



Dianne M. Triplett
Deputy General Counsel

July 1, 2020

VIA ELECTRONIC FILING

Adam J. Teitzman, Commission Clerk
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee, Florida 32399-0850

Re: *Duke Energy Florida, LLC's Petition for a limited proceeding to approve Clean Energy Connection Program and Tariff and Stipulation*; Docket No. _____

Dear Mr. Teitzman:

Enclosed for filing on behalf of Duke Energy Florida, LLC ("DEF") is DEF's Petition for a limited proceeding to approve Clean Energy Connection Program and Tariff and Exhibit A (The Stipulation), along with the following:

- Direct Testimony of Lon Huber with Exhibit No. __ (LH-1);
- Direct Testimony of Matthew G. Stout;
- Direct Testimony of Benjamin M. H. Borsch with Exhibit No. __ (BMHB-1), Exhibit No. __ (BMHB-2), Exhibit No. __ (BMHB-3) and Exhibit No. __ (BMHB-4) and Exhibit No. __ (BMHB-5); and
- Direct Testimony of Thomas G. Foster with Exhibit No. __ (TGF-1).

Thank you for your assistance in this matter. Please feel free to call me at (727) 820-4692 should you have any questions concerning this filing.

Sincerely,

s/ Dianne M. Triplett

Dianne M. Triplett

DMT/cmw
Enclosures

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Duke Energy Florida, LLC's Petition
for a limited proceeding to approve Clean Energy
Connection Program and Tariff and Stipulation

Docket No. _____

Filed: July 1, 2020

**DUKE ENERGY FLORIDA, LLC'S PETITION FOR A LIMITED PROCEEDING
TO APPROVE CLEAN ENERGY CONNECTION PROGRAM AND TARIFF AND
STIPULATION**

Duke Energy Florida, LLC ("DEF"), pursuant to Sections 366.076(1) and 366.06(3), Florida Statutes ("F.S.") and Rules 28-106.201, 25-9.004 and 25-9.033, Florida Administrative Code ("F.A.C."), hereby petitions the Florida Public Service Commission ("FPSC" or the "Commission") for a limited proceeding to approve DEF's new voluntary Clean Energy Connection Program ("CEC Program") and Tariff, as well as the Stipulation included as an exhibit to this Petition.

DEF's new CEC Program is a voluntary community solar program that allows participating customers to pay a subscription fee in exchange for receiving bill credits related to the solar generation produced by the CEC Program solar facilities. As explained further below and in the supporting testimony and exhibits filed with this Petition (which are incorporated by reference into this Petition), DEF's CEC Program is cost effective for both participants and non-participants. It is an innovative way to add cost-effective solar generation for the benefit of all DEF customers, while also responding to specific customer demand for community solar generation. Accordingly, DEF respectfully requests that the Commission approve the CEC Program and Tariff. The Tariff is included as an exhibit to Mr. Lon Huber's testimony. DEF also requests that the Commission approve the Stipulation as in the public interest.

In support of this Petition, DEF states:

Introduction

1. DEF is a Florida limited liability company with headquarters at 299 1st Avenue North, St. Petersburg, Florida 33701. DEF is an investor-owned utility operating under the jurisdiction of this Commission pursuant to the provisions of Chapter 366, Florida Statutes, and is a wholly-owned subsidiary of Duke Energy Corporation. DEF provides generation, transmission, and distribution service to approximately 1.8 million retail customers in Florida.

2. Any pleading, motion, notice, order, or other document required to be served upon DEF or filed by any party to this proceeding should be served upon the following individuals:

Dianne M. Triplett
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3. This Petition is being filed consistent with Rule 28-106.201, Florida Administrative Code. The agency affected is the Florida Public Service Commission, located at 2540 Shumard Oak Boulevard, Tallahassee, Florida 32399. This case does not involve reversal or modification of an agency decision or an agency's proposed action. Therefore, subparagraph (c) and portions of subparagraphs (b), (e), (f), and (g) of subsection (2) of that rule are not applicable to this Petition. In compliance with subparagraph (d), DEF states that it is not known at this time which, if any, of the issues of material fact set forth in the body of this Petition may be disputed by any others who may plan to participate in this proceeding.

Description of DEF's Proposed Cost-Effective Voluntary Solar Program

4. DEF's CEC Program is a voluntary community solar program that was developed, based on feedback from stakeholders, to provide customers, who either do not have the ability or the desire to place solar facilities on their property, the ability to subscribe to solar generation. In exchange for a monthly subscription fee, participating customers will receive bill credits associated with their subscribing blocks of solar power. Additional details regarding the design of the CEC Program are included in Mr. Lon Huber's testimony.

5. To determine customer interest in the CEC Program, DEF conducted several webinars, advertised the program in an e-newsletter, conducted an online customer survey and held multiple customer meetings. This customer engagement confirmed that DEF's customers have a desire for a program like the CEC Program. This desire is further demonstrated by the substantial pre-registration by large commercial and local government accounts. These customer outreach efforts, and the number of pre-enrolled customers, are discussed further in Mr. Huber's testimony.

6. Although customer interest was so strong that just a handful of large commercial customers would have filled up the entire program size, it was important to DEF that different classes and types of customers be afforded the opportunity to participate in this community solar offering. Accordingly, DEF allocated a certain amount of the total subscription to local governments and non-profit customers, to help ensure that they had sufficient notice and time to obtain internal approvals. DEF also allocated a percentage of the available capacity to small and medium business, residential, and low-income customers. Additional details regarding the allocation, as well as the timing and process for registering the different customer classes, are included in Mr. Huber's testimony.

Proposed Solar Facilities and Cost Effectiveness

7. DEF plans to build approximately 750 MW of solar generation as part of the CEC Program. Each project will be approximately 74.9 MW and will have differing in-service dates. The first two projects will come online January 2022, with the next four into service in January 2023 and the final four projects being online in January 2024. Additional information regarding the solar projects is included in Mr. Matt Stout's testimony.

8. Both participants and non-participants benefit from the CEC Program solar facilities. The projects will lower the projected system cumulative present value revenue requirement "CPVRR" as compared to such CPVRR without the solar projects by approximately \$533 million. The solar generation added to DEF's system will displace higher-cost fossil-fueled generation and therefore will lower emissions and fuel costs for all customers. Mr. Ben Borsch's testimony includes more details regarding the cost-effectiveness of the CEC Program solar facilities.

Description of Subscription Fee, Bill Credit and Regulatory Treatment

9. As explained further in Mr. Huber's testimony, participating customers will be able to purchase 1 kW increment blocks associated with DEF's CEC Program solar generators. Large commercial, small/medium business and residential customers pay a \$8.35/kW monthly subscription fee, and their bill credit, on a solar energy production basis, escalates each year as set forth in the tariff. Given the escalation of the bill credit, as compared to the subscription fee, customers can expect an approximate seven-year overall payback period. Low-income customers will pay the same monthly subscription fee, but their bill credit levels will be fixed at \$9.03/kW monthly. Because the bill credit for low-income customers is higher than their subscription fee starting on day 1, low-income customers will immediately see bill savings

associated with the CEC Program. Additional details are included in the tariff and Mr. Huber's testimony.

10. While DEF expects strong interest in the CEC Program, there may be some limited instances when all blocks are not fully subscribed by CEC Program participants. This could be due to rollover or attrition. Unsubscribed Program blocks will default to the general rate base, but because the CEC Program solar generating units are cost effective for the system, all customers will benefit from lower bills over the life of the CEC Program solar facilities.

11. DEF requests approval to include all costs and expenses, including the administrative cost for the CEC Program, as base rate recoverable costs offset by the revenue received from participating customers in the CEC Program. Specifically, DEF will record the revenue from CEC Program participants for their subscription fee as revenue received from the sale of electricity. These revenues will be included as base rate revenues in DEF's monthly earnings surveillance report. The bill credit to be paid to participants, because it largely represents the value to DEF's system of avoided fuel costs, will be recovered through the fuel and capacity cost recovery clause. These bill credits will partially offset system savings from the addition of the CEC Program solar facilities. The CEC Program administration costs will be included as base rate costs, but DEF will not seek any change in base rates during the pendency of its current rate settlement. It will, however, include these costs in its monthly earnings surveillance report. These details are discussed in greater detail in Mr. Thomas G. Foster's testimony.

Approval of Stipulation

12. As part of the stakeholder engagement described above and in further detail in Mr. Huber's testimony, DEF reached out to various counterparties to obtain input on the CEC

Program structure, in an attempt to streamline the process and gain consensus. DEF also desired to minimize the issues involved in this proceeding. As part of the stakeholder engagement process, it became evident that, absent making certain changes to the CEC Program, including making certain commitments regarding its implementation, certain parties would have intervened in this docket and raised the concerns that are addressed by the Stipulation. This would have forced DEF and the Commission Staff to litigate those issues. Instead, the Parties were able to reach agreement and resolve what otherwise would have been contentious issues. Accordingly, as part of the overall approval of the CEC Program, DEF requests that the Commission approve the Stipulation attached to this Petition as Exhibit A.

13. Approval of the Stipulation promotes administrative efficiency and avoids the time and expense associated with litigating the settled issues in this docket and is further consistent with the Commission's long-standing practice of encouraging parties to settle contested proceedings whenever possible.¹ DEF believes, and represents the Parties believe, that the Stipulation in its totality is fair, just, and reasonable and that it is in the public interest.

¹ See In re: Request for approval of amendment to connection/transfer sheets, increase in returned check charge, amendment to miscellaneous service charges, increase in meter installation charges, and imposition of new tap-in fee in Marion County by East Marion Sanitary Systems Inc., Order No. PSC-11-0566-AS-WU, Docket No. 080562-WU, (P.S.C. Dec. 11, 2011); In re: Application for staff-assisted rate case in Lee County by Mobile Manor Water Company, Inc., Order No. PSC-10-0299-AS-WU, Docket No. 090170-WU (P.S.C. May 10, 2010); In re: Application for increase in water and wastewater rates in Pasco County by Labrador Utilities, Inc., Order No. PSC-09-0711-AS-WS, Docket No. 080249-WS (P.S.C. Oct. 26, 2009); In re: Petition of Tampa Electric Company to close Rate Schedules IS-3 and IST-3 and approve new Rate Schedules GSLM-2 and GSLM-3, Order No. PSC-00-0374-S-EI, Docket No. 990037-EI (P.S.C. Feb. 22, 2000); In re: Application for staff-assisted rate case in Pasco County by Orangeland Water Supply, Order No. PSC-08-0640-AS-WU, Docket No. 070601-WU, (P.S.C. Oct. 3, 2008); and In re: Application for increase in water and wastewater rates in Lake County by Utilities, Inc. of Pennbrooke, Order No. PSC-07-0534-AS- WS, Docket No. 060261-WS (P.S.C. June 26, 2007).

The Stipulation fairly and reasonably balances the various positions of the Parties on the issues resolved by the Stipulation and serves the public interest and DEF's customers. DEF, therefore, requests and moves the Commission to grant this Petition and approve the Stipulation in its entirety.

Conclusion

WHEREFORE, DEF respectfully requests that the Commission enter an order approving the Stipulation, the CEC Program, and the associated tariff, as presented in this filing.

Respectfully submitted,

/s/Dianne M. Triplett

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Exhibit A
(The Stipulation)

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Duke Energy Florida, LLC's Petition for a limited proceeding to approve Clean Energy Connection Program and Tariff and Stipulation

Docket No. _____

STIPULATION

WHEREAS, Duke Energy Florida, LLC ("DEF" or the "Company") has developed a proposed voluntary community solar program ("Clean Energy Connection Program" or the "Program") that will provide an opportunity for DEF customers to directly support the expansion of solar power in the Program; and

WHEREAS, simultaneously with the filing of this Stipulation, DEF has petitioned the Florida Public Service Commission ("Commission") for approval of the Program; and

WHEREAS, DEF has conferred with Vote Solar, Southern Alliance for Clean Energy ("SACE") and Walmart Inc. ("Walmart") (collectively referred to herein as the "Counterparties") regarding the structure, funding, construction and operation of the Program and, based on these discussions, has determined that the Counterparties will likely seek to intervene in DEF's petition for approval of the Program; and

WHEREAS, DEF and the Counterparties have entered into this Stipulation in compromise of positions they have taken and/or intend to take with respect to their rights and interests under Chapters 350, 366 and 120, Florida Statutes, as applicable, in regards to the Program; and

WHEREAS, as part of the negotiated exchange of consideration between DEF and the Counterparties, they have each made concessions with the expectation that all provisions of the Stipulation will be adopted by the Commission; and

WHEREAS, in order to facilitate the Commission's consideration of the Program, DEF and the Counterparties have agreed to all issues relating to the Program with no dispute between DEF and the Counterparties; and

WHEREAS, DEF and the Counterparties agree that this Stipulation is in the public interest.

NOW THEREFORE, in consideration of the foregoing, DEF and the Counterparties stipulate that:

1. The principle features of the Program (as more fully described in DEF's testimony and exhibits) are:

(a) The Program size is 749 MW. This consists of 10 solar power plants sized at 74.9 MW each. DEF plans to place two solar power plants in service in 2022, with four additional plants going into service in 2023 and 2024, respectively.

(b) The 749 MW capacity is allocated 65% (486.85 MW) to commercial and industrial (demand) customers, 10% (74.9 MW) allocated to local government; 25% (187.25 MW) to residential and small business; and 27.7% of the residential portion (26 MW) for low income customers, assuming half of the residential and small business allocation is subscribed to by residential customers. For purposes of the Program, low income customers are those who qualify for any government-sponsored assistance program or any DEF-sponsored low-income efficiency program.

(c) With respect to the low-income allocation, Duke commits to:

- (1) Enact a "hold harmless" protection for low-income subscribers to ensure that monthly bills will not increase due to their enrollment;
- (2) Market the CEC Program to participants in its low-income efficiency offerings in order to maximize savings and ease enrollment for these customers;

- (3) Make enrollment available to low-income customers regardless of their arrearage status;
- (4) Informally engage with Counterparties on the outreach and engagement methods associated with the low-income allocation further defined in 1(d) below; and
- (5) Consult with any interested Counterparty prior to making any new filings that will impact the value proposition of the CEC program.

(d) The Counterparties agree that DEF may re-allocate subscriptions from one customer segment to another customer segment as needed to ensure full Program subscription with the following qualifications:

- (1) DEF agrees to preserve the local government allocation for at least six months from the initial program opening enrollment date, unless it is 100% subscribed at any time during the first six months from the enrollment date prior to reallocating any portion of the 74.9 MW to another customer segment.
- (2) DEF agrees to preserve the low-income allocation for at least one year from the date the low-income program begins enrollment, unless it is 100% subscribed at any time during the first year from the enrollment date prior to reallocating any portion of the 26 MW to another customer segment. Prior to reallocating the low-income allocation to another customer segment, DEF will use best efforts to implement brand new reasonable outreach methods to fill the low-income capacity.

(e) DEF customers may elect a subscription level equivalent to the capacity that would generate up to 100 percent of their previous 12 months' total metered kilowatt-hour ("kWh") usage, subject to Program subscription availability.

(f) Participation is voluntary. Participating DEF customers may terminate or reduce their subscription levels at any time with no penalty. Increases in subscription level will be limited to once per year based on available Program subscription availability.

(g) In accordance with the values outlined in Tariff Sheet Nos. 6.405 – 6.407, participating DEF customers will pay a monthly subscription fee and will receive a monthly solar bill credit. The subscription fee generally reflects the revenue requirement associated with constructing and operating the Program's portfolio of solar power plants, net of avoided generation and transmission capital, fixed O&M and gas reservation charges. The bill credit reflects the estimated economic value of the Program's solar power plants on DEF's system, which consists of reduced fuel, purchased power, variable O&M, and conventional pollutant and carbon emission costs.

(h) At no charge, DEF will retire the Renewable Energy Certificates (RECs) on behalf of all participants unless the participant requests DEF to move the RECs associated with their subscription to an account in their name. DEF will also provide an attestation, at customer request, for the amount of RECs that were retired on the customer's behalf. DEF will not utilize RECs associated with Program subscriptions.

(i) The 749 MW of solar generation that comprises the Program is projected to save DEF customers \$532.7 million of Cumulative Present Value Revenue Requirements. The program is designed so that 12.7% of the projected benefits will flow to the participants and 87.3% to the general body of DEF customers. Of the projected benefit flowing to the general body of customers, approximately \$39.2 million is associated with fixed costs. Unsubscribed Program capacity, including the associated energy and resulting savings, will flow to the general body of customers.

(j) The general body of customers will share in the cost-effective benefits that result from the Program.

2. DEF is authorized to recover the \$1.14 billion Program cost as set forth below:

(a) DEF will record the revenue received from the participants related to their subscription fee as revenues received from the sales of electricity and these revenues will be included in base rate revenues along with the Program cost of service and reported in DEF's monthly earnings surveillance report.

(b) The participants' bill credits will be recovered through DEF's fuel and purchased power cost recovery clause, partially offset by system savings resulting from the addition of the Program's solar power plants.

3. DEF acknowledges that the CEC Program will allow it to accelerate the amount of solar generation on its system. Accordingly, DEF will gain more experience with operating a solar portfolio and understanding how it integrates with and impacts the overall system. This additional information will help inform DEF's future resource decisions as it continues to move the fleet to cleaner generation. In all future TYSPs after approval of the CEC Program, DEF commits to

utilizing the information gained from these CEC Program solar facilities and considering whether solar facilities could be used to further advance DEF's clean energy goals and displace fossil generation. Specifically, in one future TYSP, but no later than 2023, DEF commits to evaluating whether it can cost-effectively and reliably defer or replace any projected combustion turbine ("CT") units within the planning period for that TYSP with solar plus storage facilities. As part of this evaluation, while all Parties recognize DEF's regulatory obligations, DEF agrees to consult with and consider the input of the Counterparties to this Stipulation.

4. DEF commits to continue to collect data on the economic and operational benefits and costs, to the extent such benefits and costs can be reasonably identified, from the use of customer-owned solar PV generation on its system to support overall rate design. DEF agrees to consider input from any Counterparty in the design and analysis of the data being collected, and will share the information with the Counterparties at least sixty (60) days in advance to any filing that involves changes in rate design specific to net metering. DEF commits, through 2023 to not introduce any new NM tariff, per Commission Rule, 25-6.065, unless in compliance with a cost of service study approved by the Commission, if such tariff is effective with the first billing cycle for January 2024 or beyond. Notwithstanding the foregoing sentence, DEF shall be permitted to introduce a new NM tariff at any time if necessary to comply with federal or state policy, a FERC order and/or a Commission request. No Parties are precluded from taking a position on such a filing or proceeding.

5. DEF will commit to utilize a competitive solicitation process to select its contractors and to procure equipment and materials to construct the CEC projects.

- a. The majority of local economic development (jobs, purchasing of goods, etc.) occurs in the construction phase (not the development phase). A typical 75MW

project costs approximately \$100 million. Approximately, 95% of that value is in the construction and procurement. DEF commits to competitive RFPs open to third parties to perform the construction services which include engineering, procurement, and construction (EPC). DEF provides construction oversight and management for quality, safety, and the environment.

- b. Approximately 30% of the value of the project is attributed to the solar panels themselves. DEF commits to conducting competitive RFPs for the solar panels.

6. DEF will consider both greenfield (self-development) and third-party project acquisitions to advance its solar growth objectives consistent with the below commitments.

7. For the CEC Program, DEF commits to evaluating third party projects under item #8 below, that provide dependable solar generation projects. In its evaluation process, DEF will analyze projects based on several key criteria such as, but not limited to: total estimated project cost; close proximity to DEF's transmission system; land holdings large enough to support utility scale solar projects; land that is disturbed or otherwise in agricultural use to minimize the need and costs for site clearing; land that avoids wetlands, flood zones and any environmentally sensitive habitat for plant and animal species of concern; contiguous property that is minimally divided by roads, streams, and easements; land that is not within heavily populated areas or that can be visually blend into the surrounding area through vegetative buffers; flat property with less than 5% slope in any area; land that has a suitable soil map with minimal to no known sink holes; local planning, zoning, and building authorities supportive of sustainable economic development, and for projects already under development. If any Greenfield projects are selected for any of the CEC Program facilities, DEF agrees to provide the Counterparties, in a confidential document, a document demonstrating the details and reasons the Greenfield project(s) was/were selected for

the CEC Program. At the time DEF determines appropriate, this document will also be provided to the Commission and Commission staff on a confidential basis.

8. For the CEC Program, DEF will consider acquiring third party development projects at various stages of project development from early stage (having land control and a valid generator interconnection queue position) to late stage (a fully developed project and ready for construction).

- a. After acquiring a third-party development project, the third-party developer is typically retained to provide development services until the project reaches commercial operation. DEF commits to maintaining this practice if it is determined to be of value to the project and its solar growth objectives.
- b. Depending on the project's stage of development, DEF plans to work with third parties to complete several key aspects of project development including, project siting, land acquisition, resource assessment, permitting, stakeholder engagement, obtaining interconnection rights, project design and arranging contracts for engineering, procurement and construction services. DEF will own and operate the projects from construction through end of life.

9. Within two years of the FPSC's final written order approving the CEC Program by the FPSC, DEF agrees to finalize an analysis of a potential future add-on program in which participating large CEC customers employ storage technologies, including battery systems paired with on-site solar, for back-up power at critical loads to support public health and safety. DEF agrees to consult with the Counterparties prior to conducting its analysis on issues including but not limited to: proposed methodology for identifying and evaluating costs and benefits to customers, DEF, and the grid; specific details of program design; and analysis plan and timeline.

Specifically, DEF agrees to perform an analysis to determine whether such a program would be of interest to customers, provide net benefits and be in the public interest. When complete, DEF agrees to provide a detailed description of the analysis methods, any intermediate data used, and the results of the analysis to the Counterparties and, if DEF determines that the results demonstrate that such a program is in the public interest, DEF agrees to submit the program for approval by the FPSC and the Counterparties retain the ability to engage in any related proceeding. If, however, DEF's analysis shows that the program is not in the public interest, then DEF shall have no further obligation beyond presenting the results of the analysis to the Counterparties.

10. DEF and the Counterparties agree that they will support this Stipulation and will not request or support any order, relief, outcome or result in conflict with the terms of this Stipulation in any administrative or judicial proceeding relating to, reviewing or challenging the establishment, approval, adoption or implementation of this Stipulation.

11. Nothing in this Stipulation shall have any precedential value.

12. If the provisions of this Stipulation are materially modified or not adopted in its entirety in this docket, DEF and the Counterparties are released from the terms of this Stipulation.

13. Nothing in this Stipulation precludes any party to this Stipulation from taking a different position in any other docket or proceeding or with respect to any future phase of the Program.

Respectfully submitted this 1st day of July, 2020.

[REMAINDER OF PAGE INTENTIONALLY BLANK]

Duke Energy Florida, LLC

299 1st Ave. N

St. Petersburg, FL 33701



By: _____

Catherine Stempien

State President – FL

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By: /s/ George Cavros
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By: /s/ Stephanie U. Eaton
Stephanie U. Eaton
Counsel for Walmart Inc.

**IN RE: DUKE ENERGY FLORIDA, LLC'S PETITION FOR APPROVAL OF
CLEAN ENERGY CONNECTION TARIFF AND PROGRAM**

FPSC DOCKET NO. _____

DIRECT TESTIMONY OF LON HUBER

JULY 1, 2020

I. INTRODUCTION

1 **Q. Please state your name and business address.**

2 A. My name is Lon Huber, and my business address is 550 South Tryon Street, Charlotte,
3 NC 28202.

4
5 **Q. By whom are you employed and what is your position?**

6 A. I am employed by Duke Energy Business Services, LLC ("Duke Energy"). My role is
7 Vice President, Rate Design and Strategic Solutions. In this capacity, I am responsible
8 for rate design and pricing for all of Duke Energy's affiliated utility operating
9 companies, including Duke Energy Florida ("DEF" or the "Company").

10

11 **Q. Please describe your educational background and professional experience.**

12 A. My career in the energy industry began in 2007 when I started work at a solar energy
13 research institute housed within the University of Arizona. From 2010 to 2013, I held
14 positions in the solar industry working on matters both local to Arizona and across the
15 US. Subsequently, I served as a consultant for Arizona's consumer advocate, the
16 Residential Utility Consumer's Office (RUCO), on energy related issues. I then joined

1 RUCO as a full-time employee. At RUCO, I was the staff lead on significant dockets
2 involving net metering, resource procurement, and utility solar programs.

3 I decided to rejoin the consulting space in 2015 where I worked for numerous
4 consumer advocates, state utility commissions, and energy companies. A major topic
5 of my work has been on pricing and community solar programs. For example, I
6 developed Hawaii's Community Based Renewable Energy (CBRE) program on behalf
7 of the Hawaii Public Utilities Commission; I helped shape Maryland's community
8 solar program on behalf of the Office of People Counsel; and I represented the
9 Coalition for Community Solar Access in New York on a few community solar matters.
10 My work on community solar, through the above examples and more – including my
11 efforts in Massachusetts, New Hampshire, Arizona, and Maine – helped me garner
12 Utility Dive's 2018 Innovator of the Year award.

13 My other professional focus revolves around pricing and rate design for
14 customer facing programs across the U.S., with a particular specialty in time-varying
15 rates and subscription-based pricing. I am a regular instructor at the Financial Research
16 Institute (FRI) Transformational Pricing course held at the University of Washington,
17 and up until November of 2019, when I assumed my current position with Duke
18 Energy, I consulted for entities such as the New York Public Service Commission, and
19 the Office of Consumer Counsel in Connecticut on pricing for renewable energy.

20 In terms of educational background, I obtained a Bachelor of Science degree in
21 Public Policy and Management from the University of Arizona. I also received a
22 Master of Business Administration from the Eller College of Management at the same

1 university. I completed NARUC rate school in 2014. My full resume is included as
2 Appendix A.

3

4 **Q. What is the purpose of your testimony?**

5 A. The purpose of my testimony is to provide an overview of the DEF Clean Energy
6 Connection Program (the “CEC Program”). I will provide a description of the CEC
7 Program and an explanation of the benefits and objectives of the CEC Program as well
8 as how it advances solar energy in Florida.

9

10 **Q. How has DEF been a leader in advancing clean energy in Florida?**

11 A. DEF is advancing a cleaner and smarter energy future that customers value. Solar
12 energy is part of that future and our solar initiatives will help meet our customers’
13 electricity needs. Our strong clean energy leadership and solar technology successes
14 are outlined below.

- 15 • In 1988, DEF began researching and studying grid tied solar photovoltaics, (PV) at
16 our universal solar array located near the Econlockhatchee Trail in central Florida.
- 17 • Since 2003, DEF has administered and funded over \$7 million for solar PV systems
18 at 50 K through 12 schools to promote solar energy education. About half of these
19 schools also serve as emergency shelters.
- 20 • Since 2015, DEF has been partnering with the University of South Florida St.
21 Petersburg to research and study advanced microgrids and power quality utilizing
22 solar PV generation. This complex microgrid system is installed on USFSP’s
23 campus and includes balancing loads at a campus parking garage, and electric

1 vehicle charging stations by utilizing a 100-kilowatt solar array generator and
2 battery storage.

- 3 • DEF's proven success with its Solar Base Rate Adjustment (SOBRA) projects, as
4 explained in Mr. Matthew Stout's testimony.

5 The proposed CEC Program builds on these prior successes and would add over 2.5
6 million solar panels to the DEF portfolio.

7
8 **Q. Please describe the CEC Program.**

9 A. The CEC Program is a community solar program through which participating
10 customers can voluntarily subscribe to a share of new solar energy centers. The CEC
11 Program would allow DEF to satisfy increasing customer demand for renewable energy
12 and will enable DEF to provide affordable clean energy to all of its customers.

13 The CEC Program represents the next evolution of DEF's commitment to
14 increasing renewable generation and providing innovative pricing solutions for our
15 customers. The CEC program is structured to maximize the benefits to the entire DEF
16 system and to minimize the costs to non-participating customers.

17
18 **Q. What about the CEC Program makes it a unique offering in Florida?**

19 A. DEF remains committed to designing innovative renewable energy programs that
20 maximize customer benefits. The CEC program contains a variety of innovations: 1)
21 customer centric Renewable Energy Certificate (REC) treatment; 2) a carve-out for
22 local governments that allows all who want to participate the opportunity to do so; 3)
23 an inclusive signup process to ensure that large customers who express interest in the

1 program can take advantage of it; and 4) the largest (by percentage of megawatt
2 capacity) low income carve out in Florida with ties into existing low income energy
3 efficiency programs and an easy enrollment process. Each of these will be discussed in
4 more detail below.

5
6 **Q. Why is DEF proposing this solar program?**

7 A. DEF is proposing the CEC Program to meet the substantial demand from DEF
8 customers who are seeking expanded access to solar energy, but do not have the ability
9 or the desire to construct it on their property.

10

11 **Q. Will the CEC Program interfere with private solar generation by DEF customers?**

12 A. No. Private solar generation will not be limited in any way.

13

14 **Q. Are you sponsoring any exhibits in this case?**

15 A. Yes. I am sponsoring the following exhibits:

16 • Exhibit No. __ (LH-1), Clean and Legislative Versions of Tariff sheets 6.101,
17 6.405, 6.406, and 6.407.

18 • This exhibit is true and accurate.

19

20 **II. CUSTOMER DEMAND FOR THE CEC PROGRAM**

21

22 **Q. How did DEF measure customer demand for the CEC Program?**

1 A. After Florida Power & Light filed the SolarTogether program last year, DEF began to
2 hear inquiries from its larger customers regarding a similar program. Although large
3 customers had been asking for more renewables in order to meet their sustainability
4 goals for quite a while, to get a more complete picture of small business and residential
5 demand for the CEC Program, DEF conducted surveys in May 2020. These surveys
6 were conducted online as opposed to in person as a result of the pandemic. DEF has
7 met with over 65 large customers to better understand their sustainability goals and
8 how DEF can help them be achieved. Those customers have expressed a desire for
9 more of their usage to be derived from carbon neutral sources, but often have not had
10 the space or capital to achieve the goal. DEF is also seeing more customers join groups
11 committed to bringing more renewables on to the grid such as RE100, the Southeast
12 Sustainability Directors Network and Bloomberg's American Cities Climate
13 Challenge.

14

15 **Q. What were the results of the small business and residential customer surveys?**

16 A. Residential and small business customers are interested in the proposed program. 52%
17 of residential and 47% of small business customers said that they found the program to
18 be either somewhat appealing or extremely appealing.

19

20 **Q. Did DEF market the CEC Program to customers?**

21 A. Yes. DEF marketed the CEC Program through three separate measures. DEF
22 conducted an email campaign to approximately 2000 industrial, commercial and local
23 government customers to invite them to a webinar and launched a large customer and

1 local government specific CEC Program website that was visited by over 100
2 customers. DEF held three webinars designed to provide potential participants an
3 overview of the Program. Over 120 customers either attended or listened to the webinar
4 recording. These activities began in April, during the early stages of the pandemic and
5 still saw significant customer engagement in the program. Large Account Managers,
6 Community Relations Managers and other Duke Energy employees such as myself also
7 discussed the program with dozens of individual customers. While the enrollment
8 window was open, emails were sent to customers who registered for the webinar to
9 remind them to consider a subscription.

10

11 **Q. Did DEF preregister customers?**

12 A. Yes. From May 11 until June 5, DEF preregistered a total of 12 Commercial and
13 Industrial customers who expressed an interest in participating in the Program. These
14 customers reserved capacity totaling approximately 540 MW. Local governments
15 indicated that they needed an extended timeline for enrollment due to approval
16 timelines and prioritizing Coronavirus response. As a result, their enrollment window
17 ends August 31, 2020. Feedback from local governments has been positive. DEF
18 believes that local governments will register for their full allocation.

19

20 **Q. What are the initial results from the preregistration period?**

21 A. As of June 30, 2020, 17 customers have registered that represent 535.9 MW of
22 subscriptions. A summary of the preregistered contracts to date is shown in Table A.
23 Industrial, Commercial and Education enrollment window closed 29.5% over the

1 capacity allotted for those customer classes. Government is open until August 31, as
2 stated above.

3

4

Table A. Preregistration Contracts to Date

	Number of Customers	Subscription Size (MW)	Percent of Total Program
Industrial	2	105.8	14.1
Commercial	7	154.3	20.6
Education	4	226.7	30.3
Government	6	49.1	6.6
Total	18	535.9	71.6

5

6 **Q. What is the significance of these initial results?**

7 A. These customers form the group of anchor customers that are important to the success
8 of the CEC Program. That the program is oversubscribed by 29.5% for industrial,
9 commercial and education customers shows strong demand exists for it.

10

11 **Q. How important are anchor customers to the CEC Program?**

12 A. Anchor customers provide the financial foundation for the CEC Program. These
13 customers who subscribe to large portions of the program providing the certainty DEF
14 requires to build additional solar plants under this program in 2023 and 2024. Large
15 institutional and government participants add stability to the program and reduce
16 overall program administration costs.

17

18 **III. PROGRAM DESIGN**

19

20 **Q. Did you work with stakeholders and seek input from them on program design?**

1 A. Yes, I personally engaged in extensive outreach to DEF stakeholders over the course
2 of several months. As a result of informal conversations, the local government carve
3 out was created and the enrollment window for those customers extended by almost
4 three months, the REC treatment was made more robust and the low-income program
5 was expanded, and the enrollment process was solidified. Finally, large customer
6 sustainability goals helped drive the overall program size and customer type
7 allocations.

8

9 **Q. Does the CEC Program expand access of solar power to customers?**

10 A. Yes, in two ways. First, by leveraging the utility's buying power, the CEC Program
11 allows customers to contribute to additional solar resources in Florida at a lower price
12 than if they put up their own solar systems. Second, the CEC Program allows customers
13 who cannot or do not want to put solar on their premise to participate in a solar energy
14 program.

15

16 **Q. In what other way does the CEC Program increase access to solar energy for**
17 **customers?**

18 A. Customers who do not have good rooftop space, either due to orientation or shading,
19 are currently not good candidates to invest in their own solar generation. The CEC
20 Program is an offering that allows these customers to contribute to increased solar
21 generation.

22

23 **Q. What will the capacity of the CEC Program be?**

1 A. The CEC Program will be approximately 750 MW of clean solar energy to its
2 customers. DEF plans to implement the CEC Program over several years. The first
3 year of the CEC Program will consist of two solar power plants, in 2022, which will
4 accommodate 20% of the demand created by pre-registered local government and
5 industrial customers and provide surplus capacity to service approximately 5000
6 residential and commercial customers. Additional solar facilities will be added in 2023
7 and 2024 (four facilities in each year). As stated previously, when those plants achieve
8 commercial operations large customer and local government subscriptions will grow.
9 In addition, more residential and small business will be added to the program.

10

11 **Q. How will CEC Program capacity be allocated among different customer groups?**

12 A. Twenty-five percent of CEC Program capacity will be allocated to residential and small
13 business customers. Seventy-five percent of CEC Program capacity will be allocated
14 to commercial and industrial customers. Ten percent of the Program capacity will be
15 allocated to local governments which reside in the commercial and industrial group.

16 **Q. What is the reason for the separate carve-out for local government customers?**

17 A. We want to be responsive to local governments who wish to use the CEC program to
18 meet their sustainability needs, therefore DEF has reserved a portion of the CEC
19 program for these customers. The carveout allows local governments to follow their
20 energy procurement processes without having to worry that the large commercial and
21 industrial customers would take all the available capacity. This carve out was a
22 suggestion from stakeholders, in alignment with DEF's desire to ensure that customers
23 who had voiced interest in renewables be able to participate.

1

2 **Q. To how much capacity will each customer be able to subscribe?**

3 A. Participating customers may subscribe for up to 100% of their previous 12 months of
4 usage, based on availability. If the customer does not have 12 months of usage DEF
5 will estimate it based on partial usage and/or forecasted usage.

6

7 **Q. Will participating customers be required to enter into a long-term contract?**

8 A. No. Participation in the CEC Program will be voluntary, and customers will be
9 permitted to terminate or change their participation in the CEC Program at any time
10 without penalty. However, if they terminate participation and choose to re-join later,
11 their credit level would start at the year one level. This is to ensure that customers are
12 not able to game the CEC Program and obtain higher level credits without contributing
13 their fair share of subscription fees.

14

15 **Q. Will customers be able to increase their subscription amounts?**

16 A. Yes. Once per subscription year, a customer may subscribe for additional shares in the
17 program, subject to availability.

18

19 **Q. What bill credit rate will customers receive for added subscriptions?**

20 A. Customers will receive bill credits for additional subscriptions according to the tariffed
21 rates, starting with the year-one credit. Please see my Exhibit No. __ (LH-1). For
22 customers that add subscriptions, they will see multiple credit lines on their bill
23 representing the different vintages of their shares. This will ensure that customers

1 cannot add shares in the future without making the appropriate contributions to the
2 program.

3

4 **Q. Why start additional subscriptions at the year-one credit rate?**

5 A. This program rule offers benefits to non-participating customers. First, by starting
6 additions at the year-one credit, it will provide more revenue for the program than
7 originally forecasted. For example, if a customer holds a share for five years and then
8 relinquishes the share, that share would be paying the five-year credit rate. If a new
9 customer claims that share in the next year, the credit paid is the year-one credit
10 resulting in program savings to the non-participating customers. While the subscribing
11 customer still sees a seven-year payback, the resetting of the credit amounts ends up
12 assigning more of the total program benefits to the non-participating customers.
13 Second, if additional shares become available for whatever reason, allowing other
14 customers to claim those shares keeps the program fully subscribed, which benefits
15 non-participants as well. Additionally, DEF anticipates there will be more interested
16 customers than program capacity and seeks to provide renewable power to as many
17 customers interested in it as possible. The program is designed for participants to
18 fund the CPVRR of the facilities, receive RECs, provide bill savings without long-term
19 commitments. Backfilling subscriptions with new participants allows for participant
20 flexibility and provides even more benefits to the new participant and non-participants.

21

22

IV. LOW INCOME CARVE-OUT

23

1 **Q. Will a portion of the CEC Program be available to low income customers?**

2 A. Yes, DEF will allocate 27.7% percent of the residential capacity referenced above for
3 low income customers. These customers will receive a bill credit rate that ensures that
4 in no year will their subscription charge increase their total bill. This allocation was
5 chosen because this is the percentage of DEF residential customers who are eligible for
6 low-income energy efficiency programs.

7
8 **Q. Why did DEF decide to set aside capacity for low income customers?**

9 A. Working with stakeholders, DEF chose to mirror the demographics of its service
10 territory. Approximately twenty eight percent of residential customers live in poverty
11 within the service territory, therefore, assuming half of the small customer capacity is
12 subscribed to by residential customers, the 26MW set aside for low income equals
13 27.7% of the residential customer capacity in the program.

14
15 **Q. Will low income customers save money by participating in the program?**

16 A. Yes. The low income participant monthly subscription fee is \$8.35/kW-month, the
17 same as all other customers. The credit rate is different than that of other participant
18 classes. It is \$9.03/kW-month, regardless of solar generation, yielding a savings of
19 \$0.86/kW-month.

20
21 **Q. Is the low income program subsidized?**

22 A. It is not. The program was designed to give low income customers the same benefit/kw
23 subscription on a CPVRR basis as other customers in the program but adjusted to have

1 relatively more benefits early and less benefits later allowing for bill reductions every
2 year

3

4 **Q. How will the program be marketed to low income customers?**

5 A. Many local governments and non-profits have already offered to help DEF in
6 marketing the program through material distribution and events. DEF welcomes their
7 participation. In addition, DEF will send direct mail, emails, include information in
8 monthly customer bills and on www.duke-energy.com. DEF sees great opportunity in
9 cross-marketing with the existing low income energy efficiency program. Additional
10 opportunities may include apps and other resources used by low income subsidy
11 members. DEF has also committed to producing materials in Spanish.

12

13 **Q. What customers qualify to be in the program?**

14 A. Any customer showing proof of participation in any federal, state or local government
15 subsidy program or has participated in DEF's low income energy efficiency program
16 is eligible to participate.

17

18 **Q. How will a low-income customer qualify to be in the Program?**

19 A. It will depend on the way in which they are applying to the Program. DEF will host an
20 application at www.duke-energy.com which will allow customers to upload proof of
21 participation in a government subsidy program. At events, customers can bring this
22 proof and the program representative can take a picture of collateral presented. DEF
23 intends to make the enrollment process simple for low income customers. Examples

1 of this are events at subsidized housing and advertising within subsidy program mobile
2 apps where only program participants have access.

3

4 **Q. What is the difference between the eligibility for the low income energy efficiency**
5 **programs and this program?**

6 A. To participate in low income energy efficiency, a customer must earn less than 200%
7 of the Federal Poverty Guidelines. The majority of government subsidy programs also
8 use 200% of the Federal Poverty Guideline, although some are lower. As stated above,
9 any customer participating in a government subsidy program is eligible for the low
10 income carve out in Clean Energy Connection.

11

12 **Q. Will low income customers ever see their bill increase as a result of program**
13 **participation?**

14 A. No.

15

16 **V. FINANCIAL IMPACT OF THE PROGRAM ON PARTICIPANTS**

17

18 **Q. How much will it cost to participate in the program?**

19 A. \$8.35/kw/mo. Please reference Sheet Number 6.407 of my Exhibit No. __ (LH-1).

20

21 **Q. Will the CEC Program provide an economic value to participating customers?**

1 A. Participants will receive benefits in the form of bill credits that are designed to grow
2 annually. These benefits are projected to exceed participant subscription costs by the
3 fifth year of continuous enrollment.

4

5 **Q. How do participants save money in the program?**

6 A. Customers earn bill credits in proportion to the amount their share of solar energy
7 produces. The bill credits are a function of the bill credit rate per kWh and the amount
8 of the generation. The initial bill credit amount will be the average of the first three
9 years of bill credits. After 36 months of continuous participation, the bill credit rate
10 increases by 1.5% and continues to do so every 12 months with the 1.5% escalation
11 discontinuing in the 31st year. Over time the bill credit rate increases allow for the bill
12 credits to exceed the subscription charge; thus, lowering the customer's DEF monthly
13 bill.

14

15 **Q. Why a three-year average?**

16 A. As noted above, the large customer subscriptions will be phased in over three years,
17 timed with the CEC solar plants achieving commercial operation. As a result, and in
18 consideration of making the program easy to understand and implement, DEF decided
19 to average the credit rate during that ramp up time. The alternative was to break large
20 customer subscriptions up by the year the solar plant would come online, thereby
21 eventually resulting in three different credit rates after build out is complete for those
22 customers. DEF did not want to make program economics unnecessarily complicated

1 for customers. Even with this three-year average, DEF was able to setup the program
2 to achieve around a seven-year payback for participants.

3
4 **Q. How did DEF arrive at the seven-year payback?**

5 A. DEF used a seven-year payback based on my experience in the solar industry, learnings
6 from FPL's Solar Together program, and discussions with some of our largest
7 customers. This payback period will make the CEC attractive to both large and small
8 customers as they seek ways to obtain solar energy.

9
10 **Q. How does the price of the CEC Program compare to the price of solar power in**
11 **Florida?**

12 A. As of April 2020, the average price of a solar system in Florida is \$2.65 per Watt_{DC}.¹
13 Contrast this with the average cost of utility-scale solar, which has a price of \$1.20 per
14 Watt_{DC} with single-axis tracking, assuming an inverter loading ratio of 1.33.² This
15 price difference is due to economies of scale and buying in bulk. Further, unlike rooftop
16 solar, it is becoming standard for utility scale technology to use tracking arrays to
17 maximize energy production. Tracking increases the output of an array and the time
18 periods of production compared to fixed tilt.³ Because of these price differences, CEC
19 program participants can add new solar generation to Florida's electric grid at a cheaper

¹ <https://www.energysage.com/solar-panels/solar-panel-cost/fl/> (Accessed April 7, 2020).

² *Utility-Scale Solar: Empirical Trends in Project Technology, Cost, Performance, and PPA Pricing in the United States – 2019 Edition*;
https://emp.lbl.gov/sites/default/files/lbnl_utility_scale_solar_2019_edition_final.pdf

³ *Ibid.*

1 price point and with more energy produced than if they bought individual systems on
2 their own.

3

4

VI. IMPACT TO NON-PARTICIPANTS

5

6 **Q. What benefits will the CEC Program provide to DEF's overall customer**
7 **population?**

8 A. As explained in more detail in the testimony of Mr. Benjamin Borsch, the solar
9 generation added to DEF's overall system under the CEC Program will displace fossil-
10 fueled generation, thereby lowering emissions and fuel expenses for all customers. As
11 a cost-effective solar generation system, the CEC Program is expected to lower
12 customer bills over the life of the CEC Program.

13

14 **Q. Will the CEC Program save DEF's total customer population money?**

15 A. Yes. On a cumulative present value revenue requirement ("CVPPR") basis, the CEC
16 Program is projected to save DEF customers an estimated \$533 million when compared
17 to DEF's overall system without the CEC Program. The CEC Program is designed to
18 be cost-effective for both participating and non-participating customers and will enable
19 DEF customers to support the expansion of solar power.

20

21 **Q. How does the CEC Program provide a value to non-participating customers?**

22 A. The CEC Program provides a different way of allocating new generation costs. The
23 program provides benefits to all customers, while the participants eventually fund all

1 the fixed revenue requirements of the new generation. In fact, non-participating
2 customers will receive 87.3 percent of benefits, while subscription fee revenues will
3 cover 104.9% of the fixed program costs.

4

5 **Q. Does the CEC Program provide any other benefits to DEF's customers and the**
6 **state of Florida?**

7 A. Yes, the CEC Program will result in DEF constructing approximately 750 MWs of new
8 solar generation, spread out over approximately ten sites. These projects will be located
9 across DEF's service territory, and will bring economic benefits to the areas, both in
10 terms of temporary construction jobs, more permanent maintenance jobs, and
11 additional tax value to the local and state governments. Investments of this scale can
12 also attract companies to the state as businesses look to locate to states with favorable
13 environments for clean energy. While this is of course not a deciding factor for
14 approval of the program, it is an important byproduct of the CEC Program.

15

16 **VII. ENVIRONMENTAL BENEFITS FOR PARTICIPANTS**

17

18 **Q. Will the CEC Program provide environmental benefits to participating**
19 **customers?**

20 A. Yes, DEF will retire all REC's on behalf of participants. Industrial and local
21 government customers have told DEF that having a program that helps customers meet
22 their particular renewable energy and sustainability goals was of great importance. The

1 REC treatment in the CEC Program allows participants to claim the renewable energy
2 benefits, helping them meet their individual goals.

3

4 **Q. Will the RECs be registered?**

5 A. Yes. RECs will be registered in the North American Renewables Registry (NAR). The
6 NAR system assigns a unique identifier to each REC to enable registration, tracking
7 and retirement. More information on NAR can be found www.apx.com/registries/nar/.

8

9 **Q. Why register the RECs?**

10 A. It is the registration of the solar generation that creates the REC and the retirement of
11 that REC that allows customers to make the claim that they are using renewable energy.
12 The sustainability goals of large customers and local governments are often based on
13 the retirement of RECs. Smaller customers who participate in these programs are not
14 normally familiar with the concept of the REC but have a desire to use renewable power
15 and the REC allows for that.

16

17 **Q. Can customers request to have RECs transferred into an account in their name?**

18 A. Yes, large customers and local governments may request RECs associated with their
19 subscription be transferred to an account in their name.

20

21 **Q. What happens if a customer does not elect a specific REC treatment?**

1 A. RECs associated with subscriptions will be retired on behalf of all participants. Large
2 customers and local governments may request informal attestation of their subscription
3 from DEF at no cost.

4

5 **Q. Are there any fees to have RECs transferred to a customer's account?**

6 A. NAR charges a fee to transfer RECs. This will be passed through to the participant
7 requesting the transfer. DEF will not charge a fee for its services.

8

9 **Q. How will DEF handle RECs from unsubscribed generation?**

10 A. Currently DEF plans to hold them.

11

12 **VIII. PROGRAM IMPLEMENTATION**

13

14 **Q. When will the CEC Program begin operating?**

15 A. As mentioned, commercial operation of the CEC Program will begin in early 2022,
16 with additional solar projects being added in 2023 and 2024. The offerings to
17 residential and small commercial customers will be limited by the available capacity of
18 projects constructed. As additional projects come online, DEF will offer subscriptions
19 for that additional capacity to residential and small commercial customers. If customer
20 demand exceeds the available capacity of any project, customers will be placed on a
21 waitlist to replace customers who leave the program.

22 **Q. Where will the projects making up the CEC program be located?**

1 A. The projects will be distributed across the DEF service territory, bringing geographic
2 diversity to the program's production for the DEF system.

3

4 **Q. How will large customer subscriptions be implemented since solar plants will**
5 **achieve commercial operation over there years?**

6 A. Large customer subscriptions will be phased in over three years, increasing as the CEC
7 plants reach commercial operation.

8

9 **Q. How will DEF customers enroll residential and small business customers in the**
10 **CEC Program?**

11 A. DEF will utilize a web-based enrollment system for residential and small business
12 customers, which will allow customers to view and select the subscription level that
13 suits their needs. As always, DEF customer representatives will be available to assist
14 customers seeking to enroll in the CEC Program.

15

16 **Q. Why is the residential and small business enrollment process different from large**
17 **customer and local government?**

18 A. DEF is seeking diversity in the customer types participating in the program and
19 determined a first come, first serve process may impede reaching that goal. Therefore,
20 every customer was accepted, but their subscription size was reduced to meet the
21 overall capacity limit for that customer group. In addition, their subscriptions will be
22 phased in over three years as program capacity increases so that no customer must wait
23 until 2024 to start progress toward their sustainability goals. Residential customer

1 subscriptions are expected to only be 3-5kW, so it was not feasible to phase their
2 subscriptions in a similar way.

3

4 **Q. What if there is more demand than capacity available?**

5 A. DEF anticipates that there will not be enough capacity for all interested customers.
6 Once the residential and small commercial capacity has been subscribed, DEF will
7 maintain a waiting list of interested customers to ensure that as customers leave the
8 program, new customers can participate, and it stays fully subscribed. To fairly
9 distribute capacity among large customers, DEF opened an enrollment window which,
10 upon closure, was reviewed and all subscription requests were reduced by the
11 percentage by which the allotment was over-subscribed. This methodology ensured
12 that any large customer who wanted to participate could do so. The process is currently
13 occurring for local governments. Their enrollment window will close August 31, 2020.

14

15 **Q. Will participants have access to information about the solar plants?**

16 A. Yes, participants will have access to program information tailored to their subscription
17 level when they log into their account at www.duke-energy.com. The dashboard will
18 show fees paid, credits earned, solar generation and the environmental equivalents such
19 as trees planted and cars avoided.

20

21 **IX. PROGRAM ADMINISTRATION COSTS**

22

23 **Q. What is the projected cost to administer the program?**

1 A. To set up and run the program for 33 years, DEF estimates that the program
2 administration costs will be approximately \$16.5MM.

3

4 **Q. What costs are included in the administration costs?**

5 A. Labor for one program manager and one specialist, IT expense to implement the
6 program in the billing system and on the website, marketing and REC registration fees
7 charged by NAR.

8

9 **X. SUMMARY AND CONCLUSION**

10

11 **Q. Should the Commission approve the CEC Program?**

12 A. Yes, as demonstrated by my testimony and the other testimony filed in support of
13 DEF's Petition, the CEC Program should be approved as an innovative approach to
14 meeting customer demand and achieving the objectives of adding additional clean
15 energy to DEF's portfolio for the benefit of all its customers.

16

17 **Q. Does this conclude your testimony?**

18 A. Yes.

19

Clean Tariffs:
6.101, 6.405, 6.406,
and 6.407



SECTION NO. VI
SECOND REVISED SHEET NO. 6.101
CANCELS FIRST REVISED SHEET NO. 6.101

INDEX OF RATE SCHEDULES

FPSC UNIFORM
RATE SCHEDULE
DESIGNATION

BEGINS ON
SHEET NO.

SOL-1	Shared Solar Rider – Experimental Pilot Program	6.395
NSMR-1	Optional - Non-Standard Meter Rider (AMI Opt-Out)	6.400
CEC-1	Clean Energy Connection Rider (Optional Solar Program)	6.405



**RATE SCHEDULE CEC-1
CLEAN ENERGY CONNECTION RIDER
OPTIONAL SOLAR PROGRAM**

Availability:

The Clean Energy Connection Rider ("the Program") is available to all Customers throughout the entire service area served by Duke Energy Florida (DEF) subject to subscription availability. This optional Program allows customers to subscribe to a portion of universal solar capacity built for the benefit of the Program and receive bill credits for the actual solar production associated with their subscription.

Applicable:

This optional rider is offered in conjunction with the applicable rates, terms, and conditions under which the Customer takes service from DEF. All rates and charges under the Customers' otherwise applicable metered rate schedule shall apply.

Limitation of Service:

Any Customer account taking service under another Company rate schedule whose account is current is eligible to participate. Eligible Customers may elect a subscription level in 1 kW units representing up to 100% of their previous 12-month total kWh usage. Increases in number of units purchased will be limited to once per rolling 12-month period from the anniversary date of program enrollment, and subject to program availability. Customers who present proof of participation in local, state, or federal assistance are eligible for participation at the low-income pricing provided by this tariff.

Rate:

The Monthly Subscription shall be equal to the sum of the Monthly Subscription Fee + Monthly Bill Credit as follows:

Monthly Subscription			
Participant		Low-Income Participant	
Subscription Rate \$/kW-Month	Bill Credit Rate ¢/kWh	Subscription Rate \$/kW-Month	Bill Credit Rate \$/kW-Month
See Sheet No. 6.407	See Sheet No. 6.407	See Sheet No. 6.407	See Sheet No. 6.407

Notes:

- (1) Monthly Bill Credit amounts resulting in a total bill below the minimum monthly bill will have any excess credit amounts applied to subsequent monthly bill amounts.

Minimum Monthly Bill:

The minimum monthly bill shall be the customer's minimum bill under the applicable Rate Schedule. The Monthly Subscription Fee and offsetting Monthly Bill Credit will appear as separate line items on the participant's bill during every month of enrollment, and are subject to all applicable taxes and fees.

Terms of Payment:

Bills rendered hereunder are payable within the time limit specified on the bill at Company-designated locations.

Term of Service:

The term of service will be no less than one (1) billing cycle. Participants may at any time following their first billing cycle, terminate their participation or reduce the number of subscribed units purchased. Participants may be terminated from the program by DEF if the Customer becomes delinquent on the Customer's electric service account, enters into a payment arrangement plan, or for failure to satisfy eligibility requirements. Upon termination, whether initiated by Customer or by DEF, the account is prohibited from re-enrolling for a twelve (12) month period.

Special Provisions:

1. In the event that the Customer transfers their electric service to a different location within DEF's service area, the Customer's subscription shall be transferred to the new service location unless the Customer notifies DEF otherwise.
2. Customers shall not be permitted to redirect Bill Credits or transfer the obligation to pay Subscription Fees to other Duke Energy customer accounts, nor will DEF assign Bill Credits or Subscription Fees to any party other than the original subscribing Customer.
3. Participation in this Program does not convey to the Customer any right, title or interest in or to any portion of the property comprising of any Duke Energy owned solar facilities or any solar facilities constructed pursuant to the Program.

**RATE SCHEDULE CEC-1
CLEAN ENERGY CONNECTION RIDER
OPTIONAL SOLAR PROGRAM
(Continued From Page No. 1)**

4. All solar plants allocated to the Program will be registered with the North America Renewables Registry (NAR) and renewable energy credits (RECs) retired on behalf of all participating Customers on a yearly basis. Upon Customer's request, DEF will move the RECs associated with the Customer's subscription to the Customer's account, at the Customer's expense. Notification to move RECs must be made by the Customer to DEF. RECs will be moved after the payment of the fee. Once a REC is retired on behalf of all participants, it cannot be moved into an individual Customer's account.
5. Subscription Fees and Bill Credits received for additional subscriptions, after a Customer election to increase the number of units purchased, shall begin in Participant Program Year One (1), while previously held subscriptions remain on the Participant Program Year that pertains to the date of the Customer's original subscription.

**RATE SCHEDULE CEC-1
CLEAN ENERGY CONNECTION RIDER
OPTIONAL SOLAR PROGRAM
(Continued From Page No. 2)**

**MONTHLY SUBSCRIPTION
COMMUNITY SOLAR PROGRAM PARTICIPANT RATES**

Phase 1				
	Participant		Low-Income Participant	
Participant Program Year	Subscription Rate \$/kW-Month	Bill Credit Rate c/kWh	Subscription Rate \$/kW-Month	Bill Credit Rate \$/kW-Month
1	\$8.35	(4.0370)	\$8.35	(\$9.03)
2	\$8.35	(4.0370)	\$8.35	(\$9.03)
3	\$8.35	(4.0370)	\$8.35	(\$9.03)
4	\$8.35	(4.0980)	\$8.35	(\$9.03)
5	\$8.35	(4.1590)	\$8.35	(\$9.03)
6	\$8.35	(4.2210)	\$8.35	(\$9.03)
7	\$8.35	(4.2840)	\$8.35	(\$9.03)
8	\$8.35	(4.3480)	\$8.35	(\$9.03)
9	\$8.35	(4.4130)	\$8.35	(\$9.03)
10	\$8.35	(4.4790)	\$8.35	(\$9.03)
11	\$8.35	(4.5460)	\$8.35	(\$9.03)
12	\$8.35	(4.6140)	\$8.35	(\$9.03)
13	\$8.35	(4.6830)	\$8.35	(\$9.03)
14	\$8.35	(4.7530)	\$8.35	(\$9.03)
15	\$8.35	(4.8240)	\$8.35	(\$9.03)
16	\$8.35	(4.8960)	\$8.35	(\$9.03)
17	\$8.35	(4.9690)	\$8.35	(\$9.03)
18	\$8.35	(5.0440)	\$8.35	(\$9.03)
19	\$8.35	(5.1200)	\$8.35	(\$9.03)
20	\$8.35	(5.1970)	\$8.35	(\$9.03)
21	\$8.35	(5.2750)	\$8.35	(\$9.03)
22	\$8.35	(5.3540)	\$8.35	(\$9.03)
23	\$8.35	(5.4340)	\$8.35	(\$9.03)
24	\$8.35	(5.5160)	\$8.35	(\$9.03)
25	\$8.35	(5.5990)	\$8.35	(\$9.03)
26	\$8.35	(5.6830)	\$8.35	(\$9.03)
27	\$8.35	(5.7680)	\$8.35	(\$9.03)
28	\$8.35	(5.8550)	\$8.35	(\$9.03)
29	\$8.35	(5.9430)	\$8.35	(\$9.03)
30	\$8.35	(6.0320)	\$8.35	(\$9.03)
31	\$8.35	(6.0320)	\$8.35	(\$9.03)
32	\$8.35	(6.0320)	\$8.35	(\$9.03)

ISSUED BY: Javier J. Portuondo, Vice President, Rates & Regulatory Strategy – FL

EFFECTIVE:

Legislative Tariffs:
6.101, 6.405,
6.406, and 6.407



INDEX OF RATE SCHEDULES

FPSC UNIFORM RATE SCHEDULE DESIGNATION		BEGINS ON SHEET NO.
SOL-1	Shared Solar Rider – Experimental Pilot Program	6.395
NSMR-1	Optional - Non-Standard Meter Rider (AMI Opt-Out)	6.400
<u>CEC-1</u>	<u>Clean Energy Connection Rider (Optional Solar Program)</u>	<u>6.405</u>

RATE SCHEDULE CEC-1
CLEAN ENERGY CONNECTION RIDER
OPTIONAL SOLAR PROGRAM

Availability:

The Clean Energy Connection Rider ("the Program") is available to all Customers throughout the entire service area served by Duke Energy Florida (DEF) subject to subscription availability. This optional Program allows customers to subscribe to a portion of universal solar capacity built for the benefit of the Program and receive bill credits for the actual solar production associated with their subscription.

Applicable:

This optional rider is offered in conjunction with the applicable rates, terms, and conditions under which the Customer takes service from DEF. All rates and charges under the Customers' otherwise applicable metered rate schedule shall apply.

Limitation of Service:

Any Customer account taking service under another Company rate schedule whose account is current is eligible to participate. Eligible Customers may elect a subscription level in 1 kW units representing up to 100% of their previous 12-month total kWh usage. Increases in number of units purchased will be limited to once per rolling 12-month period from the anniversary date of program enrollment, and subject to program availability. Customers who present proof of participation in local, state, or federal assistance are eligible for participation at the low-income pricing provided by this tariff.

Rate:

The Monthly Subscription shall be equal to the sum of the Monthly Subscription Fee + Monthly Bill Credit as follows:

<u>Monthly Subscription</u>			
<u>Participant</u>		<u>Low-Income Participant</u>	
<u>Subscription Rate</u> <u>\$/kW-Month</u>	<u>Bill Credit Rate</u> <u>¢/kWh</u>	<u>Subscription Rate</u> <u>\$/kW-Month</u>	<u>Bill Credit Rate</u> <u>\$/kW-Month</u>
<u>See Sheet</u> <u>No. 6.407</u>	<u>See Sheet</u> <u>No. 6.407</u>	<u>See Sheet</u> <u>No. 6.407</u>	<u>See Sheet</u> <u>No. 6.407</u>

Notes:

- (1) Monthly Bill Credit amounts resulting in a total bill below the minimum monthly bill will have any excess credit amounts applied to subsequent monthly bill amounts.

Minimum Monthly Bill:

The minimum monthly bill shall be the customer's minimum bill under the applicable Rate Schedule. The Monthly Subscription Fee and offsetting Monthly Bill Credit will appear as separate line items on the participant's bill during every month of enrollment, and are subject to all applicable taxes and fees.

Terms of Payment:

Bills rendered hereunder are payable within the time limit specified on the bill at Company-designated locations.

Term of Service:

The term of service will be no less than one (1) billing cycle. Participants may at any time following their first billing cycle, terminate their participation or reduce the number of subscribed units purchased. Participants may be terminated from the program by DEF if the Customer becomes delinquent on the Customer's electric service account or for failure to satisfy eligibility requirements. Upon termination, whether initiated by Customer or by DEF, the account is prohibited from re-enrolling for a twelve (12) month period.

Special Provisions:

1. In the event that the Customer transfers their electric service to a different location within DEF's service area, the Customer's subscription shall be transferred to the new service location unless the Customer notifies DEF otherwise.
2. Customers shall not be permitted to redirect Bill Credits or transfer the obligation to pay Subscription Fees to other Duke Energy customer accounts, nor will DEF assign Bill Credits or Subscription Fees to any party other than the original subscribing Customer.
3. Participation in this Program does not convey to the Customer any right, title or interest in or to any portion of the property comprising of any Duke Energy owned solar facilities or any solar facilities constructed pursuant to the Program.

RATE SCHEDULE CEC-1
CLEAN ENERGY CONNECTION RIDER
OPTIONAL SOLAR PROGRAM
(Continued From Page No. 1)

4. All solar plants allocated to the Program will be registered with the North America Renewables Registry (NAR) and renewable energy credits (RECs) retired on behalf of all participating Customers on a yearly basis. Upon Customer's request, DEF will move the RECs associated with the Customer's subscription to the Customer's account, at the Customer's expense. Notification to move RECs must be made by the Customer to DEF. RECs will be moved after the payment of the fee. Once a REC is retired on behalf of all participants, it cannot be moved into an individual Customer's account.
5. Subscription Fees and Bill Credits received for additional subscriptions, after a Customer election to increase the number of units purchased, shall begin in Participant Program Year One (1), while previously held subscriptions remain on the Participant Program Year that pertains to the date of the Customer's original subscription.

RATE SCHEDULE CEC-1
CLEAN ENERGY CONNECTION RIDER
OPTIONAL SOLAR PROGRAM
(Continued From Page No. 2)

MONTHLY SUBSCRIPTION
COMMUNITY SOLAR PROGRAM PARTICIPANT RATES

<u>Phase 1</u>				
	<u>Participant</u>		<u>Low-Income Participant</u>	
<u>Participant Program Year</u>	<u>Subscription Rate \$/kW-Month</u>	<u>Bill Credit Rate c/kWh</u>	<u>Subscription Rate \$/kW-Month</u>	<u>Bill Credit Rate \$/kW-Month</u>
<u>1</u>	<u>\$8.35</u>	<u>(4.0370)</u>	<u>\$8.35</u>	<u>(\$9.03)</u>
<u>2</u>	<u>\$8.35</u>	<u>(4.0370)</u>	<u>\$8.35</u>	<u>(\$9.03)</u>
<u>3</u>	<u>\$8.35</u>	<u>(4.0370)</u>	<u>\$8.35</u>	<u>(\$9.03)</u>
<u>4</u>	<u>\$8.35</u>	<u>(4.0980)</u>	<u>\$8.35</u>	<u>(\$9.03)</u>
<u>5</u>	<u>\$8.35</u>	<u>(4.1590)</u>	<u>\$8.35</u>	<u>(\$9.03)</u>
<u>6</u>	<u>\$8.35</u>	<u>(4.2210)</u>	<u>\$8.35</u>	<u>(\$9.03)</u>
<u>7</u>	<u>\$8.35</u>	<u>(4.2840)</u>	<u>\$8.35</u>	<u>(\$9.03)</u>
<u>8</u>	<u>\$8.35</u>	<u>(4.3480)</u>	<u>\$8.35</u>	<u>(\$9.03)</u>
<u>9</u>	<u>\$8.35</u>	<u>(4.4130)</u>	<u>\$8.35</u>	<u>(\$9.03)</u>
<u>10</u>	<u>\$8.35</u>	<u>(4.4790)</u>	<u>\$8.35</u>	<u>(\$9.03)</u>
<u>11</u>	<u>\$8.35</u>	<u>(4.5460)</u>	<u>\$8.35</u>	<u>(\$9.03)</u>
<u>12</u>	<u>\$8.35</u>	<u>(4.6140)</u>	<u>\$8.35</u>	<u>(\$9.03)</u>
<u>13</u>	<u>\$8.35</u>	<u>(4.6830)</u>	<u>\$8.35</u>	<u>(\$9.03)</u>
<u>14</u>	<u>\$8.35</u>	<u>(4.7530)</u>	<u>\$8.35</u>	<u>(\$9.03)</u>
<u>15</u>	<u>\$8.35</u>	<u>(4.8240)</u>	<u>\$8.35</u>	<u>(\$9.03)</u>
<u>16</u>	<u>\$8.35</u>	<u>(4.8960)</u>	<u>\$8.35</u>	<u>(\$9.03)</u>
<u>17</u>	<u>\$8.35</u>	<u>(4.9690)</u>	<u>\$8.35</u>	<u>(\$9.03)</u>
<u>18</u>	<u>\$8.35</u>	<u>(5.0440)</u>	<u>\$8.35</u>	<u>(\$9.03)</u>
<u>19</u>	<u>\$8.35</u>	<u>(5.1200)</u>	<u>\$8.35</u>	<u>(\$9.03)</u>
<u>20</u>	<u>\$8.35</u>	<u>(5.1970)</u>	<u>\$8.35</u>	<u>(\$9.03)</u>
<u>21</u>	<u>\$8.35</u>	<u>(5.2750)</u>	<u>\$8.35</u>	<u>(\$9.03)</u>
<u>22</u>	<u>\$8.35</u>	<u>(5.3540)</u>	<u>\$8.35</u>	<u>(\$9.03)</u>
<u>23</u>	<u>\$8.35</u>	<u>(5.4340)</u>	<u>\$8.35</u>	<u>(\$9.03)</u>
<u>24</u>	<u>\$8.35</u>	<u>(5.5160)</u>	<u>\$8.35</u>	<u>(\$9.03)</u>
<u>25</u>	<u>\$8.35</u>	<u>(5.5990)</u>	<u>\$8.35</u>	<u>(\$9.03)</u>
<u>26</u>	<u>\$8.35</u>	<u>(5.6830)</u>	<u>\$8.35</u>	<u>(\$9.03)</u>
<u>27</u>	<u>\$8.35</u>	<u>(5.7680)</u>	<u>\$8.35</u>	<u>(\$9.03)</u>
<u>28</u>	<u>\$8.35</u>	<u>(5.8550)</u>	<u>\$8.35</u>	<u>(\$9.03)</u>
<u>29</u>	<u>\$8.35</u>	<u>(5.9430)</u>	<u>\$8.35</u>	<u>(\$9.03)</u>
<u>30</u>	<u>\$8.35</u>	<u>(6.0320)</u>	<u>\$8.35</u>	<u>(\$9.03)</u>
<u>31</u>	<u>\$8.35</u>	<u>(6.0320)</u>	<u>\$8.35</u>	<u>(\$9.03)</u>
<u>32</u>	<u>\$8.35</u>	<u>(6.0320)</u>	<u>\$8.35</u>	<u>(\$9.03)</u>

ISSUED BY: Javier J. Portuondo, Vice President, Rates & Regulatory Strategy – FL

EFFECTIVE:

**HIBIN RE: DUKE ENERGY FLORIDA, LLC'S PETITION FOR APPROVAL OF
CLEAN ENERGY CONNECTION TARIFF AND PROGRAM**

FPSC DOCKET NO. _____

DIRECT TESTIMONY OF MATTHEW G. STOUT

JULY 1, 2020

1 **Q. Please state your name and business address.**

2 A. My name is Matthew G. Stout. My business address is Mail Code ST-14A, 400 South
3 Tryon Street, Charlotte, NC 28202.

4

5 **Q. By whom are you employed and what is your position?**

6 A. I am employed by Duke Energy as a Managing Director of Business Development for
7 Wind and Solar Development.

8

9 **Q. Please describe your duties and responsibilities in that position.**

10 A. I am responsible for the development of new solar facilities in Florida on behalf of
11 Duke Energy Florida, LLC ("DEF" or the "Company"). I lead a team that conducts
12 solar development activities including project siting, land acquisition, resource
13 assessment, permitting, obtaining interconnection rights, project layout and design and
14 arranging contracts for engineering, procurement and construction services, as well as
15 originating, structuring, and executing transactions to acquire rights to existing solar
16 development projects.

17

1 **Q. Please describe your educational background and professional experience.**

2 A. I received a BA degree in Economics from Connecticut College in 1998. I began my
3 career as a management consultant for PricewaterhouseCoopers and later worked as an
4 investment banking associate for Morgan Joseph. In 2007, I earned an MBA from the
5 Ross School of Business and an MS in Environmental Policy from the School of
6 Natural Resources at the University of Michigan with a focus on renewable energy.
7 During graduate school, I managed business development at STM Power, Inc., a start-
8 up manufacturer of renewable power generation equipment. Upon finishing graduate
9 school, I joined Catamount Energy Corporation, a renewable energy development
10 company, where I helped site new wind energy facilities across the United States. I
11 joined Duke Energy in 2008 and have had several positions focused on renewable
12 energy development, including Manager of Business Development for Solar and Wind,
13 Managing Director of Project Acquisitions, and most recently Managing Director of
14 Wind and Solar Development for the regulated utilities. In total, I have over 21 years
15 of professional work experience, including 13 years of renewable energy business
16 development. Over the last several years, I have been responsible for vetting and
17 developing all ten universal solar projects for DEF pursuant to its 2017 Revised and
18 Restated Stipulation and Settlement Agreement (“2017 Settlement”). Activities for
19 those solar projects including identifying viable sites and projects within DEF’s service
20 territory, negotiating for panels and other equipment, negotiating and selecting
21 qualified Engineering, Procurement, and Construction (“EPC”) contractors, and
22 ultimately ensuring the timely construction of those facilities within the approved
23 funding amount filed with the commission.

1

2 **Q. What is the purpose of your testimony?**

3 A. My testimony is provided to support DEF's request for approval of its new Clean
4 Energy Connection program and tariff ("CEC Program"). Specifically, I support
5 DEF's ability to develop and construct the projects over the time period presented such
6 that 1) the projects are constructed within the projected costs for the ten solar projects
7 that will be included in DEF's CEC Program and 2) that they are capable of producing
8 the energy (MWhs) that are forecasted for the customers participating in the Clean
9 Energy Connection Program.

10

11 **Q. Are you presenting exhibits in this proceeding?**

12 A. No.

13

14 **Q. Please describe DEF's experience with developing and building universal solar**
15 **facilities.**

16 A. DEF's experience with developing and building universal solar includes thirteen
17 facilities in the state of Florida in the last five years, representing over 700 MW of
18 solar. Ten of the projects were in support of the SOBRA program that have gone into
19 service or will go into service between 2018 and 2021. Additionally, DEF developed
20 and constructed three distribution tied projects in 2016 and 2017. DEF developed many
21 of these facilities directly, while acquiring others from third-party developers. In all
22 cases, DEF procured all major equipment, selected the EPC contractor, oversaw
23 construction, and managed operations and maintenance. With these activities within

1 our scope, DEF was able to ensure that each project sited, developed, and constructed
2 achieved its placed in-service without any meaningful delays and within the budgeted
3 amount of capital funding filed with the commission (including during the COVID-19
4 pandemic).

5 Similar to how we selected and developed the ten projects for the SOBRA
6 program, DEF intends to complete the next ten projects under the Clean Energy
7 Connection program through a combination of greenfield development and third-party
8 project acquisitions. DEF has extensive experience in evaluating greenfield sites and
9 projects under development by third party developers. DEF considers several factors
10 during project evaluation such as cost-effective interconnection to the grid,
11 environmental impacts, constructability of the site, development status and schedule,
12 overall costs, quality/type of materials (such as panel, inverter and racking,
13 manufacturers), project location, zoning entitlements, experience and competencies of
14 the developer, and construction schedule. DEF has developed robust relationships with
15 key equipment suppliers (modules, inverters, transformers, SCADA), with
16 Engineering, Procurement, and Construction (“EPC”) contractors, and with consultants
17 and law firms utilized in the development phase. DEF has developed a robust set of
18 standards and design criteria that are applied to all solar power plants that help
19 streamline request for proposals for major equipment and EPC services and help
20 streamline construction and operations. As such, DEF has a successful track record of
21 developing universal solar facilities on budget and on schedule.

22

1 **Q. Please describe more specifically DEF’s experience with developing and building**
2 **each of the universal solar facilities for the SOBRA program and discuss how your**
3 **experience with these projects will be leveraged for the development of the**
4 **projects under the Clean Energy Connection program.**

5 A. The Hamilton Solar Power Plant is a 74.9 MWac single-axis tracking solar facility
6 located in Hamilton County, Florida. The project utilized high-efficiency
7 monocrystalline solar modules fixed to a single-axis tracking racking system, yielding
8 an expected capacity factor of approximately 30%. The project used a mixture of 360-
9 watt and 365-watt modules, procured from JA Solar (a top five ranked manufacturer
10 by global shipping volume), single-axis tracking racking system procured from Array
11 Technologies, Inc., one of the leading tracker manufacturers, and inverters sourced
12 from Toshiba Mitsubishi Electric Industries Corporation (“TMEIC”), a leading inverter
13 manufacturer. The facility was constructed upon approximate 565 acres of agricultural
14 fields, where minimal site preparation was required (i.e. timbering, clearing, or
15 grading). M. A. Mortenson Company (“Mortenson”) was selected to perform final
16 facility engineering, design and construction. Mortenson has proven to be a reliable
17 EPC partner, having constructed over 3,700 MW of solar energy facilities. The project
18 was placed in-service in December 2018.

19 The Trenton Solar Power Plant is a 74.9 MWac single-axis tracking solar
20 facility, yielding an expected capacity factor of approximately 29%, located in Gilchrist
21 County, Florida. The project used a mixture of 365-watt and 370-watt modules,
22 procured from REC America and a mixture of 380-watt and 385-watt modules,
23 procured from JA Solar (both leading, Tier I manufacturers), single-axis racking system

1 procured from Array Technologies, Inc. and inverters sourced from TMEIC. The
2 facility was constructed on approximately 580 acres under a long-term lease. The site
3 was a former agricultural/cattle grazing land as well as pine timber and relatively flat
4 with minimal sloping that allowed for the use of a tracking system. The point of
5 interconnection was the existing Trenton 69kV Substation. Mortenson was selected
6 to perform final facility engineering, design and construction. DEF acquired the
7 company that held the early stage development assets of the project from Southeast
8 Solar and Power, LLC, the original developer of the project. Southeast Solar and
9 Power, LLC was responsible for the site control, interconnection queue position and a
10 limited amount of environmental and permitting work. DEF acquired the project in
11 September 2018, completed all development activities and placed the project in-service
12 in December 2019.

13 The Lake Placid Solar Power Plant is a 45.0 MWac single-axis tracking solar
14 facility, yielding an expected capacity factor of approximately 29%, located in
15 Highlands County, Florida. The project used a mixture of 340-watt and 345-watt
16 modules, procured from Seraphim Energy Group (a leading, Tier I manufacturer),
17 single-axis racking system procured from Array Technologies, Inc., and inverters
18 sourced from SMA Solar Technology (“SMA”), a leading inverter solutions provider.
19 The facility was constructed on approximately 380 acres under a long-term lease. The
20 site was a former citrus grove and relatively flat with minimal sloping that allowed for
21 the use of a tracking system. The point of interconnection was the existing Lake Placid
22 North 69kV Substation. Overland Contracting Inc., a subsidiary of Black & Veatch
23 (“B&V”) was selected to perform final facility engineering, design and construction.

1 B&V has been actively engaged in the EPC and solar industry since 1973 and has
2 executed full EPC services for 1,379 MW of solar PV projects in Florida and completed
3 1.8+ GW in design engineering services on solar projects. DEF acquired the
4 development assets of the project from EDF Renewables, the original developer of the
5 project. The project was placed in-service in December 2019.

6 The Columbia Solar Power Plant is a 74.9 MWac single-axis tracking solar
7 facility, yielding an expected capacity factor of approximately 31%, located in
8 Columbia County, Florida. The project used 435-watt Series 6 thin film modules,
9 procured from First Solar, Inc. a vertically integrated solar PV manufacturer, single-
10 axis tracking racking system procured from Array Technologies, Inc. and inverters
11 sourced from TMEIC. The facility was constructed upon approximately 580 acres
12 under a long-term lease. The site was relatively flat with minimal sloping that allowed
13 for the use of a tracking system. The facility was connected to a 69kV DEF
14 transmission line that bisects the site. DEF acquired the developed project site from
15 First Solar Development, LLC. Mortenson was selected to perform final facility
16 engineering, design and construction. The project was placed in service in March 2020.

17 The DeBary Solar Power Plant is a 74.5 MWac solar facility located in Volusia
18 County, Florida. The project utilized solar modules mounted to a fixed-tilt racking
19 system, yielding an expected capacity factor of approximately 24%. The project used
20 a mixture of 360-watt and 365-watt modules, procured from Hanwha Q Cells America,
21 Inc. (a top five ranked manufacturer by global shipping volume) and the fixed racking
22 system was procured from Sol Components, a CEMCO affiliate. CEMCO is
23 recognized as one of the largest manufacturers of steel framing in the U.S. Inverters

1 were sourced from TMEIC. The facility was constructed upon approximately 445 acres
2 of company owned property, adjacent to an existing power plant. The site was
3 primarily undeveloped timber land and due to the topography and geographic layout, a
4 fixed-tilt racking system was best suited. Fixed tilt systems cost less to install and
5 produce a lower energy output compared to single-axis tracking systems. The point of
6 interconnection was the existing Highbanks 115kV Substation located on-site. Moss
7 & Associates, LLC (“Moss”) was selected to perform final facility engineering, design
8 and construction. Moss is a proven reliable EPC partner, based in Florida, having
9 constructed over 3,500 MW of solar energy facilities. The project was placed in-
10 service in May 2020.

11 The Twin Rivers Solar Power Plant is a 74.9 MWac single-axis tracking solar
12 facility, yielding an expected capacity factor of approximately 27%, located in
13 Hamilton County, Florida. The project is using a mixture of 415-watt and 420-watt
14 modules, procured from Hanwha Q Cells America Inc., single-axis racking system
15 procured from Array Technologies, Inc., and inverters sourced from TMEIC. The
16 facility was constructed on approximately 515 acres under a long-term lease. The site
17 was agricultural land and relatively flat with minimal sloping that allowed for the use
18 of a tracking system. The point of interconnection was a new 230kV Substation.
19 Wanzek Construction Inc. (“Wanzek”) was selected to perform final facility
20 engineering, design and construction. Wanzek is a wholly owned subsidiary of the
21 Mastec Group (“Mastec”), based in Coral Gables, Florida. Mastec is publicly traded
22 on the New York Stock Exchange under the ticker symbol “MTZ”. Wanzek is a
23 ~\$1.6B annual revenue EPC provider of renewable energy power plants, primarily

1 using wind and solar technology. Wanzek has contracted over 720 MWdc of solar
2 projects over the past two years. DEF acquired the early stage development assets of
3 the project from Tradewind Energy, Inc., the original developer of the project.
4 Tradewind Energy, Inc. had secured site control and an interconnection queue position
5 and had completed a limited amount of site investigation. DEF acquired the project,
6 as is, in August 2017 and then completed all development activities. The project started
7 construction in March 2020 and is expected to achieve placed in-service in January
8 2021.

9 The Santa Fe Solar Power Plant is a 74.9 MWac single-axis tracking solar
10 facility, yielding an expected capacity factor of approximately 29%, located in
11 Columbia County, Florida. The project is using a mix of 425-watt, 430-watt, and 435-
12 watt thin film Series 6 modules, procured from First Solar, Inc., single-axis racking
13 system procured from Array Technologies, Inc. and inverters sourced from TMEIC.
14 The facility was constructed on approximately 607 acres that were purchased before
15 construction. The site consisted mostly of cattle grazing with a limited amount of
16 timberland and was relatively flat with minimal sloping that allowed for the use of a
17 tracking system. The point of interconnection was a new DEF 230kV Substation.
18 Mortenson was selected to perform final facility engineering, design and construction.
19 DEF acquired the development assets of the project from First Solar Development,
20 LLC. First Solar was responsible for all development and permitting activities, DEF
21 acquired the project following the completion of development activities in June 2019.
22 The project started construction in April 2020 and is expected to achieve placed in-
23 service in January 2021.

1 The Charlie Creek Solar Power Plant is a 74.9 MWac single-axis tracking solar
2 facility located in Hardee County, Florida. The project is using solar modules mounted
3 to a tracking system, yielding an expected capacity factor of approximately 29.0%. The
4 project is using 430-watt modules, procured from Hanwha Q Cells America, Inc.,
5 tracking system procured from Array Technologies, Inc, and inverters sourced from
6 TMEIC. The facility is being constructed upon approximately 610 acres that are leased.
7 The site is primarily citrus groves and cattle grazing land and relatively flat with
8 minimal sloping that allowed for the use of a tracking system. The point of
9 interconnection is a new DEF 230 kV substation located on-site. Wanzek was selected
10 to perform final facility engineering, design and construction. The project anticipates
11 being placed in-service in December 2021.

12 The Duette Project is a 74.5 MWac single-axis tracking solar facility located in
13 Manatee County, Florida. The project will utilize solar modules mounted to a tracking
14 system, yielding an expected capacity factor of approximately 28%. The project is
15 using 425-watt modules, procured from Hanwha Q Cells America, Inc., single-axis
16 racking system will be procured from Array Technologies, Inc., and inverters sourced
17 from TMEIC. The facility will be constructed upon approximately 520 acres that will
18 be purchased. The site is primarily citrus groves and is relatively flat with minimal
19 sloping that will allow for the use of a tracking system. The point of interconnection
20 is the existing Dry Prairie 230/69 kV Substation. Moss was selected to perform final
21 facility engineering, design and construction. The project anticipates being placed in-
22 service in December 2021.

1 The Archer Solar Power Plant is a 74.9 MWac solar facility located in Alachua
2 County, Florida. The project is a single-axis tracking facility, yielding an expected
3 capacity factor of approximately 28%. The project is using 440-watt thin film Series 6
4 modules, procured from First Solar, Inc., single-axis racking system procured from
5 Array Technologies, Inc. and inverters sourced from TMEIC. The facility will be
6 constructed upon approximately 630 acres of mostly flat pine timber land with minimal
7 sloping allowing for the use of a tracking system. The point of interconnection is the
8 existing DEF Archer 230/69 kV Substation. B&V was selected to perform final facility
9 engineering, design and construction. The project anticipates being placed in-service
10 by December 2021.

11 The development and construction of the ten SOBRA projects has led to several
12 key lessons learned for development, engineering, procurement and construction. In
13 general, these projects required approximately 600 acres each, land was selected that
14 minimized environmental impacts, reduced construction costs by utilizing flat land
15 with proper soil conditions and a minimum amount of clearing. Project design was
16 optimized with single-axis tracking or a fixed tilt with enough land to support higher
17 DC/AC ratios for achieving targeted capacity factors. The team has had success using
18 both thin film (First Solar) and crystalline solar panels (such as Hanwha Q Cells).
19 Balance of system equipment that has proven cost effective and reliable such as TMEIC
20 inverters and racking systems from Array Technologies. We have worked with and
21 identified several key strong EPC firms including Mortenson, Black & Veatch,
22 Wanzek, and Moss. We have gained experienced connecting to the solar projects at
23 various points on the transmission system, including connecting at 69kV, 115kV, and

1 230kV, in some cases by building new switching stations to break a line or by
2 connecting into an existing substation. In conclusion, developing and building the ten
3 SOBRA projects has provided us with a set of best practices and strong partners to
4 advance the next ten projects under the CEC program.

5
6 **Q. Please describe the CEC Program DEF is presenting for approval.**

7 A. DEF's CEC Program consists of ten separate solar projects, with a nameplate capacity
8 of approximately 750 megawatts (MW) of universal solar generation. Each solar
9 project is planned to be 74.9 MW, with an assumed capacity factor of 28%. The first
10 two projects are planned to come online in early 2022, while the next four will go in
11 service in 2023. The last four will go into service in 2024. Collectively, these projects
12 will generate approximately 1,837,147 MWhs per year when all are in-service and
13 operating.

14
15 **Q. Does DEF have specific sites selected for any of the ten projects that make up the**
16 **CEC Program?**

17 A. No, DEF has a robust pipeline of advanced projects that it is evaluating for inclusion
18 in the CEC program, including both greenfield projects and projects that are under
19 development by third parties. Final selection is highly dependent on the completion of
20 interconnection studies for the projects under review. However, the process for
21 selecting sites is the same as I have previously described in connection with DEF's
22 three SOBRA filings for universal solar projects placed into service pursuant to the
23 2017 Settlement. Specifically, DEF has been and will continue a comprehensive

1 review of greenfield sites (including sites that it already owns) and projects already in
2 development in DEF's service territory. DEF identified projects already in the
3 interconnection queue with favorable queue positions. DEF is willing to purchase solar
4 projects in various stages of completion from third-party developers, but projects must
5 meet our standards of development and construction and fit into our strategic build
6 plan. The primary factors when considering the purchase of a third-party developed
7 site are interconnection queue position for transmission connection to the grid and
8 expected grid upgrades, environmental impacts, constructability of the site,
9 development status and schedule, overall cost, quality/type of materials (such as panel,
10 inverter and racking, manufacturers), project location, zoning entitlements, experience
11 and competencies of developer, and construction schedule. DEF expects that the ten
12 solar projects for the CEC Program will be selected from among this list of qualified
13 projects.

14
15 **Q. What are the assumed costs for the solar projects that make up the CEC**
16 **Program?**

17 A. DEF anticipates that the 2022 projects will each cost approximately \$113 million
18 including approximately \$10 million in transmission network upgrades. The 2023
19 projects are expected to cost approximately \$106 million each including \$10 million in
20 network upgrades, while the 2024 projects are each projected to cost \$102 million
21 including \$10 million in network upgrades. These costs translate to a per kW cost of
22 \$1,372/kWac for the 2022 projects, \$1,273/kWac for the 2023 projects, and
23 \$1,222/kWac for the 2024 projects before the network upgrades.

1 **Q. How did DEF develop the costs for the various solar projects without specific sites**
2 **selected?**

3 A. DEF is actively engaged in the Florida solar market. At the time of drafting this filing,
4 we have five projects that have recently completed construction and are in operation,
5 two projects under construction, and three projects that are at the final development
6 stage with agreements in place for panel supply and transformers and with final
7 selection of construction contractors completed. As explained above, DEF, under my
8 specific direction, has brought several solar projects on-line and has contracts in place
9 for several more. Most recently, in connection with the third SOBRA filing, DEF has
10 specific pricing information on several solar projects that are expected to come on-line
11 in late 2021, right before the first two 2022 CEC Program solar projects. By building
12 on that recent experience with solar facility pricing, and layering in appropriate
13 adjustments to the market that are forecasted for 2023 and 2024, DEF believes that its
14 projected solar project costs are conservative and reasonable for inclusion in the CEC
15 Program.

16
17 **Q. Did DEF take any other action to confirm the reasonableness of its assumed**
18 **project costs?**

19 A. Yes, I contacted several major panel suppliers to confirm the panel pricing for the 2022
20 solar projects and to obtain proposals for panel supply for the 2023 and 2024 project.
21 Based on the information they informally provided, the assumed panel prices for those
22 projects are appropriate. In addition, we have had EPC firms conduct site visits and
23 provide pricing quotes for the potential 2022 projects and we expect similar

1 construction costs for the 2023 and 2024 projects. Finally, we have confirmed our costs
2 estimates for the remaining components of a typical solar power plant including the
3 project substation and transformer, the SCADA system, real estate and development
4 expenses, construction management, and all interconnection costs typically included in
5 a Large Generator Interconnection Agreement.

6

7 **Q. Should the Commission approve the CEC Program based on the projected solar**
8 **costs you have provided in this testimony?**

9 **A.** Yes. DEF's active participation in the solar market developing and constructing the 10
10 SOBRA projects provides a baseline for cost estimating the 2022 CEC projects that
11 will be constructed in the same year as the final three SOBRA projects. In addition,
12 DEF's work with outside suppliers and knowledge of the construction market has
13 provided the guidance necessary to estimate costs to construct the 2023 and 2024 CEC
14 projects.

15

16 **Q. Does that conclude your testimony?**

17 **A.** Yes.

18

**IN RE: DUKE ENERGY FLORIDA, LLC'S PETITION FOR APPROVAL OF
CLEAN ENERGY CONNECTION TARIFF AND PROGRAM**

FPSC DOCKET NO. _____

DIRECT TESTIMONY OF BENJAMIN M. H. BORSCH

JULY 1, 2020

1 **Q. Please state your name and business address.**

2 A. My name is Benjamin M. H. Borsch. My business address is Duke Energy Florida,
3 LLC, 299 1st Avenue North, St. Petersburg, Florida 33701.

4

5 **Q. By whom are you employed and what is your position?**

6 A. I am employed by Duke Energy Florida, LLC ("DEF" or the "Company") as the
7 Director, IRP & Analytics.

8

9 **Q. Please describe your duties and responsibilities in that position.**

10 A. I am responsible for resource planning for DEF. I am responsible for directing the
11 resource planning process in an integrated approach in order to find the most cost-
12 effective alternatives to meet the Company's obligation to serve its customers in
13 Florida. I oversee the completion of the Company's Ten-Year Site Plan ("TYSP") filed
14 each April.

15

16 **Q. Please describe your educational background and professional experience.**

1 A. I received a Bachelor of Science and Engineering degree in Chemical Engineering from
2 Princeton University. I joined Progress Energy in 2008 supporting the project
3 management and construction department in the development of power plant projects.
4 In 2009, I became Manager of Generation Resource Planning for Progress Energy
5 Florida, and following the 2012 merger with Duke Energy Corporation, I accepted my
6 current position. Prior to joining Progress Energy, I was employed for more than five
7 years by Calpine Corporation where I was Manager (later Director) of Environmental
8 Health and Safety for Calpine's Southeastern Region. In this capacity, I supported
9 development and operations and oversaw permitting and compliance for several gas-
10 fired power plant projects in nine states. I was also employed for more than eight years
11 as an environmental consultant with projects including development, permitting, and
12 compliance of power plants and transmission facilities. I am a professional engineer
13 licensed in Florida and North Carolina.

14
15 **Q. Please give an overview of the Company's presentation in this filing.**

16 A. The Company is presenting testimony from four witnesses. My testimony will focus
17 on the Company's demonstration of cost effectiveness for the Clean Energy Connection
18 Program and Tariff ("CEC Program"). The testimony of Mr. Matthew G. Stout focuses
19 on the assumed solar costs for the various solar projects that DEF is proposing to
20 construct as part of the CEC Program. The testimony of Mr. Thomas G. Foster presents
21 the financial modeling performed to calculate the subscription fees and bill credits
22 associated with DEF's Clean Energy Connection Program ("CEC"). Finally, Mr. Lon
23 Huber will provide details on the design and administration of the CEC Program, as

1 well as a summary of the discussions between DEF and its customers regarding the
2 CEC Program.

3

4 **Q. What is the purpose of your testimony?**

5 A. The purpose of my testimony is to present the results of the economic analysis which
6 shows that DEF's proposed CEC Program, as described below, is cost effective. My
7 testimony covers several areas. First, I briefly describe the CEC Program. Second, I
8 discuss the major assumptions and methodology used to perform the economic
9 analysis. Third, I present the results of the economic analysis, demonstrating that the
10 addition of the proposed 749 MW of solar projects is cost effective.

11

12 **Q. Are you presenting exhibits in this proceeding?**

13 A. Yes. They consist of the following exhibits which are attached to my testimony:

14 Exhibit No. __ (BMHB-1), "Load Forecast;"

15 Exhibit No. __ (BMHB-2), "Fuel Forecasts;"

16 Exhibit No. __ (BMHB-3), "Cost Effectiveness (CPVRR) Analysis Results;"

17 Exhibit No. __ (BMHB-4), "Resource Plans;" and

18 Exhibit No. __ (BMHB-5), "CPVRR"

19 These exhibits are true and accurate.

20

21 **Q. Please summarize your testimony.**

22 A. The proposed CEC program involves the construction of 749 MW of PV solar
23 generating facilities coming into service over a period of approximately 25 months,

1 between January 2022 and January 2024 to provide solar generation whose attributes
2 will be assigned to customers participating in the program (“subscribers”). These
3 facilities and their generation will also provide a benefit to all DEF customers through
4 the reduction of system operating costs and fuel consumption. DEF performed an
5 economic analysis and determined that the projects included in the CEC Program result
6 in a reduction in the Cumulative Present Value Revenue Requirements (“CPVRR”) to
7 DEF customers for a total savings of approximately \$533 million.

8

9 **Q. Please describe the CEC Program DEF is presenting for approval.**

10 A. DEF’s CEC Program is planned to consist of ten separate solar projects, with a
11 nameplate capacity of approximately 749 megawatts (MW) of universal solar
12 generation. Each solar project is planned to be 74.9 MW with an assumed capacity
13 factor of 28%. The first two projects are planned to come online in early 2022, while
14 four additional projects will go in service in each year 2023 and 2024. Collectively,
15 these projects will generate over 1.8 million MWhs per year or approximately 4% of
16 DEF’s projected Net Energy for Load in the 2024/25 timeframe.

17

18 **Q. What will these proposed solar projects cost?**

19 A. DEF anticipates that the 2022 projects will each cost approximately \$113 million
20 including approximately \$10 million in transmission network upgrades. The 2023
21 projects are expected to cost approximately \$106 million each including \$10 million in
22 network upgrades, while the 2024 projects are each projected to cost \$102 million
23 including \$10 million in network upgrades. These costs translate to a per kW cost of

1 \$1,372/kW_{ac} for the 2022 projects, \$1,273/kW_{ac} for the 2023 projects, and
2 \$1,222/kW_{ac} for the 2024 projects before the network upgrades. The development of
3 the costs is described in more detail in Mr. Stout’s testimony.

4
5 **Q. Are the proposed solar projects that make up the CEC Program cost effective?**

6 A. Yes. As explained below, DEF analyzed the total system cost of the DEF system with
7 the projects as compared to the total DEF system costs without the projects and found
8 that the solar projects as proposed reduce the total system cost and are thus cost
9 effective for DEF’s customers.

10
11 **Q. How did DEF evaluate the cost effectiveness of the solar projects?**

12 A. DEF calculated the cost effectiveness in the same manner that it performs cost
13 effectiveness evaluations of numerous projects including the development of the Ten-
14 Year Site Plan and every Solar Base Rate Adjustment (“SoBRA”) filing it has made
15 pursuant to its 2017 Revised and Restated Stipulation and Settlement Agreement
16 (“2017 Settlement”). DEF calculates the total system cost projected over the life of the
17 solar projects for a scenario with the solar projects and compares it to the total system
18 cost calculated for a scenario without the solar projects. Lower total system costs for
19 the scenario with the solar projects represents savings to DEF’s customers. As with
20 our Ten-Year Site Plan, this analysis is performed using the Planning and Risk suite of
21 modeling tools to evaluate the production cost results. Project specific capital costs
22 come from the project development teams and revenue requirements are then
23 developed. Finally, project specific solar performance projections are developed using

1 the PVSyst model and provided to the production cost model. These data become
2 inputs to derive the system costs for the two cases developed with and without the solar
3 projects in service.

4 In addition to the reference case, assuming the base case fuel price projection and a
5 carbon emission cost beginning in 2025, DEF also performed sensitivities based on low
6 and high fuel price projections. Results of these differential CPVRR analyses, the
7 difference between with and without the solar projects are shown below and in Exhibit
8 No. __ (BMBH-3). The fuel price forecasts are shown in Exhibit No. __ (BMHB-2)
9 attached to this testimony.

10 **Q. Please describe the major assumptions used in developing the CPVRR analyses.**

11 A. Three major assumptions used in developing the CPVRR analyses are the forecast of
12 DEF system energy and demand (“Load Forecast”), the forecast of future prices for
13 natural gas, coal, and oil (“Fuel Forecast”) and the forecast of price proxies for the costs
14 associated with future greenhouse gas emissions reduction programs (“CO2 Emissions
15 Price Forecast”)

16 • Load Forecast – The analysis uses DEF’s most recent official load forecast
17 developed in the fall of 2019, which is presented as the base case load forecast in
18 the DEF 2020 Ten-Year Site Plan (“TYSP”) filed with the commission April 1,
19 2020. The load forecast was also used to support DEF’s third and most recent filing
20 for approval of SoBRA projects pursuant to the 2017 Settlement. This load forecast
21 is attached as Exhibit No. __ (BMHB-1).

22 • Fuel Price Forecast – The reference case analyses use DEF’s most recent published
23 fuel price forecast also utilized in DEF’s 2020 TYSP. The base case fuel price

forecast was developed using short-term and long-term spot market price projections from industry-recognized sources. The base cost for coal is based on the existing contracts and spot market coal prices and transportation arrangements between DEF and its various suppliers. For the longer term, the prices are based on a forecast of spot market prices reflective of expected market conditions. Oil and natural gas prices are estimated based on current and expected contracts and spot purchase arrangements as well as near-term and long-term market forecasts. Oil and natural gas commodity prices are driven primarily by open market forces of supply and demand. Natural gas firm transportation cost is determined primarily by pipeline tariff rates. For the low and high fuel price scenarios, DEF developed ranges of natural gas and coal prices around the reference forecast based on the range of prices seen in the Energy Information Administration's high price (Low Oil and Gas Resource and Technology Case) and low price (High Oil and Gas Resource and Technology Case) forecasts.

- CO₂ Emissions Price Forecast – The CO₂ allowance price projections used in this filing are also DEF's latest projections used in the development of the 2020 TYSP.

Q. What are the results of DEF's cost effectiveness evaluation for these projects?

A. DEF has found that the projects are cost effective for its customers. The total system costs calculated over the project lives when including the projects in the DEF resource plan are lower when compared to the total system costs excluding the projects. The net results of this analysis (system costs with the projects minus system costs without the projects) are summarized in the table below and in Exhibit No. __ (BMHB-3).

1

CPVRR Net Cost / (Savings) of Proposed Solar Projects
\$ Millions (2020)

Low Fuel Sensitivity	Base Case Fuel	High Fuel Sensitivity
(404)	(533)	(831)

2 **Q. Were these CPVRR benefits used to develop the Clean Energy Connection**
3 **tariff?**

4 A. Yes. Exhibit BMHB-5 provides a grouping of the CPVRR costs and benefits caused
5 by the introduction of the Clean Energy Connection solar to the system in a way that
6 ties to the way that costs and benefits were used to develop the tariff. The cost of the
7 new solar, including the capital and associated costs along with the program
8 administration costs are grouped together. The next grouping shows the capital and
9 fixed cost savings associated with deferred conventional generation investment. These
10 two groups of items totaled together are the CPVRR total that was used to develop the
11 total CPVRR for the creation of the subscription fee as described in DEF Witness
12 Foster's testimony. The third grouping shows the variable cost saving resulting from
13 the operation of the solar units on the DEF system. The total CPVRR of these variable
14 cost saving was used to develop the subscription credit as described in Mr. Foster's
15 testimony. This provides a portion of the benefits from the energy, variable cost and
16 emissions savings to the subscribers in a manner that supports the program while
17 reserving the balance of these benefits to the general body of the customers.

18

19 **Q. What are the primary drivers of the benefits to DEF customers?**

1 A. The primary driver of the value to DEF customers is the savings in fuel, operating and
2 maintenance costs and projected emissions costs primarily from reductions in CO2
3 emissions. DEF customers will also realize a significant benefit from the generating
4 capacity associated with these solar facilities. The proposed addition of the Clean
5 Energy Connection projects results in the deferral of the need for multiple gas fired
6 peaking projects and the displacement of the need for 230 MW of gas fired peakers
7 entirely along with deferral or displacement of the associated gas transportation.
8 Operation of the proposed facilities displaces more than 51 million MWh of fossil fired
9 generation over the life of the program.

10

11 **Q. Please describe the resource plans used in this analysis.**

12 A. The resulting plans are shown in Exhibit BMHB-4. The “No Clean Energy Connection
13 Solar” shows a need for nine 225 MW (nominal) combustion turbines between 2026
14 and 2034. The Clean Energy Connection Solar plan shows a need for only seven
15 combustion turbines over that same period. Over the 30-year evaluation, several
16 turbines are deferred for multiple years and the total number of turbines is reduced by
17 one. This change in the plan results in a savings in fixed costs, capital, gas reservations
18 and fixed O&M of over \$350 million measured in CPVRR. This also provides a
19 qualitative benefit since in an era of evolving clean energy technology, opportunities
20 to defer gas fired generation may bring opportunities to introduce other technologies in
21 the future.

22

23 **Q. How did DEF determine the firm capacity that these Centers will provide?**

1 A. As DEF has done for its SoBRA facilities, firm capacity value for the projects is
2 calculated based on the expected output of the solar facilities at the time of the DEF
3 seasonal peaks in summer and winter. As outlined in DEF's 2020 TYSP, DEF assigns
4 a firm summer capacity value of 57% of the facility nameplate AC rating for facilities
5 with single axis tracking design as is contemplated for the solar plants to be built as a
6 part of this program. DEF assigns no winter capacity value because the historical high
7 DEF winter peaks have occurred in the early morning hours of January mornings when
8 solar output is negligible.

9

10 **Q. What benefits do the proposed solar facilities bring to DEF's system and**
11 **customers?**

12 A. The proposed DEF solar projects provide customers with the benefits of cost-effective,
13 clean, renewable energy. These large-scale solar projects will diversify DEF's fuel mix
14 with dependable emissions free energy, and provide firm summer capacity, helping to
15 meet DEF's needs for future capacity and satisfy DEF's need for future generation
16 capacity. The proposed projects are expected to reduce DEF's annual average use of
17 natural gas by 11,000 million cubic feet along with over 7,000 tons per year of coal,
18 reducing DEF's reliance on fossil fuels. Specific CEC program benefits are discussed
19 more fully in the testimony of DEF Witness Huber.

20

21 **Q. What effect will the Clean Energy Connection Program's solar projects have on**
22 **the use of fossil fuels and the emission of greenhouse gases and other air**
23 **emissions?**

1 A. As explained above, these new solar projects will reduce the use of fossil fuels, and are
2 therefore projected to reduce global warming gases, specifically CO₂, at an average
3 rate of over 700,000 tons per year. In addition, DEF projects that the solar projects will
4 result in reductions of SO₂ and NO_x emissions by an annual average of 142 tons and
5 21 tons, respectively.

6

7 **Q. Given all these benefits, does DEF have a need for these solar projects?**

8 A. Yes. DEF has a need for cost-effective clean generation that will diversify its fuel mix
9 and defer the need for future gas-fired generation. This is in addition to the customer
10 desire for the CEC Program, which is described further in Mr. Huber's testimony. All
11 DEF's customers will benefit from the addition of the solar projects proposed in the
12 CEC Program.

13

14 **Q. Does that conclude your testimony?**

15 A. Yes.

16

Load Forecast			
Year	Summer Firm Peak MW	Winter Firm Peak MW	Net Energy for Load Mwh
2020	8,915	9,406	43,644,906
2021	8,946	8,789	43,939,025
2022	9,007	9,167	44,591,037
2023	8,735	8,922	44,535,781
2024	8,769	9,012	44,880,342
2025	8,588	8,777	44,720,775
2026	8,612	8,880	44,954,812
2027	8,666	8,941	45,267,934
2028	8,759	9,003	45,777,936
2029	8,829	9,038	46,123,759
2030	8,904	9,091	46,525,804
2031	8,940	9,036	45,949,137
2032	9,031	9,222	46,468,945
2033	9,102	9,249	46,838,648
2034	9,191	9,316	47,322,026
2035	9,283	9,379	47,807,095
2036	8,984	9,075	48,371,288
2037	9,067	9,109	48,795,901
2038	9,158	9,173	49,285,725
2039	9,294	9,236	49,776,860
2040	9,405	9,338	50,380,732
2041	9,494	9,358	50,821,460
2042	9,570	9,336	51,310,772
2043	9,679	9,491	51,855,627
2044	9,985	9,594	52,453,876
2045	9,881	9,606	52,813,645
2046	9,985	9,673	53,311,439

Fuel Forecasts											
Fuel Mid Price Forecast				Fuel High Price Forecast				Fuel Low Price Forecast			
(2020 TYSP)				(2020 TYSP)				(2020 TYSP)			
Year	Natural Gas Base Cost Regular Supply Z3	CRN Coal	Distillate Oil	Year	Natural Gas Base Cost Regular Supply Z3	CRN Coal	Distillate Oil	Year	Natural Gas Base Cost Regular Supply Z3	CRN Coal	Distillate Oil
	\$/MMBTU				\$/MMBTU				\$/MMBTU		
2020	2.41	2.12	14.13	2020	2.41	2.12	14.13	2020	2.41	2.12	14.13
2021	2.45	2.18	13.89	2021	2.48	2.18	13.89	2021	2.45	2.18	13.89
2022	2.52	2.26	14.14	2022	2.76	2.26	14.14	2022	2.52	2.26	14.14
2023	2.60	2.43	14.32	2023	3.21	2.43	14.32	2023	2.60	2.43	14.32
2024	2.75	2.52	14.60	2024	3.79	2.53	14.60	2024	2.70	2.52	14.60
2025	2.99	2.72	14.96	2025	4.15	2.75	14.96	2025	2.86	2.71	14.96
2026	3.28	2.88	15.53	2026	4.58	2.93	15.53	2026	3.07	2.85	15.53
2027	3.68	3.09	16.18	2027	5.03	3.16	16.18	2027	3.38	3.05	16.18
2028	4.20	3.33	16.93	2028	5.60	3.40	16.93	2028	3.70	3.28	16.93
2029	4.58	3.44	17.62	2029	6.05	3.51	17.62	2029	3.98	3.38	17.62
2030	4.80	3.55	18.06	2030	6.34	3.65	18.06	2030	4.13	3.51	18.06
2031	5.08	3.96	18.46	2031	6.80	4.04	18.46	2031	4.40	3.91	18.46
2032	5.37	4.11	18.88	2032	7.14	4.18	18.88	2032	4.54	4.04	18.88
2033	5.34	4.25	19.31	2033	7.09	4.33	19.31	2033	4.51	4.18	19.31
2034	5.57	4.37	19.75	2034	7.54	4.47	19.75	2034	4.66	4.33	19.75
2035	5.78	4.43	20.20	2035	7.89	4.51	20.20	2035	4.83	4.37	20.20
2036	5.86	4.53	20.66	2036	7.99	4.61	20.66	2036	4.82	4.45	20.66
2037	6.26	4.67	21.14	2037	8.64	4.77	21.14	2037	5.13	4.59	21.14
2038	6.56	4.80	21.54	2038	9.15	4.91	21.54	2038	5.36	4.71	21.54
2039	6.68	4.96	21.93	2039	9.28	5.09	21.93	2039	5.44	4.86	21.93
2040	6.97	5.10	22.07	2040	9.85	5.26	22.07	2040	5.60	5.01	22.07
2041	7.21	5.24	22.64	2041	10.29	5.42	22.64	2041	5.80	5.18	22.64
2042	7.47	5.39	23.22	2042	10.74	5.58	23.22	2042	5.97	5.35	23.22
2043	7.65	5.53	23.42	2043	11.14	5.75	23.42	2043	6.04	5.51	23.42
2044	7.95	5.67	24.02	2044	11.33	5.92	24.02	2044	6.25	5.64	24.02
2045	8.39	5.82	24.22	2045	11.95	6.04	24.22	2045	6.54	5.75	24.22
2046	8.71	5.96	24.83	2046	12.57	6.21	24.83	2046	6.76	5.91	24.83
2047	8.85	6.10	25.45	2047	13.04	6.40	25.45	2047	6.85	6.03	25.45
2048	9.14	6.25	25.64	2048	13.55	6.56	25.64	2048	6.96	6.13	25.64
2049	9.36	6.39	26.28	2049	13.90	6.72	26.28	2049	7.01	6.25	26.28
2050	9.45	6.53	26.29	2050	14.22	6.88	26.29	2050	7.05	6.39	26.29
2051	9.69	6.69	26.95	2051	14.57	7.06	26.95	2051	7.23	6.55	26.95
2052	9.93	6.86	27.62	2052	14.94	7.23	27.62	2052	7.41	6.71	27.62
2053	10.18	7.03	28.31	2053	15.31	7.41	28.31	2053	7.60	6.88	28.31

Cost Effectiveness (CPVRR) Analysis Results			
CPVRR Through Year 2053 2020\$M	<u>Clean Energy Connection Solar - No CEC Solar</u>		
	Low Fuel Prices	Mid Fuel Prices	High Fuel Prices
2022 Clean Energy Connection Units	259	259	259
2023 Clean Energy Connection Units	454	454	454
2024 Clean Energy Connection Units	427	427	427
Conventional Generation	(353)	(353)	(353)
Fuel Cost	(702)	(827)	(1,113)
Variable Costs	(67)	(65)	(64)
Environmental Costs without Carbon	(0)	(1)	(3)
Program Administrative Costs	7	7	7
Total Solar Savings before CO2 Costs	25	(99)	(385)
CO2 Cost	(429)	(434)	(446)
Solar Project CPVRR (Savings)	(404)	(533)	(831)

Resource Plans		
Year	No Clean Energy Connection Solar	Clean Energy Connection Solar
2020		
2021		
2022		Clean Energy Connection Solar 149.8 MW
2023		Clean Energy Connection Solar 299.6 MW
2024		Clean Energy Connection Solar 299.6 MW
2025		
2026		
2027	Combustion Turbine 451.6 MW	Combustion Turbine 225.8 MW
2028	Combustion Turbine 225.8 MW	
2029		Combustion Turbine 225.8 MW
2030	Combustion Turbine 225.8 MW	
2031		Combustion Turbine 225.8 MW
2032	Combustion Turbine 225.8 MW	
2033		Combustion Turbine 225.8 MW
2034	Combustion Turbine 903.2 MW	Combustion Turbine 677.4 MW
	Combined Cycle 1277.1 MW	Combined Cycle 1277.1 MW
2035		
2036		Combustion Turbine 225.8 MW
2037		
2038	Combustion Turbine 677.4 MW	Combustion Turbine 451.6 MW
2039		
2040	Combustion Turbine 225.8 MW	Combustion Turbine 225.8 MW
2041		
2042	Combined Cycle 1277.1 MW	Combined Cycle 1277.1 MW
2043		
2044	Combustion Turbine 451.6 MW	Combustion Turbine 451.6 MW
2045	Combustion Turbine 225.8 MW	Combustion Turbine 225.8 MW
2046		Combustion Turbine 225.8 MW

Cumulative Present Value Revenue Requirements (CPVRR)		
		CPVRR \$M 2020
	Program Admin. Costs	\$ 7.3
Solar Revenue Requirements	Generation Capital (\$M)	\$ 937.7
	Transmission Interconnection (\$M)	\$ 108.8
	Fixed O&M (\$M)	\$ 93.8
Avoided Non Solar Fixed Costs	Generation Capital (\$M)	\$ (158.7)
	Transmission Interconnection (\$M)	\$ (28.9)
	Fixed O&M (\$M)	\$ (12.0)
	Gas Reservation Charges (\$M)	\$ (153.9)
Avoided System Costs	System Net Fuel (\$M)	\$ (826.9)
	Start Up and VOM (\$M)	\$ (64.6)
	Emissions (\$M)	\$ (435.5)
	Total CPVRR (\$M)	\$ (532.7)

**IN RE: DUKE ENERGY FLORIDA, LLC'S PETITION FOR APPROVAL OF
CLEAN ENERGY CONNECTION TARIFF AND PROGRAM**

FPSC DOCKET NO. _____

DIRECT TESTIMONY OF THOMAS G. FOSTER

JULY 1, 2020

1 **Q. Please state your name and business address.**

2 A. My name is Thomas G. Foster. My business address is Duke Energy Florida, LLC, 299
3 1st Avenue North, St. Petersburg, Florida 33701.

4

5 **Q. By whom are you employed and what is your position?**

6 A. I am employed by Duke Energy Florida, LLC ("DEF" or the "Company") as Director
7 of Rates and Regulatory Planning.

8

9 **Q. Please describe your duties and responsibilities in that position.**

10 A. I am responsible for regulatory planning and cost recovery for Duke Energy Florida,
11 LLC ("DEF"), including the Company's filing for recovery of its investments in solar
12 projects.

13

14 **Q. Please describe your educational background and professional experience.**

15 A. I joined the Company on October 31, 2005 in the Regulatory group. In 2012, following
16 the merger with Duke Energy Corporation ("Duke Energy"), I was promoted to my
17 current position. I have 6 years of experience related to the operation and maintenance

1 of power plants obtained while serving in the United States Navy as a Nuclear Operator.
2 I received a Bachelor of Science degree in Nuclear Engineering Technology from
3 Thomas Edison State College. I received a Master of Business Administration with a
4 focus on finance from the University of South Florida and I am a Certified Public
5 Accountant in the State of Florida.

6

7 **Q. What is the purpose of your testimony?**

8 A. The purpose of my testimony is to explain the financial modeling performed to
9 calculate the subscription fees and bill credits associated with DEF's Clean Energy
10 Connection Program ("CEC").

11

12 **Q. Have you prepared, or caused to be prepared under your direction, supervision,
13 or control, exhibits in this proceeding?**

14 A. Yes. I am sponsoring the following exhibit:

15 Exhibit No.__(TGF-1), "Summary of CEC Program Revenue Requirements,
16 Subscription Fees, and Bill Credits."

17 This exhibit is true and accurate.

18

19 **Q. Please provide an overview of the modeling performed to support the calculation
20 of the subscription fees and bill credits associated with the CEC Program.**

21 A. As described more fully by DEF witness Borsch, the financial modeling for the CEC
22 Program is consistent with that used in DEF's Solar Base Rate Adjustment ("SOBRA")
23 dockets. The revenue requirements underpinning this analysis were used to develop

1 the Program subscription fees and bill credits. DEF calculated the total revenue
2 requirements over a 30-year period for each of the ten projects. In addition to the
3 traditional capital and operating costs, DEF included certain administrative costs in the
4 revenue requirements. DEF calculated the benefits associated with the ten projects
5 from both a fixed and variable perspective. The variable benefits, described in further
6 detail by DEF's witness Borsch, more than offset the fixed revenue requirements and
7 result in a projected \$533 million Cumulative Present Value of Revenue Requirements
8 ("CPVRR") net benefit to customers.

9

10 **Q. How do the design features of the CEC Program impact the development of the**
11 **subscription fees and bill credits?**

12 A. As further described in the testimony of Mr. Lon Huber, there are several design
13 features that impact the development of the subscription fees and bill credits. First,
14 based on customer feedback, DEF designed the participant pricing for the CEC
15 Program to achieve a 7-year simple payback period. Second, it is designed so that the
16 subscription fees more than cover the fixed revenue requirements of the program. This
17 can be seen in Exhibit No. __ (TGF-1) which shows that the projected subscription fee
18 revenues are greater (104.9%) than the fixed revenue requirements. By allocating more
19 than 100% of the fixed revenue requirements to participants, some of the benefits that
20 accrue to the general body of customers are fixed. Third, DEF designed the CEC
21 Program in such a way that resulted in 87.3% of the CPVRR net benefit being allocated
22 to the general body of DEF's customers, and the remaining 12.7% being allocated to
23 the CEC Program participants. To achieve this result, DEF allocated approximately

1 32.1% of the estimated variable revenue benefits to the general body of customers,
2 while the remaining 67.9% of the estimated variable benefits were allocated to
3 participants. These assumptions result in a net CPVRR benefit both for participants
4 and the general body of customers.

5
6 **Q. What are the total fixed revenue requirements for DEF's CEC Program?**

7 A. As shown on my Exhibit No.__(TGF-1), the total fixed revenue requirements for all
8 projects, including program marketing and administrative costs, is approximately
9 \$2.745 billion in nominal dollars, which results in a CPVRR equivalent of
10 approximately \$1.148 billion. This amount represents the fixed costs associated with
11 constructing and operating the 10 CEC solar plants.

12
13 **Q. What fixed system benefits are expected to arise as a result of the construction of**
14 **the solar energy centers proposed for the CEC Program?**

15 A. As shown on Exhibit No.__(TGF-1), DEF expects to realize approximately \$1.188
16 billion in nominal fixed system benefits, with a CPVRR equivalent of approximately
17 \$353.5 million. These system benefits relate to the avoidance of generation capital,
18 transmission capital, fixed O&M, and gas reservation charges.

19
20 **Q. What is the resulting net CPVRR for the fixed revenue requirements after**
21 **accounting for the fixed system benefits?**

22 A. The resulting net CPVRR of the fixed revenue requirements is approximately \$794.2
23 million.

1

2 **Q. How did DEF translate that net CPVRR figure into the monthly subscription rate**
3 **and corresponding subscription fee?**

4 A. The DEF CEC Program is designed to recover 104.9% of the program fixed revenue
5 requirements from the participants through a levelized subscription rate. This amounts
6 to \$833.4 million in net CPVRR (104.9% of \$794.2 million). DEF divided the \$833.4
7 million by the present value of the available nameplate MW_{AC} over the 30-year period
8 (8,317.4 MW_{AC}) to develop a levelized annual rate of \$100.20 per kW-year. The
9 annual rate of \$100.20 per kW-year is divided by 12 to get the monthly subscription
10 rate of \$8.35 per kW-month. The subscription rate is multiplied by the participant's
11 subscription level resulting in the subscription fee that will appear on the participants
12 bill.

13

14 **Q. What is the amount of the fixed revenue requirement CPVRR benefit for the**
15 **general body of customers proposed by DEF?**

16 A. DEF projects that the general body of customers will receive \$39.2 million of fixed
17 revenue requirement CPVRR benefit over the life of the CEC Program.

18

19 **Q. Please describe the total variable system benefits expected to arise as a result of**
20 **the CEC Program.**

21 A. As shown on my Exhibit No.__(TGF-1), DEF expects to realize nominal variable
22 benefits of \$4.7 billion, which results in a CPVRR equivalent of \$1.3 billion. These
23 benefits primarily relate to avoided fuel, variable O&M, and emissions costs.

1

2 Q. **What percentage of the total CPVRR benefit is going to participants in the DEF**
3 **CEC Program?**

4 A. 12.7% of the total CPVRR net benefits (\$67.6 million) flow to Program participants.
5 87.3% of the total CPVRR net benefit (\$465.1 million) is going to the general body of
6 customers.

7

8 Q. **How did DEF translate these system benefits into a bill credit rate and**
9 **corresponding monthly bill credit?**

10 A. The bill credit rate was developed mathematically based on Program design parameters
11 and assumptions. As mentioned earlier, the Program was designed to have a 7-year
12 simple payback, CPVRR of subscription fee revenues exceed fixed program costs, and
13 a 1.5% escalation in the bill credit rate was assumed beginning year 4. Once these
14 elements were incorporated into the model, DEF solved for a credit level that would
15 work within this framework.

16

17 Q. **What is the resulting bill credit rate that will be offered to DEF CEC Program**
18 **Participants?**

19 A. In the first year of enrollment, participants (other than low income) would receive a bill
20 credit rate of \$0.04037 for every kWh produced by their subscription capacity. It will
21 then escalate by 1.5 percent annually beginning with the fourth year which is the
22 planned first full year of production from all 10 solar facilities. Escalation will

1 discontinue in the 31st year of the program as facilities reach their projected useful life
2 of 30 years.

3

4 **Q. How was the low income bill credit rate developed?**

5 A. The low income bill credit rate was developed to deliver low income participants the
6 same CPVRR benefit per kw subscribed but does not include the 1.5% annual
7 escalation. Additionally, the credit is on a per kw vs per kWh basis which removes
8 variability on the upside or downside associated with fluctuations in plant generation.
9 This design yields a consistent bill credit for low income customers that more than
10 offsets the subscription fee in every month over the life of the Program.

11

12 **Q. Do the total variable savings resulting from the CEC Program exceed the bill**
13 **credit?**

14 A. Yes, DEF projects that the total variable savings will exceed the bill credit paid to the
15 participants and lead to the expected \$425.9 million of variable revenue benefits
16 accruing to the general body of customers. While the amount of the bill credit being
17 paid to participants is projected to exceed the actual variable savings during the early
18 years, the actual annual variable savings are projected to be greater than the bill credit
19 to be paid to participants over the life of the CEC Program. This is demonstrated on
20 my Exhibit No.__(TGF-1).

21

22 **Q. How does DEF propose to recover the base revenue requirements associated with**
23 **the CEC Program?**

1 A. Consistent with the methodology the FPSC recently approved in FPL's Solar Together
2 program, DEF proposes to recover base recoverable costs through base rates. The
3 monthly difference between the levelized subscription fees and the actual base revenue
4 requirements, including the revenue requirements allocated to the general body of
5 customers, will be reflected as base rate recoverable costs or benefits and included
6 within DEF's earnings surveillance reports. At the time of DEF's next base rate case
7 during which the solar projects are in service, DEF will include revenue related to the
8 projected levelized subscription fees from participants and the projected base revenue
9 requirements will be included for recovery via base rates.

10

11 Q. **How does DEF propose to recover the bill credit that will be provided to the CEC**
12 **Program participants?**

13 A. DEF proposes to recover these costs within the Fuel Clause, allocated based on kWh
14 sales. Over the course of the life of the CEC Program, the variable system benefits are
15 projected to reduce the fuel factor charged to all customers.

16

17 Q. **Does that conclude your testimony?**

18 A. Yes.

19

(\$ millions)	CPVRR	Nominal Total	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033-2053		
Discount Factor			0.94	0.88	0.82	0.77	0.72	0.68	0.64	0.60	0.56	0.52	0.49	0.46			
Fixed Revenue Requirements																	
CEC Capital, O&M	\$	1,140.3	\$	2,728.3	\$	-	\$	30.9	\$	87.1	\$	138.3	\$	131.3	\$	1,587.4	
Program Administrative Costs	\$	7.3	\$	16.8	\$	1.0	\$	0.6	\$	0.7	\$	0.5	\$	0.6	\$	9.6	
Total DEF CEC Costs	\$	1,147.6	\$	2,745.1	\$	1.0	\$	31.5	\$	87.8	\$	139.0	\$	132.0	\$	1,597.1	
System Benefits (1)	\$	(353.5)	\$	(1,187.9)	\$	-	\$	-	\$	-	\$	-	\$	(11.0)	\$	(1,043.8)	
Total Fixed Revenue Requirements (fav) unfav	\$	794.2	\$	1,557.2	\$	1.0	\$	31.5	\$	87.8	\$	139.0	\$	132.0	\$	553.3	
Variable Revenue Requirements																	
System Net Fuel	\$	(826.9)	\$	(2,648.0)	\$	-	\$	(8.3)	\$	(24.2)	\$	(48.4)	\$	(48.7)	\$	(2,078.1)	
Variable O&M	\$	(64.6)	\$	(178.0)	\$	-	\$	(1.4)	\$	(3.8)	\$	(5.3)	\$	(4.4)	\$	(123.1)	
Emissions	\$	(435.5)	\$	(1,884.1)	\$	-	\$	(0.1)	\$	(0.1)	\$	(0.3)	\$	(5.0)	\$	(1,759.2)	
Total Variable Revenue Requirements (fav) unfav	\$	(1,326.9)	\$	(4,710.1)	\$	-	\$	(9.8)	\$	(28.1)	\$	(54.0)	\$	(58.1)	\$	(3,960.5)	
Net Revenue Requirements (fav) unfav	\$	(532.7)	\$	(3,152.9)	\$	1.0	\$	21.7	\$	59.6	\$	85.0	\$	73.9	\$	(3,407.2)	
Participant Subscription Fees and Bill Credits																	
	% of Total																
Subscription Fees (Revenue)	\$	(833.4)	\$	(2,251.5)	\$	-	\$	(15.0)	\$	(45.0)	\$	(75.0)	\$	(75.0)	\$	(1,516.0)	
Bill Credits	\$	901.0	\$	2,542.1	\$	-	\$	14.9	\$	44.6	\$	74.3	\$	74.8	\$	1,789.0	
Participant Net Distribution (Payment)	12.7%	\$	67.6	\$	290.6	\$	-	\$	(0.1)	\$	(0.5)	\$	(0.8)	\$	(0.2)	\$	273.0
General Body of Customers Revenue Requirement																	
Fixed	% of Total																
Total Fixed Revenue Requirements	\$	794.2	\$	1,557.2	\$	1.0	\$	31.5	\$	87.8	\$	139.0	\$	132.0	\$	553.3	
Participant Subscription Fees (Revenue)	104.9%	\$	(833.4)	\$	(2,251.5)	\$	-	\$	(15.0)	\$	(45.0)	\$	(75.0)	\$	(75.0)	\$	(1,516.0)
Net Fixed Revenue Requirements (fav) unfav	-4.9%	\$	(39.2)	\$	(694.3)	\$	1.0	\$	16.5	\$	42.7	\$	63.9	\$	56.9	\$	(962.7)
Variable	% of Total																
Total Variable Revenue Requirements (fav) unfav	\$	(1,326.9)	\$	(4,710.1)	\$	-	\$	(9.8)	\$	(28.1)	\$	(54.0)	\$	(58.1)	\$	(3,960.5)	
Participant Bill Credits	67.9%	\$	901.0	\$	2,542.1	\$	-	\$	14.9	\$	44.6	\$	74.3	\$	74.8	\$	1,789.0
Net Variable Revenue Requirements (fav) unfav	32.1%	\$	(425.9)	\$	(2,168.0)	\$	-	\$	5.1	\$	16.4	\$	20.3	\$	16.7	\$	(2,171.5)
Total Gen. Body of Customers Net RevReqs (fav) unfav	87.3%	\$	(465.1)	\$	(2,862.2)	\$	1.0	\$	21.6	\$	59.2	\$	84.2	\$	73.7	\$	(3,134.2)

(1) System Impacts - Includes avoided generation capital, transmission capital, fixed O&M, and gas reservation charges