EARTHJUSTICE

ALASKA CALIFORNIA FLORIDA MID-PACIFIC NORTHEAST NORTHERN ROCKIES
NORTHWEST ROCKY MOUNTAIN WASHINGTON, D.C. INTERNATIONAL

May 19, 2014

Carlotta Stauffer, Director
Office of Commission Clerk
Florida Public Service Commission
2540 Shumard Oak Blvd.
Tallahassee, Florida 32399-0850

Re: Docket No. 130199-EI Florida Power & Light Company;
Docket No. 130200-EI Duke Energy, Florida, Inc.;
Docket No. 130201-EI Tampa Electric Company;
Docket No. 130202-EI Gulf Power Company

Dear Ms. Stauffer,

On behalf of the Southern Alliance for Clean Energy ("SACE"), I have enclosed the prefiled testimony and exhibits of Natalie Mims and Karl Rábago. Please file these documents in Docket Nos. 130199-EI, 130200-EI, 130201-EI, and 130202-EI. Please contact me if there are any questions regarding this filing.

Sincerely,

/s/ Alisa Coe
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BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Commission review of numeric conservation goals (Florida Power & Light Company).	)	DOCKET NO. 130199-EI
In re: Commission review of numeric conservation goals (Duke Energy Florida, Inc.).	)	DOCKET NO. 130200-EI
In re: Commission review of numeric conservation goals (Tampa Electric Company).	)	DOCKET NO. 130201-EI
In re: Commission review of numeric conservation goals (Gulf Power Company).	)	DOCKET NO. 130202-EI

TESTIMONY OF KARL R. RÁBAGO
ON BEHALF OF THE SOUTHERN ALLIANCE FOR CLEAN ENERGY

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS FOR THE RECORD.

A. My name is Karl R. Rábago. My business address is 2025 East 24th Avenue, Denver, Colorado.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am the principal of Rábago Energy LLC, a Colorado limited liability company.

Q. ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS PROCEEDING?

A. I am testifying on behalf of Southern Alliance for Clean Energy ("SACE").

Q. PLEASE SUMMARIZE YOUR EDUCATION AND WORK EXPERIENCE.

A. I earned a B.B.A. in management (1977) from Texas A&M University, a J.D. with honors (1984) from the University of Texas School of Law, and LL.M. degrees in military law (1988) and environmental law (1990) from, respectively, the U.S. Army Judge Advocate General's School and Pace University School of Law. I served for more than twelve years as an officer in the U.S. Army, including in the Judge Advocate General's Corps and as an assistant professor of law at the United States Military Academy at West Point, New York. I have also worked for more than 20 years in the electricity industry and related fields. I have served as a Commissioner with the Texas Public Utility Commission (1992-1994) and as a Deputy Assistant Secretary for the Office of Utility Technologies with the U.S. Department of Energy (1995-1996). More recently, I have served as Director of Government and Regulatory Affairs for the AES Corporation (2006-2008) and as Vice President of Distributed Energy Services for Austin Energy, a large urban municipal electric utility in Texas. In 2012, I founded and became the principal of Rábago Energy LLC. I also currently serve as Chairman of the Board of Directors of the Center for Resource Solutions (1997-present) and as a member of the Board of Directors of the Interstate Renewable Energy Council (2012-present). My education and work experience is set forth in detail on my resume, attached as Exhibit KRR-1.

Q. HAVE YOU TESTIFIED PREVIOUSLY BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION (THE "COMMISSION")?

A. No. I have testified under oath before several state regulatory agencies, including the North Carolina Utilities Commission, the Virginia State Corporation Commission, the Georgia Public Service Commission, the Louisiana Public Service Commission, the Michigan Public Service Commission, the District of Columbia Public Service Commission, and before Congress and state legislatures, including most recently the Minnesota State Senate and House of Representatives.

Q. WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY?

A. The purpose of my testimony is to make two key points regarding the solar photovoltaic ("solar PV") pilot programs administered by Florida Power & Light Company, Duke Energy Florida, Inc., Tampa Electric Company, and Gulf Power Company (the "Companies"). First, the Companies should substantially revise and continue their solar PV programs. Second, the Companies' solar programs should be revised to improve valuation techniques for solar PV in order to more accurately characterize solar PV cost effectiveness, and the Companies should be directed to improve their solar PV program structure and approach with a view to supporting the development of a self-sustaining solar PV market in Florida.

Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS TO THE COMMISSION.

A. I recommend that the Commission disapprove the Companies' requests to cancel their solar PV programs in favor of a substantial revision to those programs. In particular, I recommend that:

- The Companies should be directed to develop, in conjunction with Commission staff and stakeholders, a Value of Solar Methodology similar to that now in place in Minnesota, and consistent with best practice guidance provided in the IREC "Regulator's Guidebook" relating to distributed solar valuation,
- The Companies should be further directed to use Value of Solar analysis in lieu of current cost-effectiveness tests to inform solar PV program structure, and
- The Companies should be directed to establish distributed solar PV programs that are focused not on compliance, but on supporting the emergence of a self-sustaining competitive market for distributed solar PV.

Q. WHAT MATERIALS DID YOU REVIEW IN PREPARING YOUR TESTIMONY?

A. I reviewed the original applications and supporting testimony filed by the Companies, as well as the Companies' responses to interrogatories and requests for production of documents submitted by SACE and Sierra Club.

Q. WHAT LEGAL AND POLICY PROVISIONS SUPPORT YOUR TESTIMONY, FINDINGS, AND RECOMMENDATIONS REGARDING IMPROVED ANALYSIS AND PROGRAM DESIGN FOR DISTRIBUTED SOLAR PV?

A. There is abundant support in Florida statutes and policy for advancement of clean renewable energy resources that reduce emissions and promote generation diversity. These include:

- Florida State Comprehensive Plan, Section 187.201, Florida Statutes (as amended 2008) – relating to improvement of air quality, reduction of emissions, promotion of alternative energy resources, promotion of solar energy technologies, promotion of low-carbon emitting power plants, and development of more secure energy resources.
- Florida Energy Efficiency Conservation Act (FEECA), Section 366.80, et seq., Florida Statutes – relating to legislative intent that the use of solar energy and other clean energy resources be encouraged; requiring Commission adoption of goals for demand-side renewable energy resources; requiring Commission consideration of costs and benefits to customers and the need for incentives; and requiring consideration of costs associated with regulation of greenhouse gas emissions.

Q. DOES FEDERAL POLICY ALSO IMPACT DISTRIBUTED SOLAR PV PROGRAMS?

A. Yes. In particular, I direct the Commission's attention to the recently reinstated U.S. EPA Cross-State Air Pollution Rule, which could provide opportunities to reduce regulatory risk and cost through increased reliance on distributed solar PV resources, and to forthcoming U.S. EPA regulations regulating greenhouse gas emissions from existing fossil fuel plants, which are expected to provide compliance flexibility mechanisms that favor distributed solar PV generation. I further note that the recently released National Climate Assessment that points out the serious risks facing Florida due to climate change resulting from greenhouse gas emissions.

IMPROVEMENTS TO THE COMPANIES' SOLAR PV PROGRAMS

Q. HAVE YOU REVIEWED THE COMPANIES' SOLAR PV PROGRAM

INFORMATION?

A. Yes, and based on that review, I have several recommendations for improving program design. My recommendations are informed by my own experience in program management as a utility executive, and by my familiarity with many other solar PV programs.

Q. WHAT ARE YOUR FINDINGS ON REVIEW OF THE COMPANIES' SOLAR PV PROGRAMS?

A. The Companies programs have resulted in valuable installations of distributed solar PV at homes, businesses, and schools. These systems will be generating clean, climate-proof, drought-proof, flat-priced electricity for decades to come. While the amount of distributed solar generation in Florida remains extremely small, the programs launched by the Commission hint at much greater potential for clean solar generation at or very near the point of consumption in Florida, to the benefit of ratepayers, the utilities, and society. However, the Companies' compliance-oriented approach to distributed solar PV severely constrained the opportunity reveal the benefits of solar rebate investments and to realize market transformation benefits in their service territories and therefore to maximize utility, ratepayer, and societal benefits that could have been obtained.

Q. WHAT DEFICIENCIES DO YOU FIND IN THE COMPANIES' SOLAR PV PILOT PROGRAMS?

A. My concerns are in two categories. First, I have concerns about the structure and operation of the solar PV pilot programs. The way in which the programs were conducted had significant negative impacts on the evaluation of the programs. Second, I have concerns about the metrics used to judge the cost-effectiveness of the Companies' solar PV pilot programs.

Q. WHAT ARE YOUR CONCERNS ABOUT SOLAR PV PROGRAM STRUCTURE AND ADMINISTRATION?

A. Most obviously, it is apparent that the Companies lack experience and determination to make distributed solar succeed, as demonstrated by the fact that these solar pilots had to be launched by Commission order as late as 2009, a time when many utilities in many less sunny states and nations were moving into mature and successful program structures. The numbers of customers taking advantage of the incentives demonstrates the pent-up demand for solar in Florida that existed in 2011 when programs started operating, and continues today.

Q. WHAT OTHER CONCERNS DO YOU HAVE?

A. The Companies reveal a mixed attitude to distributed solar PV. On the one hand, they declare distributed solar PV pilot programs as conclusively uneconomic for failure to pass DSM cost-effectiveness tests. Then they oppose any further efforts to support distributed solar PV deployment because, in the words of FPL witness Koch, "[t]he Solar Pilots have run for sufficient time to fully understand their performance and results, and they are scheduled to expire at the end of 2014." Witness Guthrie from DEF commented that in three years, installed price reductions did not meet expectations, but cited no efforts or explanation for that failure except that the Company now questions "if the rebates are truly incentivizing the market to reduce costs." Witness Guthrie further testifies that customer-owned solar has become "more viable and less expensive," and at the same time, the programs "fail the cost-effectiveness screens." On the other hand, witness Guthrie testifies, and I agree, that if the Commission decides to maintain the solar programs, new future programs should eliminate subsidization, leverage scale and scope to lower installed costs, account for and minimize integration costs, and gather and analyze meaningful data regarding solar deployment.

Q. CAN YOU DETAIL YOUR FINDINGS REGARDING THE COMPANIES' EVALUATION OF DISTRIBUTED SOLAR PV AND THE PILOT SOLAR

PROGRAMS?

A. This testimony addresses the programs and evaluations conducted by Florida Power & Light (FPL), Duke Energy Florida (DEF), Tampa Electric Company (TECO), and Gulf Power (Gulf). Several common themes emerge in the Companies' filings regarding the solar PV pilot programs and in their approach to distributed solar PV in general. These themes include:

- All of the Companies find that solar PV pilot programs were not cost-effective as evaluated. None considered any alternative approaches to evaluation of the programs.
- All of the Companies utilizes sophisticated avoided cost analysis in development of their resource plans and in screening alternative DSM programs. None applied this sophistication to the evaluation of the solar PV pilot programs or to the cost-effectiveness of distributed solar PV as a specific alternative resource.
- All of the Companies recognized the risk of fuel price volatility associated with increased reliance on natural gas; rather than integrate the avoidance of this risk into valuation of solar PV, the Companies limited their evaluation of fuel price risk to alternative price forecasts for entire resource plans.
- All of the Companies reported considering avoided generation, fuel, generation O&M, and transmission and distribution costs in evaluating alternative demand side resources. However, none of the Companies informed this analysis with the load-weighted and time differentiated value of solar PV generation. None of the Companies used Effective Load Carrying Capacity or other tools to fairly and fully assess the capacity credit that should be applied in valuing solar PV.
- All of the Companies reported that they do not develop specific cost estimates or detailed plans for transmission and distribution investments beyond a 10-year horizon, in some case as few as 5 years. As a result, they did not value transmission and

distribution cost avoidance during the entire 30+ years that a distributed solar PV system is likely to operate.

- None of the Companies reported assessing any value for the operational security and disaster-recovery benefits of distributed solar PV generation.
- None of the Companies assessed environmental regulatory risk beyond current compliance costs in valuing distributed solar PV as a specific technology option.
- All of the Companies reported that line losses at the transmission and distribution levels were correlated with load, but none of the Companies evaluated the value or cost-effectiveness of distributed solar PV in avoiding these load-weighted losses.
- None of the Companies integrated any location-specific analysis of the potential value of distributed solar PV into their evaluations.
- All of the Companies admitted that their solar PV pilot programs had enjoyed significant (from 25% to 38%) reductions in the installed cost of solar PV, and that their solar PV pilot programs had completely failed to contribute to those cost reductions.
- All of the Companies reported substantial popularity and rapid reservation of rebates in every program year of the solar PV pilots. All reported significant failure rates in converting reservations into installations. None reported any effort to regularize solar installation rates over the entire program year or to improve the completion rates for reservations.
- All of the Companies simultaneously cited the falling price of distributed solar as evidence of mature distributed solar markets and the failure of the programs to pass cost effectiveness tests.
- All of the Companies recommend termination of the funding for the solar PV pilots; none recommended improvements to the programs.

Q. WAS THERE ANY COMPANY-SPECIFIC INFORMATION THAT YOU WISH TO CITE IN PARTICULAR?

A. Yes. Though the quality and form of data provided in response to interrogatories and requests for production varied significantly, several noteworthy examples evidence a failure on the part of each Company to maximize the opportunity provided by the Commission's order to conduct pilot programs. In some cases, this evidence suggests efforts to ensure that distributed solar PV markets do not develop in Florida.

Q. WHAT DEF-SPECIFIC EVIDENCE DO YOU WANT TO NOTE?

A. DEF provided detailed information about solar PV technology assumptions. Many of these assumptions are inconsistent with broader market information. DEF relied on a 20-year measure life for solar PV even though virtually all module providers warrant their equipment for 25 years. DEF limits the value of the federal tax credit to 15% in spite of the fact that the credit is currently 30%. DEF assumes that residential solar costs $4.17/watt to install, even though prices are lower across Florida. DEF also includes marketing costs in its cost-effectiveness evaluations even though the programs require no marketing.

Q. WHAT GULF-SPECIFIC EVIDENCE DO YOU WANT TO NOTE?

A. Gulf reported that administrative expenses increased from 20% in 2011 to 30% in 2013 even as solar PV costs fell 38% during the same period. These excessive costs adversely impact cost-effectiveness. Gulf also reported that it spends ratepayer funds to purchase natural gas price hedges, but does not include this cost in evaluating the benefits of solar PV.

Q. WHAT FPL-SPECIFIC EVIDENCE DO YOU WANT TO NOTE?

A. FPL takes the position of assessing a penalty against distributed solar PV based on "avoiding fuel-efficient new generation," though the basis for this approach is not explained in testimony or responses.

Q. DO YOU AGREE WITH THE COMPANIES' ASSESSMENT THAT THE SOLAR PV PILOT PROGRAMS SHOULD BE TERMINATED?

A. The Companies' Solar PV Pilot Programs should not continue in their present form. I have strong concerns about leaving control and management of the solar PV programs in the hands of the Companies without significant modification, oversight, and stakeholder involvement.

Q. DO YOU AGREE WITH THE COMPANIES' CONCLUSIONS THAT SOLAR IS NOT COST-EFFECTIVE AND AS A RESULT, THE SOLAR PV PROGRAMS IMPOSE UNFAIR RATE IMPACTS ON NON-SOLAR CUSTOMERS?

A. No. The Companies' conclusions in this regard are unsupportable for two reasons. First, the solar PV programs were not properly structured to achieve cost-effectiveness or the development of a self-sustaining market for distributed solar. In the face of rapid and continuing declines in the price installed price of solar PV, a properly structured solar PV program could leverage these cost improvements, the growing customer popularity of distributed solar, efficiencies that will emerge from more mature market infrastructure, and more effective rebate and incentive strategies to support market development. Second, the solar PV programs use inadequate and inappropriate cost-effectiveness criteria when evaluating distributed solar as a resource. Improvements in valuation of the full range of costs and benefits associated with distributed solar PV would support a different conclusion regarding cost-effectiveness.

Q. DO YOU AGREE WITH FPL WITNESS KOCH THAT SOLAR PV PROGRAM PROPONENTS BEAR A BURDEN OF PRODUCTION OR PROOF IN ORDER TO JUSTIFY A COMMISSION ORDER FOR THE IMPROVEMENT AND CONTINUATION OF THE SOLAR PV INCENTIVE PROGRAMS?

A. No. In light of the extensive policy support provided in Florida Law for the clean renewable energy, in particular, solar energy, it is the Companies' obligation to conclusively establish that the solar PV programs should be terminated. In light of the problems that I have discussed, they have not met that burden.

Q. WHAT OVERRIDING OBJECTIVES SHOULD GUIDE THE STRUCTURE AND OPERATION OF A SOLAR PV PROGRAM?

A. In my view the primary goals for a strong solar PV program should be:

- The program and incentives should ultimately lead to a self-sustaining rooftop/small scale solar energy market in Florida.
- The program should provide fair compensation for solar energy value and additional financial incentives that are economically efficient, i.e., incentives that prompt customers to make solar energy investments they would not otherwise make, without being excessive.

Q. WHAT INDICATORS SHOULD THE COMPANIES TRACK IN MONITORING THEIR SOLAR PV PROGRAMS?

A. The Companies should focus not just on numbers of systems, dollars, kilowatts, and kilowatt hours. For a pilot program that should translate into a full program, it is the direction that the numbers are moving that is most important, and whether continued progress is being made toward program objectives designed to achieve program goals. Some of the key indicators of a sound solar program include:

- Progressive reduction in the incentives stimulating customer investment in solar PV.
- Progressive and systematic reductions in system and component costs.
- Progressive reduction in the fraction of system cost represented by incentives.
- Progressive increases in solar PV capacity per dollar of program budget.
- Progressive increases in the numbers of solar contractors and full-time, year-round employees.

Q. WHAT FACTORS SHOULD THE COMPANIES TRACK IN ORDER TO UNDERSTAND STATEWIDE AND COMPANY-SPECIFIC SOLAR PV MARKET CONDITIONS?

A. The Companies' program managers should track several factors on an ongoing basis that could impact local solar market conditions in order to reach a judgment about those market conditions so as to inform the setting of economically efficient solar incentive levels. Factors impacting emerging solar markets are local, regional, national, and even international, and include:

- Local and regional solar installer workloads
- Availability of skilled workforce
- Local and regional economic conditions
- Local customer awareness
- Local markets for solar financing
- Other local economic incentives
- Utility incentive programs in Florida, especially adjacent utilities
- Regulatory and legislative policy development in Florida, the Southeast, and the United States
- National solar module prices
- National solar incentive levels and status of programs
- National tax policy and incentives relating to solar energy
- International solar incentive programs (which impact global solar module prices)

In combination, these factors can impact customer demand for incentives and program participation. For example, when prices for modules drop quickly, customer demand for incentives can grow quickly. If such a trend is long-term in nature, adjustments to incentive levels may be warranted. In fact, recent reductions in installed solar costs as well as the availability of substantial federal tax incentives have been drivers of downward adjustments in rebates and incentives across the United States.

Q. WHAT OTHER RECOMMENDATIONS DO YOU HAVE FOR A STRONG SOLAR PV PROGRAM?

A. I have several other recommendations. These include:

- Good solar PV programs feature regular meetings of program staff with solar installation contractors and stakeholders, featuring two-way dialogue about market conditions, program performance, administrative requirements, and other issues. These meetings provide invaluable "ground-truthing" for solar program managers.
- Program managers should continually review the state of the art in solar promotion programs to stay abreast of innovations and opportunities for program improvements.
- While solar PV programs should be designed to provide predictability regarding incentives and program requirements, it is also appropriate to grant flexibility to program managers to respond to unexpected or sooner-than-expected changes in solar PV market conditions. When program adjustments are required they should not be a surprise to the Commission or stakeholders.
- Program managers should also be prepared for increases in the average size of installed systems as solar prices fall. Larger system sizes consume larger incentives per customer, and in a fixed budget environment, potentially reduce the number of systems receiving incentives. On the other hand, per-unit fixed and system costs decline with system size, allowing for more kilowatts per incentive dollar expended.
- Robust solar PV programs should account for repeat customers. Distributed solar is modular in nature, meaning customers can install a system one year, and expand the system in later years as demand or household budget grows. These system expansion investments can be a relatively low cost path to valuable incremental market growth.

THE COMPANIES SHOULD CONDUCT A COMPREHENSIVE VALUE OF SOLAR ANALYSIS

Q. WHAT IS THE BENEFIT OF COMPREHENSIVE VALUE OF SOLAR (VOS) ANALYSIS FOR SOLAR PV?

A. Full and updated evaluation of resource value improves the chance that a forward-looking resource or program plan will strike the economically efficient balance in crafting robust and least-cost plans in the most cost effective manner possible. If a renewable generation resource is under-valued by the Companies, it will be under-selected and under-utilized in its plans. In my view this is precisely the situation with the solar PV programs run by the Companies. The cost-effectiveness tests applied do not account for all the value of solar, and, as a result, the Companies reach a conclusion that their solar programs should be terminated. A full VOS analysis is necessary. It is not enough to say that one resource is "expensive" compared to another unless the benefits of the competing resources are also assessed and compared. The Companies' cost-effectiveness evaluations suffer from this flaw.

Q. HOW DO UTILITIES TYPICALLY ASSESS THE VALUE OF DISTRIBUTED SOLAR PV?

A. Distributed solar resources have historically not fared well in traditional utility ratemaking systems, which often have a financial bias toward large, capital-intensive projects owned by the utility. Historically, these utility-owned projects, if successful, tend to maximize profits at the expense of the lowest cost and highest value for customers. Historically utilized preferences tend to assign higher value to dispatchable generation options with low capacity cost, while undervaluing several increasingly valuable and important components, such as fuel price volatility, regulatory (especially environmental) risk, water supply and availability risk, transmission infrastructure requirements, and others. Traditional avoided cost methodologies, designed to set energy payments based on current costs, can reduce the value of low- or zero-risk resources and long run marginal cost and risk reductions.

Q. IS THIS APPROACH EVIDENT IN THE COMPANIES SOLAR PV PROGRAMS?

A. Yes. The Companies use and report the installed capacity cost of solar PV, but do not assess and characterize the full value of solar in providing energy, capacity, transmission and distribution, risk-reduction, and other benefits. It also appears that the Companies' do not assign full credit to solar PV generation that will accrue to the utility and all ratepayers over the full 30+ year useful life of installed systems. In addition, each of the Companies' assigns a "lost revenues" cost to solar PV that fails to account for all costs that the utilities avoid. This over-calculation of costs negatively impacts the cost-effectiveness assessment.

Q. DOES THIS TRADITIONAL PROCESS PROPERLY ADDRESS RENEWABLE RESOURCES?

A. No. This traditional process has not addressed renewable resources properly. More and different data about value is required.

Q. CAN YOU ELABORATE FURTHER?

A. Yes. It is important to understand the coincidence or overlap of solar production with hourly prices, which informs the energy value and capacity credit that should be recognized for this resource. Capacity credit informs the value for avoided capacity, avoided transmission and distribution investment, line losses, and other values. The Company should also recognize value for the greenhouse gas benefits of solar energy as well as the reduced risk of environmental regulation that solar energy provides—very real economic risks even in the absence of current control costs. Traditional calculations tend to ignore all manner of risk, including fuel price and environmental regulation risks. In response to SACE's efforts to adduce the various value factors considered by the Companies for renewable resources, it appears that in spite of a high availability of the raw data, few of these value factors are considered and even fewer are quantified.

Q. HOW HAS DISTRIBUTED SOLAR VALUATION EVOLVED?

A. As the U.S. Department of Energy reported to Congress in 2007,

> *"Calculating [distributed generation] benefits is complicated, and ultimately requires a complete dataset of site-specific operational characteristics and circumstances. This renders the possibility of utilizing a single, comprehensive analysis tool, model, or methodology to estimate national or regional benefits of [distributed generation] highly improbable. However, methodologies exist for accurately evaluating "local" costs and benefits (such as [distributed generation] to support a distribution feeder). It is also possible to develop comprehensive methods for aggregating local [distributed generation] costs and benefits for substations, local utility service areas, states, regional transmission organizations, and the Nation as a whole.[1]"*

Over the past two decades, a number of local studies have been conducted to calculate the benefits of distributed solar. Today, VOS analysis rests on a solid foundation of data that, if applied, can significantly improve the Companies solar PV program structure and evaluation.

VALUE OF SOLAR ANALYSIS

Q. WHAT IS VALUE OF SOLAR (VOS) ANALYSIS?

A. VOS analysis identifies and characterizes the value attributes of solar energy generation by thoroughly characterizing and quantifying the costs avoided by solar generation. Numerous VOS studies published over the past decade share a common general approach and fairly common general structure. A representative list of these studies is described in greater detail in attached Exhibit KRR-2, a recent report from the Rocky Mountain Institute's eLab

[1] U.S. DOE, "The Potential Benefits of Distributed Generation and the Rate-Related Issues That May Impede Its Expansion: Report Pursuant to Section 1817 of the Energy Policy Act of 2005," June 2007.

Project entitled "A Review of Solar PV Benefit and Cost Studies.[2]" While results vary depending on methodologies, local energy markets and other factors, research consistently suggests that distributed solar energy has value that significantly exceeds the Companies' and utility ratepayers' costs associated with stimulating distributed solar energy development. That value should be, but is not, reflected in the Companies' evaluation of their solar PV programs and in their characterization of solar PV in planning. As a consequence, the Companies propose less solar development, zero goals, and even termination of distributed solar PV incentives. The Companies propose less solar PV support than would be economically efficient and miss a valuable opportunity to support the growth of a distributed solar market in Florida.

Q. WHAT ARE THE BASIC ELEMENTS OF DISTRIBUTED SOLAR VOS ANALYSIS?

A. VOS analysis is an expansion on a full avoided cost approach that adds a long term valuation perspective, including, as appropriate and quantifiable, social costs and benefits. There are two basic steps: first, benefits and costs are identified and grouped, then, second, the benefits are quantified. These steps are essentially the same as traditional ratemaking functions inherent in cost of service analysis. The focus is on the net value that distributed resources bring to utility and grid finances and operations.

Q. IS THE CALCULATION OF VOS MARKET DRIVEN?

A. Yes. VOS calculations are, at heart, avoided cost calculations that embrace a full range of costs avoided by distributed solar generation, including savings over the life of the solar generation system. So the source of the value of solar is in the market costs avoided and market benefits received. As explained earlier, solar valuation studies offer improved

[2] "A Review of Solar PV Benefit and Cost Studies," Rocky Mountain Institute eLab Report, April 2013. ("RMI eLab Report") Available at: http://www.rmi.org/Content/Files/eLab-DER_cost_value_Deck_130722.pdf.

market pricing signals over traditional avoided cost calculations, which ignore long-term risk, especially fuel price and environmental regulatory risk. My own experience with Austin Energy's VOS methodology is that the calculated value of solar better reflects market conditions and the value of solar investments than short-term avoided cost calculations and base rate calculations established in prior years based on historical test year costs.

Q. WHAT ARE THE BENEFITS AND COSTS STUDIED IN VOS ANALYSIS?

A. The benefits and costs are those that accrue to the utility and its ratepayers as a result of the satisfaction of the demand for electricity services from a distributed solar facility in lieu of the Companies' use of current and planned system resources to meet that demand. The value of solar to the Companies, as a renewable distributed generation resource, must be calculated in a very different manner from traditional capital- intensive, remote central station projects. A value of solar analysis also differs from other cost-effectiveness analyses conducted from a societal perspective in that customer investment and costs are typically omitted. At a high level, the costs and benefits to the Company and ratepayers associated with distributed solar energy generation systems include:

- Energy: The basic electrical energy created by the distributed solar system, plus a credit for line-loss savings that accrue because distributed solar displaced generation from remote, central station plants.
- Capacity: Also referred to as "demand." Capacity values capture the avoided capital investments in generation, transmission and distribution that flow from distributed solar generation units.
- Grid Support (Interconnected Operations Services): Often referred to as "ancillary services." These benefits include affirmative provision of services and avoidance of costs related to a range of services inherent in maintaining a reliable, functioning grid

network. This grid support or ancillary services include, at both the transmission and distribution level, reactive supply and voltage control, regulation and frequency response, energy and generator imbalance, scheduling, forecasting and system control and dispatch.

- Customer benefits: Customers accrue a number of benefits from hosting and operating distributed solar systems including reputational, community participation, bill management and stability, and efficiency support benefits. While some of these benefits do not accrue to the utility, some do, like reduced bad debt and delayed payment costs that accompany self-generation.
- Financial and security: These benefits generally reduce both the cost and risk associated with maintaining reliable electric service for customers, especially in the face or variable regulatory, economic, and grid security conditions. These benefits include utility fuel price volatility control, and costs associated with emergency customer power and outages, as well as more rapid and less costly recovery from outage events.
- Environment: Distributed solar creates benefits in reducing the supply portfolio costs associated with control of criteria pollutants, greenhouse gas emissions, water use, and land use. Where control regimes exist, these costs may be reflected in the cost of operating polluting resources. Distributed solar valuation goes beyond traditional avoided cost approaches in recognizing that these resources also affirmatively reduce financial risks associated with compliance with future control regimes.
- Social: Distributed solar also generates social benefits associated with net job growth benefits compared to "conventional" generation options, increased local tax revenues, reduced occupational safety costs (such as black lung insurance), and others.

Q. HOW ARE THESE BENEFITS AND COSTS QUANTIFIED?

A. I previously cited a Rocky Mountain Institute study that assessed several quantification studies. My recommendation is that the Companies should be directed to develop a quantification methodology and value of solar calculation in consultation with a broadly based group of stakeholders.

Q. HAVE ANY OF THE STUDIES QUANTIFIED THE VALUE OF SOLAR PV IN FLORIDA?

A. Though a strong body of research exists on this topic nationally, I have found no studies based on Florida data. The RMI eLab Report that I cited earlier and attached to this report characterizes more than a dozen "value of solar" and other studies addressing solar PV costs and benefits. Among the more prominent researchers cited was Richard Perez. Richard Perez led a team that published a study titled "The Value of Distributed Solar Electric Generation to New Jersey and Pennsylvania.[3]" That study modeled the value of a 15% peak load penetration of distributed solar electric generation at seven locations in the region. The model addressed the following values:

- Fuel Cost Savings
- O&M Cost Savings
- Security Enhancement Value
- Long Term Societal Value
- Fuel Price Hedge Value
- Transmission and Distribution Capacity Value
- Market Price Reduction
- Environmental Value
- Economic Development Value
- Solar Penetration Costs

[3] "The Value of Distributed Solar Electric Generation to New Jersey and Pennsylvania," Clean Power Research, November 2012. ("CPR NJ & PA Study 2012") Available at: http://mseia.net/site/wp-content/uploads/2012/05/MSEIA-Final-Benefits-of-Solar-Report-2012-11-01.pdf

- Generation Capacity Value

The study found that the total value of distributed solar ranged from $0.256 to $0.318 per kWh. A copy of the paper is attached at Exhibit KRR-3 and is offered as an indicator of how a comprehensive distributed VOS study can be conducted. More recently, the State of Minnesota Department of Commerce developed, and the Minnesota Public Utilities Commission approved a value of solar calculation methodology.

Q. PLEASE DESCRIBE THE MINNESOTA DEPARTMENT OF COMMERCE'S VALUE OF SOLAR METHODOLOGY AND ITS RELEVANCE TO YOUR RECOMMENDATIONS.

A. In 2013, the State of Minnesota enacted a law that created an option for electric utilities to offer a Value of Solar tariff as an alternative to net metering. The Value of Solar rate aims to compensate solar generators fairly for the value of their output, and to create an opportunity for utilities to fully recover their costs of providing service to those customers. After a widely-praised stakeholder process that was transparent and engaged dozens of utilities, business and government representatives, advocates and concerned citizens, the Minnesota Department of Commerce developed a value of solar methodology (Minnesota Methodology)[4]. That methodology is intended to guide the development of any Value of Solar tariff proposals in Minnesota, and is attached at Exhibit KRR-4.

Q. WHAT ARE THE MAJOR FEATURES OF THE MINNESOTA METHODOLOGY?

A. Key aspects of the Minnesota methodology include:

- A standard solar photovoltaic rating convention
- Methods for creating an hourly solar production time-series, representing the aggregate

[4] Minnesota Value of Solar: Methodology, MN Department of Commerce Division of Energy Resources, Clean Power Research (Jan. 31, 2014), available at http://www.cleanpower.com/wp-content/uploads/MN-VOS-Methodology-2014-01-30-FINAL.pdf.

output of all solar systems in the service territory per unit capacity corresponding to the output of a solar resource on the margin

- Requirements for calculating the electricity losses of the transmission and distribution systems
- Methods for performing technical calculations for avoided energy, effective generation capacity and effective distribution capacity
- Economic methods for calculating each value component (e.g., avoided fuel cost, capacity cost, etc.)
- Requirements for summarizing input data and final calculations in order to facilitate PUC and stakeholder review

Q. WHY DO YOU DIRECT THE COMMISSION AND THE COMPANIES TO THE MINNESOTA METHODOLOGY?

A. The Minnesota Methodology stands in stark contrast to the methodologies used by the Companies in their applications. The Minnesota Methodology demonstrates the comprehensive, objectively verifiable approach that can be developed when a broad range of stakeholder and expert opinions are focused on the solar valuation issue. As explained in the Minnesota Methodology, if a value of solar is set correctly, it will account for the real value of photovoltaic generated electricity, and the utility and its ratepayers will be indifferent to whether the electricity is supplied from customer-owned photovoltaic resource or from comparable conventional means. This valuation eliminates cross-subsidization concerns if incorporated in a tariff, and used in resource planning, it can provide market signals for the adoption of technologies that could significantly enhance the value of solar electricity, such as smart inverters. A properly conducted resource plan should include accurate valuation of all resources options, including solar. The Minnesota Methodology represents a detailed and well-documented example that the Companies could use to guide their work in correcting the deficiencies of their current processes.

Q. CAN STUDY RESULTS FROM OTHER JURISDICTIONS BE APPLIED DIRECTLY TO THE COMPANIES AND UTILITY OPERATIONS IN FLORIDA?

A. These studies were not based on specific data from the Companies' service territory or from data for Florida. Given the diversity of the data sets from which the studies are drawn, and the relatively high importance of energy and local costs in the estimation, it is reasonable to conclude that the value delivered by distributed solar in the Companies' service territory will be significant and likely higher than the current retail price for electricity. Growing experience with VOS analysis yields insights as to best practice in distributed solar valuation. I recently co-authored a report published by the Interstate Renewable Energy Council (IREC) that sets out current best practice for distributed solar PV valuation.

Q. PLEASE DESCRIBE THE IREC REPORT ON SOLAR VALUATION AND ITS RELEVANCE TO YOUR RECOMMENDATIONS.

A. In October 2013, IREC published a paper authored by Jason Keyes and myself, entitled "A Regulator's Guidebook: Calculating the Benefits and Costs of Distributed Solar Generation" ("Guidebook").[5] The Guidebook, attached as Exhibit KRR-5, draws on many distributed solar valuation studies to recommend a framework for a methodology for performing a benefit/cost evaluation for distributed solar. The Guidebook's recommended approach differs greatly from the approaches taken by the Companies. Key principles underlying the methodology that my co-author and I recommended include reliance on data, transparency, reasonable evaluation of costs and benefits, and consistency in approach.

Q. WHAT DOES THE IREC GUIDEBOOK RECOMMEND REGARDING THE

[5] A Regulator's Guidebook: Calculating the Benefits and Costs of Distributed Solar Generation, Interstate Renewable Energy Council (Oct. 2013), available at http://www.irecusa.org/publications/.

SCOPING OF A BENEFITS/COSTS STUDY?

A. In the Guidebook we recommend that the Commission clarify a number of issues at the onset of a benefit/cost study, including:

- *What is the appropriate discount rate for evaluation of costs and benefits?*

  Studies typically use the utility weighted average cost of capital, though there is a strong argument for use of a risk-adjusted discount rate to reflect the performance characteristics of solar generation.

- *What is being considered – all solar generation or exports to the grid only?*

  Where net metering is being evaluated, it is appropriate to limit the evaluation to exported energy. However, for a two-part rate and full value of solar analysis, all generation should be evaluated.

- *Over what timeframe will the study examine the benefits and costs of solar resources?*

  The timeframe for analysis should reflect the useful life of solar resources, today typically 30 years, though there is a strong argument that a sensitivity evaluation should consider a useful life as long as 35 years.

- *What does utility load look like in the future?*

  Under traditional net metering arrangements, customer-sited distributed solar generation operates to reduce utility load. Under some structures, such as a feed-in tariff, distributed generation does not reduce load, but does contribute to utility energy and capacity requirements at or near the point of generation.

- *What level of market penetration for distributed solar generation is assumed in the future?*

  It is unreasonable to assume exponentially higher market penetration rates in the short term. Likewise, it is not reasonable to assume penetration rates that are artificially constrained. Sensitivity analysis can be useful to gauge the impacts of more reasonable penetration rates.

- *What models are used to provide analytical inputs?*

  Utility models such as Strategist are extremely useful in conducting integrated resource plan analysis, but often are constrained in their ability to model small-scale resources. Extrapolation of results to analyze these resources can induce errors. Full transparency and sensitivity analysis at varying scales of deployment, and with variation in other assumptions (such as the penetration rate of distributed storage technology) is essential to accurately model distributed solar generation.

- *What geographic boundaries are assumed in the analysis?*

  Solar resources may demonstrate improvements in availability due to geographic dispersion. Solar insolation values, which drive energy production, vary depending on location. These variations should be accounted for in study design.

- *What system boundaries are assumed?*

  Solar integration costs may vary the location where solar generation is cited. These factors extend beyond land and construction costs and should be accounted for in a study.

- *From whose perspective are benefits and costs measured?*

  I recommend that the Companies use a combined test that incorporates ratepayer impacts testing and societal cost testing.

- *Are benefits and costs estimated on an annualized or levelized basis?*

  A levelized cost analysis extending over the useful life of the solar resource is best for fully capturing the avoided costs and delivered benefits of solar generation.

Q. WHAT DATA SETS DOES THE GUIDEBOOK RECOMMEND TO CONDUCT A FULL BENEFITS/COSTS ANALYSIS FOR SOLAR GENERATION?

A. The Guidebook recommends that the utility obtain or develop the following data sets:

- The five or ten-year forward price of natural gas, the most likely fuel for marginal generation, along with longer-term projections in line with the life of the solar generation system.

- Hourly load shapes, broken down by customer class to analyze the intra-class and inter-class impacts of solar generation.
- Hourly production profiles for distributed solar generators, including south-facing and west-facing arrays.
- Line losses based on hourly load data, so that marginal avoided line losses due to solar generation can be calculated.
- Both the initial capital cost and the fixed and variable O&M costs for the utility's marginal generation unit.
- Distribution planning costs that identify the capital and O&M cost (fixed and variable) of constructing and operating distribution upgrades that are necessary to meet load growth.
- Hourly load data for individual distribution circuits, particularly those with current or expected higher than average penetrations of distributed solar generation, in order to capture the potential for avoiding or deferring circuit upgrades.

I believe that the Companies have assembled most, if not all, of this data in the course of ongoing resource planning and other activities. Where utility-specific data is not readily available, analysts may develop suitable estimation methods or use third-party data (such as PV-WATTS data for solar performance).

Q. WHAT CATEGORY OF BENEFITS FROM SOLAR GENERATION SHOULD BE ASSESSED?

A. Consistent with the Guidebook, I recommend that the following solar generation benefits be addressed by the Company in an analysis:

- Energy – Based on not running a gas-fired plant

- System Losses – Based on marginal losses
- Generation Capacity – Using Effective Load Carrying Capability or similar analysis
- Transmission and Distribution Capacity – Not limited to large planning increments
- Grid Support Services – Evaluation of ancillary services value
- Financial – Fuel price hedge
- Financial – Market Price Response
- Security – Stability and Resiliency
- Environment: Carbon & Other Factors – Residual (beyond compliance) benefits
- Social – Economic development

Q. WHAT COSTS SHOULD BE ASSESSED?

A. As discussed in the Guidebook, I believe it is appropriate to assess utility costs as well. These costs include direct utility costs and may include an assessment of lost revenues. I note that assumptions about administrative costs (such as billing costs) should reflect automated billing systems. Interconnection costs incurred solely by the customer should not be included. And finally, I reiterate that integration costs should be based on realistic assumptions about solar generation penetration rates.

Q. HOW DOES VOS RELATE TO INCENTIVE PAYMENTS MADE BY THE COMPANIES UNDER THEIR SOLAR PV PROGRAMS?

A. The calculated value of solar can serve as a benchmark indicator for payments a utility makes for third-party solar energy. As with the theory behind avoided cost calculation, VOS analysis quantifies the value equal to what it would cost either the utility or a third party to provide solar energy delivered to the point where the energy does its work. It establishes an economic "indifference price." The Companies, however, appears to conduct no value-based analysis to inform either incentive levels or cost-effectiveness evaluations.

Q. WHAT IS THE RELATIONSHIP BETWEEN THE CALCULATION OF VOS AND

THE ANALYSIS OF SOLAR RESOURCES AS A FACTOR IN RETAIL RATES PAID BY RATEPAYERS IN GENERAL?

A. Because the VOS approach improves on the Companies' traditional avoided cost methodology, it indicates a compensation level that can be used to ensure net positive benefits to ratepayers. That is, once the value of solar is fully and accurately known, the Company can be assured that distributed solar enabled at a lower payment will generate excess value for the Company and its ratepayers. At volume, these cumulative excess benefits will exert downward pressure on rates, reflecting a value-to-price differential. The Company's practice today is not grounded in value analysis, but rather in strict regulatory compliance. Such practice provides no assurance of value in excess of cost. This represents a significant opportunity cost to the Company and its customers.

Q. DO SOLAR PROGRAM SUBSCRIPTION RATES INDICATE WHETHER THE INCENTIVE AND PAYMENT LEVEL REFLECTS THE VALUE OF SOLAR PV TO THE COMPANIES AND THEIR RATEPAYERS?

A. No. Program subscription rates indicate how investor-customers perceive payment levels under current market conditions. In some cases, the timing of program reservations can be a powerful indicator of poor program administration. Solar deployment markets will not mature to efficiency in feast/famine cycles. Releasing an entire year's worth of incentives in a short period of time will encourage rapid subscription, but as the Companies have all testified, rapid reservation does not necessary mean high completion rates or the development of more efficient markets.

Q. IN SUMMATION, WHAT SHOULD THE COMMISSION AND THE COMPANIES REASONABLY CONCLUDE BASED ON THE MANY PUBLISHED DISTRIBUTED VOS STUDIES?

A. From published VOS research, the Commission and the Companies can and should reasonably conclude that:

- Distributed solar systems in the Companies' service territories likely have value that will exceed the payment required to facilitate wider deployment of solar as a generation resource.
- Because distributed solar value exceeds the cost to facilitate deployment, increased deployment of distributed solar will put downward pressure on rates.
- Value of solar analysis coupled with greater market development can support and confirm the cost-effectiveness of solar PV, that is, the availability of distributed solar at costs that are less than value.

In sum, distributed solar value analysis enables the Commission and the Companies to benchmark the resource value of the distributed solar option and to conclude that the Companies should move forward with a revised solar PV program structure that advances the deployment of distributed solar in the Companies' service territories beyond the limits of previous programs, and, of course, current proposals.

VOS, AVOIDED COST, AND COST-EFFECTIVENESS TESTS

Q. EARLIER IN YOUR TESTIMONY, YOU DISCUSSED AVOIDED COST METHODOLOGY. CAN YOU DISTINGUISH BETWEEN VOS AND TRADITIONAL AVOIDED COST CALCULATIONS?

A. Yes. Avoided cost analysis differs from VOS analysis in two key ways. First, most avoided cost analysis is not a "full avoided cost" calculation. Second, traditional avoided cost analysis differs from more far-reaching, forward-looking analyses used to evaluate new resource additions. A major difference between the two approaches relates to risk. Not all resources bear the same risks. Risk is not well addressed even in full avoided cost methodologies. A resource that depends on long-term availability of fuel at an affordable price is very different from distributed solar, which has no fuel cost, now or in the future.

This risk of price volatility is not captured in avoided cost calculations or in cost-effectiveness tests currently utilized. Risk, therefore, is either ignored or undervalued in current evaluation methodologies.

Q. PLEASE EXPLAIN HOW RISK VALUATION IMPACTS RESOURCE VALUATION AND COST-EFFECTIVENESS EVALUATION.

A. Undervaluing fuel volatility risk and other risks means that resource options like distributed solar is seen to avoid less cost than it actually does. This results from adjustments made to traditional ratemaking and cost recovery decades ago. Utilities are increasing their dependence on generation run on fuels with volatile pricing patterns—natural gas, in particular. They use pass-through cost recovery mechanisms for fuel costs in fuel cost reconciliation charges or "fuel charges," as they are often called. Generally, regulations approved the addition of fuel costs recovery riders on customer bills, over and above basic rates for electricity to address potential regulatory lag issues arising from price volatility.

As a result, utility finances are largely immunized from the deleterious impacts of regulatory lag in fuel cost recovery, but also less sensitive to fuel price volatility than even their customers. The typical "peaker" approach to avoided cost calculations confirms this—it is a methodology that essentially gives no value to resources that reduce fuel price volatility and instead affirmatively favors resources with low capacity costs, even if the long-run fuel costs of the resource are extremely variable. By undervaluing distributed solar, this approach encourages a utility to procure or support solar at a sub-optimal levels in its planning, systematically rejecting resources that reduce portfolio exposure to fuel price volatility risk.

A similar undervaluation arises regarding security risk and vulnerability to disruptions due to natural and man-made events and risks associated with obtaining water at affordable prices, for example. Of course, greenhouse gas regulation and other environmental regulatory risks (such as that associated with coal ash pond spills) add additional risk. Economic efficiency is maximized by an analysis that quantifies the full future stream of benefits and costs avoided over the full operational life of distributed solar and expressly addresses the risk associated with all costs over the life of each resource option. There is significant value in a generation resource that has no fuel or water cost or environmental regulatory cost over its entire life—a value appears to be largely ignored in the Companies' planning process and, in particular, in the goal setting and solar PV program evaluation processes. Understanding risk reduction value of all types associated with increased deployment of solar PV is key to constructing an optimally diverse portfolio of resources and to evaluating program costs and benefits.

Q. ARE THERE FUTURE COSTS AND/OR BENEFITS THAT SHOULD BE INCLUDED IN EVALUATING THE VALUE OF DISTRIBUTED SOLAR, BUT WHICH ARE NOT FINITELY QUANTIFIABLE?

A. Some costs and benefits are not precisely quantifiable. There is an analytical risk in erroneous valuation. Undervaluing one "alternative" option is the same as overvaluing the incumbent or reference unit. Overvaluing an option might impose costs on ratepayers that could inflate rates. It is appropriate to reach a reasonable level of confidence about a value estimate before using it in resource evaluation decision. But, the field is hardly static. Avoided cost and VOS methodologies have improved over the past several decades. There are also some values that, while difficult to quantify, should be reviewed qualitatively as part of the process of resource plan development. For example, while the tax base and job creation benefits of distributed solar market penetration might not yet lend themselves to discrete quantification in a utility resource plan or explicit reflection in utility rates, job creation and other economic development benefits must be expressly reviewed in the planning exercises. Such factors often have a strong impact on market and regulatory risk.

Q. HOW WOULD FORWARD-LOOKING RESOURCE EVALUATION FURTHER IMPROVE THE EVALUATION OF ALTERNATIVES?

A. Avoided cost methodologies are an appropriate means for comparing the cost avoided when a single unit of energy from a Qualifying Facility is introduced into the grid on a year-by-year basis. Distributed solar systems, however, are long-lived, with high availability and low output degradation. This is why distributed solar programs should take a longer view than is taken with traditional avoided cost calculation. Levelized cost of energy calculations and production cost modeling exercises are explicitly focused on a resource's capability to meet the demand for energy over the life of the resource. They are not limited to traditional marginal cost calculations such as are used in setting avoided cost rates. The amount paid to stimulate the construction and operation of a new distributed system will likely yield thirty or more years of continued energy generation and benefit creation. The most common and appropriate way to account for this stream of benefits is to adjust a full avoided cost calculation by iterating it over the entire expected operating life of the system and then calculating a levelized present value of that stream of benefits.

Q. HOW DOES A LEVELIZED PRESENT VALUE OF A STREAM OF FULL AVOIDED COSTS CALCULATION POTENTIALLY IMPACT RATEPAYERS?

A. The approach of both conducting a full avoided cost calculation and then adjusting it for the forward looking stream of value puts evaluation of the resource alternative on a level evaluation playing field with other resources and with planned additions to the system. More importantly, it sets a benchmark for the price above which the utility and ratepayers would be adversely impacted, and below which both the utility and its ratepayers would benefit. It sets a fair level for testing for financial indifference. It is important to note that unlike utility-owned assets, distributed solar systems owned and operated by customers and third parties create no long term stranded cost risk for the utility. Performance or production payments at or below the full value of distributed solar are calculated to minimize such risk by only paying when energy is generated.

RECOMMENDATIONS

Q. PLEASE STATE YOUR RECOMMENDATIONS TO THE COMMISSION.

A. I recommend that the Commission disapprove the Companies' requests to cancel their solar PV programs and instead order a substantial revision to those programs. In particular, I recommend:

- The Companies should be directed to develop, in conjunction with Commission staff and stakeholders, a Value of Solar Methodology similar to that now in place in Minnesota and consistent with the best-practice recommendations in the Regulator's Guidebook on valuation of the benefits and costs of distributed solar generation.
- The Companies should be further directed to use Value of Solar analysis in lieu of current cost-effectiveness tests to inform solar PV program structure.
- The Companies should be directed to establish distributed solar PV programs that are focused not simply on minimal compliance, but on supporting the emergence of a self-sustaining competitive market for distributed solar PV. Staff and other stakeholders should have an explicit and formal role in this program development process.

Q. WHAT RECOMMENDATION DO YOU OFFER REGARDING COMMUNITY SOLAR PROGRAMS DISCUSSED BY THE COMPANIES?

A. I believe that community solar programs offer an important opportunity to make participation in the benefits of distributed solar an option for more customers and in more areas of a utility service territory. Community solar programs can be cost-effective, fair, and can help support the development of self-sustaining distributed solar markets. However, it is vitally important that these programs also be soundly designed and administered, and that cost-effectiveness analysis is supported by full VOS analysis. The

Interstate Renewable Energy Council has published a report entitled "Model Rules for Shared Renewable Energy Programs,[6]" attached at Exhibit KRR-6 that should be consulted prior to developing a proposal for community solar. While it is beyond the scope of this testimony to address the Companies' community solar programs in detail, I would note that the FPL proposal for a donation program for utility-owned solar projects in Docket No. 140070-EG is not a community solar program or a suitable alternative to customer-owned distributed solar generation. That proposal merely recycles a failed approach to solar PV development based on a charitable donation model.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

[6] Model Rules for Shared Renewable Energy Programs, Interstate Renewable Energy Council (Jun. 2013), available at http://www.irecusa.org/regulatory-reform/shared-renewables/.