BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Petition for Determination of Need for Citrus County Combined Cycle Power Plant	)))	DOCKET NO. _____ Submitted for filing: May 27, 2014

DUKE ENERGY FLORIDA, INC.'S NOTICE OF FILING

Duke Energy Florida, Inc. ("DEF" or the "Company") hereby gives notice of filing the Direct Testimony of Alan S. Taylor with Exhibit AST-1 in support of DEF's Petition for Determination of Need for the Citrus County Combined Cycle Power Plant.

Respectfully submitted this 27th day of May, 2014.

/s/ James Michael Walls

James Michael Walls
Florida Bar No. 0706242
Blaise N. Gamba
Florida Bar No. 0027942
CARLTON FIELDS JORDEN BURT, P.A.
Post Office Box 3239
Tampa, FL 33601-3239
Telephone: (813) 223-7000
Facsimile: (813) 229-4133

John T. Burnett
Deputy General Counsel
Dianne M. Triplett
Associate General Counsel
DUKE ENERGY FLORIDA, INC.
Post Office Box 14042
St. Petersburg, FL 33733-4042
Telephone: (727) 820-5587
Facsimile: (727) 820-5519

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Petition for Determination Of Need for Citrus County Combined Cycle Power Plant

DOCKET NO. _____
Submitted for filing: May 27, 2014

DIRECT TESTIMONY OF ALAN S. TAYLOR

ON BEHALF OF DUKE ENERGY FLORIDA, INC.

IN RE: PETITION FOR DETERMINATION OF NEED FOR CITRUS COUNTY COMBINED CYCLE POWER PLANT

BY DUKE ENERGY FLORIDA, INC.

FPSC DOCKET NO. _____

DIRECT TESTIMONY OF ALAN S. TAYLOR

I. INTRODUCTION AND QUALIFICATIONS.

Q. Please state your name and business address.

A. My name is Alan Taylor. My business address is 821 15th Street, Boulder, Colorado 80302.

Q. By whom are you employed and in what capacity?

A. I am President of Sedway Consulting, Inc. ("Sedway Consulting").

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

A. I perform consulting engagements in which I assist utilities, regulators, and customers with the challenges that they may face in today's dynamic electricity marketplace. My area of specialization is in the provision of independent evaluation services in power supply solicitations and in the associated economic and financial analysis of power supply options.

Q. Please describe your education and professional experience.

A. I earned a Bachelor of Science Degree in energy engineering from the Massachusetts Institute of Technology and a Masters of Business Administration from the Haas School of Business at the University of California, Berkeley, where I specialized in finance.

I have worked in the utility planning and operations area for 25 years, predominantly as a consultant specializing in integrated resource planning, competitive bidding analysis, utility industry restructuring, market price forecasting, and asset valuation. I have testified before state commissions in proceedings involving resource solicitations, environmental surcharges, and fuel adjustment clauses.

I began my career at Baltimore Gas & Electric Company ("BG&E"), where I performed efficiency and environmental compliance testing on the utility system's power plants. I subsequently worked for five years as a senior consultant at Energy Management Associates ("EMA", now New Energy Associates), training and assisting over two dozen utilities in their use of EMA's operational and strategic planning models, PROMOD III and PROSCREEN II. During my graduate studies, I was employed by Pacific Gas & Electric Company ("PG&E"), where I analyzed the utility's proposed demand side management ("DSM") incentive ratemaking mechanism, and by Lawrence Berkeley Laboratory ("LBL"), where I evaluated utility regulatory policies surrounding the development of brownfield generation sites.

Subsequently, I worked at PHB Hagler Bailly (and its predecessor firms) for ten years, serving as a vice president in the firm's Global Economic Business Services practice and as a senior member of the Wholesale Energy Markets practice of PA Consulting Group, when that firm acquired PHB Hagler Bailly in 2000. In 2001, I founded Sedway Consulting, Inc. and have continued to specialize in economic analyses associated with electricity wholesale markets. Since the founding of Sedway Consulting, I have provided independent evaluation services in over two dozen electric utility conventional and renewable resource solicitations.

II. PURPOSE AND SUMMARY OF TESTIMONY

Q. What is the purpose of your testimony?

A. Sedway Consulting was retained by Duke Energy Florida, Inc. ("DEF" or the "Company") to provide independent monitoring and evaluation services in the utility's 2013 solicitation for competitive power supplies. As the principal consultant on the project, I helped with the development of the Request for Proposals ("RFP") and associated website, reviewed DEF's solicitation process, and performed a parallel and independent economic evaluation of both DEF's Next Planned Generating Unit ("NPGU") and the proposals that were received by DEF in response to the utility's solicitation. Ultimately, I concluded that DEF's NPGU – the Citrus County combined-cycle ("CC") facility described in DEF's RFP – represented the most cost-effective resource for meeting DEF's resource needs for 2018. This resource will entail two 820 MW (summer capacity) phases with in-service dates of May 1, 2018, and December 1, 2018, for a total installed capacity of 1,640 MW by the end of 2018. DEF's RFP sought power supply

alternatives for this 2018 time-frame and thus is referred throughout my testimony and attachments as the 2018 RFP.

The purpose of my testimony is to describe my role as an independent monitor/evaluator and present my findings. I will discuss the process and tools that I used to conduct Sedway Consulting's independent economic evaluation. Based on the results of my independent evaluation, I concluded that DEF's Citrus County CC resource is more cost-effective than the proposed power purchase agreement ("PPA") and asset sale alternatives that were submitted in DEF's resource solicitation.

Q. Are you sponsoring any exhibits in this case?

A. Yes. I am sponsoring Exhibit No. __ (AST-1) consisting of two documents, which are attached to my direct testimony:

Document No. 1	Resume of Alan S. Taylor
Document No. 2	Sedway Consulting's Independent Evaluation Report

III. INDEPENDENT MONITOR/EVALUATOR ACTIVITIES.

Q. Please describe the role you performed as an independent monitor/evaluator in DEF's 2018 RFP project.

A. As the independent monitor/evaluator in DEF's 2018 RFP, I reviewed DEF's 2013 Ten-Year Site Plan, the RFP and associated website prior to the solicitation's launch, and the utility's modeling processes pertaining to its use of EPM, DEF's detailed production cost model. I attended the October 2, 2013 Pre-

Issuance Meeting and the October 18, 2013 Bidders Conference, both in Tampa. Throughout the process, I monitored all email exchanges and conference calls between DEF and potential or actual bidders. Before receiving the proposals, I requested that DEF run its detailed production cost model and provide production cost results that I could use to calibrate Sedway Consulting's resource evaluation model. Per the instructions in the RFP, I was sent electronic copies of all proposals directly from the bidders on or about the Proposal Due Date (December 9, 2013) and evaluated the economic, operational, and pricing information from each proposal. DEF conferred with me on a number of issues relating to proposal RFP-noncompliance decisions, interpretation of proposal information, clarification requests, and economic evaluation assumptions. Regarding RFP-noncompliance decisions, there were proposals that did not meet all of the RFP's threshold requirements and technical criteria. DEF and Sedway Consulting decided to set aside these matters, move ahead with the evaluation of those proposals, and reconsider the issues in a qualitative assessment later if necessary. As the evaluation progressed, DEF and I discussed appropriate courses of action and modeling assumptions. Using Sedway Consulting's Response Surface Model ("RSM"), I evaluated DEF's NPGU and each submitted proposal and assessed their overall costs. I compared Sedway Consulting's ranking and results with those of DEF to confirm consistency of assumptions and concurrence of conclusions, and I documented the entire process in an independent evaluation report.

Q. You stated that you were involved in the development of the RFP and associated website. What did your involvement entail?

A. As the independent evaluator, I reviewed draft versions of the RFP document and website, participated in several discussions by phone, and was given the opportunity to provide my input and suggestions for improving the RFP and associated website. As an example, DEF had decided to conduct its 2018 RFP through the use of a web platform called PowerAdvocate and suggested that Sedway Consulting simply download all proposal submissions that were updated to this platform. In other power supply solicitations, Sedway Consulting has conducted a bid opening process where it has received and retained materials directly from bidders without relying on any intermediary and felt that the integrity of the independent monitor/evaluator process was enhanced by this. DEF agreed to change its RFP and website information to instruct all bidders to send electronic copies of all proposal materials on a flashdrive directly to Sedway Consulting following their uploading of such materials to the web platform.

Q. Do you believe that DEF's RFP was a reasonable document for soliciting proposals?

A. Yes. As one who has developed over a dozen such utility resource RFPs, I believe that DEF's RFP struck a good balance between being sufficiently detailed without being burdensome on the respondent. With its RFP, DEF released an Attachment A – Key Terms, Conditions and Definitions document that provided bidders with a clear understanding of the general business arrangement that DEF contemplated.

Q. Do you believe that DEF's evaluation process was conducted fairly?

A. Yes. The proposals and DEF's NPGU were evaluated on an equal footing, with consistent assumptions applied to all resource options.

IV. DESCRIPTION OF SEDWAY CONSULTING MODEL.

Q. Please describe Sedway Consulting's RSM model and its use in DEF's resource solicitation.

A. The RSM is a spreadsheet model that I have used in dozens of solicitations around the country. It is a relatively straightforward tool that allows one to independently assess the cost impacts of different generating or purchase resources for a utility's supply portfolio. Most of the evaluation analytics in the RSM involve calculations that are based entirely on my input of proposal costs and characteristics. A small part of the model examines system production cost impacts and needs to be calibrated to simulate a specific utility's system. In the case of the DEF solicitation, in the weeks prior to the proposal opening, I requested that DEF execute specific sets of runs with its detailed production cost model. With the results of these runs, I was able to calibrate the RSM to approximate the production cost results that DEF's EPM detailed production cost model would produce in a subsequent evaluation of any proposals or self-build options that DEF might receive. Thus, I would not have to rely on DEF's modeling of a proposal or self-build option; instead, I would be able to insert my own inputs into my own model and independently evaluate the economic impact of any particular resource. In short, the RSM provides an independent assessment to help ensure against the inadvertent introduction of significant mistakes that could cause the evaluation team to reach the wrong conclusions.

Q. How is the RSM an independent analytical tool if it is based on initial EPM results?

A. As I noted above, most of the calculations performed by the RSM are not based on EPM results in any way. There are two main categories of costs that are evaluated in a resource solicitation: fixed costs and variable costs. The costs in the first category – the fixed costs of a proposal – are calculated entirely separately in the RSM, with no reliance on the EPM model for these calculations. The second category – variable costs – has two parts: (1) the calculation of a resource's variable dispatch rates and, (2) the impact that a resource with such variable rates is likely to have on DEF's total system production costs. As with the fixed costs, a proposal's variable dispatch rates are calculated entirely separately in the RSM, with no basis or reliance on the EPM model. It is only in the final subcategory – the impact that a resource is likely to have on system production costs – that the RSM has any reliance on calibrated results from EPM.

Q. Please elaborate on that area of calculations where the RSM is affected by the EPM calibration runs.

A. This is the area of system production costs. These costs represent the total fuel, variable operation and maintenance (O&M), emission, and purchased power energy costs that DEF incurs in serving its customers' load. Given DEF's load forecast, the existing DEF supply portfolio (i.e., all current generating facilities and purchase power contracts), and many specific assumptions about future resources and fuel costs, EPM simulates the dispatch of DEF's system and forecasts total production costs for each month of each year of the study period. At the outset of the solicitation project, the RSM was populated with monthly

system production cost results that were created by the EPM calibration runs.

Q. What did the RSM do with this production cost information?

A. Once incorporated into the RSM, the production cost information allowed the RSM to answer the question: How much money (in monthly total production costs) is DEF likely to save if it acquires a proposed resource, relative to a reference resource? The use of a reference resource simply allowed a consistent point of comparison for evaluating all proposals and DEF's self-build options. As a reference resource, I used a hypothetical gas-fired resource with a very high variable dispatch rate associated with a heat rate of 15,000 Btu/kWh. In fact, I could have picked any variable dispatch or heat rate for the reference resource and obtained the same relative ranking of proposals out of the RSM. The cost of the reference resource has no impact on the relative results – it is merely a consistent reference point.

Q. Can you provide a numerical example that shows how the RSM works?

A. Certainly. Assume that a utility has a one-year resource need of 500 MW and must select one of the two following proposals:

	Proposal A	**Proposal B**
Capacity:	500 MW	500 MW
Capacity Price:	\$9.00/kW-month	\$5.50/kW-month
Energy Price:	\$40/MWh	\$60/MWh

For both proposals, the RSM has already calculated the fixed costs (and

represented them in the capacity price) and the variable costs (and represented them in the energy price). Proposal A is more expensive in terms of fixed costs, but Proposal B is more expensive on an energy cost basis. The RSM calculates the final piece of the economic analysis – the different impacts on system production costs – to determine which proposal is less expensive in a total sense for the utility system as a whole.

Assume that the 15,000 Btu/kWh reference unit has a variable cost of $90/MWh and that the RSM has been calibrated and populated with the following production cost information:

For a 500 MW proxy resource, the utility's one-year total system production costs are:

$900 million for a $90/MWh energy price reference resource
$894 million for a $60/MWh energy price resource (Proposal B)
$876 million for a $40/MWh energy price resource (Proposal A)

Thus, the energy savings (relative to the selection of a $90/MWh reference resource) are $24 million for Proposal A with its $40/MWh energy price and $6 million for Proposal B with its $60/MWh energy price. In its proposal ranking process, the RSM converts all production cost savings into a $/kW-month equivalent value so that the savings can be deducted from the capacity price to yield a final net cost (in $/kW-month) for each proposal. Converting the energy savings in this numerical example into $/kW-month equivalent values yields the

following:

$24 million / (500 MW * 12 months) = $4.00/kW-month

$6 million / (500 MW * 12 months) = $1.00/kW-month

The RSM calculates the net cost of both proposals by subtracting the energy cost savings from the fixed costs:

	Proposal A	**Proposal B**
Capacity Price:	$9.00/kW-month	$5.50/kW-month
Energy Cost Savings:	$4.00/kW-month	$1.00/kW-month
Net Cost:	$5.00/kW-month	$4.50/kW-month

Proposal B is less expensive. This can be confirmed through a total cost analysis as well:

Proposal A will require total capacity payments of $54 million (= 500 MW x $9.00/kW-month x 12 months), and Proposal B will require $33 million (= 500 MW x $5.50/kW-month x 12 months). Thus, Proposal A has fixed costs that are $21 million more than Proposal B.

Proposal A will provide $18 million more in energy cost savings (= $24 million - $6 million); however, this is not enough to warrant paying $21 million more in fixed costs. Therefore, Proposal B is the less expensive alternative.

Note that the RSM is described in more detail in the independent evaluation

report that is attached to my testimony as Document Number 2 of my Exhibit No. ___(AST-1).

Q. With that understanding of the RSM process, what did you do to calibrate the RSM to EPM?

A. I reviewed the production cost information that DEF provided at the start of the project and confirmed that the production costs were, for the most part, exhibiting smooth, correct trends (i.e., they were increasing where they should be increasing and declining where they should be declining). Having verified that the RSM production cost values were "smooth," I was confident that inputting variable cost parameters into the models for similar proposals would yield similar production cost results. Although the RSM is not a detailed model and could not simulate DEF's production costs with EPM's accuracy, in the end (after accounting for future portfolio composition and future unit revenue requirement methodology differences), the independent RSM evaluation results tracked EPM's results reasonably well.

Q. Once the RSM was calibrated, what was the next step?

A. I was ready to receive and evaluate proposals. Bidders (and DEF's NPGU team) had been instructed to directly send me electronic versions of all proposals by December 10, 2013, and indeed all participants in the RFP did. I read each proposal and participated in discussions with DEF about interpreting the proposals, identifying areas requiring clarification, and assessing each proposal's compliance with the RFP's Minimum Requirements. DEF communicated with proposers to seek clarification and corrections to uncertain areas of the proposals,

copying me on all email correspondence and encouraging bidders to do the same.

I incorporated pricing and operational information from each proposal into the RSM. Such information included contract commencement and expiration dates, summer and winter capacity, capacity pricing, heat rates, fuel supply assumptions, variable O&M charges, start-up costs, expected forced outage hours, and expected planned outage hours. Most of this information was directly inputted into the RSM. After the initial part of the evaluation, DEF provided Sedway Consulting with its own modeling results so that Sedway Consulting could cross-check all key modeling assumptions and outputs and ensure consistency with the information in the RSM.

Q. Were there any costs that were considered in Sedway Consulting's analysis that were not predefined through the EPM/RSM calibration process described above or were not part of the actual proposals' pricing?

A. Yes, as described in the attached Independent Evaluation Report, there were two categories of costs that could not be predicted prior to the receipt of proposals or appropriately characterized in the pricing structure of proposals – 1) cost estimates for transmission network upgrades that might be required to accommodate a proposed resource or combination of resources, and 2) cost estimates for firm gas transportation requirements for gas-fired resources. Both of these cost categories were highly dependent on the location of projects, their point of electrical interconnection, and their natural gas pipeline supply considerations.

Q. How were these cost estimates developed?

A. In both cases, DEF's subject area experts provided these cost estimates after being provided pertinent details about the proposed resources.

Q. Were you in a position to independently verify these estimates?

A. No. Sedway Consulting does not have the transmission models or in-depth knowledge of Florida's current or future electric or natural gas infrastructure to develop or verify the estimates of DEF's subject area experts. However, I found them to be fairly balanced and consistent from a $/kW standpoint and do not believe that any bidder was inappropriately advantaged or disadvantaged by these estimates. I studied the estimates to see if anything was out of line and concluded that they did not appear to be biased. In addition, I was free to use or modify the estimated costs in any way I deemed appropriate – and indeed did so, in line with evaluation processes that Sedway Consulting has employed in other resource solicitations.

Q. Were there any other DEF estimates that were used in your analysis that were not locked down prior to the receipt of proposals?

A. Yes, in a sense. Sedway Consulting and DEF had discussed and locked down assumptions about generic resources that would be modeled at the end of any PPA contract periods to allow for a consistent evaluation of all proposals over the complete study period (2015-2053). Those assumptions were based on DEF's 2013 Ten-Year Site Plan and were shared with the bidding community through the RFP and a Question & Answers ("Q&A") forum prior to the submission of proposals. During the evaluation, Sedway Consulting and DEF re-examined these

generic resource "back-fill" assumptions and decided to make adjustments that would better represent the operating characteristics and costs associated with such back-fill resources during the period that they would be in service. Specifically, the assumptions were improved to recognize better heat rates (and associated lower firm gas transportation costs) and lower transmission costs for these back-fill resources. These adjustments improved the economics of all PPAs because they added a better back-fill resource than had been depicted in the RFP and Q&As. In fact, the economics of the back-fill resource were better than those of DEF's NPGU (which was based on standard current CC technology).

Q. So you do not believe that these adjustments to the back-fill resource's assumptions were in any way biased against the outside proposals?

A. No. In fact, as noted above and described in more detail in Sedway Consulting's independent evaluation report that is attached as Document No. 2 of my Exhibit No. AST-1, the adjustments improved the 35-year economics of the outside PPA proposals. All of these proposals would have ranked lower (i.e., less favorable) had the evaluation relied on the original back-fill assumptions.

V. SEDWAY CONSULTING'S FINDINGS AND RESULTS.

Q. What were the results of Sedway Consulting's RSM analysis?

A. Using the RSM, Sedway Consulting was able to compare the economics of DEF's NPGU and each of the proposed resource options. That comparison entailed a calculation of the net present value of each option from 2015 through 2053 and accounted for 1) generic resources that would need to "fill in" behind options that expired before 2053 and 2) generic resources that would need to supplement the

capacity of each proposed option or combination of options to ensure that all portfolios were the same size in MWs. DEF's NPGU was found to be $282 million (cumulative present value of revenue requirements – "CPVRR") less expensive than the next best portfolio of alternatives. The results, ranking of resources and additional scenarios are described in detail in Sedway Consulting's independent evaluation report that is attached as Document No. 2 of my Exhibit No. __ (AST-1).

Q. What do you conclude about DEF's solicitation?

A. I conclude that DEF's NPGU is the most cost-effective resource for meeting DEF's 2018 capacity needs and concur with DEF's decision to move forward with that project. The solicitation process yielded the best results for DEF's customers while treating proposers fairly. The RFP was sufficiently detailed to provide necessary information to proposers. The economic evaluation methodology and assumptions were appropriate and unbiased, and the independent evaluation procedures provided a cross-check of DEF's proposal representation in EPM and confirmed DEF's conclusions. Finally, I conclude that DEF's NPGU is at least $282 million CPVRR less expensive than the next best portfolio of alternatives.

Q. Does this conclude your direct testimony?

A. Yes, it does.

DOCUMENT 1 OF EXHIBIT AST-1

RESUME OF ALAN S. TAYLOR

AREAS OF QUALIFICATION

Independent evaluation services for competitive bidding resource selection, integrated resource planning, market analysis, risk assessment, and strategic planning

EMPLOYMENT HISTORY

- President, Sedway Consulting, Inc., Boulder, CO, 2001-present
- Senior Member of PA Consulting, Inc., Boulder, CO, 2001
- Vice President, Global Energy Business Sector, PHB Hagler Bailly, Inc., Boulder, CO, 2000
- From Senior Associate to Principal, Utility Services Group, Hagler Bailly Consulting, Inc., Boulder, CO, 1991-1999
- Senior Consultant, Energy Management Associates, Atlanta, GA, 1983-1988
- Internships at: Pacific Gas & Electric Company, San Francisco, CA (1990)
  Lawrence Berkeley National Laboratory, Berkeley, CA (1989-1991)
  MIT Resource Extraction Laboratory, Cambridge, MA (1982)
  Baltimore Gas and Electric Company, Baltimore, MD (1980)

EDUCATION

- Walter A. Haas School of Business, University of California at Berkeley, MBA, Valedictorian, Corporate Finance, 1991
- Massachusetts Institute of Technology, BS, Energy Engineering, 1983

PROFESSIONAL EXPERIENCE

- Conducted numerous competitive bidding project evaluations for conventional generating resources, renewable facilities, and off-system power purchases; analyzed thousands of such power supply proposals.
- Developed and/or reviewed dozens of requests for proposals for utility resource solicitations.
- Assisted in or monitored contract negotiations with hundreds of shortlisted bidders in utility resource solicitations.
- Testified on utility competitive bidding solicitation results, affiliate transactions, cost recovery procedures, rate case calculations, and incentive ratemaking proposals.
- Managed the development of market price forecasts of North American and European electricity markets under deregulation.
- Performed financial modeling of electric utility bankruptcy workout plans.
- Trained and assisted many of the nation's largest electric and gas utilities in their use of operational and strategic planning computer models.

SELECTED PROJECTS

2013- **California Solicitations for Resources**
2014 Client: Southern California Edison

Currently serving as the Independent Evaluator (IE) in Southern California Edison's (SCE) Local Capacity Requirements Request for Offers (LCR RFO) for 1,900-2,500 MW of new local capacity resources from energy efficiency, demand response, energy storage and/or gas-fired facilities. Also served as the IE for all five of SCE's 2013 reverse energy auctions of the dispatch rights to facilities under power purchase agreements executed with developers of facilities selected in the utility's 2006 New Generation RFO.

2013 **Minnesota Solicitation for New Resources**
Client: Minnesota Power Company

Provided independent evaluation services in a solicitation for 220 MW of wind generation in Minnesota; bids were compared to the utility's proposal to develop its own wind farm. Mr. Taylor assisted with the development of the request for proposals (RFP), performed a parallel economic evaluation of the utility's facility and all competing proposals, monitored communications and negotiations with shortlisted bidders, and provided a report for filing with the Minnesota Public Utilities Commission regarding the results of the solicitation.

2013 **Kentucky Renewable Resource Analysis**
Client: Kentucky Industrial Utility Customers

Provided expert analysis and testimony on behalf of customers of Kentucky Power regarding a renewable energy purchase agreement for output from a new 58 MW biomass facility that is expected on-line in 2017.

2006- **California Solicitations for Conventional and Renewable Resources**
2013 Client: Southern California Edison

Currently serving or has served as the IE in 23 solicitations for power or gas supplies in southern California – one, as noted above, for SCE's 2013 LCR RFO, an earlier one for over 2,500 MW of new conventional resources, four for renewable energy purchases to help SCE meet its state Renewables Portfolio Standard (RPS) requirements, five for near-term capacity resources, eight for reverse energy auctions of the dispatch rights to facilities under power purchase agreements, and four for gas financial hedging products. Mr. Taylor managed or is managing a Sedway Consulting team to perform a parallel evaluation of all proposals, monitor communications and negotiations with power suppliers, and support the review of the final selected proposals by the Procurement Review Group – a collection of non-market-participant stakeholders and regulators who are/were provided confidential access to the evaluation results at intermediate stages. He

has filed IE reports and sponsored testimony before the California Public Utilities Commission concerning the results of most of these solicitations.

2012 **Florida Solicitation for New Resources**
Client: Tampa Electric Company

Served as an independent evaluator in a solicitation for 500 MW of power supplies in Florida. New capacity had to be on-line by 2017; bids were compared to the utility's proposal to repower four existing combustion turbines into a larger combined-cycle facility. Mr. Taylor assisted with the development of the RFP, performed a parallel evaluation of all proposals, monitored communications and negotiations with contracting counterparties, and testified before the Florida Public Service Commission regarding the solicitation's results.

2011 **Minnesota Solicitation for Wind Resources**
Client: Minnesota Power

Provided independent evaluation services in a solicitation for 100 MW of wind generation in Minnesota. Proposals competed with a utility proposal to develop its own wind farm. Mr. Taylor assisted with the development of the RFP and performed a parallel economic evaluation of the utility's facility and all competing proposals.

2005- **California Solicitations for Conventional and Renewable Resources**
2010 Client: Pacific Gas & Electric

Served as the Independent Evaluator in four solicitations for new power supplies in northern California – one for 2,200 MW of new conventional resources, another for up to 1,200 MW of new generating resources from any source, and two others for between 1,400 and 2,800 GWh/year of renewable energy purchases. Mr. Taylor managed a Sedway Consulting team to perform a parallel evaluation of all proposals, monitor communications and negotiations with power suppliers, and support the review of the final selected proposals by the Procurement Review Group – a collection of non-market-participant stakeholders and regulators who were provided confidential access to the evaluation results at intermediate stages. He has filed IE reports and sponsored testimony before the California Public Utilities Commission concerning the results of most of these solicitations.

2007- **Florida Solicitation for New Resources**
2008 Client: Florida Power & Light

Provided independent evaluation services in Florida Power & Light's solicitation for 1,250 MW of new power supplies for 2011. Mr. Taylor performed a parallel economic evaluation to that which was undertaken by the utility. His work efforts allowed all proposal parameters to be

cross-checked and corrected where necessary. He sponsored testimony before the Florida Public Service Commission concerning the results of the solicitation evaluation.

2007- **Avoided Cost Analysis for Interruptible Loads**
2008 Client: Public Service Company of Colorado

Provided an independent assessment of Public Service Company of Colorado's peaking resource avoided costs for use in the utility's development of customer credits for its interruptible service tariff.

2007- **Florida Solicitations for New Resources**
2008 Client: Tampa Electric Company

Provided independent evaluation services in two separate Tampa Electric Company solicitations for 600 MW of new power supplies for 2013, as a market test for the utility's proposals to develop initially an integrated gasification combined cycle (IGCC) facility and later a gas-fired combined cycle facility.

2004- **Regulatory Support of Commission Staff**
2005 Client: Utah Division of Public Utilities

Assisted staff for the Utah Division of Public Utilities in the division's efforts to analyze PacifiCorp's 2005 rate case. Mr. Taylor reviewed production cost modeling results and forecasts of system-wide fuel and purchase power costs.

2004- **Minnesota Solicitation for New Resources**
2005 Client: Minnesota Power

Provided independent evaluation services in a solicitation for 200 MW of firm power supplies. Mr. Taylor reviewed all proposals and performed a parallel economic evaluation among proposed turnkey facilities and power purchases.

2004 **Canadian Solicitations for Conventional and Renewable Resources**
Client: Ontario Energy Ministry

Participated in a broader consulting team and provided assistance in the development of RFPs for 2,500 MW of conventional resources and 300 MW of renewable resources. New long-term sources of power were sought to replace regional coal-fired generation.

2003- **Florida Solicitation for New Resources**
2004 Client: Florida Power & Light

Provided independent evaluation services in Florida Power & Light's solicitation for 1,100 MW of new power supplies for 2007. Mr. Taylor performed a parallel economic evaluation of all proposals and reviewed, cross-checked, and corrected (where necessary) the utility's analyses. He sponsored testimony before the Florida Public Service Commission concerning the results of the solicitation evaluation.

2002- **Minnesota Solicitation for New Resources**
2003 Client: Northern States Power

Assisted in the evaluation of a large number of multi-option proposals for new power supplies in the 2005-2009 time frame. Mr. Taylor was the independent evaluator in two separate solicitations. He managed a team of individuals in the evaluation of responses for both Requests for Proposals (RFPs). In the first solicitation, contingent proposals were received that could serve as replacement contracts for 1,100 MW of nuclear capacity if NSP were forced to decommission its Prairie Island power plant in 2007. In the second solicitation, NSP sought approximately 1,000 MW of new supplies to supplement its existing supply portfolio. The evaluation included the review of over a dozen proposed wind projects.

2002 **Florida Revisions to Bidding Rule**
Client: Consortium of utilities

Provided the Florida Public Service Commission with recommendations concerning appropriate revisions to the state's bidding rule. Mr. Taylor participated in public workshops to provide the benefits of his extensive experience in performing competitive bidding solicitations and to convey what changes should or should not be made to Florida's existing bid rule to ensure the selection of the best resources for the state's electricity customers.

2002 **Arizona Testimony Concerning Competitive Bidding Solicitations**
Client: Harquahala Generating Company, LLC

Filed testimony before the Arizona Corporation Commission in the Generic Proceedings Concerning Electric Restructuring Issues and Associated Proceedings. Mr. Taylor's testimony provided the Commission with information about competitive bidding processes that he had seen work in other states. Also, his testimony addressed various concerns that were raised by Arizona Public Service as to the feasibility of implementing competitive bidding in Arizona.

2002 **Florida Solicitation for New Resources**
Client: Florida Power & Light

Provided independent evaluation services in Florida Power & Light's solicitation for 1,750 MW of new power supplies in the 2005-2006 time frame. Mr. Taylor performed a parallel economic evaluation to that which was undertaken by the utility. His work efforts allowed all proposal parameters to be cross-checked and corrected where necessary. Also, he provided suggestions on resource optimization modeling approaches that ensured the most comprehensive examination of thousands of potential combinations of proposals.

2001 **Wisconsin Testimony Concerning Competitive Bidding Solicitations**
Client: MidWest Independent Power Suppliers

Provided testimony in a proceeding before the Wisconsin Public Service Commission on behalf of a consortium of independent power producers. Mr. Taylor testified on the benefits and timing of a competitive bidding solicitation that Wisconsin Electric Power Company (WEPCO) should be ordered to conduct prior to the utility's development of $2.8 billion in self-build generation facilities (embodied in a WEPCO proposal called Power the Future – 2). Without the benefits of a competitive solicitation, there would be no defensible means of ensuring that the utility's customers were being offered the best, most cost-effective resources.

2001 **Negotiation of Full-Requirements Purchase Contract**
Client: Georgia cooperative utility

Assisted in negotiation of a $2 billion power purchase contract. Mr. Taylor worked with a team of legal experts and other consultants to assist the client in negotiating a 15-year full-requirements contract with a large, national power supplier. Detailed modeling simulations were performed to compare the complex transaction to the utility's own self-build alternatives. Mr. Taylor helped investigate and negotiate detailed provisions in the power supply contract concerning ancillary services and other operational parameters.

2001 **Evaluation of Resource Proposals**
Client: North Carolina municipal utility

Reviewed responses to a utility resource solicitation and assisted the client in developing a short list of the best bidders. Mr. Taylor reviewed the results of the client's economic analysis of the proposals and provided insights on various nonprice factors related to each of the top-ranked proposals. Mr. Taylor helped the client in structuring and strategizing for the negotiation process.

2000- **Solicitation for New Resources**
2001 Client: Public Service of Colorado

Assisted in the evaluation of a large number of multi-option proposals for new power supplies in the 2002-2005 time frame. Mr. Taylor managed a team of a dozen individuals who performed economic and nonprice evaluations of conventional and renewable proposals. Mr. Taylor developed recommendations for a short list of the best resources and managed a supplemental evaluation of second-tier bidders when the client's capacity needs subsequently increased. Ultimately, over $2 billion of contracts were negotiated for over 1,700 MW of new power supplies under terms of up to 10 years. Mr. Taylor testified before the Colorado Public Utilities Commission on the processes and results of both the primary and supplemental evaluations.

1999- **Solicitation for New Resources**
2000 Client: MidAmerican Energy

Reviewed MidAmerican's solicitation for new power supplies for the 2000-2005 resource planning period. Mr. Taylor managed a team of individuals who performed an independent parallel evaluation of MidAmerican's analysis of responses to the utility's request for proposals (RFP). Mr. Taylor reviewed MidAmerican's evaluation and negotiation process and testified to the fairness and appropriateness of MidAmerican's actions. He filed testimony before the utility regulatory commissions in Iowa, Illinois, and South Dakota.

2000 **Electricity Market Assessments**
Client: various American and European clients

Helped develop electricity market prices for regional electricity markets in North America (California, New England, Arizona/New Mexico, Louisiana) and Europe (Austria, Belgium, France, Germany, and the Netherlands). Mr. Taylor worked with project teams in the U.S. and Europe to develop simulation models and databases to forecast energy and capacity prices in the deregulating power markets.

1999 **Evaluation of New Resources**
Client: Florida Power Corporation

Helped prepare the FPC's RFP for long-term supply-side resources and assisted in the independent evaluation of responses. Mr. Taylor oversaw the review of FPC's computer simulations (in PROVIEW and PROSYM) of the proposals that were received. The project team also evaluated the proposals by using a response surface model to approximate the results that might be produced in the more detailed simulations. Mr. Taylor testified before the Florida Public Service Commission concerning his assessment of FPC's solicitation and the results of the analysis.

1998 **Evaluation of New Resources**
Client: Public Service of Colorado

Assisted the evaluation of proposals for PSCo's near-term 1999 resource additions and managed the complete third party evaluation of proposals for resources in the 2000-2007 time frame. Such resources included third-party facilities and power purchases, as well as company-sponsored interruptible tariffs. Mr. Taylor assisted with the development of the request for proposals and oversaw the evaluation of all responses. He and his team monitored subsequent negotiations with shortlisted bidders. Mr. Taylor testified before the Colorado Public Utilities Commission on the fairness of the solicitation and the results of the evaluation.

1997- **Evaluation/Negotiation of Transmission Interconnection Solicitation**
1999 Client: New Century Energies

Managed a solicitation for participation in a major transmission project interconnecting Southwestern Public Service (a Texas member of the Southwest Power Pool) and Public Service of Colorado (a member of the Western Systems Coordinating Council). As the first major inter-reliability-council transmission project in the era of open access, FERC required that SPS and PSCo solicit third-party interest in participation. This project required the development of an RFP and evaluation of responses for both equity participation and long-term transmission service for over 21 alternative high-voltage AC/DC/AC transmission projects. The evaluation focused on the costs and intangible risks of different transmission alternatives relative to the benefits and savings associated with increased economy interchange, avoided future generating capacity, and reductions in single-system spinning reserve and reliability requirements.

1996- **Evaluation/Negotiation of All-Source Solicitation**
1997 Client: Southwestern Public Service

Managed the evaluation of a broad array of responses to an all-source solicitation that was issued by Southwestern Public Service (SPS). Resources in the areas of conventional supply-side generation, renewable resources, off-system transactions, DSM, and interruptible loads were proposed. The evaluation entailed scoring the proposals for a variety of price and nonprice attributes. Mr. Taylor assisted Southwestern in its negotiations with the bidders and performed the detailed evaluation of the best and final offers.

1996- **Risk Assessment for 1,000-MW Solicitation**
1997 Client: Seminole Electric Cooperative

Managed the review and assessment of risks associated with responses to a 1,000-MW solicitation that was issued by Seminole Electric Cooperative. The evaluation entailed reviewing selected proposals' financial feasibility, performance guarantees, fuel supply plans, O&M plans, project siting, dispatching flexibility, and bidder qualifications.

1997 **Analysis/Testimony - Louisville Gas & Electric's Fuel Adjustment Clause**
Client: Kentucky Industrial Utility Customers

Performed a detailed examination of Louisville Gas & Electric's (LG&E) fuel adjustment clause and identified misallocated costs in the areas of transmission line losses and purchased power fuel costs. Mr. Taylor also critiqued LG&E's rate adjustment methodology and recommended closer scrutiny of costs associated with jurisdictional and non-jurisdictional sales. Mr. Taylor testified before the Kentucky Public Service Commission and presented the findings of his analysis.

1995 **Development of All-Source Solicitation RFPs**
Client: Southwestern Public Service

Managed the development of five RFPs that solicited resources in the areas of conventional supply-side generation, renewable resources, off-system transactions, DSM, and interruptible loads. The RFPs were issued by SPS as part of an all-source solicitation to identify resources that may be competitive with two generation facilities that SPS intended to develop.

1994 **Development of Competitive Bidding RFP**
Client: Empire District Electric Company

Based on knowledge gained from the review of dozens of other utility RFPs, developed a combined-cycle resource RFP for Empire District Electric Company. The project team was responsible for the RFP's entire development, including the development of scoring provisions for price and nonprice project attributes.

1993 **Selection of Developer for 25 MW Wind Facility**
Client: Northern States Power

Evaluated bids that were received by NSP in a solicitation for the development of a 25 MW wind facility in Minnesota. The proposals were scored and ranked through a point-based evaluation system that was developed prior to the solicitation. The scoring involved an assessment of operational and financial feasibility, power purchase pricing terms, construction schedules, and community acceptance issues.

Sedway Consulting, Inc.

INDEPENDENT EVALUATION REPORT FOR DUKE ENERGY FLORIDA'S 2013 POWER SUPPLY SOLICITATION

Submitted by:

Alan S. Taylor
Sedway Consulting, Inc.
Boulder, Colorado

May 21, 2014

REDACTED

Introduction and Background

On October 8, 2013, Duke Energy Florida, Inc. (DEF) issued a Request for Proposals (RFP) for 2018 capacity and energy from resources that might be more cost-effective for its customers than its Next Planned Generating Unit (NPGU) – a 1,640 MW combined-cycle (CC) facility proposed to be sited in Citrus County, Florida.

Sedway Consulting, Inc. (Sedway Consulting) was retained to provide independent monitoring and evaluation services to DEF and provide a parallel economic evaluation of responses to the RFP. This independent evaluation report documents Sedway Consulting's evaluation process and presents the results of Sedway Consulting's economic analysis. It describes:

- the proposals that were received in response to DEF's 2018 RFP,
- Sedway Consulting's proprietary Response Surface Model (RSM) which was used to conduct the parallel economic evaluation,
- fundamental assumptions that were applied, and
- additional economic factors that affected the final cost of each resource.

Receipt of Proposals

In DEF's RFP, bidders were instructed to upload proposals to DEF via a web-based bid submission platform by December 9, 2013 and deliver a copy directly to Sedway Consulting via flash-drives one day later. On or before December 10, 2013, Sedway Consulting received 12 proposals associated with seven projects from five power suppliers (with DEF's NPGU proposal included as one proposal/project/supplier in these totals). All but one of the projects were natural gas-fired technologies. The response to the RFP did not yield enough proposed transactions with enough capacity to match the MWs of DEF's NPGU. However, DEF had declared in the RFP and during the RFP Question & Answer (Q&A) process that it would develop and evaluate sufficiently-sized portfolios of proposals and generic self-build resources. DEF and Sedway Consulting therefore undertook the review and evaluation of all of the proposals with that in mind.

The 12 proposals/seven projects entailed the following:

1. [redacted] a [redacted] power purchase agreement (PPA) for capacity and energy deliveries commencing May 1, 2018 [redacted] Hereafter, this proposal will be referred to as Proposal A in the unredacted portions of this report.

2. [redacted] a [redacted] PPA for capacity and energy deliveries commencing May 1, 2018 [redacted] Hereafter, this proposal will be referred to as Proposal B in the unredacted portions of this report.

REDACTED

3. [redacted]) PPA for capacity and energy deliveries commencing May 1, 2018 [redacted]. The bidder provided alternative proposals for two PPAs of different durations – one of approximately [redacted] with an expiration date of [redacted] and a second of approximately [redacted] with an expiration date of [redacted] Hereafter, these two proposals will be referred to as Proposal C1 (for the shorter PPA) and Proposal C2 (for the longer PPA) in the unredacted portions of this report.

4. [redacted] a [redacted], with three options offered: a [redacted] PPA for capacity and energy deliveries commencing May 1, 2018, a [redacted] PPA for deliveries commencing January 1, 2015, and an asset sale offer. Hereafter, these proposals will be referred to as Proposals D1 (for the 2018 PPA), D2 (for the 2015 PPA) and D3 (for the asset sale) in the unredacted portions of this report.

5. [redacted] a [redacted] with three options offered: a [redacted] PPA for capacity and energy deliveries commencing May 1, 2018, a [redacted] PPA for deliveries commencing January 1, 2015, and an asset sale offer. Hereafter, these proposals will be referred to as Proposals E1 (for the 2018 PPA), E2 (for the 2015 PPA) and E3 (for the asset sale) in the unredacted portions of this report.

6. [redacted]: a [redacted] PPA for capacity and energy deliveries commencing January 1, 2019 [redacted] Hereafter, this proposal will be referred to as Proposal F in the unredacted portions of this report.

7. **DEF's NPGU**: a 1,640 MW (summer capacity) new CC facility to be built in two phases at a proposed site in Citrus County, Florida – with the first 820 MW phase to come on-line by May 1, 2018 and the second 820 MW phase to come on-line by December 1, 2018.

Table A-1 depicts key information for each of the proposals and DEF's NPGU. Specifically, the table includes each resource's:

- first-year summer capacity,
- power plant type,
- year that the PPA or asset transaction is expected to commence deliveries,
- PPA term (or economic life in the case of asset transaction),
- levelized capacity price or capital-related revenue requirement plus fixed operation and maintenance (O&M) price/charges (over the PPA term or asset life)
- full load heat rate (averaged over the PPA term or asset life), and
- levelized variable O&M charge.

REDACTED

For Proposal C, the shorter-term PPA (i.e., Proposal C1) was found to be more cost-effective than the bidder's longer-term option. For Proposals D and E, the primary PPA proposals (i.e. Proposals D1 and E1, with start dates in 2018) were found to be the most cost-effective offers among those associated with each of those facilities. Thus, the table includes statistics for those best proposal options.

Table A-1
Summary of Proposals and DEF's NPGU

Resource	Sum. Cap. (MW)	Type	Start Year	Term/ Econ. Life (yrs)	Cap. Price ($/kW-mo)	Full Load Heat Rate (Btu/kWh)	Var. O&M ($/MWh)
Proposal A	[redacted]	[redacted]	2018	[redacted]	[redacted]	[redacted]	[redacted]
Proposal B	[redacted]	[redacted]	2018	[redacted]	[redacted]	[redacted]	[redacted]
Proposal C1	[redacted]	[redacted]	2018	[redacted]	[redacted]	[redacted]	[redacted]
Proposal D1	[redacted]	[redacted]	2018	[redacted]	[redacted]	[redacted]	[redacted]
Proposal E1	[redacted]	[redacted]	2018	[redacted]	[redacted]	[redacted]	[redacted]
Proposal F	[redacted]	[redacted]	2019	[redacted]	[redacted]	[redacted]	[redacted]
NPGU	1,640	CC	2018	35	8.64	6,730	3.35

It is important to note that the levelized capacity price for DEF's NPGU in Table A-1 includes all capital costs (for generation and transmission investments) and fixed O&M costs. Unlike the NPGU, none of the bid information in Table A-1 includes transmission costs – all of which were calculated as described later in this report and subsequently added to the bid costs.

Disqualification Decisions

Sedway Consulting reviewed all of the proposals to ensure that they met the RFP's threshold requirements. Although there were a few areas where some proposals may not have completely met a strict interpretation of the RFP's requirements, DEF and Sedway Consulting agreed to defer these concerns and proceed with the evaluation of all proposals and consider these issues in a qualitative assessment later, if necessary. Thus, no proposals were disqualified.

Evaluation Process

Through its review of the proposals that Sedway Consulting received during the bid submission process, Sedway Consulting extracted the following economic information for each proposal (including DEF's NPGU):

- Capacity (winter and summer; base and duct-fired, where applicable)
- Commencement and expiration dates of contract
- Capacity pricing (or asset sales price, if applicable)
- Fixed O&M pricing or charges
- Firm fuel transportation assumptions
- Fuel pricing or indexing
- Heat rate (base and duct-fired, where applicable)
- Variable O&M pricing or charges
- Start-up costs and fuel requirements
- Expected forced outage and planned outage hours
- Third-party transmission costs.

The remainder of this report section addresses the following topics:

- a description of the RSM and its evaluation process,
- the use of a "back-fill" resource in evaluating proposed transactions that expire before the end of the study period,
- proposal/resource cost computation (and costs that were developed outside of the RSM),
- the use of "side-fill" resources to supplement proposals/portfolios so that the resulting portfolios have the same capacity as DEF's NPGU, and
- the process of developing final cost estimates for all resources.

RSM Evaluation Process

The economic information for all outside proposals and DEF's NPGU was input into Sedway Consulting's RSM – a power supply evaluation tool that was calibrated to approximate the impact of each resource on DEF's system production costs. The RSM calculated each option's annual fixed costs and variable dispatch costs, estimated the production cost impacts of each option, and accounted for capacity replacement costs for all proposed contracts that expired before the end of the study period. In addition, Sedway Consulting's analysis accounted for the different sizes of resources by supplementing those resources with generic resource capacity. For those resources and scenarios where a resource/portfolio did not fully match the capacity of DEF's NPGU, a per-MW cost of a new generic current-technology CC was added to the resource's costs to cover the difference.

An option's net cost was a combination of fixed and variable cost factors. On the fixed side, the RSM calculated annual fixed costs associated with capacity payments (or generation-related revenue requirements), fixed O&M costs, firm gas transportation costs, third-party transmission wheeling charges (where applicable), transmission revenue requirements, and debt equivalence costs (for PPAs). These annual total fixed costs were discounted to mid-2014 dollars.

On the variable cost side, the RSM first developed a variable dispatch charge (in $/MWh) for each option for each month. This charge was calculated by multiplying the option's heat rate by the specified monthly fuel index price and adding the variable O&M charge.

The RSM then estimated DEF's system production costs for each month and each option by interpolating between production costs estimates that were extracted from a set of runs from EPM – DEF's detailed production cost model. These runs were performed at the start of the project and were used to calibrate the RSM by varying the monthly variable dispatch charge for a proxy proposal and recording the resulting DEF system production cost.

For the same capacity as the proposal under consideration, the RSM also estimated DEF's system production costs for a natural-gas-fired reference unit that had a high variable dispatch charge based on a heat rate of 15,000 Btu/kWh. Thus, for each option, the RSM yielded estimates of the annual production cost savings that DEF would be projected to experience if the utility selected the resource option, relative to acquiring the same sized transaction but at the high reference resource dispatch rate. The lower an option's variable dispatch charge, the greater the production cost savings.

Back-Fill Resource

As was mentioned earlier, the RSM accounted for the costs of replacing capacity for all proposed contracts that expired before the end of the study period (2053). This was done by "filling in" for the lost capacity at the end of each proposal's term of service. This allowed for a consistent and appropriate comparison of the value of proposals that had varying contract durations. In effect, by supplementing each short-term proposal with a back-fill resource for the later years, the RSM was simulating what DEF would have to do when a proposed transaction expired – acquire or develop an amount of replacement capacity that was roughly equal to that expired resource.

As the basis for cost assumptions for the back-fill resource, Sedway Consulting (and DEF) decided to use a generic future CC resource with the operating efficiencies of the advanced technologies that are available (currently at a higher price) in the development pipeline. Sedway Consulting assumed that the $/kW fixed cost assumptions (e.g., capital-related revenue requirements and fixed O&M costs) would be the same as DEF's standard technology generic CC assumptions that were publicized in the RFP's Q&A process. However, the variable cost assumptions (e.g., heat rates, variable O&M costs,

fuel supply issues) were based on the capabilities of the advanced technology facilities. Thus, the underlying assumption was that the advanced technology benefits will be available at traditional technology prices in the time-frame that the back-fill resource would be used. All capital-related costs and variable O&M costs were escalated by 2.5%/year. In addition, Sedway Consulting employed a methodological variation, whereby the RSM scaled the replacement capacity to exactly equal the size of the expiring proposal resource. Thus, all PPA proposals enjoyed the benefit of being replaced at the end of their terms with a resource that exhibited the operating efficiencies and economy-of-scale benefits of an advanced CC plant. In other words, if a 200 MW proposal ended in 2033, the RSM assumed that a 200 MW CC facility replaced it in 2034; however, the construction costs for the replacement facility were not those that would typically be associated with a 200 MW combined-cycle plant, but rather, they were a prorated portion of the construction costs of a larger (793 MW) advanced CC facility.

As noted above, depending on the "in-service date" for the back-fill resource, the back-filler's capital costs were escalated from a 2018 base-year value by 2.5%/year. This escalation assumption represented DEF's estimate of how construction costs were likely to increase for its generation alternatives. Sedway Consulting decided to use this escalation value to trend the filler's annual capacity charges over time. Thus, instead of using DEF's declining revenue requirements profile for the recovery of capacity costs, Sedway Consulting used an escalating pattern that yielded the same long-term present value of revenue requirements. A traditional revenue requirements profile results in the highest capital charges in a project's early years. Thereafter, the capital-related charges decline. This is the opposite from what is usually seen in most power purchase proposals in power supply solicitations. Most power purchase proposals tend to have flat or escalating capacity charges, presumably reflecting expectations that general inflation will increase the costs of constructing new facilities in the future. Sedway Consulting therefore restructured the filler's profile of capacity costs to match what is generally seen in the marketplace. This meant that the filler's first year's capacity costs were the lowest, with each year thereafter escalating at 2.5%. Figure A-1 displays the escalating capacity price profile used by Sedway Consulting as well as the traditional declining revenue requirements profile. Both profiles have the same present value.

Over the full 35 years, the restructuring of the back-fill resource's capacity costs made no difference to the present value of the facility's revenue requirements. However, in the evaluation of outside proposals that did not extend through the end of the study period, it provided a more favorable basis for such proposals' evaluation and captured the appropriate end-effects of post-2053 costs. In effect, it assumed that, following the expiration of an outside proposal's term, DEF would procure replacement power supplies at a trended price based on the advanced CC resource. In reality, if the advanced CC resource as a utility-build resource was determined to be most cost-effective at this future decision point, the declining revenue requirements profile would represent the actual annual costs that DEF's customers would likely pay.

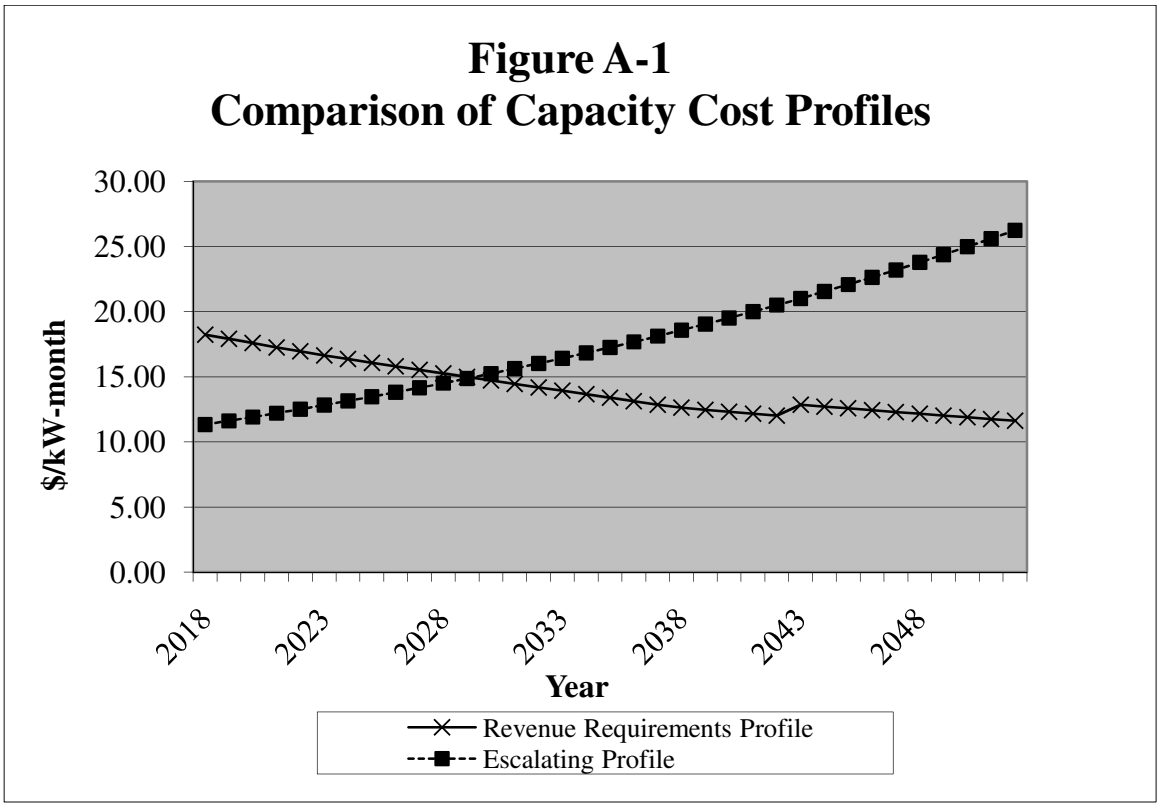
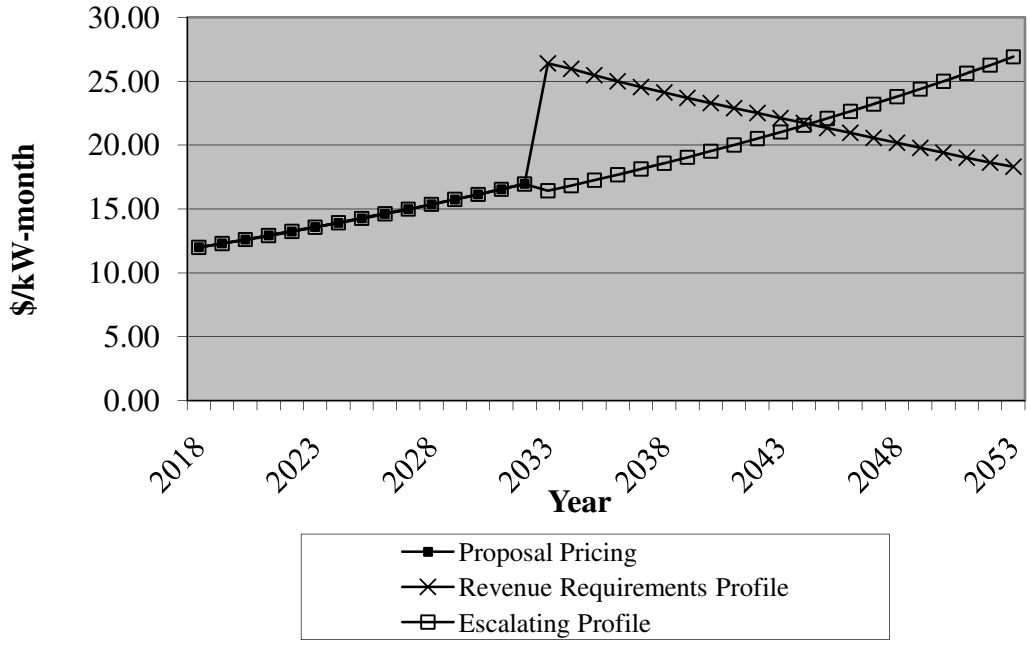


Figure A-2 depicts a comparison of the two approaches for replacing a hypothetical 15-year proposed power supply contract. The proposed contract is assumed to have a capacity charge that begins at $12/kW-month and escalates at 2.5%/year.

Relative to the declining revenue requirements methodology, the escalating filler capacity cost methodology favors the 15-year proposed power supply because it defers the most expensive years of capacity costs until beyond the end of the study period. Thus, the present value of total study-period capacity costs (i.e., power supply proposal plus filler resource) is lower under the escalating filler methodology than under the declining revenue requirements methodology. Ultimately, the use of different filler methodologies by Sedway Consulting and DEF provided added value in looking at the evaluation results from two different perspectives and ensuring that the conclusions were supported from either perspective. However, because Sedway Consulting and DEF used these different methodologies, the total net present value differences depicted in the final results were understandably different.

Figure A-2
Comparison of Filler Capacity Cost Methodologies



Proposal/Resource Cost Computation

Sedway Consulting used its own proprietary revenue requirements model to develop estimates of the annual revenue requirements for DEF' NPGU and cross-checked them with those provided by DEF. Both sets of values compared quite closely, with DEF's having a slightly higher cumulative present value of revenue requirements (CPVRR) – by approximately 1%. Because DEF's values were developed from a more detailed model, Sedway Consulting adopted DEF's annual revenue requirements for use in the RSM.

Most of the input assumptions for the proposals and other cost and operational parameters for DEF's NPGU were directly input into the RSM in a straightforward fashion from the proposal submissions. However, the following were some key additional external cost estimates that were developed outside of each proposal and input into the RSM or, in the case of the last item, calculated within the model from a combination of proposal information and DEF financial parameters:

- Firm gas transportation
- Third-party transmission costs
- DEF transmission costs
- Debt equivalence costs.

Firm gas transportation. DEF's RFP required that bidders of gas-fired projects ensure that firm gas transportation would be available for their facilities. In the RFP bid forms/spreadsheets, bidders were asked to provide information that would allow DEF to estimate the expected annual firm gas transportation (i.e., pipeline reservation) charges for each project. Sedway Consulting reviewed DEF's calculations, compared DEF's values to some of its own calculations and ultimately adopted the same or close approximations to DEF's values. Table A-2 shows the normalized average[1] annual firm gas transportation charges (on a $/kW-year basis) that were assigned to each resource/proposal, as well as the normalized CPVRR impact on each proposal's economic evaluation.

In addition to the annual firm gas pipeline reservation charges, DEF estimated fuel price adders for each project's natural gas supply, where applicable. These adders accounted for locational basis differentials and, in some cases, additional firm gas transportation variable charges. These adders resulted in slightly higher delivered gas prices for the gas-fired outside proposals and generic resources than for DEF's NPGU. Sedway Consulting performed a sensitivity whereby all applicable projects were supplied with gas at the NPGU price and found that the CPVRR impact for the outside proposals was not very significant. That impact is depicted in the final column in Table A-2.

Table A-2
Firm Gas Transportation Cost Assumptions and CPVRR Impact

Proposal/Resource	Annual Charges ($/kW-year)	Reservation Charge CPVRR Impact ($/kW)	Fuel Price Adder CPVRR Impact ($/kW)
Proposal A	47	442	39
Proposal B	0	0	0
Proposal C1	59	461	63
Proposal D1	113	1120	40
Proposal E1	114	1123	38
Proposal F	122	1158	38
NPGU	97	1086	0
Side-Fill-May	72	786	104
Side-Fill-Dec	72	755	101
Back-Fill (2040)	75	149	28

[1] For some resources, the annual charges were the same in all years; in other cases, the annual charges stepped up at certain points in time; in those instances, Table A-2 depicts the average value over the term of the proposal.

Third-party transmission costs. For resources outside of DEF's territory, bidders had to identify in their proposals any firm transmission wheeling charges (e.g., for point-to-point transmission service) that would be incurred and passed on to DEF. Table A-3 depicts the assumptions that were provided by the bidders and verified by the evaluation team. Wheeling charges were assumed to remain flat over the duration of the transaction; this was likely to be a conservative assumption.

Table A-3
Transmission Wheeling Cost Assumptions and CPVRR Impact

Resource/Proposal	Annual Wheeling Charges ($M/year)	CPVRR Impact ($M)
Proposal A	0	0
Proposal B	0	0
Proposal C	0	0
Proposal D	3.1	37
Proposal E	0	0
Proposal F	2.5	23
NPGU	0	0

DEF transmission costs. With the addition of new generation to a utility system, portions of the utility's transmission grid may need to be reinforced. This can entail the construction of new circuits or the reconductoring and upgrading of existing transmission lines. For proposals that were outside of DEF's transmission system, bidders were responsible for including the costs of such network upgrades to the other transmission provider's system in their bid pricing. However, with regard to DEF's transmission system, any proposal for generation supplies – whether located within or outside of DEF's system – might trigger the need for DEF network upgrades. Estimates of such investments were calculated by DEF's transmission department for specific portfolios of potential resources. Sedway Consulting extracted information from these portfolio transmission estimates and assigned specific portions of the transmission costs to individual proposals. This allowed for an approximation of each proposal's stand-alone costs. However, a portfolio's transmission cost estimate is dependent upon the composition of that portfolio (e.g., size and electrical location of each resource) and cannot necessarily be dissected and isolated to specific proposals or resources. Thus, on an individual project basis, these segmented estimates were entirely Sedway Consulting's decisions and were not supported by DEF's transmission department's analysis. That said, when proposals were recombined back into the studied transmission portfolios, Sedway Consulting ensured that the correct total transmission costs for the portfolio were used. In instances where Sedway Consulting developed a portfolio that had not been studied by DEF's transmission department, the Sedway Consulting results are obviously an approximation based on the dissection process and do not reflect actual study results.

Table A-4 provides the proposal-specific transmission capital estimate derived and used by Sedway Consulting in its stand-alone analysis, as well as the $/kW CPVRR impact on each proposal's economic evaluation.

Table A-4
DEF Network Upgrade Assumptions and CPVRR Impact

Resource/Proposal	Network Upgrades ($M)	CPVRR Impact ($M)
Proposal A	90	96
Proposal B	0	0
Proposal C1	95	83
Proposal D1	54	59
Proposal E1	54	59
Proposal F	54	57
NPGU	40	N/A[1]
Side-Fill-May	30	37
Side-Fill-Dec	30	36
Back-Fill (2040)	30	9

[1]Included in base revenue requirements for NPGU.

Sedway Consulting employed a different methodology than DEF for converting network upgrade capital cost estimates into cost impacts. Sedway Consulting calculated levelized annual transmission revenue requirements[2] for the applicable investment and applied those annual costs only during the term of the PPA (or economic life of the asset in the case of owned generation options). DEF developed revenue requirements from the transmission investment estimates and applied them for all years of the study period for all bids. Neither approach was right or wrong; each was based on slightly different but defensible end-effects assumptions. In any case, the two approaches did not result in significant CPVRR differences in portfolio transmission costs.

Debt Equivalence Costs. Rating agencies view some portion of a utility's capacity payment obligations to a power provider as the equivalent of debt on the utility's balance sheet. If a utility does not rebalance its capital structure by issuing stock, this debt equivalent can negatively impact a utility's financial ratios and cause rating agencies to downgrade their opinion of the utility's creditworthiness. This can increase the utility's cost of borrowing.

Sedway Consulting estimated for each PPA proposal the costs for DEF to rebalance its capital structure if it were to enter into the PPA. This estimate was referred to as a debt equivalence "equity adjustment" because it reflected the present value of the incremental

[2] Assuming a 40-year transmission asset life.

cost of the additional equity that DEF would need to raise to preserve the integrity of its balance sheet. Table A-5 depicts the net present value of the debt equivalence/equity adjustment for all of the proposals.

Table A-5
CPVRR Impact of Debt Equivalence/Equity Adjustment
($M)

Resource/Proposal	CPVRR Impact ($M)
Proposal A	87
Proposal B	9
Proposal C1	68
Proposal C2	98
Proposal D1	17
Proposal D2	18
Proposal D3	0
Proposal E1	15
Proposal E2	15
Proposal E3	0
Proposal F	13

Side-Fill Resource – Portfolio Cost Computation

In Sedway Consulting's analysis, projects were initially evaluated on a stand-alone basis rather than in the context of a long-term generation expansion plan, as was the case with DEF's detailed model. In its final analysis, Sedway Consulting accounted for the different capacity of each resource by developing portfolios of resources (i.e., combinations of bids and generic resource additions) that all were equivalent in size to DEF's NPGU. The proposed NPGU is expected to provide 820 MW (summer capacity) in May, 2018, and another 820 MW by December, 2018, for a total first-year capacity of 1,640 MW. Thereafter, the facility's capacity is expected to experience degradation and average approximately 1,617 MW over its life. Thus, Sedway Consulting developed portfolios that were all 1,617 MW in size, with 820 MW coming on-line in May, 2018, and the remaining 797 MW coming on-line in December, 2018. These portfolios were developed by adding "side-fill" generic resources that were sized to exactly fill out the portfolio capacity. Thus, although these costs were developed from estimates for a 793 MW generic CC, they were smoothly scaled to other capacities.

Using the costs and expected energy benefits of a generic current-technology CC, Sedway Consulting derived a net cost of $9.09/kW-month for the May, 2018 side-fill resource and $8.83/kW-month for the December, 2018 side-fill resource.

The inclusion of side-fill resources in the RSM results placed those results on a more comparable footing with the DEF detailed production costing and generation expansion results. DEF used specific generic CCs and CTs as side-fill resources to develop portfolios that were roughly equal to the NPGU.

RSM Evaluation Results

Table A-6 depicts a ranking of all of the resources that were modeled: outside proposals, NPGU, and generic back-fill and side-fill options. The ranking is based on each resource's levelized and normalized $/kW-month net cost.

There are five important things to note in reviewing the RSM ranking. First, the results are based on a stand-alone analysis, are normalized for the size of each resource, and therefore, at this stage, do not match the capacity of DEF's NPGU (except of course for the NPGU itself). Total portfolio effects and cost comparisons are addressed later.

Second, all of the resources have positive net costs because all of them have fixed costs that exceed their benefits. Thus, absent a reliability need, it would not make economic sense for DEF to select any of the resources.

Third, as evidenced by its position near the top of the ranking (in second place), the "Back-Fill" resource was one of the most cost-effective resources modeled – in fact, more cost-effective than DEF's NPGU. Thus, every proposal was provided with the benefits of being back-filled with a very economic resource. All of the proposal results in Table A-6 include the effect of the back-fill resource, with its costs and benefits blended into the depicted levelized net costs. Sedway Consulting believes that this was a generous assumption but an appropriate one. The back-fill resource bolstered the economics of virtually all of the proposals and reflected the possibility that DEF could acquire more advanced technology (than the NPGU) in the future if it were able to satisfy its interim needs with the proposals.

Fourth, all outside proposals – with the exception of Proposal B – were less economic (even with the back-fill resource's beneficial effects) than DEF's NPGU.

Fifth, the table includes May and December pairs of side fill combustion turbine ("CT," i.e., simple-cycle peakers) and CC resources, with the CC resources higher ranked and more cost-effective than the CT resources. DEF and Sedway Consulting discussed this and noted that if a portfolio with side-fill CCs was selected as the best portfolio, that would invariably trigger another RFP through the Florida Bid Rule. Using the side-fill CTs would not have that result. Ultimately, Sedway Consulting decided to use the best side-fill resources to give outside proposals the most cost-effective portfolio partners but recognized that additional scenarios with the side-fill CTs might be warranted if the best portfolio was likely to trigger another RFP. In fact, a single sensitivity using side-fill CTs for the top competing portfolio increased that portfolio's CPVRR by $90 million.

REDACTED

Table A-6
Ranking of Proposals/Resources
(Cost and Benefit Components of Levelized Net Cost)

Proposal/Resource	First-Year Capacity (MW)	Start Date	Capacity & Fixed O&M Cost ($/kW-month)	Firm Gas Transp. Cost ($/kW-month)	Transx Cost ($/kW-month)	Debt Equiv. Cost ($/kW-month)	Total Cost ($/kW-month)	Energy Benefits ($/kW-month)	Levelized Net Cost ($/kW-month)
Proposal B	[redacted]	5/1/18	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Back-Fill	793	Varies	9.23	5.60	0.35	0.00	15.18	10.03	5.14
DEF Citrus County	1,640	5/1/18	8.64	8.41	0.00[1]	0.00	17.04	9.47	7.57
Side-Fill – CC Dec	793	12/1/18	9.10	5.84	0.35	0.00	15.29	6.46	8.83
Proposal A	[redacted]	5/1/18	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Side-Fill – CC May	793	5/1/18	9.23	5.84	0.35	0.00	15.42	6.33	9.09
Side-Fill – CT Dec	187	12/1/18	4.48	6.02	0.49	0.00	10.99	1.47	9.52
Side-Fill – CT May	187	5/1/18	4.55	6.02	0.49	0.00	11.05	1.43	9.62
Proposal C1	[redacted]	5/1/18	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Proposal C2	[redacted]	5/1/18	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Proposal D1	[redacted]	5/1/18	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Proposal E1	[redacted]	5/1/18	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Proposal F	[redacted]	1/1/19	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Proposal E2	[redacted]	5/1/15	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Proposal D3	[redacted]	1/1/15	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Proposal E3	[redacted]	1/1/15	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Proposal D2	[redacted]	5/1/15	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

[1] NPGU transmission costs are included in the capacity cost value.

Portfolio Analysis

Based on the RSM results from the stand-alone analysis, Sedway Consulting developed portfolios of proposals and side-fill generic CC resources that amounted to 820 MW in May 2018 and an additional 797 MW in December 2018. This was accomplished with the "Side-Fill – CC May" and "Side-Fill – CC Dec" resources in Table A-6, where the size and associated net costs (i.e., CPVRR over the study period) for these resources were scaled to fill out each portfolio to the 820 MW May and 797 MW December capacity levels in 2018.

Based on this analysis, Sedway Consulting found that DEF's NPGU single-resource portfolio was the least-cost option. Table A-7 depicts the top portfolios and their fixed costs, energy benefits, net costs, and the differences in the net costs relative to that of DEF's NPGU. Each portfolio's net cost is equal to the portfolio's fixed costs minus the portfolio's energy benefits. As described above, the fixed costs include all capacity-related costs (e.g., PPA capacity payments, revenue requirements, fixed O&M costs, firm gas transportation costs, transmission-related costs, and debt equivalence). The energy benefits represent the portfolio's production cost savings relative to the 15,000 heat rate reference resource. The portfolios in the table include the best proposal from each proposed resource, in addition to the best combinations of proposals.

Table A-7
Portfolio Net Costs
($M, $CPVRR_{2014}$)

	Proposal/Portfolio	Fixed Costs	Energy Benefits	Net Cost	Difference from NPGU
1	DEF NPGU	3,611	2,006	1,604	0
2	Proposals A & B	3,311	1,424	1,887	282
3	Proposal B	3,305	1,414	1,890	286
4	Proposal A	3,282	1,373	1,908	304
5	Proposal E1	3,365	1,332	2,033	429
6	Proposal F	3,371	1,329	2,042	438
7	Proposals A, B & C1	3,651	1,607	2,044	440
8	Proposals A & C1	3,610	1,554	2,056	452
9	Proposal D1	3,388	1,326	2,062	458
10	Proposal C1	3,650	1,544	2,106	502
11	Proposals A, D1, E1 & F	3,400	1,270	2,130	526
12	Proposals A, B, C1, D1, E1 & F	3,759	1,502	2,257	653
13	Proposals B, C1, D1, E1 & F	3,790	1,491	2,299	694
14	Proposals D1, E1 & F	3,573	1,260	2,313	709

As noted earlier, all of the proposal portfolios (i.e., Portfolios 2 through 14) included side-fill resources as supplements to the proposals listed in the Proposal/Portfolio column to fill out the size of the portfolio so that each portfolio would be roughly equivalent to the 1,617 MW long-run average capacity of DEF's NPGU. Thus, the information in Table A-7 includes the costs and benefits of appropriately-sized side-fill resources.

On a net present value basis, the NPGU was found to be $282 million less expensive than the next lowest-cost portfolio of alternatives. Sedway Consulting believes that this is a conservative cost differential because of the conservative nature of the analysis, as discussed earlier (e.g., the analytic methodologies that favored PPAs).

Conclusions

Sedway Consulting performed an independent evaluation of DEF's NPGU relative to the responses to DEF's 2018 RFP and concluded that the NPGU represents the lowest-cost resource for meeting DEF's 2018 resource need. The NPGU was found to be $282 million less expensive on a CPVRR basis than the next cheapest portfolio of alternatives.