PUBLIC

STATE OF NEW JERSEY
BOARD OF PUBLIC UTILITIES

In the Matter of the Petition of Nautilus Offshore Wind, LLC for the Approval of the State Waters Wind Project and Authorizing Offshore Wind Renewable Energy Certificates	)	**BPU Docket No. QO18080843**

SURREBUTTAL TESTIMONY OF DAVID E. DISMUKES, PH.D.
ON BEHALF OF THE
DIVISION OF RATE COUNSEL

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I. INTRODUCTION AND QUALIFICATIONS

Q. WOULD YOU PLEASE STATE YOUR NAME AND BUSINESS ADDRESS?

A. My name is David E. Dismukes. My business address is 5800 One Perkins Place Drive, Suite 5-F, Baton Rouge, Louisiana, 70808. I am the same person that prepared and pre-filed direct expert testimony on behalf of the New Jersey Division of Rate Counsel ("Rate Counsel") on October 2, 2018.

Q. WHAT IS THE PURPOSE OF YOUR SURREBUTTAL TESTIMONY?

A. The purpose of my surrebuttal testimony is to respond to some of the arguments made in the rebuttal testimony provided by Mr. Steven Gabel on behalf of Nautilus Offshore Wind, LCC ("Nautilus" or "the Company"). I will also provide an updated net benefits analysis based on the revised Offshore Wind Renewable Energy Certificate ("OREC") pricing proposal provided in the rebuttal testimony of Mr. Christopher Wissemann. My failure to directly respond to each and every specific issue raised in the Company's rebuttal does not suggest in any way that I agree with those positions. Rather, not addressing many of these issues, in large part, is based upon my belief that the Company's rebuttal arguments are simply duplicative of their direct testimony and original filing in this matter. For instance, Mr. Gabel's rebuttal testimony again goes to great lengths to make an argument as to why his inflated carbon values should be used in this proceeding. Mr. Gabel also attempts to suggest that both the Governor's and the Board's energy policies support

the use of these inflated values. These proposed carbon values, however, unnecessarily transfer a considerable amount of environmental performance risk away from the proposed project and onto New Jersey ratepayers. My opinions, and the support for these opinions, referencing prior Board Orders, as well as other authoritative sources, were clearly articulated in my direct testimony have not changed as result of Mr. Gabel's rebuttal testimony.

Q. DOES THE REVISED NET BENEFIT ANALYSES PROVIDED BY THE COMPANY SUFFER FROM SOME OF THE SAME "BIG PICTURE" ISSUES THAT YOU RAISED IN YOUR DIRECT TESTIMONY?

A. Yes. I noted in my direct testimony that a fundamental question the Board needs to ask in this proceeding is whether the Company's net benefit tests passes any kind of "reasonableness test" in terms of its results. The revised net benefit analyses provided in the Company's rebuttal testimony suffers from the same problems as those I identified in my direct testimony. It is difficult to accept that a project with unit costs that are [redacted] the prevailing cost estimates for offshore wind ("OSW") projects in the U.S. and Europe will result in any form of net benefits to New Jersey ratepayers. The Company's net benefit results continue to defy any form of "reasonableness test" and, as I noted in my direct testimony, these net benefit results (both in the Company's direct and rebuttal) are based upon a wildly different set of economic assumptions and data than what was used during the earlier incarnation of this project just a few years ago: this fact is incontrovertible and was not addressed in the Company's rebuttal testimony.

Q. PLEASE SUMMARIZE YOUR SURREBUTTAL TESTIMONY.

A. I continue to recommend that the Board not approve the Nautilus project and reject its revised OREC plan (as provided in Mr. Wissemann's rebuttal) since neither are in the public

interest and they do not meet the statutory requirements of the Offshore Wind Economic Development Act ("OWEDA") as they have been proposed. The proposed Nautilus project, and its proposed OREC plan, do not produce a net economic benefit to New Jersey ratepayers and should be rejected by the Board.

II. THE COMPANY'S REVISED CARBON VALUATION ANALYSIS

Q. DID THE COMPANY PROVIDE A REVISED CARBON ANALYSIS IN ITS REBUTTAL TESTIMONY?

A. Yes. The Company provided a revised carbon valuation analysis based upon what it references as "further review."[1] According to Mr. Gabel, the Company's prior carbon valuation estimates included a spreadsheet error in calculating the average of what Mr. Gabel references as "four separate cases" that were included in a study published by the U.S. Government Interagency Working Group on Social Cost of Carbon (hereafter "Interagency Report"). The Company's analysis was based only on the three higher cases in the technical update to this report, not all four "cases."

Q DO YOU AGREE WITH THE ASSERTION THAT THIS INTERAGENCY REPORT PROVIDED FOUR SEPARATE "CASES?"

A. No, the Company misrepresents the nature of this analysis and what was provided in the report. The Interagency Report provides one analysis using **four separate discount rates** to represent the differing opportunity cost of a fixed set of carbon emission values in any given time period. While it may be appropriate to look at differing assumptions regarding differing emission unit values over time (i.e., cost/value per ton), averaging empirical outcomes over different discount rates is simply not appropriate and is inconsistent with standard cost-benefit analysis

[1] Rebuttal Testimony of Steven Gabel, page 8, lines 9-10.

("CBA") practice. Discount rates are intended to represent unique opportunity costs and risks and should be considered on an independent basis. For instance, four percent is commonly used as a standard "rule of thumb" societal discount rate for many CBA purposes. It would not be acceptable, nor in keeping with standard CBA practices to average a societal rate with a private discount rate (for instance, something in the order of eight percent) since doing so would not ensure the coherence, compatibility, and comparability of the resulting "averages." The Board should reject such an approach that is incorrect and inconsistent with standard CBA practices.

Q. PLEASE REMIND THE BOARD HOW YOU DEVELOPED YOUR ALTERNATIVE CARBON VALUATION RECOMMENDATION.

A. My alternative recommendation uses a value included in the Office of Clean Energy Report developed by the Rutgers Center for Energy, Economic and Environmental Policy ('CEEEP"). This report is used for energy efficiency program cost-effectiveness purposes and includes recommended emissions valuations, energy prices, capacity prices, and discount rate. The CEEEP Report uses a carbon valuation that is based on the second lowest discount rate provided in the table (three percent). This is the same valuation I recommended as an alternative for measuring the carbon emissions mitigation benefits of the Nautilus project. This value is the one that represents the central tendency in terms of the distribution of benefits included in the Interagency Report, as I have shown more clearly on Schedule DED-SR-1. Thus, it is a reasonable alternative to use for carbon valuation relative to what was offered by the Company since it is a measure of central tendency itself, and thus, does not need to be averaged even further, as incorrectly asserted by Mr. Gabel in his rebuttal testimony. To do so simply misrepresents the fundamental results of the study and would be inconsistent with CBA standards.

Q. PLEASE CLARIFY WHETHER YOU BELIEVE THESE CARBON VALUES SHOULD BE INCLUDED?

A. No, I do not believe these additional societal costs should be included in this analysis for the numerous reasons I identified in my direct testimony. There are many rationales and prior Board precedents to exclude these societal values since New Jersey will be part of a regional greenhouse gas accord which seeks to "internalize" the costs of these carbon emissions through market-based mechanisms. To include such values in this proceeding simply double counts the potential carbon mitigation value of this project.

Q. HAS THE BOARD RECENTLY ISSUED ANY GUIDANCE DOCUMENTS AS PART OF ITS RECENT OSW SOLICITATION NOTICE?

A Yes. On September 17, 2018, the Board issued an order in response to the Governor's Executive Order 8 opening an application window for the solicitation of 1,100 MW of OSW capacity.[2] The application window has been designed to allow OSW project developers to submit applications consistent with the requirements established under OWEDA, and in compliance with the rules at N.J.A.C. 14:8-6 that outline the application process and specific requirements for an offshore wind project to be deemed eligible by the Board to receive state subsidies in the form of ORECs. The Board order included a "Guidance Document" that was designed to provide standardized direction for developers interested in submitting OSW applications before the Board.

Q. DID THESE GUIDANCE DOCUMENTS INCLUDE ANY "BASELINE" ASSUMPTIONS THAT OSW PROJECTS WERE EXPECTED TO USE FOR PROJECT PROPOSAL AND BIDDING PURPOSES?

[2] BPU Docket No. QO18080851, September 17, 2018.

A. Yes. The Guidance Document included a technical appendix entitled "Standardized Inputs for Cost-Benefit Analysis." These standardized inputs included energy prices, capacity prices, Class 1 REC prices and a standardized discount rate of seven percent that should be used in all OSW applications before the Board. This appendix is included as Schedule DED-SR-2.

Q. DID THESE GUIDANCE DOCUMENTS INCLUDE ANY UNDERLYING CARBON VALUATION ASSUMPTIONS OR ANY OTHER STANDARDIZED ASSUMPTIONS ABOUT AIR EMISSIONS UNIT VALUES?

A. No. The guidance document did not include any standardized carbon values (market or "societal") nor did it include any other standardized per unit emissions values on either a market or societal basis. The absence of these values, at least on its face, suggests that there are no Board "certified" or "acknowledged" or "recommended" societal values that will be required to be used, for any air pollutant, for OSW project evaluation purposes contrary to Mr. Gabel's assertions.

III. ENERGY, CAPACITY AND CLASS 1 REC PRICES

Q. DO YOU AGREE WITH THE COMPANY'S ASSERTIONS THAT YOUR ENERGY PRICE FORECAST PROPOSALS, BASED UPON THE CEEEP REPORT, ARE UNREASONABLE FOR NET BENEFIT PURPOSES?

A. No. As I noted in my direct testimony, I used the CEEEP Report since it is a well-known, documented, and transparent source and has been updated and used over the past decade by both the Board and the Office of Clean Energy ("OCE") in the evaluation of over $288 million in energy efficiency programs. The AURORA model, instead, is a black-box proprietary model that is difficult to use in proceedings of this nature.

Q. DO YOU AGREE WITH THE COMPANY'S ASSERTION THAT THE AURORA MODEL HAS BEEN "ACCEPTED FOR USE BY THE STATE OF NEW JERSEY?"

A No. I have not been able to corroborate any instance where the Board has formally "accepted" or "approved" the use of the AURORA model. As I noted in a discovery response to the Company, I am not aware of any Board finding of fact or conclusions of law that the AURORA model is an "accepted method of forecasting energy prices" as asserted by the Petitioner.[3] Interestingly, the Company provides no citation to any order in which the Board has purportedly accepted this modelling platform. The only instance that I know of where this modeling platform was used was in a recent New Jersey Natural Gas Company proceeding which ultimately settled.[4] There was no agreement among the parties nor separate findings of fact in the settlement that the AURORA modeling platform was acceptable or approved in forecasting any form of energy prices.

Q. DID THE BOARD USE THE AURORA MODEL IN DEVELOPING ITS STANDARDIZED INPUTS IN ITS GUIDANCE DOCUMENTS?

A No, that does not appear to be the case, and the standardized energy prices that are provided in the Guidance Documents are very comparable to the CEEEP Report energy prices, not those assumed by the Company. Schedule DED-SR-3 provides a comparison of the estimated energy revenue benefit using the AURORA prices developed by the Company, and those recommended by the CEEEP Report as well as the Board's current OSW Guidance Document. The chart is pretty clear in showing the outlier in the three estimates (which is the Company's proposed energy price estimates).

Q. WAS THE AURORA MODEL USED BY FISHERMAN'S ENERGY IN ITS LAST APPLICATION BEFORE THE BOARD?

[3] Rate Counsel Response to Nautilus Discovery Request NOW-RC-14.
[4] BPU Docket No. GO18030355

A No. Interestingly, the webpage associated with the firm that developed and licenses the AURORA model (EPIS, LLC) appears to have been in business, and providing its product and support services since 1997.[5] Yet, this purportedly "fundamental based model" was not used in the last Fishermen's Energy application. In that filing, Fishermen's used a more transparent and publicly-available energy forecast developed by the U.S. Energy Information Administration as part of its Annual Energy Outlook ("AEO"). The switch to this alternative software and modeling platform, therefore, is suspect, particularly since it is: (a) inconsistent with the model used in the past proceeding, (b) inconsistent with the Board's Guidance Documents, and (c) appears to result in the tilting of the overall net benefit results in a direction that is inconsistent with common sense.

Q. DO YOU AGREE WITH THE COMPANY'S CRITICISMS OF YOUR CAPACITY PRICE FORECASTS?

A. No. I disagree with many of the Company's assertions for many of the same reasons I discussed earlier. The Company's proposals are selective and have the tendency to overstate project benefits and shift the risk of capacity price shortfalls onto ratepayers. Admittedly, however, the differences between the capacity prices I proposed in my direct testimony and the ones used by the Company, are not significantly different.

Q. DO AGREE WITH MR. GABEL'S ASSERTION THAT THERE WAS A DATA TRANSFORMATION ERROR IN YOUR CAPACITY PRICES?

A Yes, Schedule DED-SR-4 provides a revised analysis and compares that with my original analysis and the Company's analysis. This correction does increase my estimated capacity revenues which account for [redacted] of the Company's estimated total project benefits.

[5] See EPIS, LLC, http://epis.com/company/; and http://epis.com/xmp_in_action/real_examples.php.

Q. HAVE YOU COMPARED YOUR RECOMMENDED CLASS 1 REC REVENUES TO THOSE INCLUDED IN THE BOARD'S GUIDANCE DOCUMENTS?

A. Yes, Schedule DED-SR-5 provides a comparison using the estimated Class 1 REC revenues that would arise using the assumptions included in the Board's OSW Guidance Documents. The Board's assumed Class 1 REC revenues are higher than those assumed in the CEEEP Report (and my original recommendations) but are substantially lower than those estimated/assumed by the Company.

Q. HAVE YOU CONDUCTED A COMPARISON OF THE NET BENEFITS ANALYSIS RESULTS USING INPUTS FROM THE BOARD'S GUIDANCE DOCUMENTS, THE CEEEP REPORT, AND THE COMPANY'S FILING?

A Yes and that analysis has been provided on Schedule DED-SR-6. The schedule clearly shows that the Company's proposal, even under its revised OREC pricing schedule provided by Mr. Wissemann, fails to generate net benefits.

Q. SHOULD THE BOARD EVALUATE THIS PROJECT USING THE INPUTS IN ITS SOLICITATION DOCUMENTS?

A Yes. I am concerned about the policy implications and the perceived competitiveness of the OSW bidding process if the Board were to use inputs for the Nautilus project that differed significantly from the guidance it is providing to developers in the general 1,100 MW solicitation. When I originally prepared my direct testimony in this matter, my goal was to use a set of standard inputs that were readily available, transparent, and less debatable than the development of an independent set of estimates/assumptions. Hence, the rationale for recommending the use of the inputs included in the CEEEP Report (energy prices, capacity prices, Class 1 REC prices, and discount rates). I was unaware, at the time of preparing my direct testimony, that the solicitation

notice issued by the Board included these standardized assumptions. I am concerned, at this point in the proceeding, that the Nautilus project may obtain an unfair and potentially uncompetitive advantage if it were permitted to rely upon net benefit modeling inputs that differ substantially from what will be expected of other OSW developers. Further, the Board could be undermining its own goals of using a set of standardized inputs for OSW project evaluation if it fails to apply them to the application at hand. Developers making offers in the general solicitation may have little incentive, or may provide a host of alternative analyses, with differing input assumptions, should the Board choose to set a precedent in this proceeding that deviates from the expectations in the general solicitation.

IV. VOLATILITY

Q. DO YOU AGREE WITH THE COMPANY'S REBUTTAL POSITIONS REGARDING ITS VOLATILITY ESTIMATES?

A. No, and I have prepared an analysis that maps out my disagreement with the Company in Schedule DED-SR-7. In summary, the Company's volatility analysis relies on studies that were completed by Synapse Energy Economics (collectively, "Synapse studies") in a number of Net Metering proceedings across the country. The Synapse studies, in turn, utilize a methodology defined by a 2008 Navigant Consulting Report entitled "Photovoltaics Value Analysis." The analysis included in my direct testimony, as shown on page 3 of Schedule DED-SR-7, is the same exact methodology used in the original Navigant study cited by Synapse. The only difference is that my direct testimony utilized contemporaneous data relevant to New Jersey markets, not market data from places as far away as Mississippi.

Q. CAN RENEWABLES POTENTIALLY PROVIDE ANY HEDGE VALUE?

A. Yes, but the value of the hedge is dependent upon the contract price since the contract price can avoid "super-spikes" in wholesale power prices. Yet the only way a renewable resource can provide a volatility "hedge" is if: (a) there is a reasonable opportunity of seeing a large number of "super-spikes" in wholesale power prices; and (b) the hedge itself is not incredible costly. Unfortunately, both of these conditions will fail to materialize under the Company's proposal since: (a) recent power prices over the past several years have not been subject to the high natural gas price-induced super-spikes of the past; and (b) the very high OREC "hedge" price. I have provided an example of this in Schedule DED-SR-8. This maps the Company's proposed OREC price to pricing data for 2014, the year of the polar vortex, and arguably, one of the more volatile pricing periods over the past several years. The OREC price does provide some price hedge, but that hedge is exceptionally limited given the infrequency of the spikes and the high OREC "hedge" price.

V. OTHER ISSUES

Q. DO YOU HAVE ANY OTHER CONCERNS ABOUT THE COMPANY'S REBUTTAL?

A Yes. The Company notes that its price volatility estimates will create a "flip" in financial interests, from a ratepayer perspective, relative to wholesale electricity market prices.[6] The discussion seems to suggest that the proposed Nautilus OSW project, from a financial perspective, is nothing more than a contract for differences ("CFD"), albeit a relatively pricey CFD, designed to influence the effective wholesale power prices paid by New Jersey retail ratepayers. The implication of Mr. Gabel's rebuttal assertion, coupled with the merit order dispatch benefits included in the Company's net benefit analysis, is that, if approved, New Jersey ratepayers will

[6] Direct Testimony of Steven Gabel, page 16, lines 12-14.

benefit from an OSW project that is able to influence regional power markets (through shifts in dispatch and pricing volatility) and wholesale electricity price outcomes. This raises important federal-state jurisdictional issues that could be challenged at a later date. Consider, for instance, that in 2011, the Maryland Public Service Commission approved an agreement with Competitive Power Ventures ("CPV") that had a CFD-type relationship comparable to the one being suggested by Mr. Gabel. While I am not offering a legal opinion, it is my understanding, from a policy perspective, that the U.S. Supreme Court ultimately ruled against Maryland's approval of this agreement stating it had overstepped and interfered with the FERC's exclusive rights over wholesale rates.[7] If the Board approves an OSW project based upon similar benefits, it could be falling into the same problem.

Q. HAVE YOU EXAMINED THE NAUTILUS PROJECT'S NET BENEFITS WITHOUT THESE MERIT ORDER OR VOLATILITY BENEFITS?

A Yes, and the results of that analysis are provided in Schedule DED-SR-9. The results show that the project does not pass the net benefits test if these questionable, potentially market-influencing benefits are excluded.

Q. DO THE BOARD'S GUIDANCE DOCUMENTS INCLUDE STANDARDIZED INPUTS FOR MERIT ORDER OR VOLATILITY BENEFITS?

A No, and these benefits are not mentioned in any direct fashion in those documents. If the Board were to accept these as legitimate benefits for project approval in this proceeding, but fail

[7] : *Hughes v. Talen Energy Mktg*., 578 U.S. Also see: Walton, R. 2016. What the Hughes v. Talen Supreme Court decision means for state power incentives. Utility Dive. Available at: https://www.utilitydive.com/news/what-the-hughes-v-talen-supreme-court-decision-means-for-state-power-incen/418046/; Cicale, N and K. Osborne. 2016. U.S. Supreme Court blasts Maryland for distorting PJM's capacity market. FERC Blog. Available at: http://www.fercblog.com/2016/04/19/u-s-supreme-court-blasts-maryland-distorting-pjm-capacity-market/; and Farmer, M. 2016. Why the Supreme Court's decision in Hughes is good for clean energy. NRDC. Available at: https://www.nrdc.org/experts/miles-farmer/why-supreme-courts-decision-hughes-good-clean-energy.

to consider them for projects in the general solicitation, it runs the risk of affording the Nautilus project an unfair and uncompetitive advantage.

VI. CONCLUSIONS AND RECOMMENDATIONS

Q PLEASE SUMMARIZE YOUR RECOMMENDATIONS.

A. I continue to recommend that the Board not approve the Nautilus project and reject its revised OREC plan since neither are in the public interest and do not meet the statutory requirements of the OWEDA as they have been currently proposed. The proposed Nautilus project, and its proposed OREC plan, do not produce a net economic benefit to New Jersey ratepayers and should be rejected by the Board.

Q. DOES THIS CONCLUDE YOUR SURREBUTTAL TESTIMONY FILED ON NOVEMBER 20, 2018?

A. Yes.

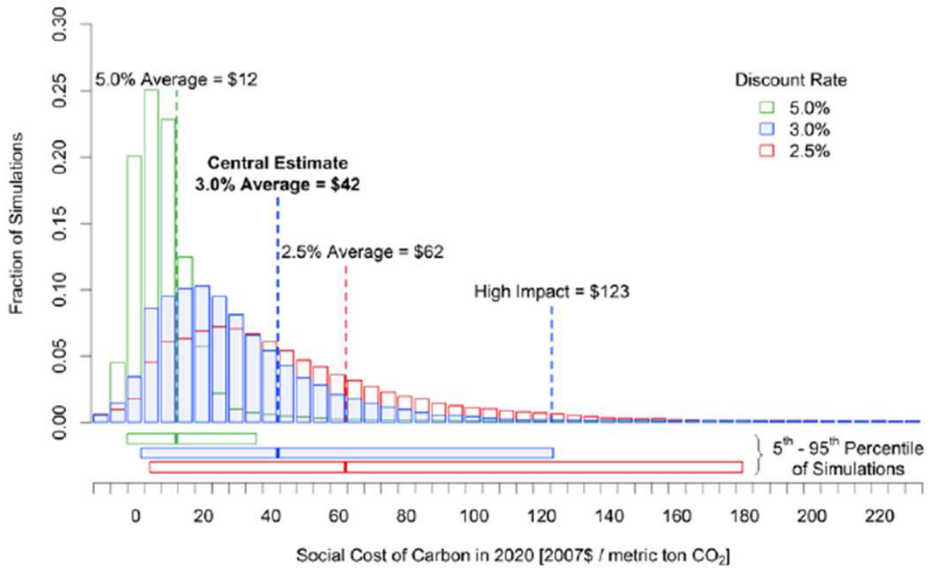
Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866

Nautilus further criticizes Rutgers Center for Energy, Economic, and Environmental Policy's ("CEEEP") use of the second-lowest IWGSCC's estimate. (Gabel Rebuttal 8:3-7)

Table ES-1: Social Cost of CO_2, 2010 – 2050 (in 2007 dollars per metric ton of CO_2)

Year	5% Average	3% **Average**	2.5% Average	High Impact (95th Pct at 3%)
2010	10	**31**	50	86
2015	11	**36**	56	105
2020	12	**42**	62	123
2025	14	**46**	68	138
2030	16	**50**	73	152
2035	18	**55**	78	168
2040	21	**60**	84	183
2045	23	**64**	89	197
2050	26	**69**	95	212

Figure ES-1: Frequency Distribution of SC-CO_2 Estimates for 2020[3]



This represents a fundamental mis-understanding of the IWGSCC's work. It did not identify "four separate cases for CO2 emissions," but rather **ONE** single case evaluated under three different discount rates, and a fourth estimate representing a 95 percent confidence estimate. The "second-lowest" IWGSCC's estimate represents the Central Estimate of the analysis under the federal government's primary social discount rate of 3 percent.

Source: Technical Support Documents: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866 (August 2016), Interagency Working Group on Social Cost of Greenhouse Gases at 3 and 4.

GUIDELINES FOR APPLICATION SUBMISSION FOR PROPOSED OFFSHORE WIND FACILITIES

New Jersey Board of Public Utilities
44 S Clinton Ave, Trenton, NJ

September 17, 2018

Attachment Seven: Standard Inputs for Cost-Benefit Analysis

STANDARDIZED INPUTS FOR COST-BENEFIT ANALYSIS

This document describes the background and creation of standardized inputs for applicants to use in applying to sell Offshore Wind RECs (ORECs) to the State. These inputs and methods apply specifically to the cost-benefit analysis that all bidders must submit under N.J.A.C 14:8-6.5.(a).(11).

The goal of these inputs is to provide a common set of methods and assumptions for applicants so that evaluators may review projects on a comparable basis. While the cost-benefit analysis must use these inputs, **bidders may still provide alternative valuations using inputs they feel are reasonable.** Any such analyses should be supported by a detailed description of what was done and work papers that would allow evaluators to reproduce any such analyses.

The price projections are included at the end of this document and will also be available as a separate file on the procurement website.

Energy Revenues

Energy revenues represent a significant but uncertain source of revenue for the project. The process used to create these price estimates is explained below.

- To create an energy price estimate we start with the cost of peak monthly energy futures at PJM's Western Hub from the NYMEX/Clearport exchange.[1] These quotes go out through the end of 2021. The prices for that year (as of August 24, 2018) are shown in Table One below.

- To create monthly off-peak prices we multiply the monthly prices times a historic ratio of on-peak to off-peak prices. The ratio is taken from the New Jersey Electric Distribution Company (EDC) retail rate impact models, posted on the New Jersey Basic Generation Service (BGS) Auction website.[2] These are public and calculated by each EDC based on three years of historical data. These are also shown in the table below, specifically for PSE&G.

[1] https://www.cmegroup.com/trading/energy/electricity/pjm-western-hub-peak-calendar-month-real-time-lmp_quotes_settlements_futures.html#tradeDate=08%2F24%2F2018

[2] http://www.bgs-auction.com/bgs.dataroom.occ.asp. See the "BGS RSCP Pricing Factors" models.

J This gives us a set of peak and off-peak prices at PJM's Western Hub (in western Pennsylvania). To create estimates for New Jersey we multiply these prices times the historic differential between the Western Hub and a specific EDC's zone. Again, these are provided in the EDC rate models, based off of three years of data, and shown below, specifically for PSE&G.

TABLE ONE
ENERGY PRICE BUILDUP

Month	Peak Western Hub Price ($/MWh)[1]	On/Off-Peak Ratio[2]	Off-Peak Western Hub Price ($/MWh)	Hub to Zone Ratio (On Peak)[2]	Hub to Zone Ratio (Off Peak)[2]	Final PSE&G On-Peak Price	Final PSE&G Off-Peak Price
21-Jan	$ 46.73	0.7756	$ 36.24	95%	95%	$ 44.38	$ 34.37
21-Feb	$ 43.95	0.7756	$ 34.09	95%	95%	$ 41.74	$ 32.33
21-Mar	$ 35.32	0.7756	$ 27.39	95%	95%	$ 33.54	$ 25.98
21-Apr	$ 31.05	0.7756	$ 24.08	95%	95%	$ 29.49	$ 22.84
21-May	$ 30.95	0.7756	$ 24.01	95%	95%	$ 29.39	$ 22.76
21-Jun	$ 30.95	0.6401	$ 19.81	93%	86%	$ 28.83	$ 17.10
21-Jul	$ 37.11	0.6401	$ 23.76	93%	86%	$ 34.56	$ 20.51
21-Aug	$ 33.83	0.6401	$ 21.66	93%	86%	$ 31.51	$ 18.69
21-Sep	$ 30.76	0.6401	$ 19.69	93%	86%	$ 28.65	$ 17.00
21-Oct	$ 28.47	0.7756	$ 22.08	95%	95%	$ 27.04	$ 20.94
21-Nov	$ 28.47	0.7756	$ 22.08	95%	95%	$ 27.04	$ 20.94
21-Dec	$ 31.60	0.7756	$ 24.51	95%	95%	$ 30.01	$ 23.24

1 https://www.cmegroup.com/trading/energy/electricity/pjm-western-hub-peak-calendar-month-real-time-lmp_quotes_settlements_futures.html#tradeDate=08%2F24%2F2018

2 http://www.bgs-auction.com/bgs.dataroom.occ.asp "2019_PSE&G_BGS_RSCP_Rate_Spreadsheet_29_June_2018.xls"")

To project prices farther out we utilize a forecast of price growth. For this, we turn to the latest Annual Energy Outlook (AEO) produced by the US Energy Information Administration (EIA). The 2018 AEO produces a number of projections regarding energy use, prices, capacity, emissions, and other items. For this analysis we can take the projected growth of the nominal cost of generation in the RFC East (Eastern PJM) zone. The current base or "reference" case for

the AEO predicts a rate of growth per year for this area from 2017 through 2050.[3] Using this, our forecast escalates each year by the forecast annual growth rate for that specific year.

This forecast is done on an EDC-specific basis and bidders should use the zone of the EDC that they will deliver power to. In other words, if the project is going to connect into Atlantic Electric's territory it should use the on/off peak ratios and hub/zone differentials from Atlantic's models. If the project is connecting into PSE&G's territory it should use PSE&G's inputs. This helps account for the locational difference in market prices.

Net Output

With prices for each month and on and off peak period the bidder should then multiply their projected net output **at the P(50) value** for each on and off-peak period in each month to determine an estimate of energy market revenues. We use P(50) since this is the average output the project could expect over its lifetime.

Capacity Revenues

Ideally, any qualified offshore wind project will sell capacity into PJM's Reliability Pricing Model (RPM) Auction. Prices in that auction vary by year and by location with prices in PSE&G's territory being typically higher than elsewhere. Prices are set for one year three years ahead of time, so it's possible that a project could at least know its first year capacity value and use that value in their analysis. However, prices after that are generally harder to predict as they depend on new entry, plant retirements, PJM estimates of transmission constraints and load growth. Given this complexity we use a simple method using the historical record to set a price for capacity by zone and simply escalating the result by inflation. For example, the average resulting capacity price from the RPM Auction for the past five years in the PSE&G zone is $188.61/MW-day.[4] For the Atlantic Electric Zone the number is $165.30/MW-day. For ease of use we round these numbers to $190/MW-day and $165/MW-day. Prices for subsequent years are simply escalated out at 2% to reflect inflation.

Another factor with renewable projects in PJM is the quantity of capacity they are allowed to sell. PJM currently measures the capacity contribution of a wind facility by taking their average summer capacity factor over the most recent three years of operation. If no data is available for a given year then the project must use the PJM class average wind capacity factor, which is

[3] https://www.eia.gov/outlooks/aeo/data/browser/#/?id=62-AEO2018&region=3-9&cases=ref2018&start=2016&end=2050&f=A&linechart=ref2018-d121317a.5-62-AEO2018.3-9&map=&sourcekey=0

[4] This reflects small adjustments for incremental auctions, which take place each year between the initial RPM auction and the delivery year.

currently 17.6%.[5] The bidder should use this method, using the unit's net maximum capacity and assuming the project hits it's P(50) summer capacity factor in each operating year. So a 100 MW project would provide 17.6 MW of capacity the first year. Starting in year four the project's capacity contribution would be 100 MW times the P(50) summer net capacity factor.[6] Just to give a sense of how much this would contribute to project value, at $160/MW-day a 100 MW wind facility with a 30% summer P(50) capacity factor would earn about $6.67/MWh.[7]

Class 1 RECs

Under New Jersey law each OREC is counted as a Class 1 REC, meaning that every OREC purchased is one less Class 1 REC that must be procured. Therefore the avoided cost of Class 1 RECs is a benefit created by the project. To estimate the value of this benefit we start with a value of $13/REC in energy year 2017 (June 2016—May 2017). This is roughly the weighted average price of Class 1 RECs for that time as reported in the EY2018 Compliance presentation.[8] This value is simply escalated by 2% each year as a rough proxy for inflation). So, for example, the Energy year 2022 price would be 13*(1+.02)^5 or $14.35/REC. Bidders should assume their net P(50) output for the purpose of calculating avoided Class 1 REC benefits.

Ancillary Services

No ancillary services revenues be should attributed to the project.

Discount Rate

In assessing the impacts of each project we wish to see the costs and benefits or each project on a net present value basis. For this exercise bidders should calculate costs and benefits be calculated on a nominal basis and discounted using a rate of 7%.

[5] Available at http://www.pjm.com/-/media/planning/res-adeq/class-average-wind-capacity-factors.ashx?la=en. This is the factor for wind in "open/flat terrain".
[6] Years 2-3 would be a blended rate. For example, with a 30% P(50) capacity factor, year 2's capacity contribution would be (17.8+17.8+30)/3 or 21.87 MW.
[7] The math here is ($160MW/day*365 days*30 MW)/(8760*.3*100)=$6.67/MWh. If the project were a standard combined cycle it would get credit for a full 100 MW of capacity and earn $22.22/MWh.
[8] Available at http://www.njcleanenergy.com/renewable-energy/program-updates/rps-compliance-reports. The actual value is on slide 7 and is $13.14/REC.

Attachment One - Energy Price Buildup

Month	Peak Western Hub Price ($/MWh)	On/Off-Peak Ratio	Off-Peak Western Hub Price ($/MWh)	Hub to Zone Ratio (On Peak)	Hub to Zone Ratio (Off Peak)	Final PSE&G On-Peak Price	Final PSE&G Off-Peak Price	On/Off-Peak Ratio	Off-Peak Western Hub Price ($/MWh)	Hub to Zone Ratio (On Peak)^2	Hub to Zone Ratio (Off Peak)^2	Final JCP&L On-Peak Price	Final JCP&L Off-Peak Price	On/Off-Peak Ratio	Off-Peak Western Hub Price ($/MWh)	Hub to Zone Ratio (On Peak)	Hub to Zone Ratio (Off Peak)	Final ACE On-Peak Price	Final ACE Off-Peak Price	On/Off-Peak Ratio	Off-Peak Western Hub Price ($/MWh)	Hub to Zone Ratio (On Peak)	Hub to Zone Ratio (Off Peak)	Final RECO On-Peak Price	Final RECO Off-Peak Price
Jan-21	$ 46.73	0.7756	$ 36.24	95%	95%	$ 44.38	$ 34.37	0.7756	$ 36.24	0.9139	0.92811	$ 42.71	$ 33.64	0.7756	$ 36.24	0.91667	0.9294	$ 42.84	$ 33.69	0.77561	$ 36.24	0.9□7	0.939	$ 44.24	$ 34.05
Feb-21	$ 43.95	0.7756	$ 34.09	95%	95%	$ 41.74	$ 32.33	0.7756	$ 34.09	0.9139	0.92811	$ 40.17	$ 31.64	0.7756	$ 34.09	0.91667	0.9294	$ 40.29	$ 31.68	0.77561	$ 34.09	0.9□7	0.939	$ 41.61	$ 32.02
Mar-21	$ 35.32	0.7756	$ 27.39	95%	95%	$ 33.54	$ 25.98	0.7756	$ 27.39	0.9139	0.92811	$ 32.28	$ 25.43	0.7756	$ 27.39	0.91667	0.9294	$ 32.38	$ 25.46	0.77561	$ 27.39	0.9□7	0.939	$ 33.44	$ 25.73
Apr-21	$ 31.05	0.7756	$ 24.08	95%	95%	$ 29.49	$ 22.84	0.7756	$ 24.08	0.9139	0.92811	$ 28.38	$ 22.35	0.7756	$ 24.08	0.91667	0.9294	$ 28.46	$ 22.38	0.77561	$ 24.08	0.9□7	0.939	$ 29.40	$ 22.62
May-18	$ 30.95	0.7756	$ 24.01	95%	95%	$ 29.39	$ 22.76	0.7756	$ 24.01	0.9139	0.92811	$ 28.29	$ 22.28	0.7756	$ 24.01	0.91667	0.9294	$ 28.37	$ 22.31	0.77561	$ 24.01	0.9□7	0.939	$ 29.30	$ 22.55
Jun-18	$ 30.95	0.6401	$ 19.81	93%	86%	$ 28.83	$ 17.10	0.6401	$ 19.81	0.92063	0.85282	$ 28.49	$ 16.90	0.6401	$ 19.81	0.9363	0.87027	$ 28.98	$ 17.24	0.64015	$ 19.81	0.9□2	0.872	$ 28.84	$ 17.28
Jul-18	$ 37.11	0.6401	$ 23.76	93%	86%	$ 34.56	$ 20.51	0.6401	$ 23.76	0.92063	0.85282	$ 34.16	$ 20.26	0.6401	$ 23.76	0.9363	0.87027	$ 34.75	$ 20.67	0.64015	$ 23.76	0.9□2	0.872	$ 34.58	$ 20.72
Aug-18	$ 33.83	0.6401	$ 21.66	93%	86%	$ 31.51	$ 18.69	0.6401	$ 21.66	0.92063	0.85282	$ 31.14	$ 18.47	0.6401	$ 21.66	0.9363	0.87027	$ 31.68	$ 18.85	0.64015	$ 21.66	0.9□2	0.872	$ 31.52	$ 18.89
Sep-18	$ 30.76	0.6401	$ 19.69	93%	86%	$ 28.65	$ 17.00	0.6401	$ 19.69	0.92063	0.85282	$ 28.32	$ 16.79	0.6401	$ 19.69	0.9363	0.87027	$ 28.80	$ 17.14	0.64015	$ 19.69	0.9□2	0.872	$ 28.66	$ 17.18
Oct-18	$ 28.47	0.7756	$ 22.08	95%	95%	$ 27.04	$ 20.94	0.7756	$ 22.08	0.9139	0.92811	$ 26.02	$ 20.49	0.7756	$ 22.08	0.91667	0.9294	$ 26.10	$ 20.52	0.77561	$ 22.08	0.9□7	0.939	$ 26.95	$ 20.74
Nov-18	$ 28.47	0.7756	$ 22.08	95%	95%	$ 27.04	$ 20.94	0.7756	$ 22.08	0.9139	0.92811	$ 26.02	$ 20.49	0.7756	$ 22.08	0.91667	0.9294	$ 26.10	$ 20.52	0.77561	$ 22.08	0.9□7	0.939	$ 26.95	$ 20.74
Dec-18	$ 31.60	0.7756	$ 24.51	95%	95%	$ 30.01	$ 23.24	0.7756	$ 24.51	0.9139	0.92811	$ 28.88	$ 22.75	0.7756	$ 24.51	0.91667	0.9294	$ 28.97	$ 22.78	0.77561	$ 24.51	0.9□7	0.939	$ 29.92	$ 23.02
Jan-22						$ 44.81	$ 34.70					$ 43.12	$ 33.97					$ 43.25	$ 34.01					$ 44.67	$ 34.38
Feb-22						$ 42.14	$ 32.64					$ 40.56	$ 31.95					$ 40.68	$ 31.99					$ 42.01	$ 32.33
Mar-22						$ 33.87	$ 26.23					$ 32.59	$ 25.67					$ 32.69	$ 25.71					$ 33.76	$ 25.98
Apr-22						$ 29.77	$ 23.06					$ 28.65	$ 22.57					$ 28.74	$ 22.60					$ 29.68	$ 22.84
May-22						$ 29.68	$ 22.98					$ 28.56	$ 22.50					$ 28.65	$ 22.53					$ 29.59	$ 22.77
Jun-22						$ 29.11	$ 17.27					$ 28.77	$ 17.06					$ 29.26	$ 17.41					$ 29.12	$ 17.45
Jul-22						$ 34.90	$ 20.71					$ 34.50	$ 20.46					$ 35.08	$ 20.87					$ 34.92	$ 20.92
Aug-22						$ 31.81	$ 18.88					$ 31.45	$ 18.65					$ 31.98	$ 19.03					$ 31.83	$ 19.07
Sep-22						$ 28.93	$ 17.16					$ 28.59	$ 16.96					$ 29.08	$ 17.30					$ 28.94	$ 17.34
Oct-22						$ 27.30	$ 21.14					$ 26.27	$ 20.69					$ 26.35	$ 20.72					$ 27.22	$ 20.94
Nov-22						$ 27.30	$ 21.14					$ 26.27	$ 20.69					$ 26.35	$ 20.72					$ 27.22	$ 20.94
Dec-22						$ 30.30	$ 23.47					$ 29.16	$ 22.97					$ 29.25	$ 23.00					$ 30.21	$ 23.25
Jan-23						$ 45.90	$ 35.55					$ 44.17	$ 34.79					$ 44.30	$ 34.84					$ 45.76	$ 35.21
Feb-23						$ 43.17	$ 33.43					$ 41.54	$ 32.72					$ 41.67	$ 32.77					$ 43.04	$ 33.12
Mar-23						$ 34.69	$ 26.87					$ 33.38	$ 26.30					$ 33.49	$ 26.33					$ 34.58	$ 26.62
Apr-23						$ 30.50	$ 23.62					$ 29.35	$ 23.12					$ 29.44	$ 23.15					$ 30.40	$ 23.40
May-23						$ 30.40	$ 23.54					$ 29.25	$ 23.04					$ 29.34	$ 23.07					$ 30.31	$ 23.32
Jun-23						$ 29.81	$ 17.69					$ 29.47	$ 17.48					$ 29.97	$ 17.83					$ 29.83	$ 17.87
Jul-23						$ 35.75	$ 21.21					$ 35.33	$ 20.95					$ 35.94	$ 21.38					$ 35.77	$ 21.43
Aug-23						$ 32.59	$ 19.33					$ 32.21	$ 19.10					$ 32.76	$ 19.49					$ 32.60	$ 19.54
Sep-23						$ 29.63	$ 17.58					$ 29.29	$ 17.37					$ 29.79	$ 17.72					$ 29.65	$ 17.76
Oct-23						$ 27.96	$ 21.66					$ 26.91	$ 21.20					$ 26.99	$ 21.23					$ 27.88	$ 21.45
Nov-23						$ 27.96	$ 21.66					$ 26.91	$ 21.20					$ 26.99	$ 21.23					$ 27.88	$ 21.45
Dec-23						$ 31.04	$ 24.04					$ 29.87	$ 23.53					$ 29.96	$ 23.56					$ 30.94	$ 23.81
Jan-24						$ 47.29	$ 36.63					$ 45.51	$ 35.85					$ 45.65	$ 35.90					$ 47.15	$ 36.28
Feb-24						$ 44.48	$ 34.45					$ 42.80	$ 33.71					$ 42.93	$ 33.76					$ 44.34	$ 34.12
Mar-24						$ 35.74	$ 27.68					$ 34.40	$ 27.09					$ 34.50	$ 27.13					$ 35.63	$ 27.42
Apr-24						$ 31.42	$ 24.34					$ 30.24	$ 23.82					$ 30.33	$ 23.85					$ 31.33	$ 24.11
May-24						$ 31.32	$ 24.26					$ 30.14	$ 23.74					$ 30.23	$ 23.78					$ 31.23	$ 24.03
Jun-24						$ 30.72	$ 18.23					$ 30.36	$ 18.01					$ 30.88	$ 18.37					$ 30.73	$ 18.42
Jul-24						$ 36.83	$ 21.85					$ 36.41	$ 21.59					$ 37.03	$ 22.03					$ 36.85	$ 22.08
Aug-24						$ 33.58	$ 19.92					$ 33.19	$ 19.68					$ 33.75	$ 20.08					$ 33.59	$ 20.13
Sep-24						$ 30.53	$ 18.11					$ 30.18	$ 17.90					$ 30.69	$ 18.26					$ 30.55	$ 18.30
Oct-24						$ 28.81	$ 22.31					$ 27.73	$ 21.84					$ 27.81	$ 21.87					$ 28.72	$ 22.10
Nov-24						$ 28.81	$ 22.31					$ 27.73	$ 21.84					$ 27.81	$ 21.87					$ 28.72	$ 22.10
Dec-24						$ 31.98	$ 24.77					$ 30.78	$ 24.24					$ 30.87	$ 24.27					$ 31.88	$ 24.53

Month	Peak Western Hub Price ($/MWh)	On/Off-Peak Ratio	Off-Peak Western Hub Price ($/MWh)	Hub to Zone Ratio (On Peak)	Hub to Zone Ratio (Off Peak)	Final PSE&G On-Peak Price	Final PSE&G Off-Peak Price	On/Off-Peak Ratio	Off-Peak Western Hub Price ($/MWh)	Hub to Zone Ratio (On Peak)[2]	Hub to Zone Ratio (Off Peak)[2]	Final JCP&L On-Peak Price	Final JCP&L Off-Peak Price	On/Off-Peak Ratio	Off-Peak Western Hub Price ($/MWh)	Hub to Zone Ratio (On Peak)	Hub to Zone Ratio (Off Peak)	Final ACE On-Peak Price	Final ACE Off-Peak Price	On/Off-Peak Ratio	Off-Peak Western Hub Price ($/MWh)	Hub to Zone Ratio (On Peak)	Hub to Zone Ratio (Off Peak)	Final RECO On-Peak Price	Final RECO Off-Peak Price
Jan-25						$ 51.73	$ 40.07					$ 49.79	$ 39.22					$ 49.94	$ 39.27					$ 51.58	$ 39.69
Feb-25						$ 48.66	$ 37.68					$ 46.83	$ 36.88					$ 46.97	$ 36.93					$ 48.51	$ 37.33
Mar-25						$ 39.10	$ 30.28					$ 37.63	$ 29.64					$ 37.74	$ 29.68					$ 38.98	$ 30.00
Apr-25						$ 34.37	$ 26.62					$ 33.08	$ 26.06					$ 33.18	$ 26.09					$ 34.27	$ 26.37
May-25						$ 34.26	$ 26.54					$ 32.97	$ 25.97					$ 33.07	$ 26.01					$ 34.16	$ 26.29
Jun-25						$ 33.61	$ 19.94					$ 33.22	$ 19.70					$ 33.78	$ 20.10					$ 33.62	$ 20.15
Jul-25						$ 40.29	$ 23.91					$ 39.83	$ 23.62					$ 40.51	$ 24.10					$ 40.31	$ 24.16
Aug-25						$ 36.73	$ 21.79					$ 36.31	$ 21.53					$ 36.93	$ 21.97					$ 36.75	$ 22.02
Sep-25						$ 33.40	$ 19.82					$ 33.01	$ 19.58					$ 33.58	$ 19.98					$ 33.42	$ 20.02
Oct-25						$ 31.52	$ 24.41					$ 30.33	$ 23.89					$ 30.42	$ 23.93					$ 31.42	$ 24.18
Nov-25						$ 31.52	$ 24.41					$ 30.33	$ 23.89					$ 30.42	$ 23.93					$ 31.42	$ 24.18
Dec-25						$ 34.98	$ 27.10					$ 33.67	$ 26.52					$ 33.77	$ 26.56					$ 34.88	$ 26.84
Jan-26						$ 51.02	$ 39.52					$ 49.10	$ 38.68					$ 49.25	$ 38.73					$ 50.87	$ 39.14
Feb-26						$ 47.98	$ 37.17					$ 46.18	$ 36.38					$ 46.32	$ 36.43					$ 47.84	$ 36.82
Mar-26						$ 38.56	$ 29.87					$ 37.11	$ 29.23					$ 37.22	$ 29.27					$ 38.45	$ 29.59
Apr-26						$ 33.90	$ 26.26					$ 32.63	$ 25.70					$ 32.72	$ 25.73					$ 33.80	$ 26.01
May-26						$ 33.79	$ 26.17					$ 32.52	$ 25.62					$ 32.62	$ 25.65					$ 33.69	$ 25.93
Jun-26						$ 33.14	$ 19.66					$ 32.76	$ 19.43					$ 33.32	$ 19.82					$ 33.16	$ 19.87
Jul-26						$ 39.74	$ 23.58					$ 39.28	$ 23.29					$ 39.95	$ 23.77					$ 39.76	$ 23.82
Aug-26						$ 36.23	$ 21.49					$ 35.81	$ 21.23					$ 36.42	$ 21.67					$ 36.24	$ 21.72
Sep-26						$ 32.94	$ 19.54					$ 32.56	$ 19.31					$ 33.11	$ 19.70					$ 32.96	$ 19.75
Oct-26						$ 31.08	$ 24.08					$ 29.91	$ 23.56					$ 30.01	$ 23.60					$ 30.99	$ 23.85
Nov-26						$ 31.08	$ 24.08					$ 29.91	$ 23.56					$ 30.01	$ 23.60					$ 30.99	$ 23.85
Dec-26						$ 34.50	$ 26.72					$ 33.20	$ 26.15					$ 33.30	$ 26.19					$ 34.40	$ 26.47
Jan-27						$ 54.25	$ 42.02					$ 52.21	$ 41.12					$ 52.36	$ 41.18					$ 54.08	$ 41.62
Feb-27						$ 51.02	$ 39.52					$ 49.10	$ 38.68					$ 49.25	$ 38.73					$ 50.87	$ 39.14
Mar-27						$ 41.00	$ 31.76					$ 39.46	$ 31.08					$ 39.58	$ 31.12					$ 40.88	$ 31.46
Apr-27						$ 36.04	$ 27.92					$ 34.69	$ 27.32					$ 34.79	$ 27.36					$ 35.94	$ 27.65
May-27						$ 35.93	$ 27.83					$ 34.58	$ 27.24					$ 34.68	$ 27.27					$ 35.82	$ 27.57
Jun-27						$ 35.24	$ 20.91					$ 34.83	$ 20.66					$ 35.42	$ 21.08					$ 35.26	$ 21.13
Jul-27						$ 42.25	$ 25.07					$ 41.76	$ 24.77					$ 42.48	$ 25.27					$ 42.27	$ 25.33
Aug-27						$ 38.52	$ 22.85					$ 38.07	$ 22.58					$ 38.72	$ 23.04					$ 38.54	$ 23.09
Sep-27						$ 35.02	$ 20.78					$ 34.62	$ 20.53					$ 35.21	$ 20.95					$ 35.04	$ 21.00
Oct-27						$ 33.05	$ 25.60					$ 31.81	$ 25.05					$ 31.90	$ 25.09					$ 32.95	$ 25.36
Nov-27						$ 33.05	$ 25.60					$ 31.81	$ 25.05					$ 31.90	$ 25.09					$ 32.95	$ 25.36
Dec-27						$ 36.68	$ 28.41					$ 35.30	$ 27.81					$ 35.41	$ 27.85					$ 36.57	$ 28.14
Jan-28						$ 55.76	$ 43.19					$ 53.67	$ 42.27					$ 53.83	$ 42.33					$ 55.59	$ 42.78
Feb-28						$ 52.45	$ 40.62					$ 50.47	$ 39.76					$ 50.63	$ 39.81					$ 52.29	$ 40.24
Mar-28						$ 42.15	$ 32.64					$ 40.56	$ 31.95					$ 40.69	$ 31.99					$ 42.02	$ 32.34
Apr-28						$ 37.05	$ 28.70					$ 35.66	$ 28.09					$ 35.77	$ 28.13					$ 36.94	$ 28.43
May-28						$ 36.93	$ 28.61					$ 35.54	$ 28.00					$ 35.65	$ 28.04					$ 36.82	$ 28.34
Jun-28						$ 36.22	$ 21.49					$ 35.81	$ 21.23					$ 36.41	$ 21.67					$ 36.24	$ 21.72
Jul-28						$ 43.43	$ 25.77					$ 42.93	$ 25.46					$ 43.66	$ 25.98					$ 43.45	$ 26.04
Aug-28						$ 39.59	$ 23.49					$ 39.14	$ 23.21					$ 39.80	$ 23.68					$ 39.61	$ 23.74
Sep-28						$ 36.00	$ 21.36					$ 35.59	$ 21.10					$ 36.19	$ 21.53					$ 36.02	$ 21.58
Oct-28						$ 33.97	$ 26.31					$ 32.70	$ 25.75					$ 32.79	$ 25.79					$ 33.87	$ 26.07
Nov-28						$ 33.97	$ 26.31					$ 32.70	$ 25.75					$ 32.79	$ 25.79					$ 33.87	$ 26.07
Dec-28						$ 37.71	$ 29.21					$ 36.29	$ 28.58					$ 36.40	$ 28.62					$ 37.59	$ 28.93
Jan-29						$ 56.54	$ 43.79					$ 54.41	$ 42.86					$ 54.57	$ 42.92					$ 56.37	$ 43.38
Feb-29						$ 53.17	$ 41.18					$ 51.17	$ 40.31					$ 51.33	$ 40.36					$ 53.01	$ 40.80
Mar-29						$ 42.73	$ 33.10					$ 41.12	$ 32.39					$ 41.25	$ 32.44					$ 42.60	$ 32.79
Apr-29						$ 37.57	$ 29.10					$ 36.15	$ 28.48					$ 36.26	$ 28.52					$ 37.45	$ 28.82
May-29						$ 37.44	$ 29.00					$ 36.04	$ 28.38					$ 36.15	$ 28.42					$ 37.33	$ 28.73
Jun-29						$ 36.73	$ 21.79					$ 36.30	$ 21.53					$ 36.92	$ 21.97					$ 36.74	$ 22.02
Jul-29						$ 44.03	$ 26.13					$ 43.53	$ 25.81					$ 44.27	$ 26.34					$ 44.06	$ 26.40
Aug-29						$ 40.14	$ 23.82					$ 39.68	$ 23.53					$ 40.36	$ 24.01					$ 40.16	$ 24.07
Sep-29						$ 36.50	$ 21.66					$ 36.08	$ 21.39					$ 36.69	$ 21.83					$ 36.52	$ 21.88
Oct-29						$ 34.44	$ 26.68					$ 33.15	$ 26.11					$ 33.25	$ 26.15					$ 34.34	$ 26.43
Nov-29						$ 34.44	$ 26.68					$ 33.15	$ 26.11					$ 33.25	$ 26.15					$ 34.34	$ 26.43
Dec-29						$ 38.23	$ 29.61					$ 36.79	$ 28.98					$ 36.90	$ 29.02					$ 38.12	$ 29.33

Month	Peak Western Hub Price ($/MWh)	On/Off-Peak Ratio	Off-Peak Western Hub Price ($/MWh)	Hub to Zone Ratio (On Peak)	Hub to Zone Ratio (Off Peak)	Final PSE&G On-Peak Price	Final PSE&G Off-Peak Price	On/Off-Peak Ratio	Off-Peak Western Hub Price ($/MWh)	Hub to Zone Ratio (On Peak)[2]	Hub to Zone Ratio (Off Peak)[2]	Final JCP&L On-Peak Price	Final JCP&L Off-Peak Price	On/Off-Peak Ratio	Off-Peak Western Hub Price ($/MWh)	Hub to Zone Ratio (On Peak)	Hub to Zone Ratio (Off Peak)	Final ACE On-Peak Price	Final ACE Off-Peak Price	On/Off-Peak Ratio	Off-Peak Western Hub Price ($/MWh)	Hub to Zone Ratio (On Peak)	Hub to Zone Ratio (Off Peak)	Final RECO On-Peak Price	Final RECO Off-Peak Price
Jan-30						$ 57.28	$ 44.37					$ 55.13	$ 43.42					$ 55.30	$ 43.48					$ 57.11	$ 43.95
Feb-30						$ 53.87	$ 41.73					$ 51.85	$ 40.84					$ 52.01	$ 40.90					$ 53.71	$ 41.34
Mar-30						$ 43.30	$ 33.53					$ 41.67	$ 32.82					$ 41.79	$ 32.87					$ 43.17	$ 33.22
Apr-30						$ 38.06	$ 29.48					$ 36.63	$ 28.85					$ 36.74	$ 28.89					$ 37.95	$ 29.20
May-30						$ 37.94	$ 29.38					$ 36.51	$ 28.76					$ 36.62	$ 28.80					$ 37.82	$ 29.11
Jun-30						$ 37.21	$ 22.08					$ 36.78	$ 21.81					$ 37.41	$ 22.26					$ 37.23	$ 22.31
Jul-30						$ 44.62	$ 26.47					$ 44.10	$ 26.15					$ 44.85	$ 26.69					$ 44.64	$ 26.75
Aug-30						$ 40.67	$ 24.13					$ 40.20	$ 23.84					$ 40.89	$ 24.33					$ 40.69	$ 24.38
Sep-30						$ 36.98	$ 21.94					$ 36.56	$ 21.68					$ 37.18	$ 22.12					$ 37.00	$ 22.17
Oct-30						$ 34.90	$ 27.03					$ 33.59	$ 26.46					$ 33.69	$ 26.49					$ 34.79	$ 26.78
Nov-30						$ 34.90	$ 27.03					$ 33.59	$ 26.46					$ 33.69	$ 26.49					$ 34.79	$ 26.78
Dec-30						$ 38.74	$ 30.00					$ 37.28	$ 29.36					$ 37.39	$ 29.40					$ 38.62	$ 29.72
Jan-31						$ 58.11	$ 45.01					$ 55.93	$ 44.05					$ 56.10	$ 44.11					$ 57.94	$ 44.59
Feb-31						$ 54.66	$ 42.33					$ 52.60	$ 41.43					$ 52.76	$ 41.49					$ 54.49	$ 41.93
Mar-31						$ 43.92	$ 34.02					$ 42.27	$ 33.30					$ 42.40	$ 33.34					$ 43.79	$ 33.70
Apr-31						$ 38.61	$ 29.91					$ 37.16	$ 29.27					$ 37.27	$ 29.31					$ 38.50	$ 29.63
May-31						$ 38.49	$ 29.81					$ 37.04	$ 29.18					$ 37.15	$ 29.22					$ 38.37	$ 29.53
Jun-31						$ 37.75	$ 22.40					$ 37.31	$ 22.13					$ 37.95	$ 22.58					$ 37.77	$ 22.63
Jul-31						$ 45.26	$ 26.85					$ 44.74	$ 26.53					$ 45.50	$ 27.07					$ 45.29	$ 27.14
Aug-31						$ 41.26	$ 24.48					$ 40.79	$ 24.19					$ 41.48	$ 24.68					$ 41.28	$ 24.74
Sep-31						$ 37.52	$ 22.26					$ 37.09	$ 21.99					$ 37.72	$ 22.44					$ 37.54	$ 22.49
Oct-31						$ 35.41	$ 27.42					$ 34.07	$ 26.84					$ 34.18	$ 26.88					$ 35.30	$ 27.16
Nov-31						$ 35.41	$ 27.42					$ 34.07	$ 26.84					$ 34.18	$ 26.88					$ 35.30	$ 27.16
Dec-31						$ 39.30	$ 30.44					$ 37.82	$ 29.79					$ 37.93	$ 29.83					$ 39.18	$ 30.15
Jan-32						$ 58.33	$ 45.17					$ 56.13	$ 44.21					$ 56.30	$ 44.28					$ 58.15	$ 44.75
Feb-32						$ 54.86	$ 42.49					$ 52.79	$ 41.58					$ 52.95	$ 41.64					$ 54.69	$ 42.09
Mar-32						$ 44.08	$ 34.14					$ 42.43	$ 33.42					$ 42.56	$ 33.47					$ 43.95	$ 33.82
Apr-32						$ 38.76	$ 30.02					$ 37.30	$ 29.38					$ 37.41	$ 29.42					$ 38.64	$ 29.73
May-32						$ 38.63	$ 29.92					$ 37.18	$ 29.28					$ 37.29	$ 29.32					$ 38.51	$ 29.64
Jun-32						$ 37.89	$ 22.48					$ 37.45	$ 22.21					$ 38.09	$ 22.66					$ 37.91	$ 22.71
Jul-32						$ 45.43	$ 26.95					$ 44.91	$ 26.63					$ 45.67	$ 27.17					$ 45.45	$ 27.24
Aug-32						$ 41.41	$ 24.57					$ 40.94	$ 24.28					$ 41.63	$ 24.77					$ 41.44	$ 24.83
Sep-32						$ 37.66	$ 22.34					$ 37.22	$ 22.07					$ 37.86	$ 22.52					$ 37.67	$ 22.57
Oct-32						$ 35.53	$ 27.52					$ 34.20	$ 26.94					$ 34.30	$ 26.97					$ 35.43	$ 27.26
Nov-32						$ 35.53	$ 27.52					$ 34.20	$ 26.94					$ 34.30	$ 26.97					$ 35.43	$ 27.26
Dec-32						$ 39.44	$ 30.55					$ 37.96	$ 29.90					$ 38.07	$ 29.94					$ 39.32	$ 30.26
Jan-33						$ 58.77	$ 45.52					$ 56.56	$ 44.55					$ 56.73	$ 44.61					$ 58.59	$ 45.09
Feb-33						$ 55.27	$ 42.81					$ 53.19	$ 41.90					$ 53.36	$ 41.96					$ 55.11	$ 42.41
Mar-33						$ 44.42	$ 34.40					$ 42.75	$ 33.67					$ 42.88	$ 33.72					$ 44.29	$ 34.08
Apr-33						$ 39.05	$ 30.25					$ 37.58	$ 29.60					$ 37.70	$ 29.64					$ 38.93	$ 29.96
May-33						$ 38.92	$ 30.15					$ 37.46	$ 29.51					$ 37.57	$ 29.55					$ 38.81	$ 29.86
Jun-33						$ 38.18	$ 22.65					$ 37.74	$ 22.38					$ 38.38	$ 22.84					$ 38.20	$ 22.89
Jul-33						$ 45.77	$ 27.16					$ 45.25	$ 26.83					$ 46.02	$ 27.38					$ 45.80	$ 27.44
Aug-33						$ 41.73	$ 24.76					$ 41.25	$ 24.46					$ 41.95	$ 24.96					$ 41.75	$ 25.02
Sep-33						$ 37.94	$ 22.51					$ 37.50	$ 22.24					$ 38.14	$ 22.69					$ 37.96	$ 22.75
Oct-33						$ 35.81	$ 27.73					$ 34.46	$ 27.14					$ 34.56	$ 27.18					$ 35.70	$ 27.47
Nov-33						$ 35.81	$ 27.73					$ 34.46	$ 27.14					$ 34.56	$ 27.18					$ 35.70	$ 27.47
Dec-33						$ 39.74	$ 30.78					$ 38.25	$ 30.13					$ 38.36	$ 30.17					$ 39.62	$ 30.49
Jan-34						$ 59.88	$ 46.38					$ 57.63	$ 45.39					$ 57.81	$ 45.46					$ 59.70	$ 45.94
Feb-34						$ 56.32	$ 43.62					$ 54.20	$ 42.69					$ 54.37	$ 42.75					$ 56.15	$ 43.21
Mar-34						$ 45.26	$ 35.06					$ 43.56	$ 34.31					$ 43.69	$ 34.36					$ 45.12	$ 34.73
Apr-34						$ 39.79	$ 30.82					$ 38.29	$ 30.16					$ 38.41	$ 30.20					$ 39.67	$ 30.53
May-34						$ 39.66	$ 30.72					$ 38.17	$ 30.07					$ 38.29	$ 30.11					$ 39.54	$ 30.43
Jun-34						$ 38.90	$ 23.08					$ 38.45	$ 22.80					$ 39.11	$ 23.27					$ 38.92	$ 23.32
Jul-34						$ 46.64	$ 27.67					$ 46.10	$ 27.34					$ 46.89	$ 27.90					$ 46.67	$ 27.96
Aug-34						$ 42.52	$ 25.23					$ 42.03	$ 24.92					$ 42.74	$ 25.43					$ 42.54	$ 25.49
Sep-34						$ 38.66	$ 22.94					$ 38.21	$ 22.66					$ 38.87	$ 23.12					$ 38.68	$ 23.18
Oct-34						$ 36.48	$ 28.26					$ 35.11	$ 27.66					$ 35.22	$ 27.69					$ 36.37	$ 27.99
Nov-34						$ 36.48	$ 28.26					$ 35.11	$ 27.66					$ 35.22	$ 27.69					$ 36.37	$ 27.99
Dec-34						$ 40.49	$ 31.36					$ 38.97	$ 30.70					$ 39.09	$ 30.74					$ 40.37	$ 31.07

Month	Peak Western Hub Price ($/MWh)	On/Off-Peak Ratio	Off-Peak Western Hub Price ($/MWh)	Hub to Zone Ratio (On Peak)	Hub to Zone Ratio (Off Peak)	Final PSE&G On-Peak Price	Final PSE&G Off-Peak Price	On/Off-Peak Ratio	Off-Peak Western Hub Price ($/MWh)	Hub to Zone Ratio (On Peak)[2]	Hub to Zone Ratio (Off Peak)[2]	Final JCP&L On-Peak Price	Final JCP&L Off-Peak Price	On/Off-Peak Ratio	Off-Peak Western Hub Price ($/MWh)	Hub to Zone Ratio (On Peak)	Hub to Zone Ratio (Off Peak)	Final ACE On-Peak Price	Final ACE Off-Peak Price	On/Off-Peak Ratio	Off-Peak Western Hub Price ($/MWh)	Hub to Zone Ratio (On Peak)	Hub to Zone Ratio (Off Peak)	Final RECO On-Peak Price	Final RECO Off-Peak Price
Jan-35						$ 61.18	$ 47.38					$ 58.88	$ 46.38					$ 59.05	$ 46.44					$ 60.99	$ 46.94
Feb-35						$ 57.54	$ 44.56					$ 55.37	$ 43.62					$ 55.54	$ 43.68					$ 57.36	$ 44.15
Mar-35						$ 46.24	$ 35.81					$ 44.50	$ 35.05					$ 44.64	$ 35.10					$ 46.10	$ 35.48
Apr-35						$ 40.65	$ 31.48					$ 39.12	$ 30.81					$ 39.24	$ 30.86					$ 40.53	$ 31.19
May-35						$ 40.52	$ 31.38					$ 39.00	$ 30.72					$ 39.11	$ 30.76					$ 40.40	$ 31.09
Jun-35						$ 39.74	$ 23.58					$ 39.28	$ 23.29					$ 39.95	$ 23.77					$ 39.76	$ 23.82
Jul-35						$ 47.65	$ 28.27					$ 47.10	$ 27.93					$ 47.90	$ 28.50					$ 47.67	$ 28.57
Aug-35						$ 43.44	$ 25.77					$ 42.94	$ 25.46					$ 43.67	$ 25.98					$ 43.46	$ 26.04
Sep-35						$ 39.50	$ 23.43					$ 39.04	$ 23.15					$ 39.71	$ 23.62					$ 39.52	$ 23.68
Oct-35						$ 37.27	$ 28.87					$ 35.87	$ 28.25					$ 35.98	$ 28.29					$ 37.16	$ 28.60
Nov-35						$ 37.27	$ 28.87					$ 35.87	$ 28.25					$ 35.98	$ 28.29					$ 37.16	$ 28.60
Dec-35						$ 41.37	$ 32.04					$ 39.81	$ 31.36					$ 39.93	$ 31.40					$ 41.24	$ 31.74
Jan-36						$ 63.28	$ 49.01					$ 60.90	$ 47.97					$ 61.08	$ 48.04					$ 63.09	$ 48.55
Feb-36						$ 59.51	$ 46.10					$ 57.28	$ 45.11					$ 57.45	$ 45.18					$ 59.33	$ 45.66
Mar-36						$ 47.83	$ 37.04					$ 46.03	$ 36.26					$ 46.17	$ 36.31					$ 47.68	$ 36.70
Apr-36						$ 42.05	$ 32.57					$ 40.46	$ 31.87					$ 40.59	$ 31.92					$ 41.92	$ 32.26
May-36						$ 41.91	$ 32.46					$ 40.33	$ 31.77					$ 40.46	$ 31.81					$ 41.78	$ 32.16
Jun-36						$ 41.11	$ 24.39					$ 40.63	$ 24.09					$ 41.32	$ 24.59					$ 41.13	$ 24.64
Jul-36						$ 49.29	$ 29.24					$ 48.72	$ 28.89					$ 49.55	$ 29.48					$ 49.31	$ 29.55
Aug-36						$ 44.93	$ 26.66					$ 44.41	$ 26.34					$ 45.17	$ 26.88					$ 44.95	$ 26.94
Sep-36						$ 40.85	$ 24.24					$ 40.38	$ 23.95					$ 41.07	$ 24.44					$ 40.87	$ 24.49
Oct-36						$ 38.55	$ 29.86					$ 37.10	$ 29.22					$ 37.21	$ 29.27					$ 38.44	$ 29.58
Nov-36						$ 38.55	$ 29.86					$ 37.10	$ 29.22					$ 37.21	$ 29.27					$ 38.44	$ 29.58
Dec-36						$ 42.79	$ 33.14					$ 41.18	$ 32.44					$ 41.31	$ 32.48					$ 42.66	$ 32.83
Jan-37						$ 64.81	$ 50.19					$ 62.37	$ 49.13					$ 62.56	$ 49.20					$ 64.61	$ 49.72
Feb-37						$ 60.95	$ 47.21					$ 58.66	$ 46.20					$ 58.84	$ 46.27					$ 60.77	$ 46.76
Mar-37						$ 48.98	$ 37.94					$ 47.14	$ 37.13					$ 47.28	$ 37.18					$ 48.84	$ 37.58
Apr-37						$ 43.06	$ 33.35					$ 41.44	$ 32.64					$ 41.57	$ 32.69					$ 42.93	$ 33.04
May-37						$ 42.92	$ 33.24					$ 41.31	$ 32.54					$ 41.43	$ 32.58					$ 42.79	$ 32.93
Jun-37						$ 42.10	$ 24.98					$ 41.61	$ 24.68					$ 42.32	$ 25.18					$ 42.12	$ 25.24
Jul-37						$ 50.48	$ 29.95					$ 49.89	$ 29.59					$ 50.74	$ 30.19					$ 50.50	$ 30.26
Aug-37						$ 46.02	$ 27.30					$ 45.48	$ 26.97					$ 46.26	$ 27.52					$ 46.04	$ 27.59
Sep-37						$ 41.84	$ 24.82					$ 41.36	$ 24.52					$ 42.06	$ 25.03					$ 41.86	$ 25.08
Oct-37						$ 39.48	$ 30.58					$ 38.00	$ 29.93					$ 38.11	$ 29.97					$ 39.36	$ 30.29
Nov-37						$ 39.48	$ 30.58					$ 38.00	$ 29.93					$ 38.11	$ 29.97					$ 39.36	$ 30.29
Dec-37						$ 43.82	$ 33.94					$ 42.18	$ 33.22					$ 42.30	$ 33.27					$ 43.69	$ 33.62
Jan-38						$ 66.77	$ 51.71					$ 64.26	$ 50.61					$ 64.45	$ 50.68					$ 66.57	$ 51.23
Feb-38						$ 62.80	$ 48.64					$ 60.43	$ 47.60					$ 60.62	$ 47.67					$ 62.61	$ 48.18
Mar-38						$ 50.46	$ 39.09					$ 48.57	$ 38.25					$ 48.71	$ 38.31					$ 50.31	$ 38.72
Apr-38						$ 44.36	$ 34.36					$ 42.70	$ 33.63					$ 42.82	$ 33.68					$ 44.23	$ 34.04
May-38						$ 44.22	$ 34.25					$ 42.56	$ 33.52					$ 42.69	$ 33.57					$ 44.09	$ 33.93
Jun-38						$ 43.37	$ 25.73					$ 42.87	$ 25.42					$ 43.60	$ 25.94					$ 43.39	$ 26.00
Jul-38						$ 52.00	$ 30.85					$ 51.40	$ 30.48					$ 52.28	$ 31.11					$ 52.03	$ 31.18
Aug-38						$ 47.41	$ 28.13					$ 46.86	$ 27.79					$ 47.66	$ 28.36					$ 47.43	$ 28.42
Sep-38						$ 43.11	$ 25.57					$ 42.61	$ 25.27					$ 43.33	$ 25.78					$ 43.13	$ 25.84
Oct-38						$ 40.68	$ 31.51					$ 39.15	$ 30.84					$ 39.27	$ 30.88					$ 40.56	$ 31.21
Nov-38						$ 40.68	$ 31.51					$ 39.15	$ 30.84					$ 39.27	$ 30.88					$ 40.56	$ 31.21
Dec-38						$ 45.15	$ 34.97					$ 43.45	$ 34.23					$ 43.58	$ 34.27					$ 45.01	$ 34.64
Jan-39						$ 69.07	$ 53.50					$ 66.48	$ 52.36					$ 66.68	$ 52.43					$ 68.87	$ 53.00
Feb-39						$ 64.97	$ 50.32					$ 62.52	$ 49.25					$ 62.71	$ 49.32					$ 64.77	$ 49.84
Mar-39						$ 52.21	$ 40.44					$ 50.25	$ 39.58					$ 50.40	$ 39.63					$ 52.05	$ 40.06
Apr-39						$ 45.90	$ 35.55					$ 44.17	$ 34.79					$ 44.30	$ 34.84					$ 45.76	$ 35.21
May-39						$ 45.75	$ 35.43					$ 44.03	$ 34.68					$ 44.16	$ 34.73					$ 45.61	$ 35.10
Jun-39						$ 44.87	$ 26.62					$ 44.35	$ 26.30					$ 45.11	$ 26.84					$ 44.89	$ 26.90
Jul-39						$ 53.80	$ 31.92					$ 53.18	$ 31.54					$ 54.09	$ 32.18					$ 53.83	$ 32.25
Aug-39						$ 49.05	$ 29.10					$ 48.48	$ 28.75					$ 49.31	$ 29.34					$ 49.07	$ 29.40
Sep-39						$ 44.59	$ 26.46					$ 44.08	$ 26.14					$ 44.83	$ 26.67					$ 44.62	$ 26.74
Oct-39						$ 42.08	$ 32.59					$ 40.50	$ 31.90					$ 40.62	$ 31.95					$ 41.96	$ 32.29
Nov-39						$ 42.08	$ 32.59					$ 40.50	$ 31.90					$ 40.62	$ 31.95					$ 41.96	$ 32.29
Dec-39						$ 46.71	$ 36.18					$ 44.95	$ 35.41					$ 45.09	$ 35.46					$ 46.57	$ 35.84

Month	Peak Western Hub Price ($/MWh)	On/Off-Peak Ratio	Off-Peak Western Hub Price ($/MWh)	Hub to Zone Ratio (On Peak)	Hub to Zone Ratio (Off Peak)	Final PSE&G On-Peak Price	Final PSE&G Off-Peak Price	On/Off-Peak Ratio	Off-Peak Western Hub Price ($/MWh)	Hub to Zone Ratio (On Peak)[2]	Hub to Zone Ratio (Off Peak)[2]	Final JCP&L On-Peak Price	Final JCP&L Off-Peak Price	On/Off-Peak Ratio	Off-Peak Western Hub Price ($/MWh)	Hub to Zone Ratio (On Peak)	Hub to Zone Ratio (Off Peak)	Final ACE On-Peak Price	Final ACE Off-Peak Price	On/Off-Peak Ratio	Off-Peak Western Hub Price ($/MWh)	Hub to Zone Ratio (On Peak)	Hub to Zone Ratio (Off Peak)	Final RECO On-Peak Price	Final RECO Off-Peak Price
Jan-40						$ 71.41	$ 55.31					$ 68.72	$ 54.13					$ 68.93	$ 54.21					$ 71.19	$ 54.79
Feb-40						$ 67.16	$ 52.02					$ 64.64	$ 50.91					$ 64.83	$ 50.98					$ 66.96	$ 51.53
Mar-40						$ 53.97	$ 41.80					$ 51.94	$ 40.91					$ 52.10	$ 40.97					$ 53.81	$ 41.41
Apr-40						$ 47.45	$ 36.75					$ 45.66	$ 35.97					$ 45.80	$ 36.02					$ 47.31	$ 36.40
May-40						$ 47.30	$ 36.63					$ 45.52	$ 35.85					$ 45.65	$ 35.90					$ 47.15	$ 36.29
Jun-40						$ 46.39	$ 27.52					$ 45.85	$ 27.19					$ 46.63	$ 27.75					$ 46.41	$ 27.81
Jul-40						$ 55.62	$ 33.00					$ 54.98	$ 32.60					$ 55.91	$ 33.27					$ 55.65	$ 33.34
Aug-40						$ 50.70	$ 30.08					$ 50.12	$ 29.72					$ 50.97	$ 30.33					$ 50.73	$ 30.40
Sep-40						$ 46.10	$ 27.35					$ 45.57	$ 27.02					$ 46.35	$ 27.58					$ 46.13	$ 27.64
Oct-40						$ 43.51	$ 33.70					$ 41.87	$ 32.98					$ 42.00	$ 33.03					$ 43.37	$ 33.38
Nov-40						$ 43.51	$ 33.70					$ 41.87	$ 32.98					$ 42.00	$ 33.03					$ 43.37	$ 33.38
Dec-40						$ 48.29	$ 37.40					$ 46.47	$ 36.61					$ 46.61	$ 36.66					$ 48.14	$ 37.05
Jan-41						$ 73.40	$ 56.85					$ 70.64	$ 55.64					$ 70.85	$ 55.71					$ 73.17	$ 56.31
Feb-41						$ 69.03	$ 53.46					$ 66.43	$ 52.33					$ 66.63	$ 52.40					$ 68.82	$ 52.96
Mar-41						$ 55.47	$ 42.97					$ 53.39	$ 42.05					$ 53.55	$ 42.11					$ 55.31	$ 42.56
Apr-41						$ 48.77	$ 37.77					$ 46.93	$ 36.97					$ 47.08	$ 37.02					$ 48.62	$ 37.42
May-41						$ 48.61	$ 37.65					$ 46.78	$ 36.85					$ 46.92	$ 36.90					$ 48.46	$ 37.30
Jun-41						$ 47.68	$ 28.29					$ 47.13	$ 27.95					$ 47.93	$ 28.52					$ 47.70	$ 28.58
Jul-41						$ 57.17	$ 33.92					$ 56.51	$ 33.51					$ 57.47	$ 34.19					$ 57.20	$ 34.27
Aug-41						$ 52.11	$ 30.92					$ 51.51	$ 30.55					$ 52.39	$ 31.17					$ 52.14	$ 31.24
Sep-41						$ 47.38	$ 28.11					$ 46.84	$ 27.77					$ 47.64	$ 28.34					$ 47.41	$ 28.41
Oct-41						$ 44.72	$ 34.63					$ 43.03	$ 33.90					$ 43.16	$ 33.94					$ 44.58	$ 34.31
Nov-41						$ 44.72	$ 34.63					$ 43.03	$ 33.90					$ 43.16	$ 33.94					$ 44.58	$ 34.31
Dec-41						$ 49.63	$ 38.44					$ 47.77	$ 37.62					$ 47.91	$ 37.68					$ 49.48	$ 38.08
Jan-42						$ 75.05	$ 58.13					$ 72.23	$ 56.89					$ 72.45	$ 56.97					$ 74.82	$ 57.58
Feb-42						$ 70.58	$ 54.67					$ 67.93	$ 53.51					$ 68.14	$ 53.58					$ 70.37	$ 54.16
Mar-42						$ 56.72	$ 43.93					$ 54.59	$ 43.00					$ 54.76	$ 43.06					$ 56.55	$ 43.52
Apr-42						$ 49.87	$ 38.62					$ 47.99	$ 37.80					$ 48.14	$ 37.85					$ 49.72	$ 38.26
May-42						$ 49.71	$ 38.50					$ 47.84	$ 37.68					$ 47.98	$ 37.73					$ 49.56	$ 38.14
Jun-42						$ 48.75	$ 28.92					$ 48.19	$ 28.58					$ 49.01	$ 29.16					$ 48.78	$ 29.23
Jul-42						$ 58.45	$ 34.68					$ 57.78	$ 34.26					$ 58.76	$ 34.96					$ 58.48	$ 35.04
Aug-42						$ 53.29	$ 31.62					$ 52.67	$ 31.23					$ 53.57	$ 31.87					$ 53.31	$ 31.95
Sep-42						$ 48.45	$ 28.75					$ 47.89	$ 28.40					$ 48.71	$ 28.98					$ 48.48	$ 29.05
Oct-42						$ 45.72	$ 35.41					$ 44.00	$ 34.66					$ 44.14	$ 34.71					$ 45.59	$ 35.08
Nov-42						$ 45.72	$ 35.41					$ 44.00	$ 34.66					$ 44.14	$ 34.71					$ 45.59	$ 35.08
Dec-42						$ 50.75	$ 39.31					$ 48.84	$ 38.47					$ 48.99	$ 38.52					$ 50.60	$ 38.94
Jan-43						$ 77.29	$ 59.86					$ 74.38	$ 58.59					$ 74.61	$ 58.67					$ 77.06	$ 59.30
Feb-43						$ 72.69	$ 56.30					$ 69.96	$ 55.10					$ 70.17	$ 55.18					$ 72.47	$ 55.77
Mar-43						$ 58.42	$ 45.25					$ 56.22	$ 44.28					$ 56.39	$ 44.35					$ 58.24	$ 44.82
Apr-43						$ 51.36	$ 39.78					$ 49.42	$ 38.93					$ 49.57	$ 38.98					$ 51.20	$ 39.40
May-43						$ 51.19	$ 39.65					$ 49.26	$ 38.80					$ 49.41	$ 38.86					$ 51.04	$ 39.28
Jun-43						$ 50.21	$ 29.79					$ 49.63	$ 29.43					$ 50.47	$ 30.03					$ 50.23	$ 30.10
Jul-43						$ 60.20	$ 35.72					$ 59.50	$ 35.29					$ 60.52	$ 36.01					$ 60.23	$ 36.09
Aug-43						$ 54.88	$ 32.56					$ 54.25	$ 32.17					$ 55.17	$ 32.83					$ 54.91	$ 32.90
Sep-43						$ 49.90	$ 29.60					$ 49.32	$ 29.25					$ 50.16	$ 29.85					$ 49.92	$ 29.91
Oct-43						$ 47.09	$ 36.47					$ 45.32	$ 35.70					$ 45.45	$ 35.74					$ 46.95	$ 36.13
Nov-43						$ 47.09	$ 36.47					$ 45.32	$ 35.70					$ 45.45	$ 35.74					$ 46.95	$ 36.13
Dec-43						$ 52.26	$ 40.48					$ 50.30	$ 39.62					$ 50.45	$ 39.67					$ 52.11	$ 40.10
Jan-44						$ 79.39	$ 61.49					$ 76.40	$ 60.18					$ 76.63	$ 60.26					$ 79.15	$ 60.91
Feb-44						$ 74.66	$ 57.83					$ 71.86	$ 56.60					$ 72.07	$ 56.68					$ 74.44	$ 57.28
Feb-44						$ 60.00	$ 46.47					$ 57.75	$ 45.48					$ 57.92	$ 45.55					$ 59.82	$ 46.04
Mar-44						$ 52.75	$ 40.85					$ 50.76	$ 39.99					$ 50.92	$ 40.04					$ 52.59	$ 40.47
Apr-44						$ 52.58	$ 40.72					$ 50.60	$ 39.86					$ 50.75	$ 39.91					$ 52.42	$ 40.34
May-44						$ 51.57	$ 30.60					$ 50.97	$ 30.23					$ 51.84	$ 30.85					$ 51.59	$ 30.92
Jun-44						$ 61.83	$ 36.69					$ 61.12	$ 36.24					$ 62.16	$ 36.98					$ 61.86	$ 37.07
Jul-44						$ 56.37	$ 33.44					$ 55.72	$ 33.04					$ 56.67	$ 33.72					$ 56.40	$ 33.79
Aug-44						$ 51.25	$ 30.41					$ 50.66	$ 30.04					$ 51.52	$ 30.66					$ 51.28	$ 30.73
Sep-44						$ 48.37	$ 37.46					$ 46.55	$ 36.66					$ 46.69	$ 36.71					$ 48.22	$ 37.11
Oct-44						$ 48.37	$ 37.46					$ 46.55	$ 36.66					$ 46.69	$ 36.71					$ 48.22	$ 37.11
Nov-44						$ 53.68	$ 41.58					$ 51.66	$ 40.69					$ 51.82	$ 40.75					$ 53.52	$ 41.19
Dec-44						$ 81.54	$ 63.15					$ 78.47	$ 61.81					$ 78.71	$ 61.90					$ 81.29	$ 62.56

Energy Year (Year ending May)	Class I REC Cost	Capacity Price ($/MW-day)			
		PSE&G	JCP&L	ACE	RECO
2017	$ 13.00	$ 224.70	$ 163.27	$ 163.27	$ 163.27
2018	$ 13.26	$ 208.59	$ 153.74	$ 153.74	$ 153.74
2019	$ 13.53	$ 218.98	$ 218.98	$ 218.98	$ 218.98
2020	$ 13.80	$ 115.93	$ 115.68	$ 115.68	$ 115.68
2021	$ 14.07	$ 174.85	$ 174.85	$ 174.85	$ 174.85
2022	$ 14.35	$ 190.00	$ 165.00	$ 165.00	$ 165.00
2023	$ 14.64	$ 193.80	$ 168.30	$ 168.30	$ 168.30
2024	$ 14.93	$ 197.68	$ 171.67	$ 171.67	$ 171.67
2025	$ 15.23	$ 201.63	$ 175.10	$ 175.10	$ 175.10
2026	$ 15.54	$ 205.66	$ 178.60	$ 178.60	$ 178.60
2027	$ 15.85	$ 209.78	$ 182.17	$ 182.17	$ 182.17
2028	$ 16.16	$ 213.97	$ 185.82	$ 185.82	$ 185.82
2029	$ 16.49	$ 218.25	$ 189.53	$ 189.53	$ 189.53
2030	$ 16.82	$ 222.62	$ 193.32	$ 193.32	$ 193.32
2031	$ 17.15	$ 227.07	$ 197.19	$ 197.19	$ 197.19
2032	$ 17.50	$ 231.61	$ 201.13	$ 201.13	$ 201.13
2033	$ 17.85	$ 236.24	$ 205.16	$ 205.16	$ 205.16
2034	$ 18.20	$ 240.97	$ 209.26	$ 209.26	$ 209.26
2035	$ 18.57	$ 245.79	$ 213.45	$ 213.45	$ 213.45
2036	$ 18.94	$ 250.70	$ 217.71	$ 217.71	$ 217.71
2037	$ 19.32	$ 255.71	$ 222.07	$ 222.07	$ 222.07
2038	$ 19.70	$ 260.83	$ 226.51	$ 226.51	$ 226.51
2039	$ 20.10	$ 266.05	$ 231.04	$ 231.04	$ 231.04
2040	$ 20.50	$ 271.37	$ 235.66	$ 235.66	$ 235.66
2041	$ 20.91	$ 276.79	$ 240.37	$ 240.37	$ 240.37
2042	$ 21.33	$ 282.33	$ 245.18	$ 245.18	$ 245.18
2043	$ 21.75	$ 287.98	$ 250.08	$ 250.08	$ 250.08
2044	$ 22.19	$ 293.74	$ 255.09	$ 255.09	$ 255.09
2045	$ 22.63	$ 299.61	$ 260.19	$ 260.19	$ 260.19
2046	$ 23.09	$ 305.60	$ 265.39	$ 265.39	$ 265.39
2047	$ 23.55	$ 311.72	$ 270.70	$ 270.70	$ 270.70
2048	$ 24.02	$ 317.95	$ 276.11	$ 276.11	$ 276.11
2049	$ 24.50	$ 324.31	$ 281.64	$ 281.64	$ 281.64
2050	$ 24.99	$ 330.79	$ 287.27	$ 287.27	$ 287.27

Comparison of Electric Revenue Benefits
Company, Alternative (CEEEP) and Alternative (OSW Solicitation)

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[redacted]

Source: Rebuttal Testimony of Steven Gabel, page 11, lines 1 through 21; Company Petition, Appendix B, Attachment 72; Center for Energy, Economic & Environmental Policy. 2018. Energy Efficiency Cost-Benefit Analysis Avoided Cost Assumptions. March 13, 2018. Available at: http://www.njcleanenergy.com/files/file/Library/Market%20Research/Avoided%20Cost%20Memo%20(3-13-18).pdf; and New Jersey BPU, Guidelines for Application Submission for Proposed Offshore Wind Facilities, September 17, 2018. Available at: https://www.njoffshorewind.com/application-documents/.

Comparison of Capacity Revenue Benefits
Company, Alternative (CEEEP) and Alternative (OSW Solicitation)

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Source: Rebuttal Testimony of Steven Gabel, page 11, line 25 through page 13, line 12; Company Petition, Appendix B, Attachment 72; Center for Energy, Economic & Environmental Policy. 2018. Energy Efficiency Cost-Benefit Analysis Avoided Cost Assumptions. March 13, 2018. Available at: http://www.njcleanenergy.com/files/file/Library/Market%20Research/Avoided%20Cost%20Memo%20(3-13-18).pdf; and New Jersey BPU, Guidelines for Application Submission for Proposed Offshore Wind Facilities, September 17, 2018. Available at: https://www.njoffshorewind.com/application-documents/.

Comparison of Class I REC Benefits
Company, Alternative (CEEEP) and Alternative (OSW Solicitation)

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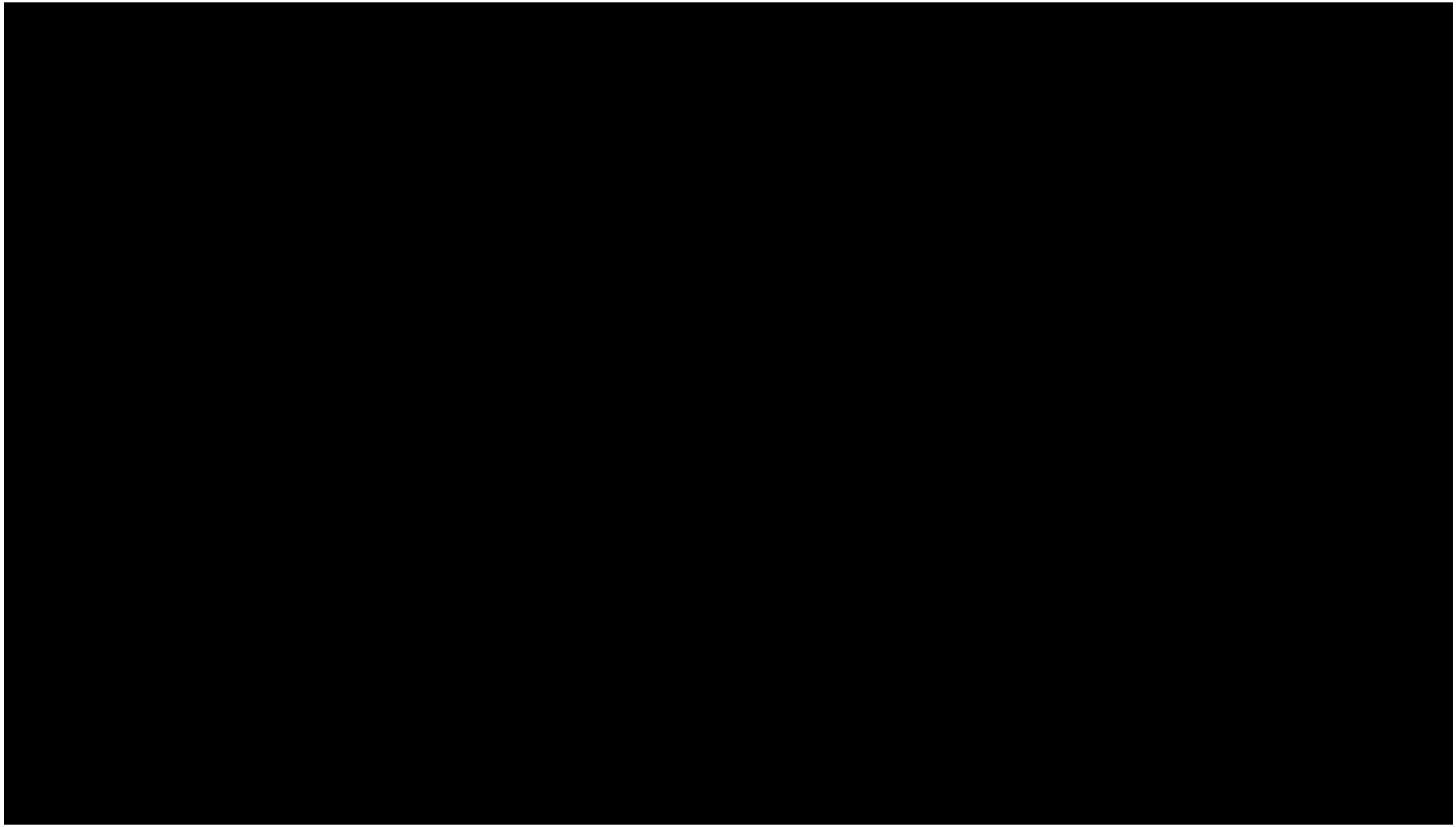

Source: Rebuttal Testimony of Steven Gabel, page 14, lines 1 through 9; Company Petition, Appendix B, Attachment 72; Center for Energy, Economic & Environmental Policy. 2018. Energy Efficiency Cost-Benefit Analysis Avoided Cost Assumptions. March 13, 2018. Available at: http://www.njcleanenergy.com/files/file/Library/Market%20Research/Avoided%20Cost%20Memo%20(3-13-18).pdf; and New Jersey BPU, Guidelines for Application Submission for Proposed Offshore Wind Facilities, September 17, 2018. Available at: https://www.njoffshorewind.com/application-documents/.

Comparison of Net Benefit Analysis
Company, Alternative (CEEEP) and Alternative (OSW Solicitation)

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Source: Rebuttal Testimony of Steven Gabel, page 3, lines 23 through 31; Company Petition, Appendix B, Attachment 72; Center for Energy, Economic & Environmental Policy. 2018. Energy Efficiency Cost-Benefit Analysis Avoided Cost Assumptions. March 13, 2018. Available at: http://www.njcleanenergy.com/files/file/Library/Market%20Research/Avoided%20Cost%20Memo%20(3-13-18).pdf; and New Jersey BPU, Guidelines for Application Submission for Proposed Offshore Wind Facilities, September 17, 2018. Available at: https://www.njoffshorewind.com/application-documents/.

Hedge Value of Proposed OREC Prices

Study	Price Adder	Source
Net Metering in Mississippi	10%	Stanton et al. *Net Metering in Mississippi*. Synapse Energy Economics. Appendix A. http://www.synapse-energy.com/sites/default/files/Net%20Metering%20in%20Mississippi.pdf
Analysis of New England fixed-price electricity contracts	8-10%	Hornby et al. *Avoided Energy Supply Costs in New England: 2013 Report*. Synapse Energy Economics. pp 5-22. http://publicservice.vermont.gov/sites/dps/files/documents/Energy_Efficiency/AESC%20Report%20-%20With%20Appendices%20Attached.pdf
PacifiCorp Resource Plan	9.6%	*2013 Integrated Resource Plan*. Rocky Mountain Power. http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Integrated_Resource_Plan/2013IRP/PacifiCorp-2013IRP_Vol1-Main_4-30-13.pdf http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Integrated_Resource_Plan/2013IRP/PacifiCorp-2013IRP_Vol2-Appendices_4-30-13.pdf
Solar PV cost-benefit study in New Jersey and Pennsylvania	7.5-18%	Stanton et al. *Net Metering in Mississippi*. Synapse Energy Economics. Appendix A. http://www.synapse-energy.com/sites/default/files/Net%20Metering%20in%20Mississippi.pdf
Analysis of Natural Gas, fixed-price contracts	17-24%	Bolinger et al. *Quantifying the Value that Energy Efficiency and Renewable Energy Provide As a Hedge Against Volatile Natural Gas Prices*. Lawrence Berkley National Labs. http://aceee.org/files/proceedings/2002/data/papers/SS02_Panel5_Paper02.pdf
Analysis of fixed-price contracts for residential customers in Ohio	8%	*Is Fixed Price Energy a Good Deal?* Walden Labs. https://waldenlabs.com/is-fixed-price-energy-a-good-deal/
Vermont Guidelines on Program Screening	10%	*EEU Avoided Costs for the 2016-2017 Time Period*. P. 17 – number 6. http://puc.vermont.gov/sites/psbnew/files/doc_library/order-re-eeu-avoided-cost-2016-2017.pdf
Oregon Guidelines on Program Screening	10%	Stanton et al. *Net Metering in Mississippi*. Synapse Energy Economics. Appendix A. http://www.synapse-energy.com/sites/default/files/Net%20Metering%20in%20Mississippi.pdf
Value of EE to Reduce Wholesale Price Volatility	14%	Baatz, Barrett, Stickles. *Estimating the Value of Energy Efficiency to Reduce Wholesale Energy Price Volatility*. http://aceee.org/research-report/u1803

Nautilus states that "the value of the hedge is not that OREC prices are lower than market prices (…); it's that the project protects ratepayers from wholesale market price increases (…). (Gabel Rebuttal 15:26 to 16:2)

Three of the studies referenced by Nautilus are sourced as a Net Metering analysis conducted by Synapse Energy Economics for the State of Mississippi. This analysis used a 10 percent adder for the hedge value benefit. (Stanton et al. *Net Metering in Mississippi*. Synapse Energy Economics. P. 60.)

Source: Petition, Appendix B, p. 90; and Stanton et al. *Net Metering in Mississippi*. Synapse Energy Economics. P. 60.

Hedge Value of Proposed OREC Prices

Stanton, Elizabeth A. et. al. (September 19, 2014). *Net Metering in Mississippi: Costs, Benefits, and Policy Considerations*. Synapse Energy Economics Inc. P. 60.

Rocky Mountain Institute Review of Solar PV Benefit and Cost Studies

Rocky Mountain Institute (RMI) conducted a review of solar photovoltaic benefit and cost studies.[65] In that study, RMI considers financial and security risks; a number of other types of risk, such as environmental ones, are not considered. While RMI notes that there is little agreement on an approach to estimating the unmonetized values of financial and security risk, it does report the risk-related benefits for fuel price hedge as reported by studies performed by Clean Power Research in Texas and New Jersey/Pennsylvania, as well as studies by NREL and by a team of researchers led by Richard Duke (RMI 2013, 35). There is a wide range in these values and they are fairly substantial, ranging from about 0.5 cents per kWh to over 3.0 cents per kWh ($5 per MWh to $30 per MWh).

The Clean Power Research (CPR) hedge benefits are based on an analysis of the volatility of natural gas prices, which are then reflected in electricity prices. The cited Texas reports are short on numbers, but the New Jersey/Pennsylvania report has more specifics. In the latter report, CPR calculates the levelized value of solar in Pennsylvania and New Jersey from $256 to $318 per megawatt hour. The fuel price hedge values range from $24 to $47 per MWh, thus roughly in the order of 10 percent.

The cited NREL study[66] gives a natural gas hedge value for photovoltaics a range from 0.0 to 0.9 cents per kWh. Overall, the total photovoltaic benefits in that study range from about 7 to 35 cents per kWh ($70 to $350 per MWh). So the hedge value fraction ranges from roughly 0 to 12 percent of the total avoided costs.

Note also that the hedge values cited in the RMI study appear to depend largely on the volatility of natural gas prices, which is likely to be lower in the future due to increased supply and lower prices in the U.S.

Conclusions and Recommendations

There are certainly a variety of risk reduction benefits of renewable generation (and energy efficiency), whether those resources come from central stations or distributed sources. The difficulties in assigning a value to these benefits lie in:

1. Quantifying the risks,
2. Identifying the risk reduction effects of renewables, and
3. Quantifying those risk reduction benefits.

To do all three steps properly would be both difficult and contentious. None of the research and case studies reviewed above has attempted it. The nearest example is the NWPCC Power Plans.

[65] Hansen, L., L. Virginia. 2013. *A Review of Solar PV Benefit and Cost Studies*. Rocky Mountain Institute. Available at: http://www.rmi.org/Knowledge-Center%2FLibrary%2F2013-13_eLabDERCostValue.

[66] Contreras, J.L., Frantzis, L., Blazewicz, S., Pinault, D., Sawyer, H. 2008. *Photovoltaics Value Analysis*. Navigant Consulting.

Notably, the Mississippi Net Metering Study did not reach its recommendations of a 10 percent adder based on a quantifiable analysis. Synapse instead referenced a prior Clean Power Research analysis that was "short on numbers," and a more evolved analysis conducted by Navigant Consulting in 2008 for the National Renewable Energy Laboratory ("NREL").

As noted by Synapse, "hedge values cited in [prior analyses] depend largely on the volatility of natural gas prices, which is likely to be lower in the future due to increased supply and lower prices in the U.S."

Source: Stanton et al. *Net Metering in Mississippi.* Synapse Energy Economics. P. 60.

Hedge Value of Proposed OREC Prices

J.L. Contreras et. al. (February 2008). *Photovoltaics Value Analysis*. Navigant Consulting Inc. P. 13.

Methodology 1: Guarantee Electricity Supply Costs
Natural gas hedge value ($/kWh) = Cost to guarantee that a portion of electricity supply costs are fixed ($/kWh)

Methodology stated in paper is the exact same framework applied by Dr. Dismukes in his Direct Testimony (evaluation of the historic benefit of a fixed price for electricity avoiding a variable one based on natural gas prices).

3.3.5 Ancillary Services

Methodology 1: Utility Bill Analysis

Ancillary Services include: VAR Support, load following, operating reserves, and dispatch and scheduling. The distributed generation (DG) units are unlikely or unable to participate in the markets for load following, operating reserves, and dispatch and scheduling. Although unlikely to participate in the market, synchronous DG may provide some of these services when operating. The potential value of ancillary services to other electric ratepayers for PV used in the Rocky Mountain Institute Report[23] is valued at the CAISO market price range of 0.5 to 1.5 cents/kWh. The Vote Solar White Paper [24] values ancillary services at 0.2 cents/kWh. The Austin Energy Report[25] evaluates the voltage regulation benefit by assuming that PV inverters could be modified to operate at the desired power factor. The results suggest that although there is a range depending on how much the PV system can be depended on for voltage support, the value will always be close to 0 cents/kWh. The MTC report by NCI values ancillary services at 0.3 cents/kWh, based on the E3 Report.[26]

Table 7. Range and Drivers: Ancillary Services

Range of Value	Net (¢ /kWh)	Drivers
High End of Range (90% percentile)	1.5	•Ancillary Service Prices •Perceived reliability for voltage support.
Low End of Range (10% percentile)	-	

3.3.6 Hedge Value

Methodology 1: Guarantee Electricity Supply Costs

Natural gas hedge value ($/kWh) = Cost to guarantee that a portion of electricity supply costs are fixed ($/kWh)

The value equals the cost of natural gas futures discounted at the risk-free discount rate. This analysis requires the natural gas price over the life of the PV system and the risk free discount rate associated with each year of the analysis. The Austin Energy Report uses NYMEX natural gas futures prices and the U.S. Treasury Yield Curve for risk free discounts rates. (The London Interbank Offer Rate (LIBOR) could also be used.) The Austin Energy Report had a discount factor of 0.96 in 2007 and 0.27 in 2035. The ASPv report values of the price hedge from 0.4 to 0.9 cents/kWh.

[23] Energy and Environmental Economics, Inc. and Rocky Mountain Institute, Methodology and Forecast of Long Term Avoided Costs for the Evaluation of California Energy Efficiency Programs (October 25, 2004)
[24] Smellof E., Quantifying the Benefits of Solar Power for California (January 2005)
[25] Hoff, T.E., Perez, R., Braun, G., Kuhn, M., Norris, B., The Value of Distributed Photovoltaics to Austin Energy and the City of Austin, Clean Power Research LLC, (March 17, 2006)
[26] Navigant Consulting Inc., Distributed Generation and Distribution Planning: An Economic Analysis for the Massachusetts DG Collaborative (February 12, 2006)

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Source: J.L. Contreras et. al. (February 2008). *Photovoltaics Value Analysis*. Navigant Consulting Inc. P. 13.

Hedge Value:
PJM NJ Hub Price Avoidance, 2014

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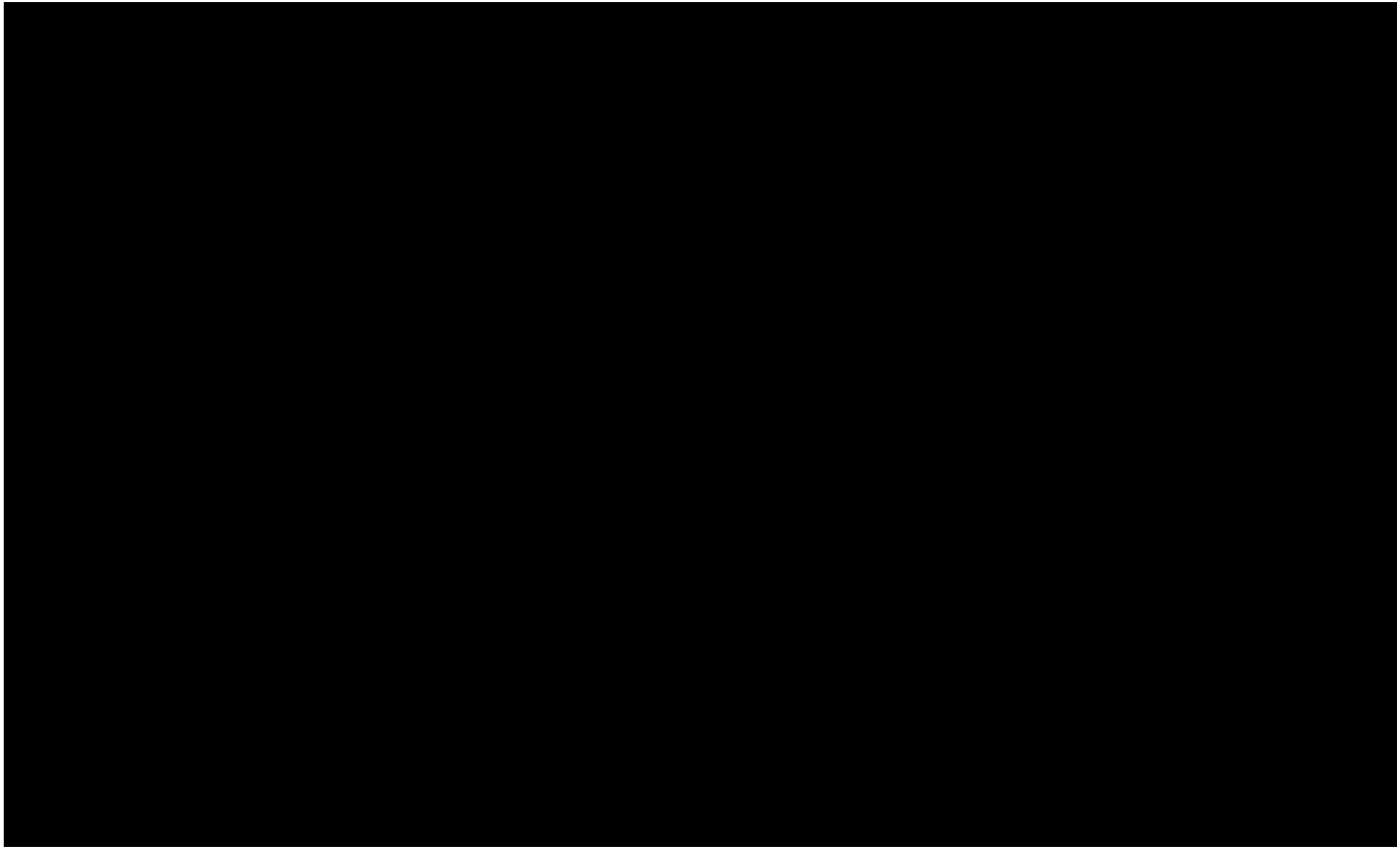

Source: PJM; Company Petition, Appendix B, Attachment 72; and Company Rebuttal, CONFIDENTIAL - EXHIBIT SG-1.

Comparison of Net Benefit Analysis
Company, Alternative (CEEEP) and Alternative (OSW Solicitation) without Merit Order and Volatility Benefits

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Source: Rebuttal Testimony of Steven Gabel, page 3, lines 23 through 31; Company Petition, Appendix B, Attachment 72; Center for Energy, Economic & Environmental Policy. 2018. Energy Efficiency Cost-Benefit Analysis Avoided Cost Assumptions. March 13, 2018. Available at: http://www.njcleanenergy.com/files/file/Library/Market%20Research/Avoided%20Cost%20Memo%20(3-13-18).pdf; and New Jersey BPU, Guidelines for Application Submission for Proposed Offshore Wind Facilities, September 17, 2018. Available at: https://www.njoffshorewind.com/application-documents/.