$ 3,715.00
Nov-2019	\$ 3,235.00
Oct-2019	\$ 4,145.00
Sep-2019	\$ 3,610.00
<hr style="border-top: 3px solid black;"/>	
Apr-2019	\$ 1,760.85
Aug-2019	\$ 3,873.87
Dec-2019	\$ 2,347.80
Feb-2019	\$ 1,408.68
Jan-2019	\$ 1,526.07
Jul-2019	\$ 3,991.26
Jun-2019	\$ 3,756.48
Mar-2019	\$ 1,643.46
May-2019	\$ 2,817.36
Nov-2019	\$ 2,465.19
Oct-2019	\$ 3,639.09
Sep-2019	\$ 3,639.09
<hr style="border-top: 3px solid black;"/>	
Apr-2019	\$ 4,215.00
Aug-2019	\$ 4,105.00
Dec-2019	\$ 3,125.00
Feb-2019	\$ 3,215.00
Jan-2019	\$ 2,570.00
Jul-2019	\$ 4,110.00
Jun-2019	\$ 4,630.00
Mar-2019	\$ 2,395.00
May-2019	\$ 4,385.00
Nov-2019	\$ 3,650.00
Oct-2019	\$ 4,495.00
Sep-2019	\$ 4,305.00
<hr style="border-top: 3px solid black;"/>	
Apr-2019	\$ 3,316.00
Aug-2019	\$ 3,996.00
Dec-2019	\$ 2,484.00
Feb-2019	\$ 2,492.00
Jan-2019	\$ 1,900.00
Jul-2019	\$ 3,680.00
Jun-2019	\$ 4,036.00
Mar-2019	\$ 2,072.00
May-2019	\$ 3,468.00
Nov-2019	\$ 2,792.00
Oct-2019	\$ 3,496.00
Sep-2019	\$ 3,580.00
<hr style="border-top: 3px solid black;"/>	
Apr-2019	\$ 234.78
Aug-2019	\$ 352.17
Dec-2019	\$ 234.78
Feb-2019	\$ 234.78
Jan-2019	\$ 234.78
Jul-2019	\$ 352.17
Jun-2019	\$ 352.17
Mar-2019	\$ 234.78

Counterparty and Payment Dates		REC Cost
May-2019	\$	234.78
Nov-2019	\$	352.17
Oct-2019	\$	352.17
Sep-2019	\$	352.17
██		
Apr-2019	\$	2,999.47
Aug-2019	\$	5,998.94
Dec-2019	\$	4,137.20
Feb-2019	\$	3,102.90
Jan-2019	\$	2,689.18
Jul-2019	\$	6,722.95
Jun-2019	\$	5,378.36
Mar-2019	\$	4,033.77
May-2019	\$	5,895.51
Nov-2019	\$	4,550.92
Oct-2019	\$	5,481.79
Sep-2019	\$	5,895.51
██		
Apr-2019	\$	13,731.00
Aug-2019	\$	16,042.50
Dec-2019	\$	9,936.00
Feb-2019	\$	9,936.00
Jan-2019	\$	7,831.50
Jul-2019	\$	14,817.75
Jun-2019	\$	16,077.00
Mar-2019	\$	8,711.25
May-2019	\$	14,766.00
Nov-2019	\$	11,316.00
Oct-2019	\$	14,610.75
Sep-2019	\$	13,472.25
██		
Apr-2019	\$	2,492.00
Aug-2019	\$	2,968.00
Dec-2019	\$	1,716.00
Feb-2019	\$	1,772.00
Jan-2019	\$	1,464.00
Jul-2019	\$	2,756.00
Jun-2019	\$	3,056.00
Mar-2019	\$	1,532.00
May-2019	\$	2,652.00
Nov-2019	\$	1,904.00
Oct-2019	\$	2,288.00
Sep-2019	\$	2,536.00
██		
Apr-2019	\$	3,900.00
Aug-2019	\$	5,020.00
Dec-2019	\$	2,910.00
Feb-2019	\$	2,940.00
Jan-2019	\$	2,280.00
Jul-2019	\$	4,425.00
Jun-2019	\$	5,130.00
Mar-2019	\$	2,545.00
May-2019	\$	4,265.00

**Information in italics is confidential*

Counterparty and Payment Dates	REC Cost
Nov-2019	\$ 1,745.00
Oct-2019	\$ 4,070.00
Sep-2019	\$ 4,055.00
Apr-2019	\$ 3,955.00
Aug-2019	\$ 4,565.00
Dec-2019	\$ 3,005.00
Feb-2019	\$ 3,015.00
Jan-2019	\$ 2,355.00
Jul-2019	\$ 4,415.00
Jun-2019	\$ 4,855.00
Mar-2019	\$ 2,490.00
May-2019	\$ 4,230.00
Nov-2019	\$ 3,315.00
Oct-2019	\$ 4,310.00
Sep-2019	\$ 4,380.00
Apr-2019	\$ 100,494.24
Aug-2019	\$ 89,461.68
Dec-2019	\$ 95,912.02
Feb-2019	\$ 102,286.80
Jan-2019	\$ 99,681.12
Jul-2019	\$ 92,030.40
Jun-2019	\$ 98,535.36
Mar-2019	\$ 91,605.36
May-2019	\$ 96,447.12
Nov-2019	\$ 99,470.24
Oct-2019	\$ 97,011.47
Sep-2019	\$ 99,910.02
Apr-2019	\$ 3,176.00
Aug-2019	\$ 3,876.00
Dec-2019	\$ 2,136.00
Feb-2019	\$ 2,112.00
Jan-2019	\$ 1,348.00
Jul-2019	\$ 3,684.00
Jun-2019	\$ 3,972.00
Mar-2019	\$ 1,988.00
May-2019	\$ 3,184.00
Nov-2019	\$ 2,604.00
Oct-2019	\$ 3,408.00
Sep-2019	\$ 3,604.00
Apr-2019	\$ 1,135.00
Aug-2019	\$ 2,000.00
Dec-2019	\$ 1,455.00
Feb-2019	\$ 1,080.00
Jan-2019	\$ 1,045.00
Jul-2019	\$ 2,085.00
Jun-2019	\$ 1,875.00
Mar-2019	\$ 1,415.00
May-2019	\$ 1,625.00
Nov-2019	\$ 1,605.00

Counterparty and Payment Dates		REC Cost
Oct-2019	\$	1,810.00
Sep-2019	\$	1,845.00
[REDACTED]		
Apr-2019	\$	2,310.00
Aug-2019	\$	4,890.00
Dec-2019	\$	2,880.00
Feb-2019	\$	2,870.00
Jan-2019	\$	1,940.00
Jul-2019	\$	4,455.00
Jun-2019	\$	4,830.00
Mar-2019	\$	2,530.00
May-2019	\$	3,925.00
Nov-2019	\$	3,265.00
Oct-2019	\$	4,080.00
Sep-2019	\$	4,230.00
[REDACTED]		
Apr-2019	\$	3,208.00
Aug-2019	\$	3,992.00
Dec-2019	\$	2,536.00
Feb-2019	\$	2,476.00
Jan-2019	\$	1,872.00
Jul-2019	\$	3,816.00
Jun-2019	\$	4,160.00
Mar-2019	\$	2,060.00
May-2019	\$	3,572.00
Nov-2019	\$	2,820.00
Oct-2019	\$	3,704.00
Sep-2019	\$	3,628.00
[REDACTED]		
Apr-2019	\$	3,244.00
Aug-2019	\$	3,952.00
Dec-2019	\$	2,604.00
Feb-2019	\$	2,448.00
Jan-2019	\$	1,904.00
Jul-2019	\$	3,788.00
Jun-2019	\$	4,232.00
Mar-2019	\$	2,096.00
May-2019	\$	3,608.00
Nov-2019	\$	2,892.00
Oct-2019	\$	3,784.00
Sep-2019	\$	3,656.00
[REDACTED]		
Apr-2019	\$	3,950.00
Aug-2019	\$	4,460.00
Dec-2019	\$	2,750.00
Feb-2019	\$	3,175.00
Jan-2019	\$	2,395.00
Jul-2019	\$	4,370.00
Jun-2019	\$	4,815.00
Mar-2019	\$	2,555.00
May-2019	\$	4,280.00
Nov-2019	\$	3,145.00
Oct-2019	\$	4,310.00

Counterparty and Payment Dates	REC Cost
Sep-2019	\$ 4,025.00
Apr-2019	\$ 4,030.00
Aug-2019	\$ 4,425.00
Dec-2019	\$ 3,075.00
Feb-2019	\$ 3,020.00
Jan-2019	\$ 2,120.00
Jul-2019	\$ 3,975.00
Jun-2019	\$ 3,130.00
Mar-2019	\$ 2,600.00
May-2019	\$ 3,520.00
Nov-2019	\$ 3,005.00
Oct-2019	\$ 3,235.00
Sep-2019	\$ 4,055.00
Apr-2019	\$ 1,762.32
Aug-2019	\$ 4,185.51
Dec-2019	\$ 2,643.48
Feb-2019	\$ 1,762.32
Jan-2019	\$ 2,056.04
Jul-2019	\$ 4,258.94
Jun-2019	\$ 4,112.08
Mar-2019	\$ 2,496.62
May-2019	\$ 3,451.21
Nov-2019	\$ 3,230.92
Oct-2019	\$ 3,818.36
Sep-2019	\$ 3,965.22
Apr-2019	\$ 1,927.50
Aug-2019	\$ 1,735.00
Dec-2019	\$ 1,522.50
Feb-2019	\$ 1,280.00
Jan-2019	\$ 1,182.50
Jul-2019	\$ 1,757.50
Jun-2019	\$ 2,217.50
Mar-2019	\$ 1,200.00
May-2019	\$ 2,052.50
Nov-2019	\$ 1,655.00
Oct-2019	\$ 1,615.00
Sep-2019	\$ 1,822.50
Apr-2019	\$ 3,815.00
Aug-2019	\$ 2,635.00
Feb-2019	\$ 2,905.00
Jan-2019	\$ 2,315.00
Jul-2019	\$ 3,120.00
Jun-2019	\$ 4,405.00
Mar-2019	\$ 2,460.00
May-2019	\$ 4,040.00
Nov-2019	\$ 1,285.00
Oct-2019	\$ 3,930.00
Sep-2019	\$ 3,315.00

Counterparty and Payment Dates		REC Cost
Apr-2019	\$	3,725.00
Aug-2019	\$	4,630.00
Dec-2019	\$	2,925.00
Feb-2019	\$	2,875.00
Jan-2019	\$	2,330.00
Jul-2019	\$	4,220.00
Jun-2019	\$	4,810.00
Mar-2019	\$	2,500.00
May-2019	\$	4,145.00
Nov-2019	\$	3,150.00
Oct-2019	\$	4,000.00
Sep-2019	\$	3,950.00

Apr-2019	\$	3,855.00
Aug-2019	\$	4,590.00
Dec-2019	\$	2,810.00
Feb-2019	\$	2,925.00
Jan-2019	\$	2,425.00
Jul-2019	\$	4,135.00
Jun-2019	\$	4,690.00
Mar-2019	\$	2,480.00
May-2019	\$	4,020.00
Nov-2019	\$	3,025.00
Oct-2019	\$	3,460.00
Sep-2019	\$	3,905.00

Apr-2019	\$	3,300.00
Aug-2019	\$	4,212.00
Dec-2019	\$	2,396.00
Feb-2019	\$	2,512.00
Jan-2019	\$	2,048.00
Jul-2019	\$	3,816.00
Jun-2019	\$	4,256.00
Mar-2019	\$	2,128.00
May-2019	\$	3,500.00
Nov-2019	\$	2,696.00
Oct-2019	\$	3,472.00
Sep-2019	\$	3,556.00

Apr-2019	\$	620.58
Aug-2019	\$	1,241.16
Dec-2019	\$	620.58
Feb-2019	\$	413.72
Jan-2019	\$	724.01
Jul-2019	\$	1,344.59
Mar-2019	\$	620.58
May-2019	\$	413.72
Nov-2019	\$	827.44
Oct-2019	\$	2,585.75

Apr-2019	\$	2,860.00
Aug-2019	\$	4,420.00
Dec-2019	\$	2,800.00

Counterparty and Payment Dates	REC Cost
Feb-2019	\$ 2,465.00
Jan-2019	\$ 1,950.00
Jul-2019	\$ 4,020.00
Jun-2019	\$ 4,375.00
Mar-2019	\$ 2,015.00
May-2019	\$ 3,120.00
Nov-2019	\$ 2,980.00
Oct-2019	\$ 3,785.00
Sep-2019	\$ 3,920.00
[REDACTED]	
Apr-2019	\$ 3,252.00
Aug-2019	\$ 3,852.00
Dec-2019	\$ 2,288.00
Feb-2019	\$ 2,428.00
Jan-2019	\$ 1,960.00
Jul-2019	\$ 3,488.00
Jun-2019	\$ 3,976.00
Mar-2019	\$ 2,068.00
May-2019	\$ 3,464.00
Nov-2019	\$ 2,528.00
Oct-2019	\$ 2,640.00
Sep-2019	\$ 3,180.00
[REDACTED]	
Apr-2019	\$ 396.50
Aug-2019	\$ 505.00
Dec-2019	\$ 287.00
Feb-2019	\$ 288.50
Jan-2019	\$ 179.00
Jul-2019	\$ 466.50
Jun-2019	\$ 499.50
Mar-2019	\$ 259.50
May-2019	\$ 428.50
Nov-2019	\$ 333.00
Oct-2019	\$ 419.00
Sep-2019	\$ 436.00
[REDACTED]	
Apr-2019	\$ 1,475.00
Aug-2019	\$ 3,295.00
Dec-2019	\$ 2,980.00
Feb-2019	\$ 2,915.00
Jan-2019	\$ 1,960.00
Jul-2019	\$ 3,800.00
Jun-2019	\$ 4,270.00
Mar-2019	\$ 2,525.00
May-2019	\$ 1,445.00
Nov-2019	\$ 3,410.00
Oct-2019	\$ 2,605.00
Sep-2019	\$ 1,675.00
[REDACTED]	
Apr-2019	\$ 3,008.00
Aug-2019	\$ 3,724.00
Dec-2019	\$ 2,312.00
Feb-2019	\$ 1,912.00

Duke Energy Progress, LLC
Docket No. E-2, Sub 1251
2019 REPS Compliance Report
Dates and Amounts of Payments for RECs - Calendar Year 2019

Redacted Version
Jennings Exhibit No. 1, Appendix 1
June 9, 2020

Counterparty and Payment Dates	REC Cost
Jan-2019	\$ 1,512.00
Jul-2019	\$ 3,564.00
Jun-2019	\$ 3,932.00
Mar-2019	\$ 1,984.00
May-2019	\$ 2,860.00
Nov-2019	\$ 2,660.00
Oct-2019	\$ 3,380.00
Sep-2019	\$ 3,628.00
[REDACTED]	
Apr-2019	\$ 1,773.00
Aug-2019	\$ 1,570.50
Dec-2019	\$ 1,271.25
Feb-2019	\$ 1,248.75
Jan-2019	\$ 861.75
Jul-2019	\$ 1,793.25
Jun-2019	\$ 1,998.00
Mar-2019	\$ 1,091.25
May-2019	\$ 1,012.50
Nov-2019	\$ 1,440.00
Oct-2019	\$ 1,838.25
Sep-2019	\$ 1,662.75
[REDACTED]	
Apr-2019	\$ 2,577.00
Aug-2019	\$ 3,078.00
Dec-2019	\$ 1,986.00
Feb-2019	\$ 1,956.00
Jan-2019	\$ 1,596.00
Jul-2019	\$ 2,841.00
Jun-2019	\$ 3,141.00
Mar-2019	\$ 1,650.00
May-2019	\$ 2,805.00
Nov-2019	\$ 2,205.00
Oct-2019	\$ 2,811.00
Sep-2019	\$ 2,706.00
[REDACTED]	
Apr-2019	\$ 3,348.00
Aug-2019	\$ 3,960.00
Dec-2019	\$ 2,472.00
Feb-2019	\$ 2,420.00
Jan-2019	\$ 1,920.00
Jul-2019	\$ 3,688.00
Jun-2019	\$ 4,076.00
Mar-2019	\$ 2,100.00
May-2019	\$ 3,616.00
Nov-2019	\$ 2,828.00
Oct-2019	\$ 3,480.00
Sep-2019	\$ 3,424.00

[END CONFIDENTIAL]

DUKE ENERGY PROGRESS, LLC
Docket No. E-2, Sub 1251

Compliance Costs

Line No.	Renewable Resource	EMF Period April 1, 2019 - March 31, 2020					Billing Period December 1, 2020 - November 30, 2021			
		RECs only	Total Units <small>Note 3</small>	Cost per Unit	Total Cost	RECs	Total Units <small>Note 3</small>	Cost per Unit	Total Cost	RECs
249										
250										
251										
252										
253										
254										
255										
256										
257										
258	Total Units and Cost for Energy and REC purchases									
259	Other Incremental Cost (see Jennings Exhibit No. 3 for Incremental Cost worksheet)			\$	1,494,316			\$	1,578,000	
260	Billing Period estimated credits for receipts related to contracts (see Jennings Exhibit No. 3)			\$	-	Note 1		\$	(500,000)	Note 1
261	Solar Rebate Program (see Jennings Exhibit No. 3 for cost detail)			\$	1,011,806			\$	1,958,668	
262	Research (see Jennings Exhibit No. 3 for Research cost detail)			\$	798,548			\$	931,500	
263	Total Research and Other Incremental Cost			\$	3,304,670			\$	3,968,168	
264	Total REPS Cost - to Williams Exhibit No. 1			\$	232,647,165			\$	188,974,108	
265	EMF Period actual credits for receipts related to contracts - to Williams Exhibit No.4 - footnote (2)			\$	(94,500)	Note 1				Jennings Exhibit No.3

REDACTED VERSION

Jennings Exhibit No. 2

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June 9, 2020

DUKE ENERGY PROGRESS, LLC

Docket No. E-2, Sub 1251

Compliance Costs

Line No.	Renewable Resource	EMF Period April 1, 2019 - March 31, 2020				Billing Period December 1, 2020 - November 30, 2021			
		RECs only	Total Units <small>Note 3</small>	Cost per Unit	Total Cost	RECs	Total Units <small>Note 3</small>	Cost per Unit	Total Cost

Notes:

Note 1: EMF Period contract receipts are not included in the under/overcollection calculation on Williams Exhibit No. 2, instead they are credited directly to customer class on Williams Exhibit No. 4. Estimated contract receipts are included in Billing Period total other incremental cost as a reduction in REPS charges proposed for the Billing Period.

Note 2: The revenue requirements associated with each of the Company's solar generating facilities were included in total in the Company's most recent base rate case. The Commission accepted DEP's conclusion that the facility costs included in its proposed base rates were prudently incurred and approved recovery through base rates. Annual levelized costs are no longer calculated and reported in this exhibit.

Note 3: Total units refers to MWhs for bundled energy and REC purchases or to RECs for purchases denoted as RECs only.

REDACTED VERSION*

EMF Period	Billing Period
April 1, 2019 - March 31, 2020	December 1, 2020 - November 30, 2021

Line No. Incremental Cost Worksheet:

Line No.	Description	EMF Period	Billing Period
1	Labor by activity:		
2	[REDACTED]		
3	[REDACTED]		
4	[REDACTED]		
5	[REDACTED]		
6	[REDACTED]		
7	[REDACTED]		
8	[REDACTED]		
9	[REDACTED]		
10	[REDACTED]		
11	[REDACTED]		
12	[REDACTED]		
13	[REDACTED]		
14	[REDACTED]		
15	[REDACTED]		
16	[REDACTED]		
17	[REDACTED]		
18	[REDACTED]		
19	[REDACTED]		
20	[REDACTED]		
21	Total Other Incremental Cost	\$ 1,494,316	\$ 1,578,000
Solar Rebate Program Cost Detail (recovery in REPS pursuant to G.S. 62-155(f)): (1)			
22	Annual Amortization of Incentives Provided to Customers, plus return on unamortized balance	\$ 962,054	\$ 1,850,434
23	Annual Amortization of Program Administrative Labor Costs, plus return on unamortized balance	[REDACTED]	[REDACTED]
24	Annual Amortization of Program Administrative Contract Labor & Other Administrative Costs, plus return on unamortized balance	[REDACTED]	[REDACTED]
25	Total Solar Rebate Program Cost	\$ 1,011,806	\$ 1,958,668

(1) All annual Solar Rebate Program costs reflect amortization of incurred costs over 20 years, including a return on the unamortized balance.

REDACTED VERSION*

Line No.	Incremental Cost Worksheet:	EMF Period		Billing Period	
		April 1, 2019 - March 31, 2020		December 1, 2020 - November 30, 2021	
	Research Cost Detail:				
26	CAPER Combined T&D System Model Study - NCSU, UNCC				
27	CAPER PV Synchronous Generator - Clemson University, NCSU				
28	Coalition for Renewable Natural Gas Membership				
29	Eos Energy Storage Technology Development - McAlpine				
30	EPRI Membership				
31	EPRI - DER Integration, Energy Storage & Distributed Generation				
32	EPRI - DER Interconnection Standards & Practices				
33	EPRI - PV monitoring project				
34	ETO - Mitigation of Transformer High Inrush Current				
35	NCSU - Adopting DVAR to Mitigate PV Impact on a Distribution System				
36	NCSU - DER Cost of Service				
37	NCSU - ETO - Feeder Anti-islanding Detection Using HIL Modeling and Simulation				
38	NCSU - ETO - Grid-forming Battery Energy Storage System Characterization & Testing				
39	NCSU - Interactions of PV Installations with Distribution Systems				
40	NCSU - Future Renewable Electric Energy Delivery & Mgmt Center (FREEDM Center)				
41	NREL - Carbon-free resource integration study				
42	Research Triangle Institute - Biogas Utilization in NC				
43	Rocky Mountain Institute - eLab				
44	UNCC - Marshall Storage Integration and Controller Design (Phase V)				
45	Total Research Cost	\$	798,548	\$	931,500
46	Total Other Incremental Cost	\$	1,494,316	\$	1,578,000
47	Projected credits for receipts related to contract amendments/liquidated damages, etc	\$	(500,000)	\$	(500,000)
48	Total Other Incremental Cost and other credits	\$	1,494,316	\$	1,078,000
49	Total Solar Rebate Program Cost	\$	1,011,806	\$	1,958,668
50	Total Research Cost	\$	798,548	\$	931,500
51	Grand Total - Other Incremental, Solar Rebate Program, and Research Cost, other credits	\$	3,304,670	\$	3,968,168
52	EMF Period actual credits for receipts related to contracts - see Note 1	\$	(94,500)		
53	Net Other Incremental, Solar Rebate Program and Research Cost	\$	3,210,170	\$	3,968,168

Note 1: EMF Period contract receipts are not included in the under/overcollection calculation on Williams Exhibit No. 2, instead they are credited directly to customer class on Williams Exhibit No. 4. Estimated contract receipts are included in Billing Period total other incremental cost as a reduction in REPS charges proposed for the Billing Period.

JENNINGS CONFIDENTIAL EXHIBIT NO. 4
DOCKET NO. E-2, SUB 1251

CONFIDENTIAL – FILED UNDER SEAL



**Center for Advanced Power Engineering Research
2017-2019 Research Project Report**

Development and Demonstration of a 40kW Photovoltaic Synchronous Generator (PVSG)

Prepared by:

Dr. Alex Huang (PI), UT Austin

Dr. Ramtin Hadidi (Co-PI), Clemson University

Project Period:

Start Date: 4/1/2017

Completion Date: 10/31/2019



**Center for Advanced Power Engineering Research
2017-2019 Research Project Report**

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**Center for Advanced Power Engineering Research
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1 Project Objectives

The project objective is to design and develop a 40 kW ultracapcitor energy storage system that works in parallel with commercial grid following PV inverters. The entire system behaves like a grid forming PV Synchronous Generator (PVSG). It is a significant step needed to make all PV systems to provide both Voltage and Frequency support to the grid.

2 Project Team and Tasks

UT Austin Team	
Role	Name
Faculty Advisor	Dr. Alex Huang
Graduate Students	Yizhe Xu (graduated), Xiangjun Quan(graduated) and Chengjing Li

Clemson Team	
Role	Name
Faculty Advisor	Dr. Ramtin Hadidi
Graduate Students	Puspal Hazra



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3 Project Description and Outcomes

3.1 Background, Research Objectives and Major Accomplishments

As the renewable energy and distributed generation penetration increases in utility power grids, the traditional control approach for these resources needs a fundamental change in order to maintain overall grid stability. Traditionally, PV inverters are designed as a grid following current source, providing no ancillary services to maintain the grid stability. For very high PV penetration levels, PV power plants will replace traditional synchronous generator and they must also provide grid frequency support and regulation capability. This effectively requires a totally new generation of PV inverter technology.

Dr. Huang's team has previously developed a single phase PVSG, this work has been accomplished and one paper was published. See paper in "Integration of DC Microgrids as Virtual Synchronous Machines into the AC Grid," in *IEEE Transactions on Industrial Electronics*, vol. 64, no. 9, pp. 7455-7466, Sept. 2017.

In this CAPER project, a novel AC coupled solution that transforms an existing grid following PV system to a grid forming one without any hardware and software modification of the PV inverter is proposed and implemented. The resulting system, the Photovoltaic Synchronous Generator (PVSG), is achieved by an AC coupled supercapacitor-based energy storage system (ESS). The following major accomplishments have been made in CAPER project:

- 1- A 40 kW/480V ultra capacitor ESS is designed, developed, and tested.
- 2- Together with a commercial PV system, the 40 kW PVSG system is tested and demonstrated in October 2019 at UT Austin in 2019. Duke Energy, Austin Energy representatives participated in the demonstration.
- 3- In Feb 2020, the 40 KW PVSG system was also demonstrated to representatives from ERCOT
- 4- A novel control for the PVSG was developed with robust inertia and primary frequency response capability.
- 5- Following papers are published.
 - [1] X. Quan *et al.*, "Novel Power Control of Voltage-Controlled Inverters for Grid Inertia Support," in 2019 IEEE Applied Power Electronics and Exposition (APEC), Anaheim, CA, USA, 2019, pp. 927-931.
 - [2] X. Quan *et al.*, "Photovoltaic Synchronous Generator (PVSG): Architecture and Control Strategy for A Grid-Forming PV Energy System," in *IEEE Journal of Emerging and Selected Topics in Power Electronics*. doi: 10.1109/JESTPE.2019.2953178 is published.
 - [3] X. Quan, A. Q. Huang and H. Yu, "A Novel Order Reduced Synchronous Power Control for Grid-Forming Inverters," in *IEEE Transactions on Industrial Electronics*. doi: 10.1109/TIE.2019.2959485



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- [4] P. Hazra and R. Hadidi, "Inertial response enhancement of a microgrid using Photovoltaic Synchronous Generator," 2018 IEEE Electronic Power Grid (eGrid), Charleston, SC, Nov. 2018, pp. 1-4.

3.2 PVSG Description

The system diagram of the implemented three-phase PVSG is shown in Fig. 1. Fig. 2 displays the schematic illustration of the proposed PVSG whose equivalent circuit diagram is shown in Fig. 3.

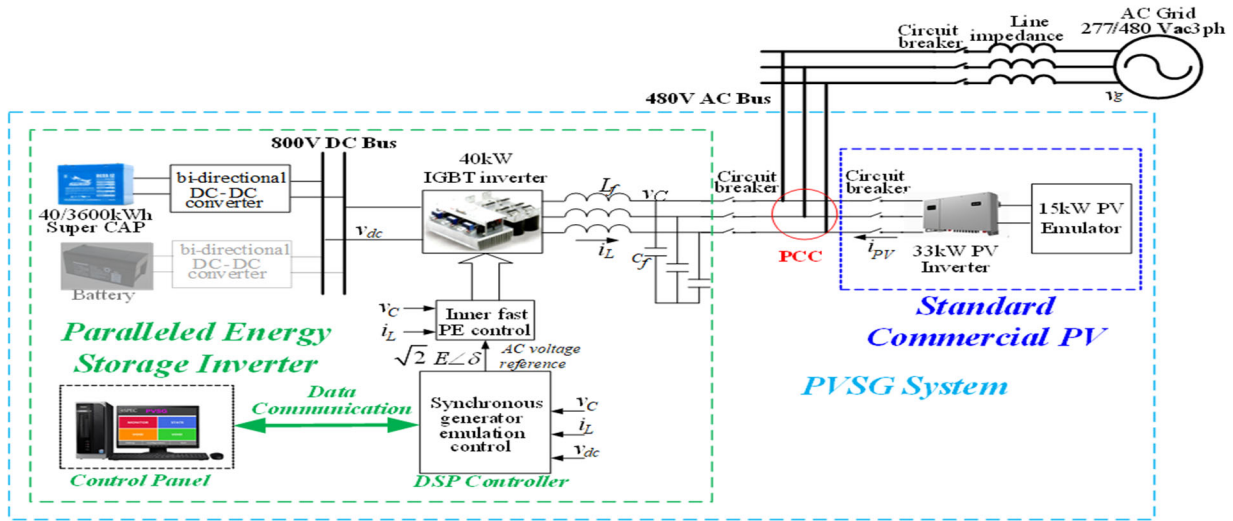


Fig. 1. System Diagram of the implemented three-phase PVSG system.

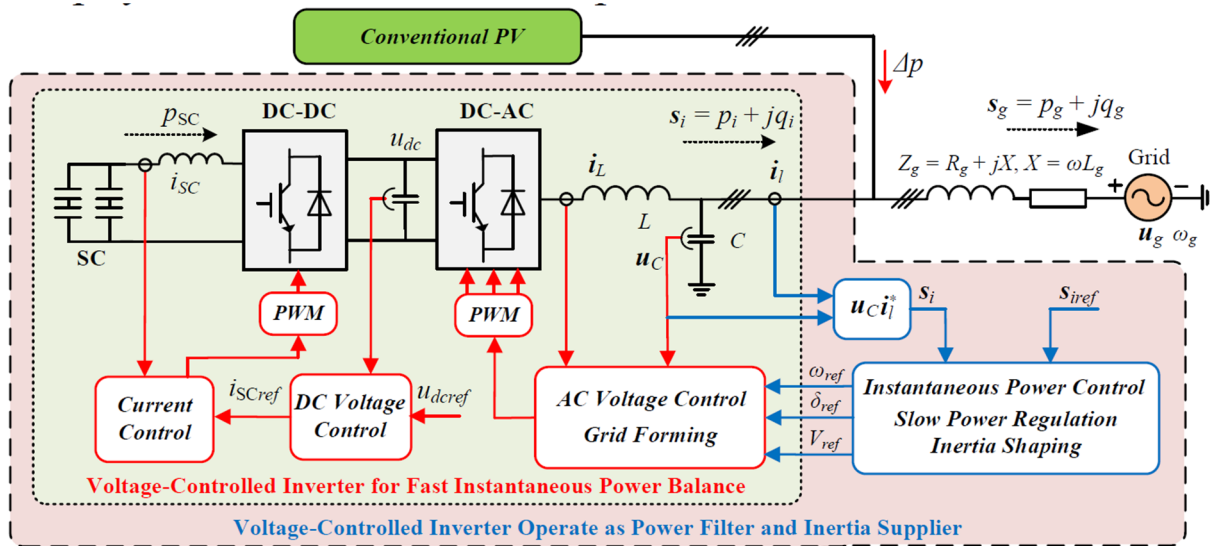


Fig. 2. Illustration of the proposed PVSG by paralleled grid-forming inverter.



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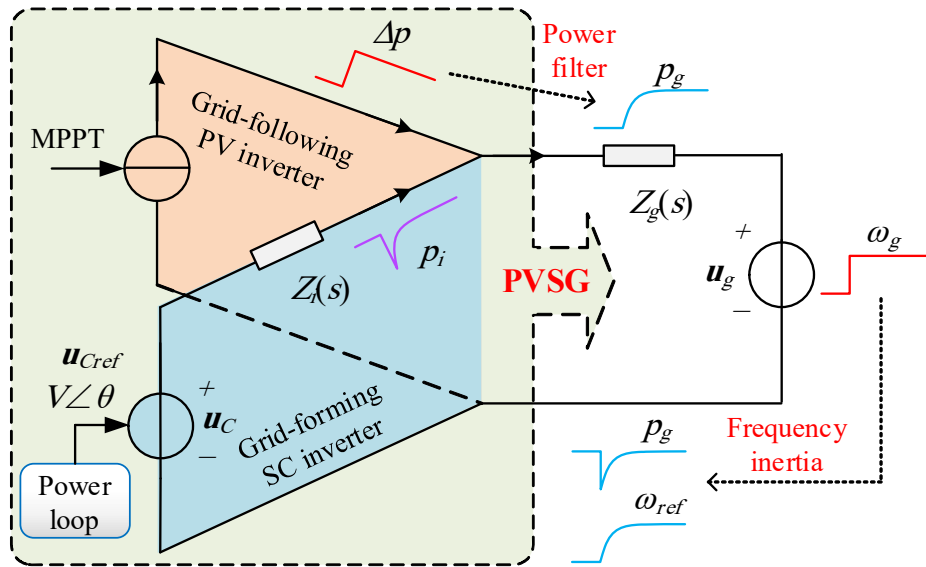


Fig. 3. Equivalent circuit diagram of the proposed PVSG and the functionality illustration of the power filter and frequency inertia.

The PVSG includes a grid following PV (and/or load) in parallel with a grid-forming inverter with SC on the DC side. The control of the PV is a standard grid-following MPPT controlled inverter system. PVSG controls are implemented in the SC inverter which can be further divided into two parts. The first one is the fundamental voltage and current control with fast dynamic response which achieves the automatic and fast response to the power intermittence and grid frequency variations, as shown by red parts in Fig. 2. The second part implements the slow power control to emulate the inertia hence achieving power filter and frequency inertia, as shown by the blue parts in Fig. 2. The proposed inertia solution includes frequency inertia and power filter as demonstrated in Fig. 3. These two functions are used to alleviate power demand of kinetic energy of SG in event of power and frequency variations. Therefore, they need a very fast and short time active power injection/absorbing to/from the grid when PV power or frequency changes suddenly. To this end, the response of the grid-forming inverter should be as fast as possible to avoid the requirement of step power from grid. As shown in Fig. 3, the conventional grid-following PV system achieves the MPPT control, while the added inverter operates as a voltage source whose amplitude and frequency are adjusted by the power loop. The proposed control diagram of the PVSG is illustrated in Fig. 4, for detailed design of AC-DC, DC-DC, and power flow controllers design please refer to [2]. TABLE I lists the system parameters and the experimental setup is displayed in Fig. 5.



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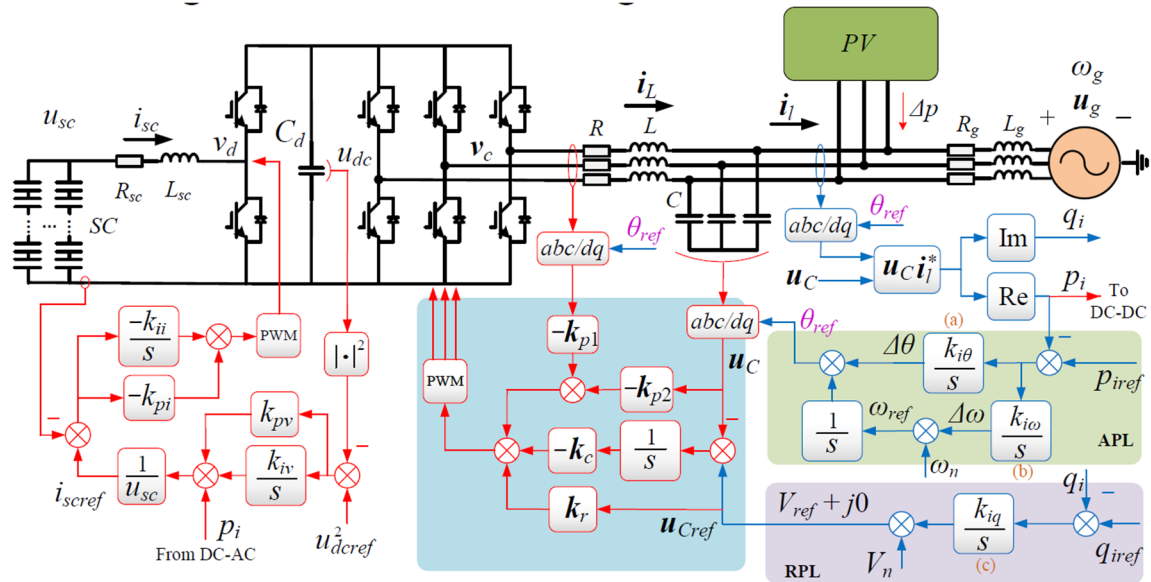


Fig. 4. Control of the proposed PVSG by paralleled grid-forming inverter.

Table 1. Circuit Parameters of the PVSG System

Parameter	Value
L	Inductance of AC filter 1 mH
C	Capacitance of AC filter 54 μ F
R	Inductor resistance 0.05 Ω
L_g	Grid-side inductance 1.5 mH
L_{sc}	SC-side inductance 1.8 mH
SC	Super capacitance 2 F
C_d	DC link capacitance 3300 μ F
f_s	Switching frequency 16,000 Hz
	Voltage ph-ph RMS/ frequency 480 V / 60 Hz
	DC link voltage 830 V



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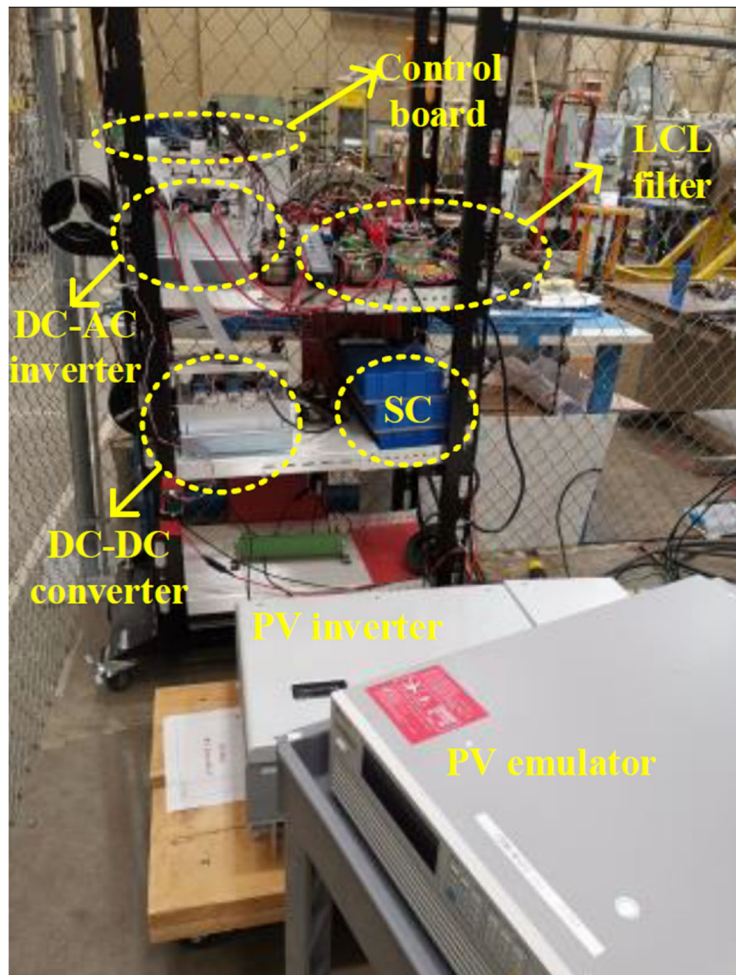


Fig. 5. Experiment setup.

3.3 Experimental Test Results

The experimental test results are shown in Fig. 6 and Fig. 7. In these tests, the PVSG system is connected to three-phase 480 V Austin Energy grid. In Fig. 6, it can be seen that by variation in the grid's frequency, shown in middle figure, the Super Capacitor (SC) system injects or absorbs active power, shown in top figure with red color, to provide inertia to the grid frequency. Also, this system is capable of reactive power compensation where the reactive power injected/absorbed by SC inverter is shown in top figure by green. In Fig. 7, it can be seen that by although a sudden change has happened in PV generation, the grid frequency is smoothed by the PVSG system.

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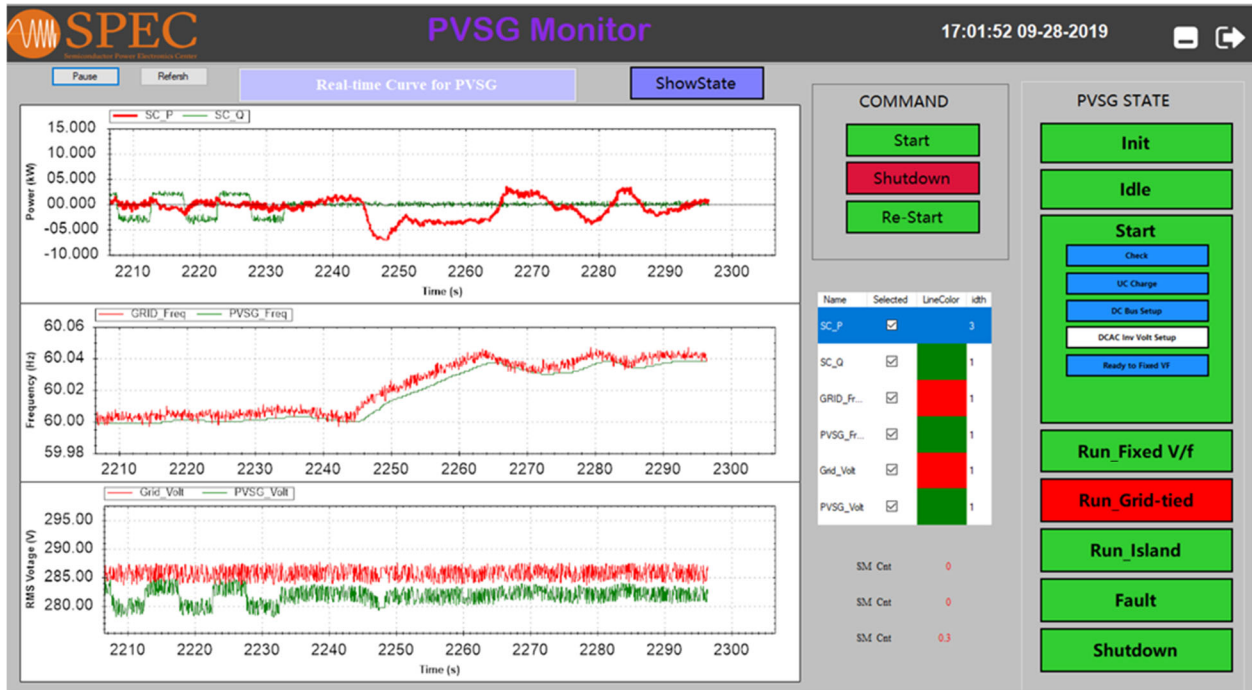


Fig. 6. Experimental test results shown by developed software.

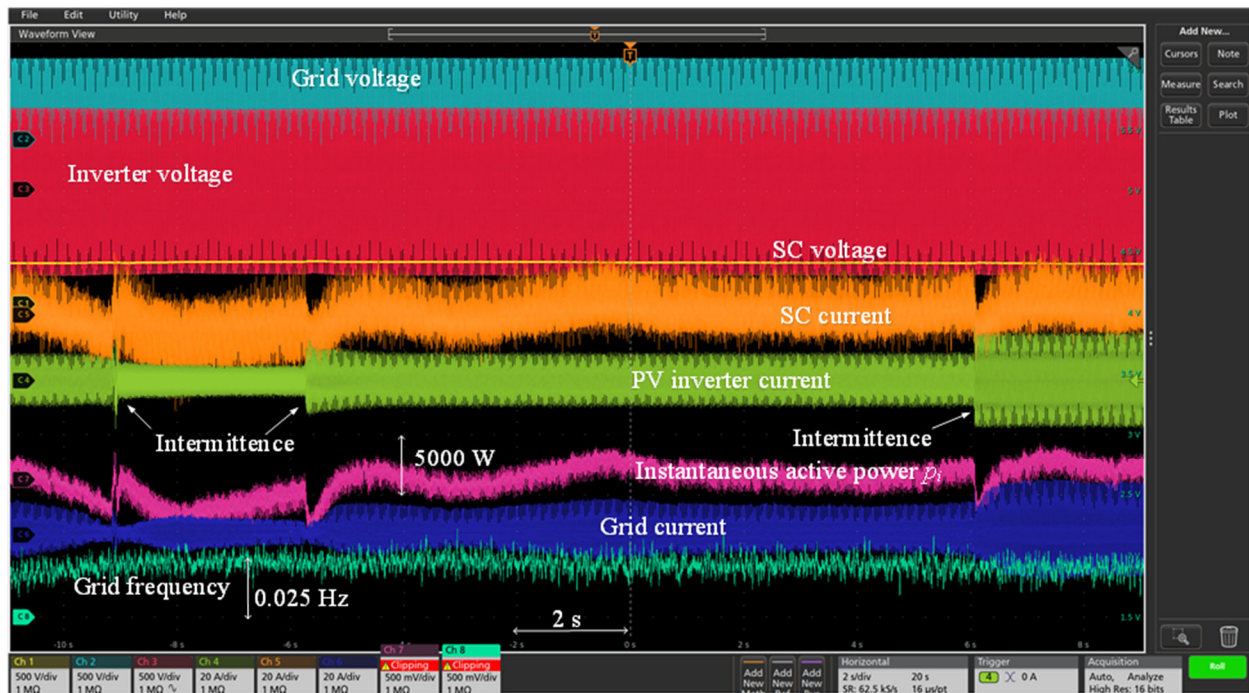


Fig. 7. Experimental results shown by oscilloscope.



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3.4 System Studies with PVSG

The system study has been performed in two microgrid test systems to show the effectiveness of the PVSG solution. Fig. 8 shows the first system. The synchronous machine is rated at 52.5 kVA, 460 V L-L RMS, 1800 RPM and PVSG unit is rated at 40 kVA.

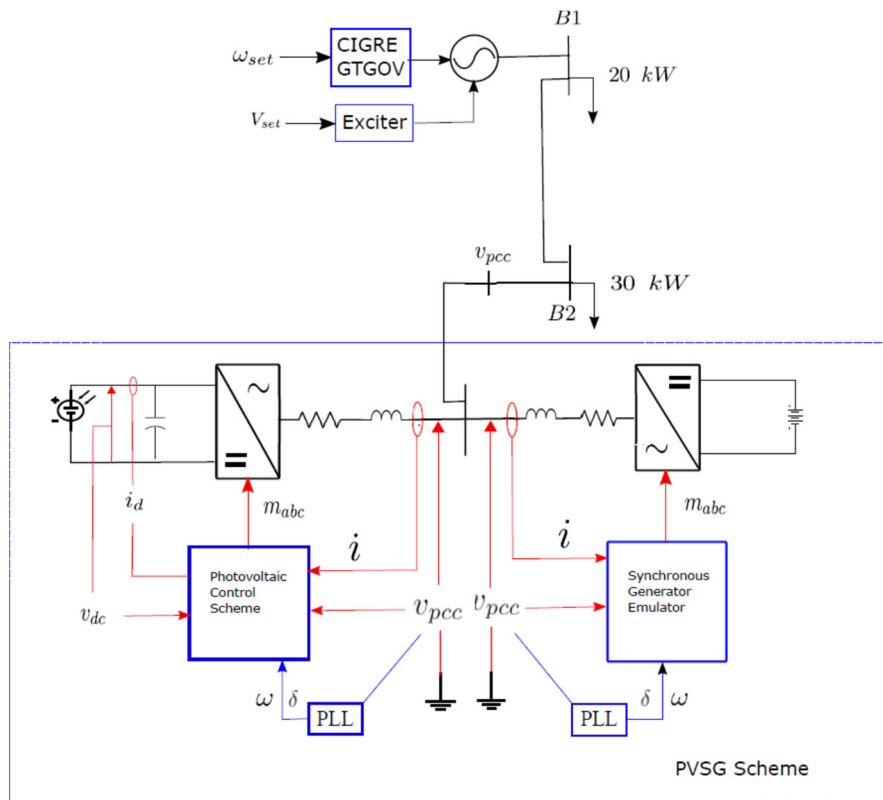


Fig. 8. Microgrid Test System for 40kVA PVSG system.

Figure 9 shows the response of PVSG units subject to power set point change in photovoltaic inverter from 0.4 p.u. to 0.3 p.u. at $t=50s$. This creates an under frequency disturbance. Figure 10 compares frequency deviation in a system with a PVSG unit and one without synchronous generator emulator part which clearly shows the improvement in frequency response. Figure 11 shows the frequency response of PVSG units subject to power set point change in photovoltaic inverter from 0.4 p.u. to 0.5 p.u. at $t=50s$. This creates an under frequency disturbance. Figure 12 compares frequency deviation in a system with a PVSG unit and one without synchronous generator emulator part which clearly shows the improvement in frequency response. All plots are in per unit.



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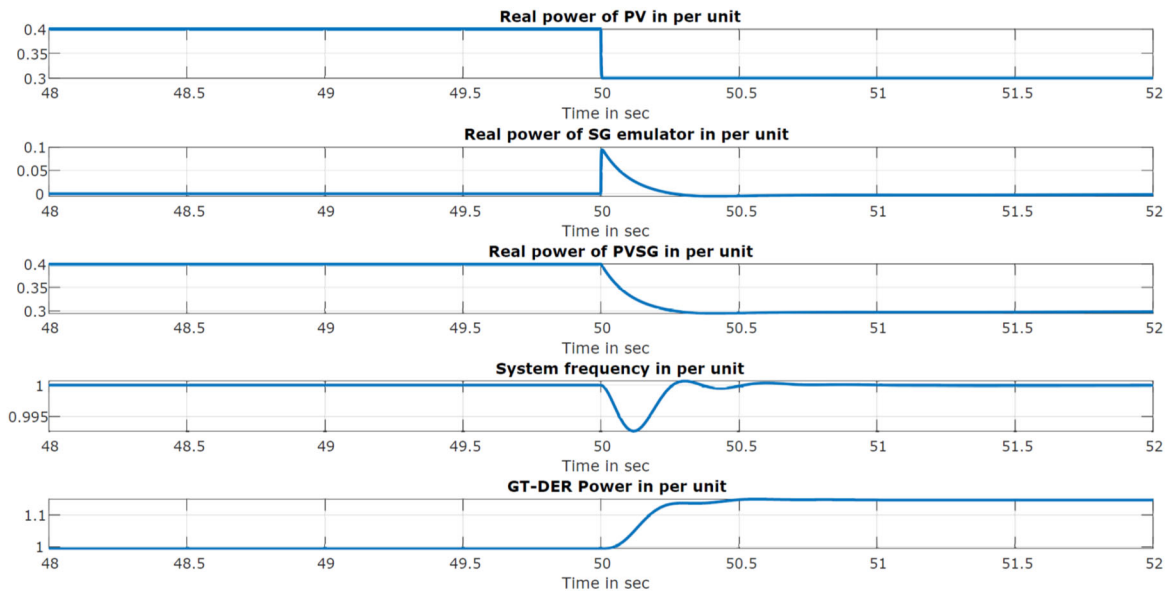


Fig. 9. Time-domain response of different components subject to power set point change in photovoltaic inverter from 0.4 p.u. to 0.3 p.u. at $t=50s$.

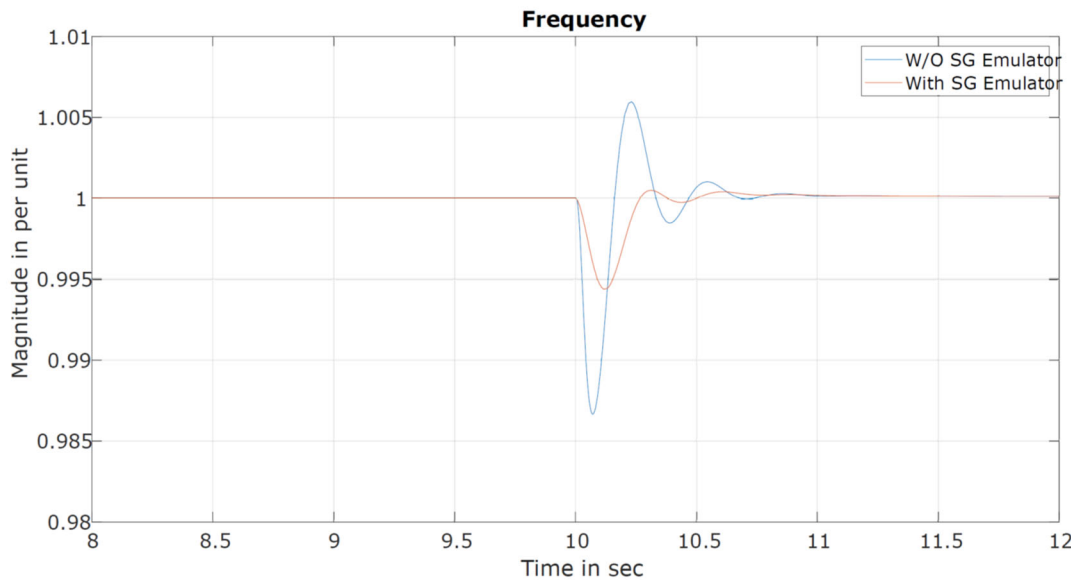


Fig. 10. Frequency comparison for a system with and without the synchronous generator emulator part.

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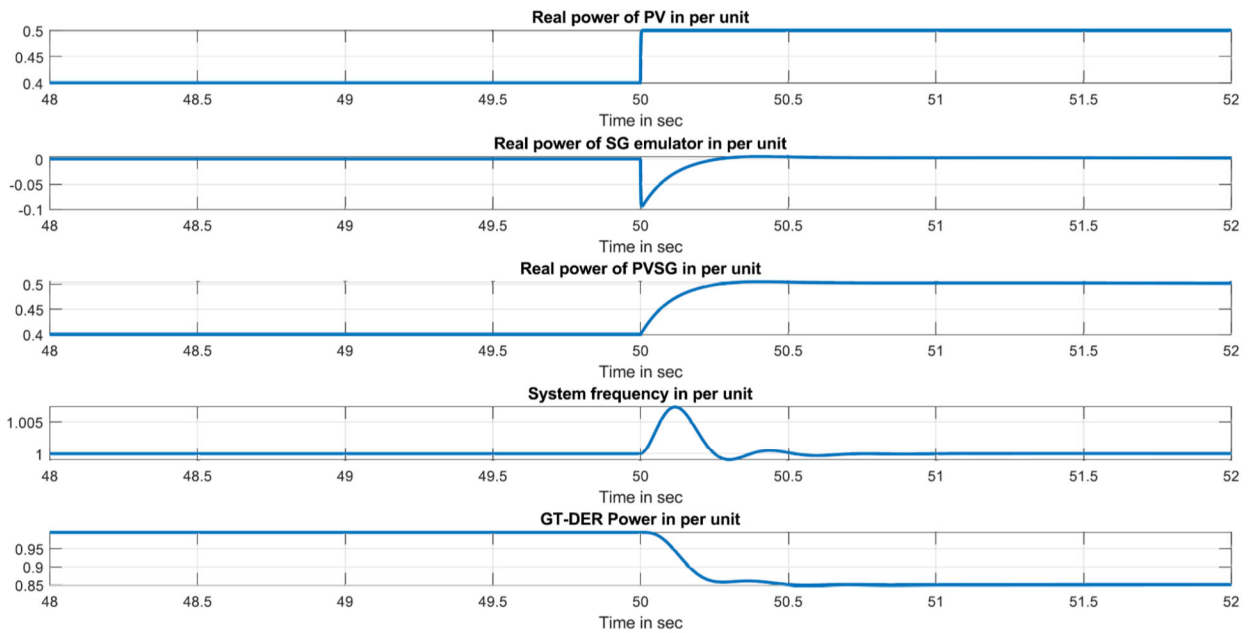


Fig. 11. Time-domain response of different components subject to power set point change in photovoltaic inverter from 0.4 p.u. to 0.5 p.u. at t=50s.

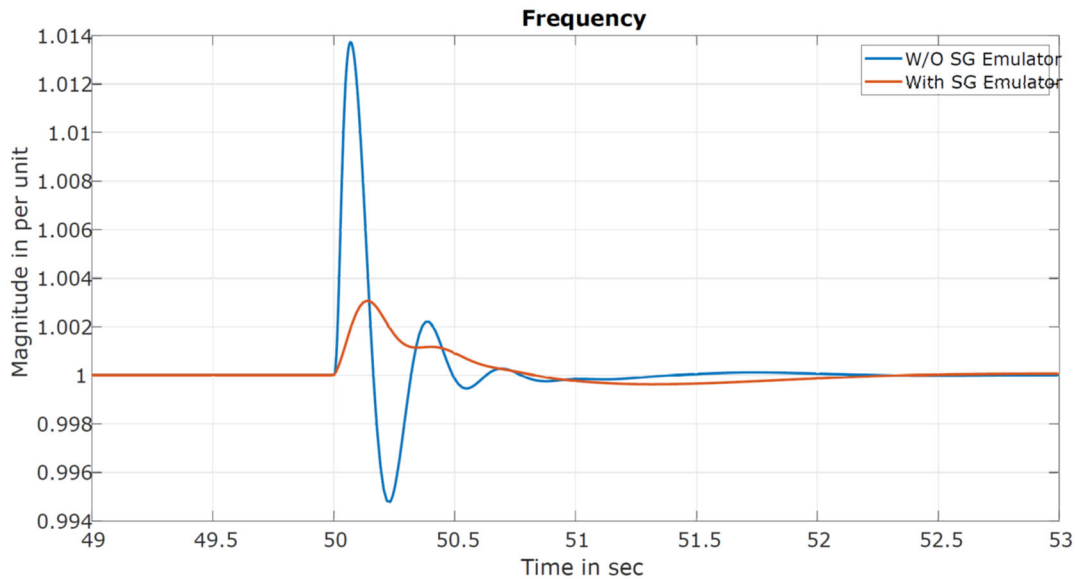


Fig. 12. Frequency comparison for a system with and without the synchronous generator emulator part.



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A second test system is considered for studying the effect of larger PVSG unit on the system behavior and response. IEEE 13 node system is selected for the study as shown in Figure 13.

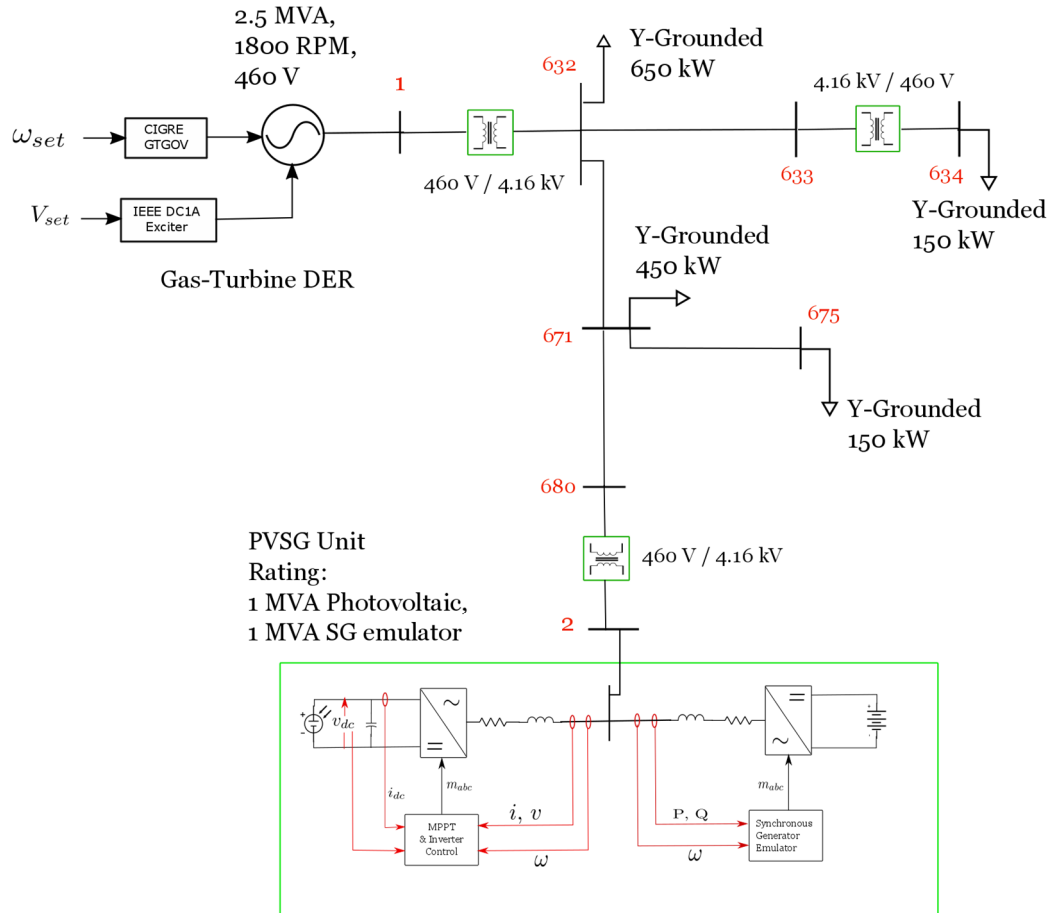


Fig. 13. Modified IEEE 13 node system for PVSG unit integration study.

The system frequency response to PV power reduction without SG emulator part in steps of 160kw until 640 kw are shown in Figure 14. The same step reduction in PV output is applied in a system with PVSG and the frequency responses are capture in Figure 15. It is clear from Figures 14 and 15 that frequency dip has been improve significantly for a system with PVSG. The real power output of PVSG unit and real power response of the gas turbine with PVSG unit are shown in Figures 16 and 17 due to this PV set point changes. Fig 16 shows smooth response of PVSG unit as a step change of PV inverter which results to better inertia support for the system.



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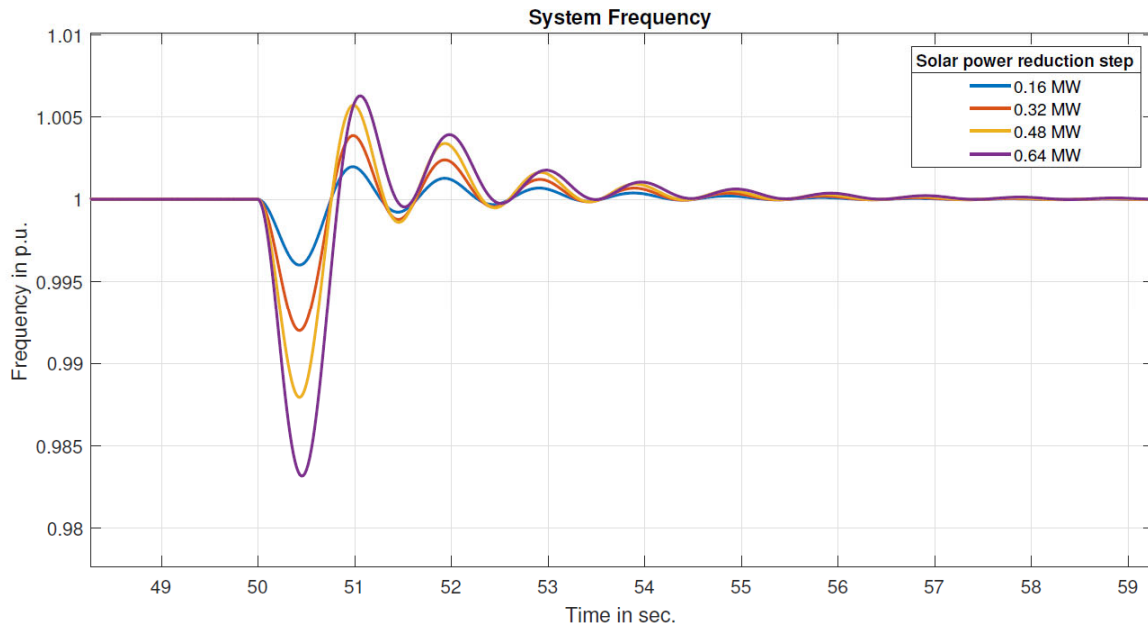


Fig. 14. Time-domain frequency response to step changes in PV inverter set-point with steps of 160 kW in the system without SG emulator.

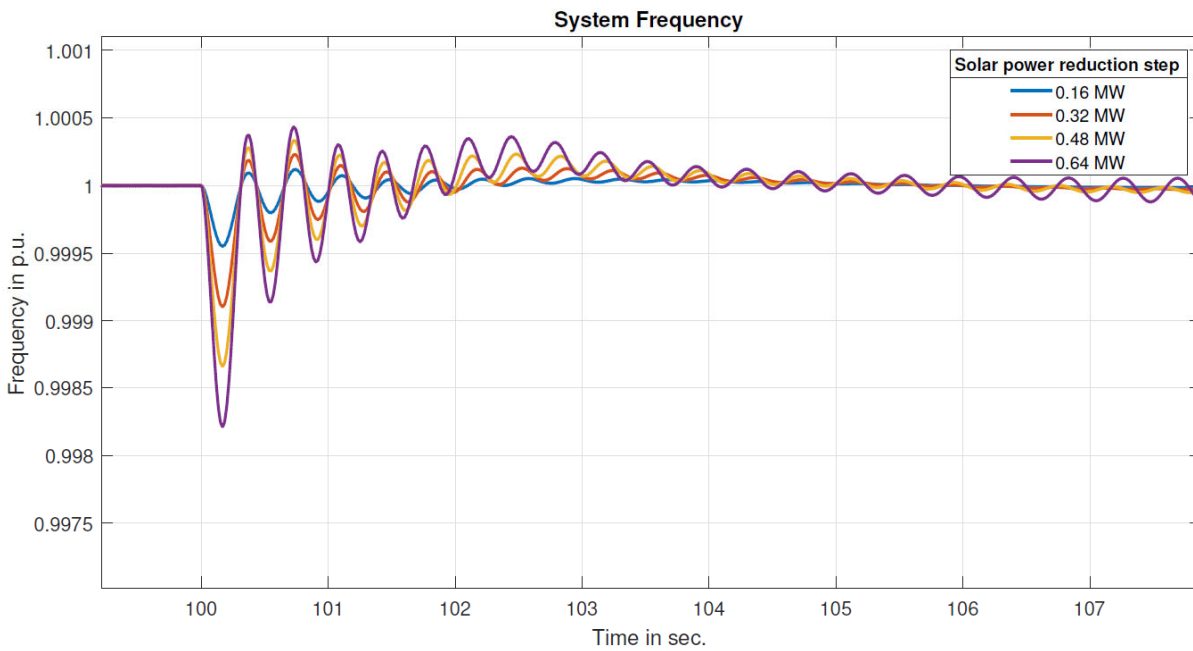


Fig. 15. Time-domain frequency response to step changes in PV inverter set-point with steps of 160 kW in the system with SG emulator.



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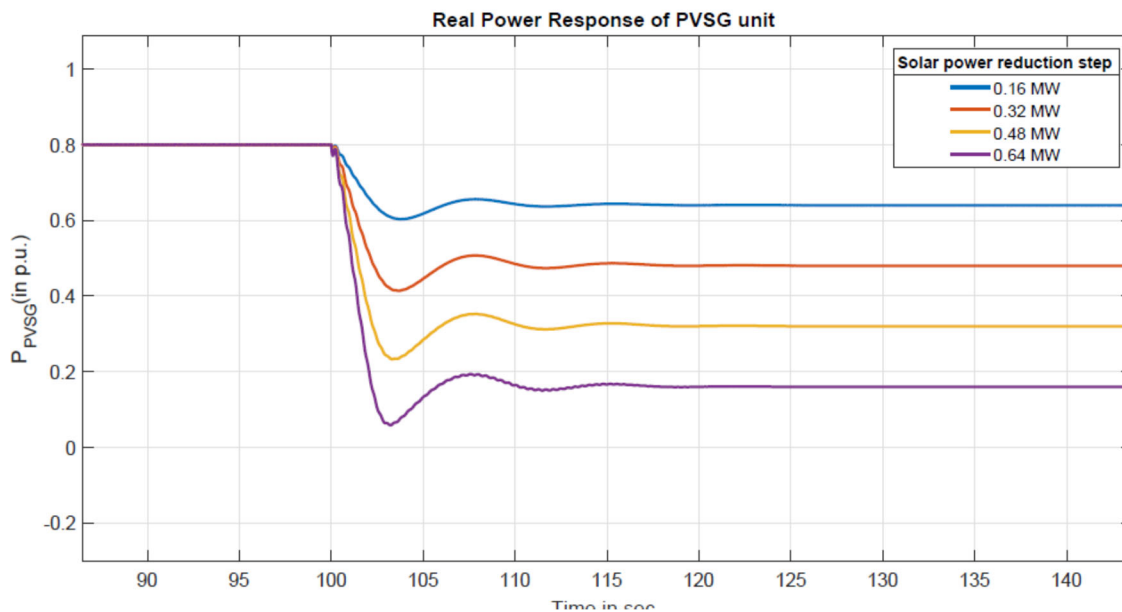


Fig. 16. Time-domain PVSG power response to step changes in PV inverter set-point with steps of 160 kW in the system with SG emulator.

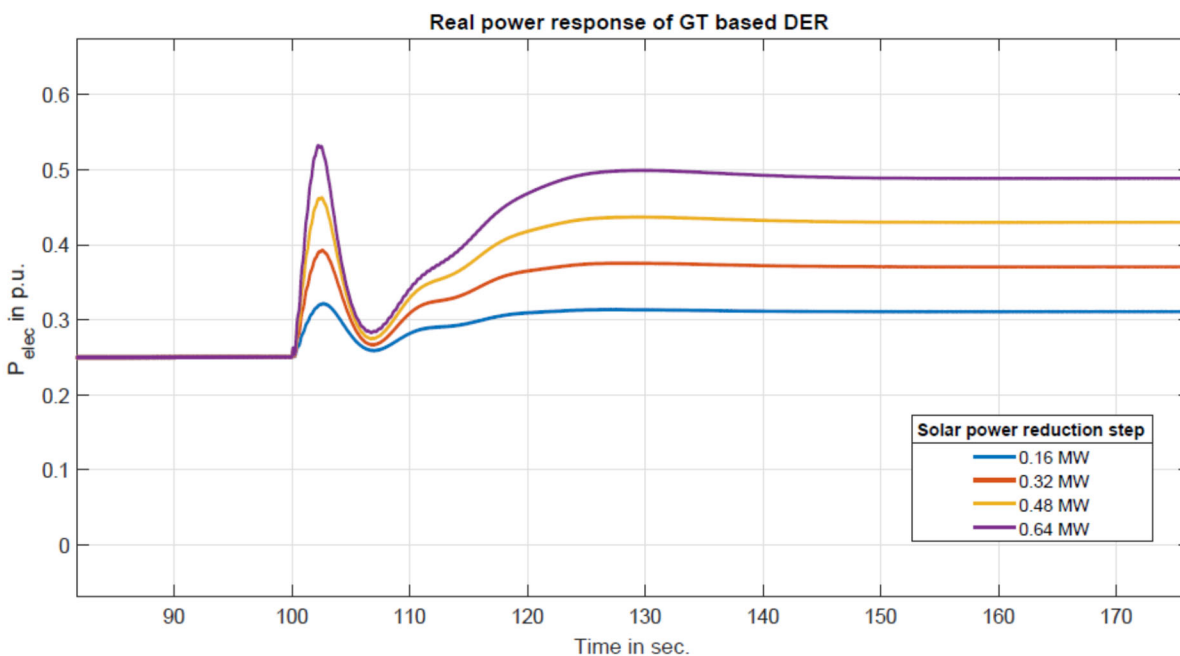


Fig. 17. Time-domain gas turbine power response to step changes in PV inverter set-point with steps of 160 kW in the system with SG emulator.



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3.5 Technical Presentations and Live Demonstration

Several technical presentation and live demonstration of the PVSG system conducted for the researchers from academia, DOE, and industry at CAPER meetings and also in Semiconductor Power Electronics Center (SPEC), University of Texas at Austin, Austin, TX that are illustrated in the following figures.



Fig. 18. Project Progress presentation at Fall 2018 CAPER meeting in Charleston, November 15, 2018.



Center for Advanced Power Engineering Research
2017-2019 Research Project Report

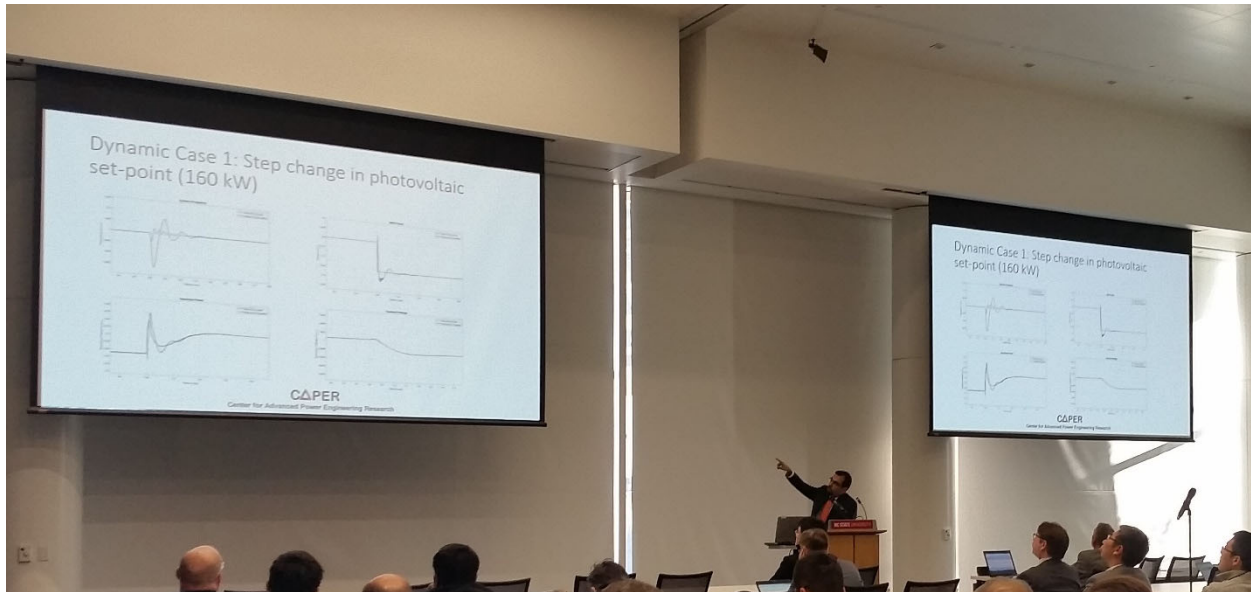


Fig. 19. Project Progress presentation at spring 2019 CAPER meeting in Raleigh on Mach 28, 2019.



Fig. 20. Project final presentation at Fall 2019 CAPER meeting in Charlotte on November 15, 2019.



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Fig.21. Live PVSG Demonstration to Duke Energy, Austin Energy, and Clemson University on October 7, 2019.



Fig.22. PVSG Demonstration to DOE guests on November 7, 2019 and January 29, 2020.



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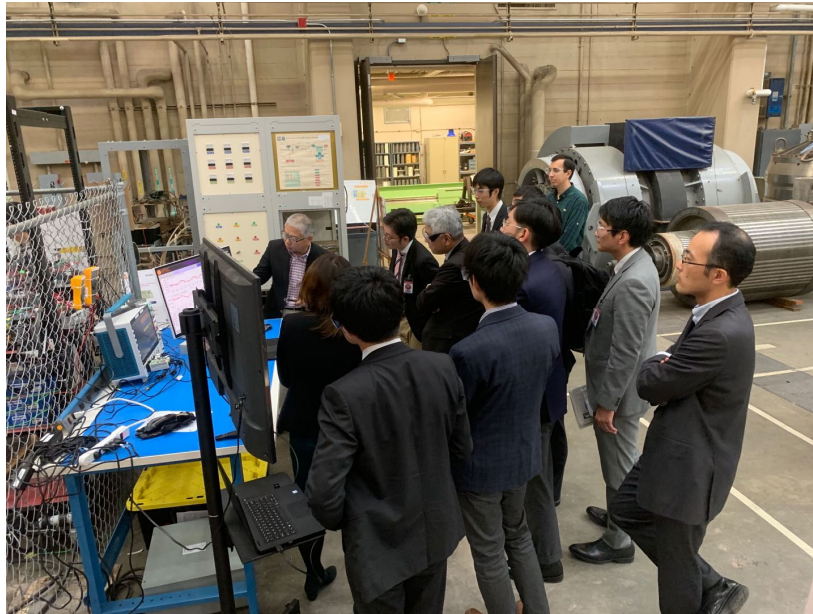


Fig.23. Demonstration to Japanese researchers from NEDO, TEPCO, Chubu Electric Power Company, Chugoku Electric Power Company, Kyushu Electric Power Company, Kansai Electric Power Company, Japan Electrical Manufacturers' Association and Mitsubishi Research Institute, Inc on November 18, 2019.



Fig.24. Live PVSG Demonstration to ERCOT and Austin Energy on February 4, 2020.

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