SOUTHERN ENVIRONMENTAL LAW CENTER

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Jan 23 2018

January 23, 2018

Via Electronic Filing

Ms. Martha Lynn Jarvis
Chief Clerk
North Carolina Utilities Commission
430 North Salisbury Street
Dobbs Building
Raleigh, NC 27603-5918

RE: In the Matter of: Application of Duke Energy Carolinas, LLC for Adjustment of Rates and Charges Applicable to Electric Service in North Carolina; ***Docket No. E-7, Sub 1146***

Dear Ms. Jarvis:

Enclosed for filing in the referenced docket is the Testimony of Jonathan Wallach on behalf of The North Carolina Justice Center, North Carolina Housing Coalition, Natural Resources Defense Council, and Southern Alliance for Clean Energy. Pursuant to Commission Rule R1-28(e), we are also submitting fifteen (15) paper copies of the testimony and accompanying exhibits for delivery on January 24, 2018.

By copy of this letter, I am serving all parties of record on the service list. Please let me know if you have any questions about this filing.

Sincerely,

s/ Robin G. Dunn
Administrative Legal Assistant

RGD
Enclosures
cc: Parties of Record

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STATE OF NORTH CAROLINA

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

In the Matter of:	**)**	
	)	
Application of Duke Energy Carolinas, LLC	**)**	**Docket No. E-7, Sub 1146**
For Adjustment of Rates and Charges	**)**	
Applicable to Electric Service in	**)**	
North Carolina	**)**	

DIRECT TESTIMONY OF

JONATHAN WALLACH

ON BEHALF OF

THE NORTH CAROLINA JUSTICE CENTER, NORTH CAROLINA HOUSING COALITION, NATURAL RESOURCES DEFENSE COUNCIL, AND SOUTHERN ALLIANCE FOR CLEAN ENERGY

Resource Insight, Inc.

JANUARY 23, 2018

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I. INTRODUCTION AND SUMMARY

Q: PLEASE STATE YOUR NAME, OCCUPATION, AND BUSINESS ADDRESS.

A: My name is Jonathan F. Wallach. I am Vice President of Resource Insight, Inc., 5 Water Street, Arlington, Massachusetts.

Q: PLEASE SUMMARIZE YOUR PROFESSIONAL EXPERIENCE.

A: I have worked as a consultant to the electric power industry since 1981. From 1981 to 1986, I was a Research Associate at Energy Systems Research Group. In 1987 and 1988, I was an independent consultant. From 1989 to 1990, I was a Senior Analyst at Komanoff Energy Associates. I have been in my current position at Resource Insight since 1990.

Over the past four decades, I have advised and testified on behalf of clients on a wide range of economic, planning, and policy issues relating to the regulation of electric utilities, including: electric-utility restructuring; wholesale-power market design and operations; transmission pricing and policy; market-price forecasting; market valuation of generating assets and purchase contracts; power-procurement strategies; risk assessment and mitigation; integrated resource planning; mergers and acquisitions; cost allocation and rate design; and energy-efficiency program design and planning.

My resume is attached as Exhibit JFW-1.

Q: HAVE YOU TESTIFIED PREVIOUSLY IN UTILITY PROCEEDINGS?

A: Yes. I have sponsored expert testimony in more than eighty state, provincial, and federal proceedings in the U.S. and Canada, including before this

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Commission in the Duke Energy Progress general rate case, Docket No. E-2, Sub 1142. I include a detailed list of my previous testimony in Exhibit JFW-1.

Q: ON WHOSE BEHALF ARE YOU TESTIFYING?

A: I am testifying on behalf of the North Carolina Justice Center, North Carolina Housing Coalition, Natural Resources Defense Council, and Southern Alliance for Clean Energy.

Q: ARE YOU SPONSORING ANY EXHIBITS?

A: Yes. I am sponsoring the following exhibits:

- Exhibit JFW-1: Resume of Jonathan Wallach, Resource Insight, Inc.
- Exhibit JFW-2: Citations to Marginal-Price Elasticity Studies

Q: WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A: On August 25, 2017, Duke Energy Carolinas, LLC ("DEC" or "the Company") filed an application and supporting testimony for approval of increased electric rates and charges. My testimony focuses on the Company's proposal to increase the monthly Basic Facilities Charge ("BFC") for residential customers. I respond to the testimony of Company witness Janice Hager regarding the Company's cost of service study ("COSS"), which served as the basis for its proposal to increase the BFC, and the testimony of Michael J. Pirro regarding DEC's proposed increase in the BFC.

Q: DOES YOUR TESTIMONY ADDRESS THE ALLOCATION OF COSTS TO THE VARIOUS RATE CLASSES BASED ON THE COMPANY'S COSS?

A: No. My testimony does not assess whether the allocation methods used in the Company's COSS produce a reasonable allocation of costs to rate classes.

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Instead, my testimony addresses the Company's proposal to rely on the allocation results from the COSS to set the level of the residential BFC.

Q: PLEASE SUMMARIZE YOUR FINDINGS AND RECOMMENDATIONS.

A: The Company has not justified its proposal to increase the residential BFC. As explained in more detail below, the proposed increase would:

- Inappropriately shift recovery of load-related costs to the residential BFC.
- Exacerbate subsidization of high-usage residential customers' costs by low-usage customers, and thereby inequitably increase bills for the Company's low-usage residential customers.
- Dampen price signals to consumers for investing in energy efficiency or distributed renewable generation.

Consequently, the Commission should reject the Company's proposal to increase the monthly BFC for residential customers.

Q: HOW IS THE REST OF YOUR TESTIMONY ORGANIZED?

A: In Section II, I describe the Company's proposal and rationale for increasing the residential BFC. In Section III, I discuss how the Company's proposal would result in a residential BFC that exceeds the actual customer-related cost per residential customer, and would thereby give rise to cost subsidization within the residential class. In Section IV, I explain how the customer charge is intended to reflect the cost to connect a customer who uses very little or zero electricity to the distribution system. I further explain in Section IV how the Company's proposal to collect more than the costs of meters, service drops, and customer services through the residential BFC would inappropriately shift recovery of load-related costs from the volumetric energy rate to the BFC and thereby

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dampen energy price signals. Finally, Section V summarizes my conclusions and recommendations.

II. DEC'S PROPOSAL TO INCREASE THE BASIC FACILITIES CHARGE

Q: WHAT IS THE BASIC FACILITIES CHARGE?

A: The BFC is a fixed fee charged to each customer on their monthly bill regardless of the customer's energy usage during that month.

Q: WHAT IS THE COMPANY'S PROPOSAL WITH RESPECT TO THE BFC FOR RESIDENTIAL CUSTOMERS?

A: For residential customers taking standard service under Rate Schedules RS, RE, ES, or ESA, DEC proposes to increase the BFC from $11.80 to $17.79 per customer per month.[1] The proposed $5.99 increase represents a 51% increase over the current BFC.

For residential customers taking time-of-use service under Rate Schedule RT, DEC proposes to increase the BFC from $13.38 to $18.73 per customer per month.[2] The proposed $5.35 increase represents a 40% increase over the current BFC for Rate Schedule RT customers.

[1] Pirro Exhibit 8, attached to *Direct Testimony of Michael J. Pirro for Duke Energy Carolinas, LLC*, Docket No. E-7, Sub 1146 (August 25, 2017) [hereinafter "Pirro Direct"]. Standard residential service is provided under Rate Schedule RS. Rate Schedule RE is applicable to residential customers who use electricity for all major end-uses. Rate Schedule ES is applicable to residential customers whose homes meet Energy Star standards. Rate Schedule ESA is applicable to residential customers who use electricity for all major end-uses and whose homes meet Energy Star standards.

[2] *Id*.

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Q: WHAT IS THE COMPANY'S RATIONALE FOR INCREASING THE BFC FOR RESIDENTIAL CUSTOMERS?

A: Company witness Pirro contends that the Company's proposal would result in a residential BFC that better reflects the customer-related cost per residential customer, as indicated by the results of the COSS:

> DE Carolina requests to increase the monthly BFC from $11.80 to $17.79 to better recover customer-related cost identified in the unit cost study for the residential rate class. Although the Company's analysis supports increasing the BFC to $23.78, we have suggested a smaller increase to moderate any effect on low usage customers.[3]

Q: WHY DOES DEC WANT TO MOVE THE RESIDENTIAL BFC CLOSER TO ITS ESTIMATE OF CUSTOMER-RELATED COST PER RESIDENTIAL CUSTOMER?

A: The Company offers two justifications for this proposal. First, Mr. Pirro asserts that increasing the BFC would mitigate purported subsidization of low-usage customers' customer-related costs by larger residential customers.[4] Second, Mr. Pirro claims that increasing the BFC to better reflect customer-related embedded costs would "signal to these customers what is the true cost impact of their usage."[5]

I address each of these justifications in the following two sections.

[3] Pirro Direct, 13.

[4] *Id.*, 10.

[5] *Id.*, 11.

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III. DEC'S PROPOSAL TO INCREASE THE BASIC FACILITIES CHARGE WOULD EXACERBATE INTRA-CLASS COST SUBSIDIZATION

Q: WHAT IS THE BASIS FOR MR. PIRRO'S ASSERTION THAT INCREASING THE BASIC FACILITIES CHARGE WOULD MITIGATE SUBSIDIZATION WITHIN THE RESIDENTIAL CLASS?

A: Mr. Pirro relies on the results of the COSS to support this claim. Specifically, Mr. Pirro reports in his direct testimony that DEC estimates a customer-related cost of $23.78 per residential customer per month based on the results of the COSS.[6] In other words, the Company estimates based on the results of the COSS that the "minimum" cost to serve a residential customer – i.e., the cost to serve a residential customer regardless of that customer's usage – is $23.78 per month.[7] With the BFC currently set at $11.80 per customer per month, the Company's estimate implies that $11.98 of the minimum cost to serve a residential customer is currently being recovered through residential volumetric energy rates.

If the Company's estimate of the customer-related cost per residential customer were reasonable, the remaining $11.98 of customer-related costs currently being recovered through the volumetric energy rate would represent a subsidy payment from customers with above-average usage to those with below-average usage. Specifically, customers with above-average usage would pay more than $11.98 per month toward recovery of minimum costs through the energy rate, while customers with below-average usage would pay less than $11.98 per month. Thus, under Mr. Pirro's rationale, the Company's proposal to increase the residential BFC from $11.80 to $17.79 would reduce the amount of

[6] *Id.*, 13.

[7] More precisely, $23.78 per month is the Company's estimate of the minimum cost to serve a Rate Schedule RS or ES customer. The Company estimates a minimum cost to serve a Rate Schedule RE or ESA customer of $24.98 per month. *See* Pirro Exhibit 8.

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customer-related costs recovered through the energy rate and thereby reduce the alleged subsidy payment from customers with above-average usage to those with below-average usage.

Q: DO YOU AGREE WITH MR. PIRRO'S CLAIM THAT INCREASING THE BFC WOULD REDUCE SUBSIDIZATION OF CUSTOMER-RELATED COSTS WITHIN THE RESIDENTIAL CLASS?

A: No. To the contrary, I conclude from a review of the COSS that residential customers with above-average usage are currently being subsidized by customers with below-average usage. Thus, the Company's proposal would actually *exacerbate* intra-class subsidization – and thereby disproportionately and inequitably increase bills for low-usage customers – by shifting load-related costs inappropriately from high-usage to low-usage customers.

Q: HOW DID YOU ARRIVE AT THIS CONCLUSION?

A: Based on my review, I find that DEC relies on the results of a minimum system analysis to estimate a customer-related distribution plant cost per residential customer. As discussed below, it is not appropriate to rely on the results of minimum system analyses to estimate *per-customer* minimum plant costs, since such analyses typically overstate the true minimum cost per customer for distribution plant. Correcting for this overstatement, I find that the total customer-related cost per residential customer is less than the amount currently being recovered through the BFC, which indicates that low-usage customers are, in fact, currently subsidizing high-usage customers.

Q: DO YOU DISPUTE THE COMPANY'S USE OF A MINIMUM SYSTEM ANALYSIS FOR THE PURPOSES OF ALLOCATING COSTS TO THE VARIOUS RATE CLASSES?

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A: No. I am not testifying in this proceeding as to whether it is reasonable to rely on a minimum system analysis for the purposes of allocating costs to rate classes in the Company's COSS. Instead, my testimony explains why it is unreasonable for DEC to use of the results of a minimum system analysis to estimate the customer-related cost per residential customer.

Q: HOW DOES THE COMPANY DERIVE THE CUSTOMER-RELATED COST PER RESIDENTIAL CUSTOMER?

A: In order to allocate costs to customer classes, the COSS first separates total costs into production, transmission, distribution, and customer functions. Costs in each function are then classified as energy-, demand-, or customer-related based on whether costs are considered to be "caused" by energy sales, peak demand, or the number of customers, respectively. Finally, costs classified as either energy-, demand-, or customer-related are allocated to customer classes in proportion to each class's contribution to total-system energy sales, peak demand, or number of customers, respectively.

According to Company witness Hager, the cost of meters, service drops, and customer services are deemed to be customer-related in the COSS. In addition, as discussed in detail below, the COSS classifies a portion of pole, conductor, and secondary transformer costs as customer-related, based on the results of a minimum system analysis of such distribution plant costs.[8]

For each of these costs classified as customer-related – i.e., the costs of meters, service drops, customer services, and the customer-related portion of distribution plant, DEC estimates a cost per residential customer by taking the amount of such costs allocated to the residential class in the COSS and then

[8] DEC response to NC Justice Center et al. Data Request Item No. 1-12.

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dividing that amount by the number of residential customers. The Company's estimate of the total customer-related cost per residential customer is then the sum of the per-customer cost for meters, service drops, customer services, and the customer-related portion of distribution plant.

Q: PLEASE DESCRIBE THE COMPANY'S MINIMUM SYSTEM ANALYSIS OF POLE, CONDUCTOR, AND SECONDARY TRANSFORMER COSTS.

A: The Company's minimum system analysis attempts to estimate the cost to install the same amount of poles, wires, and transformers as are currently on the distribution system, assuming that each piece of distribution equipment is sized to meet minimal load. In other words, the Company's minimum system analysis attempts to estimate the cost to exactly replicate the configuration of the existing distribution system using "minimum-size" equipment.

In the COSS, the "minimum" portion of distribution plant costs (as determined by the minimum system analysis) is classified as customer-related and then allocated to customer classes in proportion to the number of customers in each class. As explained above, to derive the customer-related distribution plant cost per residential customer, DEC takes the customer-related plant cost allocated to the residential class from the COSS, and divides it by the number of residential customers.

Q: IS IT REASONABLE TO RELY ON THE RESULTS OF A MINIMUM SYSTEM ANALYSIS TO ESTIMATE THE CUSTOMER-RELATED DISTRIBUTION PLANT COST PER RESIDENTIAL CUSTOMER?

A: No. As noted above, the purpose of a minimum system analysis is to determine the portion of distribution plant costs to be allocated to customer classes based on the number of customers in each class. The Company has not offered any

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evidence that its minimum system analysis also yields reliable estimates of the customer-related distribution plant cost *per customer*.

To the contrary, minimum system analyses overstate the minimum plant cost per customer because they assume that a minimum system carrying minimal load would have the same number of poles, conductor-feet, and transformers as currently installed in a distribution system designed to carry actual distribution load. In other words, the minimum system method assumes that each piece of distribution equipment would serve the same number of customers on average, regardless of whether the customers are average-sized (as for the actual system) or have minimal demand (as for the hypothetical minimum system.)

This is not a realistic assumption, since even a minimally sized piece of distribution equipment should be able to serve more minimal-demand customers than the number of average-demand customers served by average-sized distribution equipment. Consequently, the true minimum distribution plant cost to serve a customer with minimal usage is likely to be less than that derived using a minimum system analysis. Indeed, since the minimum system method attempts to estimate the plant cost incurred regardless of usage – i.e., the cost to serve load approaching zero, the true minimum plant cost per customer is zero since distribution equipment that carries zero load can serve an infinite number of customers with zero load.

Q: HAS DEC ESTIMATED THE TOTAL CUSTOMER-RELATED COST PER RESIDENTIAL CUSTOMER BASED ON THE TRUE MINIMUM PLANT COST PER CUSTOMER?

A: Yes. In response to a data request, DEC modified its COSS to estimate the total customer-related cost per residential customer with a zero minimum plant cost

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per customer.[9] Specifically, DEC classified all pole, conductor, and line transformer costs as demand-related for this version of the COSS. This modified COSS without minimum-system classification of distribution plant costs therefore includes only the cost of meters, service drops, and customer services in the calculation of customer-related costs. Based on this modified COSS, DEC estimates a total customer-related cost per residential customer of $11.08 per customer per month.[10]

To put this in perspective, the current BFC for Rate Schedule RS customers of $11.80 per month is already 6.5% higher than the customer-related embedded cost per customer derived by DEC based on the results of the modified COSS.

Q: WHAT DOES THIS RESULT TELL US ABOUT COST SUBSIDIZATION WITHIN THE RESIDENTIAL CLASS UNDER THE CURRENT BASIC FACILITIES CHARGE?

A: The fact that the current BFC exceeds the true customer-related embedded cost per residential customer indicates that a portion of demand-related distribution plant costs are inappropriately being recovered through the current BFC. This means that under the current rate structure residential customers with below-average usage currently bear a disproportionate share of demand-related distribution plant costs. Consequently, lower-usage customers are subsidizing higher-usage customers under current rates, not the other way around as Mr. Pirro contends.

[9] DEC response to NC Justice Center et al. Data Request Item No. 1-8(d).

[10] This is the Company's estimate for Rate Schedule RS and ES customers. For Rate Schedule RS and ESA customers, DEC estimates a customer-related cost per customer of $11.35 per month.

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Q: HOW WOULD THE COMPANY'S PROPOSAL TO INCREASE THE BASIC FACILITIES CHARGE AFFECT COST SUBSIDIZATION WITHIN THE RESIDENTIAL CLASS?

A: The residential BFC is currently set at a rate that exceeds the true customer-related embedded cost per residential customer. Consequently, if the BFC were increased, low-usage customers would be required to further subsidize high-usage customers. Decreasing the BFC, on the other hand, would reduce the subsidy payment from low-usage to high-usage residential customers by shifting demand-related distribution plant costs from the BFC to the volumetric energy rate.

Q: WHAT IS THE EXTENT OF THE INTRA-CLASS SUBSIDIZATION UNDER THE COMPANY'S PROPOSAL TO INCREASE THE RESIDENTIAL BASIC FACILITIES CHARGE FROM $11.80 TO $17.79?

A: As explained above, the $5.99 increase in the residential BFC proposed by DEC represents demand-related distribution plant costs that would be recovered from each residential customer every month through a fixed charged on the customer's bill. The Company estimates about 20.1 million bills in the test year for Rate Schedules RS, RE, ES, and ESA. This means that an additional $120.7 million of demand-related distribution plant costs would be recovered annually through the BFC under the Company's proposal.[11]

If the additional demand-related costs recovered through the residential BFC under the Company's proposal were instead recovered through the volumetric energy rate, each residential customer would contribute to recovery of these costs in proportion to their usage. The Company estimates sales in the test year of about 21.2 million megawatt-hours for Rate Schedules RS, RE, ES,

[11] The number of residential bills in the test year is provided in Pirro Exhibit 8.

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and ESA. Therefore, if the $120.7 million of demand-related costs continued to be recovered through the energy rate rather than through the BFC, they would be charged at a rate of 0.57 cents per kilowatt-hour ("¢/kWh").[12] Under that rate structure, a residential customer with monthly usage of 500 kWh would contribute about $34 per year toward recovery of such costs while a customer with monthly usage of 1,500 kWh would contribute about $102 per year. Thus, the 1,500 kWh customer would contribute three times more than the 500 kWh customer, in direct proportion to their usage and consistent with accepted principles of cost-causation.

In contrast, under the Company's proposal to recover an additional $120.7 million of demand-related costs through the BFC, each residential customer would contribute about $72 per year toward recovery of such costs regardless of that customer's usage. A 500 kWh customer would therefore pay more than double their fair share of these demand-related costs under the Company's proposal while a 1,500 kWh customer would pay about 70% of their fair share.

IV. DEC'S PROPOSAL TO INCREASE THE BASIC FACILITIES CHARGE WOULD DAMPEN ECONOMICALLY EFFICIENT PRICE SIGNALS

Q: WOULD THE COMPANY'S PROPOSAL TO INCREASE THE RESIDENTIAL BASIC FACILITIES CHARGE SEND APPROPRIATE PRICE SIGNALS, AS MR. PIRRO CONTENDS?

A: No. As discussed below, DEC proposes to set the residential BFC at a rate that significantly exceeds the minimum cost to connect a residential customer. The Company's proposal would shift recovery of costs which are appropriately

[12] The Company's estimate of residential sales in the test year is provided in NCUC Form E-1 Data Request, Item No. 42(c).

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recovered through the volumetric energy rates to the BFC. This shift would result in an energy rate that understates the extent to which the Company's costs are driven by customer usage. Thus, contrary to Mr. Pirro's assertion, the Company's proposal would dampen energy price signals and discourage economically efficient behavior by residential customers.

Q: HOW SHOULD RESIDENTIAL ENERGY AND CUSTOMER CHARGES BE DESIGNED IN ORDER TO PROVIDE PRICE SIGNALS FOR EFFICIENT CUSTOMER BEHAVIOR?

A: Customer charges should reflect the fact that each customer contributes equally to certain distribution costs regardless of that customer's energy usage. Volumetric energy rates, on the other hand, recognize that customers of different sizes and load profiles contribute to other distribution, transmission, and generation costs at different levels. If usage-driven costs are inappropriately collected through fixed customer charges, then customers will have reduced incentives to invest in energy efficiency or distributed renewable generation.[13]

Accordingly, volumetric energy rates should be set at levels that recover those categories of costs that tend to increase with customer usage. Energy rates should include costs directly driven by customer usage, such as plant, fuel, and operation and maintenance costs. They should also include costs that tend to rise indirectly with customer usage level, such as collection costs, uncollectible costs, and some other customer-service costs.

[13] National Association of Regulatory Utility Commissioners, *Distributed Energy Resources* Rate *Design and Compensation*, 118 (November 2016), available at https://pubs.naruc.org/pub/19FDF48B-AA57-5160-DBA1-BE2E9C2F7EA0.

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In contrast, the customer charge is intended to reflect the cost to connect to the distribution system a customer who uses very little or zero energy.[14] Such "minimum connection costs" are generally limited to plant and maintenance costs for a service drop and meter, along with meter-reading, billing, and other customer-service expenses.[15]

Q: WHAT IS THE MINIMUM COST TO CONNECT A RESIDENTIAL CUSTOMER IN THE COMPANY'S SERVICE TERRITORY?

A: As discussed in Section III, DEC estimates a minimum connection cost for residential customers – the cost per residential customer for meters, service drops, and customer services – of $11.08 per month.

Q: HOW DOES THE COMPANY'S PROPOSED BASIC FACILITIES CHARGE COMPARE TO THE MINIMUM CONNECTION COST FOR A RESIDENTIAL CUSTOMER?

A: The $17.79 BFC proposed by DEC is 1.6 times the estimated minimum connection cost. The amount in excess of minimum connection cost represents usage-related costs that are appropriately recovered in the volumetric energy rate. However, under the Company's proposal, this excess over the minimum connection cost would instead be recovered through the BFC. This shift in the recovery of usage-related costs from the volumetric energy rate to the fixed BFC would dampen price signals and discourage economically efficient behavior by residential customers.

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[14] *See, e.g.,* Jim Lazar & Wilson Gonzalez, *Smart Rate Design for a Smart Future*, Regulatory Assistance Project, 36 (July 2015), available at http://www.raponline.org/wp-content/uploads/2016/05/rap-lazar-gonzalez-smart-rate-design-july2015.pdf.

[15] A very small customer in multi-family housing might not require their own service drop. If so, the cost to connect such a customer would not include the cost of a service drop.

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Q: HOW DOES THE COMPANY'S PROPOSAL TO INCREASE THE BASIC FACILITIES CHARGE TO $17.79 AFFECT THE RATE SCHEDULE RS ENERGY RATE?

A: Along with its proposal to increase the BFC to $17.79, DEC proposes to increase the energy rate to 10.05¢/kWh in order to recover the proposed allocation of adjusted test year revenue requirements to Rate Schedule RS customers.[16] If, instead, the BFC remained at its current rate of $11.80, the energy rate would need to be increased to 10.63¢/kWh to recover the same allocated revenue requirement.[17] Thus, under the Company's proposal to increase the BFC by $5.99, the energy rate would be 0.58¢/kWh, or about 5.5%, less than the energy rate without the proposed increase to the BFC.

Q: TO WHAT EXTENT WOULD THE LOWER ENERGY RATE UNDER THE COMPANY'S PROPOSAL FOR THE BASIC FACILITIES CHARGE DAMPEN PRICE SIGNALS FOR ENERGY SAVINGS?

A: Residential customers respond to the price signals sent by the electrical rate structure. When more of a utility's costs are recovered through a fixed charge that does not vary according to usage, the incentive to save energy is reduced.

Customer responses to electric utility rates are generally measured as price elasticities, i.e., the ratio of the percentage change in consumption to the percentage change in price. Price elasticities are generally low in the short term and rise over several years, because customers have more options for increasing or reducing energy usage in the medium to long term. For example, a review by Espey and Espey (2004) of 36 articles on residential electricity demand

[16] This is the average rate (weighted by sales) across both SSI and non-SSI customers, as estimated based on data provided in response to NC Justice Center et al. Data Request Item No. 1-3.

[17] *Id.*

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published between 1971 and 2000 reports short-run elasticity estimates of about −0.35 on average across studies and long-run elasticity estimates of about −0.85 on average across studies.[18] In other words, on average across these studies, consumption decreased by 0.35% in the short term and by 0.85% in the long term for every 1% increase in price.

Studies of electric price response typically examine the change in usage as a function of changes in the marginal rate paid by the customer.[19] Table 1 lists the results of seven studies of marginal-price elasticity over the last forty years.[20]

Table 1: Summary of Marginal-Price Elasticities

Authors	Date	Elasticity Estimates
Acton, Bridger, and Mowill	1976	−0.35 to −0.7
McFadden, Puig, and Kirshner	1977	−0.25 without electric space heat and −0.52 with space heat
Barnes, Gillingham, and Hageman	1981	−0.55
Henson	1984	–0.27 to –0.30
Reiss and White	2005	−0.39
Xcel Energy Colorado	2012	–0.3 (at years 2 and 3)
Orans et al., on BC Hydro inclining-block rate	2014	–0.13 in 3rd year of phased-in rate

Q: WHAT WOULD BE A REASONABLE ESTIMATE OF THE MARGINAL-PRICE ELASTICITY FOR CHANGES IN THE RESIDENTIAL ENERGY RATE?

A: From Table 1, it appears that –0.3 would be a reasonable mid-range estimate of the impact over a few years.

[18] The citation for this study is provided in Exhibit JFW-2.

[19] For Rate Schedule RS customers, that would be the energy rate.

[20] The citations for these studies are provided in Exhibit JFW-2.

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Q: WHAT WOULD BE A REASONABLE ESTIMATE OF THE EFFECT ON ENERGY USE FROM A 5.5% REDUCTION TO THE RATE SCHEDULE RS ENERGY RATE UNDER THE COMPANY'S PROPOSAL TO INCREASE THE BASIC FACILITIES CHARGE?

A: An elasticity of –0.3 and a 5.5% reduction in marginal energy price would result in an increase in energy consumption of about 1.7%. This means that all else equal, Rate Schedule RS load would be expected to increase by about 1.7% over a several-year period as a result of implementing the Company's proposed increase to the BFC.

For comparison, I estimate that the energy savings from the Company's residential energy efficiency programs in both North and South Carolina will increase each year by an amount equivalent to about 0.4% of forecasted annual residential load.[21] Assuming that such savings are spread uniformly across all residential rate classes in the Company's North and South Carolina service territories, the consumption increase due to the Company's proposed increase in its BFC (and the resulting decrease in the energy charge) would undo about four years of Rate Schedule RS energy savings from the residential energy efficiency portfolio.

V. CONCLUSIONS AND RECOMMENDATIONS

Q: WHAT DO YOU CONCLUDE WITH RESPECT TO THE COMPANY'S PROPOSAL TO INCREASE THE RESIDENTIAL BASIC FACILITIES CHARGE TO $17.79?

A: The Company's proposal would inappropriately shift load-related costs from the volumetric energy rate to the BFC, dampen price signals to consumers for

[21] Based on data regarding residential sales and energy efficiency savings for the entire DEC service territory provided in response to NC Justice Center et al. Data Request Item No. 1-4.

reducing energy usage, disproportionately and inequitably increase bills for the Company's smallest residential customers, and exacerbate the subsidization of larger residential customers' costs by customers with below-average usage. Accordingly, the Commission should reject the Company's proposal to increase the monthly BFC to $17.79 and instead maintain the monthly BFC at its current level of $11.80.

Q: DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A: Yes.

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CERTIFICATE OF SERVICE

I certify that the parties of record on the service list have been served with the Direct Testimony of Jonathan Wallach on Behalf of the North Carolina Justice Center, North Carolina Housing Coalition, Natural Resources Defense Council, and Southern Alliance for Clean Energy either by electronic mail or by deposit in the U.S. Mail, postage prepaid.

This the 23rd day of January, 2018.

s/ Robin G. Dunn

Robin G. Dunn

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Qualifications of

JONATHAN F. WALLACH

Resource Insight, Inc.
5 Water Street
Arlington, Massachusetts 02476

SUMMARY OF PROFESSIONAL EXPERIENCE

1990–Present **Vice President, Resource Insight, Inc.** Provides research, technical assistance, and expert testimony on electric- and gas-utility planning, economics, regulation, and restructuring. Designs and assesses resource-planning strategies for regulated and competitive markets, including estimation of market prices and utility-plant stranded investment; negotiates restructuring strategies and implementation plans; assists in procurement of retail power supply.

1989–90 **Senior Analyst, Komanoff Energy Associates.** Conducted comprehensive cost-benefit assessments of electric-utility power-supply and demand-side conservation resources, economic and financial analyses of independent power facilities, and analyses of utility-system excess capacity and reliability. Provided expert testimony on statistical analysis of U.S. nuclear plant operating costs and performance. Co-wrote *The Power Analyst*, software developed under contract to the New York Energy Research and Development Authority for screening the economic and financial performance of non-utility power projects.

1987–88 **Independent Consultant.** Provided consulting services for Komanoff Energy Associates (New York, New York), Schlissel Engineering Associates (Belmont, Massachusetts), and Energy Systems Research Group (Boston, Massachusetts).

1981–86 **Research Associate, Energy Systems Research Group.** Performed analyses of electric utility power supply planning scenarios. Involved in analysis and design of electric and water utility conservation programs. Developed statistical analysis of U.S. nuclear plant operating costs and performance.

EDUCATION

BA, Political Science with honors and Phi Beta Kappa, University of California, Berkeley, 1980.

Massachusetts Institute of Technology, Cambridge, Massachusetts. Physics and Political Science, 1976–1979.

PUBLICATIONS

"The Future of Utility Resource Planning: Delivering Energy Efficiency through Distributed Utilities" (with Paul Chernick), *International Association for Energy Economics Seventeenth Annual North American Conference* (460–469). Cleveland, Ohio: USAEE. 1996.

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"The Price is Right: Restructuring Gain from Market Valuation of Utility Generating Assets" (with Paul Chernick), *International Association for Energy Economics Seventeenth Annual North American Conference* (345–352). Cleveland, Ohio: USAEE. 1996.

"The Future of Utility Resource Planning: Delivering Energy Efficiency through Distribution Utilities" (with Paul Chernick), *1996 Summer Study on Energy Efficiency in Buildings* 7(7.47–7.55). Washington: American Council for an Energy-Efficient Economy, 1996.

"Retrofit Economics 201: Correcting Common Errors in Demand-Side-Management Cost-Benefit Analysis" (with John Plunkett and Rachael Brailove). In proceedings of "Energy Modeling: Adapting to the New Competitive Operating Environment," conference sponsored by the Institute for Gas Technology in Atlanta in April of 1995. Des Plaines, Ill.: IGT, 1995.

"The Transfer Loss is All Transfer, No Loss" (with Paul Chernick), *Electricity Journal* 6:6 (July, 1993).

"Benefit-Cost Ratios Ignore Interclass Equity" (with Paul Chernick et al.), *DSM Quarterly*, Spring 1992.

"Consider Plant Heat Rate Fluctuations," *Independent Energy*, July/August 1991.

"Demand-Side Bidding: A Viable Least-Cost Resource Strategy" (with Paul Chernick and John Plunkett), *Proceedings from the NARUC Biennial Regulatory Information Conference*, September 1990.

"New Tools on the Block: Evaluating Non-Utility Supply Opportunities With *The Power Analyst*, (with John Plunkett), *Proceedings of the Fourth National Conference on Micro-computer Applications in Energy*, April 1990.

REPORTS

"Economic Benefits from Early Retirement of Reid Gardner" (with Paul Chernick) prepared for and filed by the Sierra Club in PUC of Nevada Docket No. 11-08019.

"Green Resource Portfolios: Development, Integration, and Evaluation" (with Paul Chernick and Richard Mazzini) report to the Green Energy Coalition presented as evidence in Ontario EB 2007-0707.

"Risk Analysis of Procurement Strategies for Residential Standard Offer Service" (with Paul Chernick, David White, and Rick Hornby) report to Maryland Office of People's Counsel. 2008. Baltimore: Maryland Office of People's Counsel.

"Integrated Portfolio Management in a Restructured Supply Market" (with Paul Chernick, William Steinhurst, Tim Woolf, Anna Sommers, and Kenji Takahashi). 2006. Columbus, Ohio: Office of the Ohio Consumers' Counsel.

"First Year of SOS Procurement." 2004. Prepared for the Maryland Office of People's Counsel.

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"Energy Plan for the City of New York" (with Paul Chernick, Susan Geller, Brian Tracey, Adam Auster, and Peter Lanzalotta). 2003. New York: New York City Economic Development Corporation.

"Peak-Shaving–Demand-Response Analysis: Load Shifting by Residential Customers" (with Brian Tracey). 2003. Barnstable, Mass.: Cape Light Compact.

"Electricity Market Design: Incentives for Efficient Bidding; Opportunities for Gaming." 2002. Silver Spring, Maryland: National Association of State Consumer Advocates.

"Best Practices in Market Monitoring: A Survey of Current ISO Activities and Recommendations for Effective Market Monitoring and Mitigation in Wholesale Electricity Markets" (with Paul Peterson, Bruce Biewald, Lucy Johnston, and Etienne Gonin). 2001. Prepared for the Maryland Office of People's Counsel, Pennsylvania Office of Consumer Advocate, Delaware Division of the Public Advocate, New Jersey Division of the Ratepayer Advocate, Office of the People's Counsel of the District of Columbia.

"Comments Regarding Retail Electricity Competition." 2001. Filed by the Maryland Office of People's Counsel in U.S. FTC Docket No. V010003.

"Final Comments of the City of New York on Con Edison's Generation Divestiture Plans and Petition." 1998. Filed by the City of New York in PSC Case No. 96-E-0897.

"Response Comments of the City of New York on Vertical Market Power." 1998. Filed by the City of New York in PSC Case Nos. 96-E-0900, 96-E-0098, 96-E-0099, 96-E-0891, 96-E-0897, 96-E-0909, and 96-E-0898.

"Preliminary Comments of the City of New York on Con Edison's Generation Divestiture Plan and Petition." 1998. Filed by the City of New York in PSC Case No. 96-E-0897.

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"Economic Feasibility Analysis and Preliminary Business Plan for a Pennsylvania Consumer's Energy Cooperative" (with John Plunkett et al.). 1997. 3 vols. Philadelphia, Penn.: Energy Coordinating Agency of Philadelphia.

"Good Money After Bad" (with Charles Komanoff and Rachel Brailove). 1997. White Plains, N.Y.: Pace University School of Law Center for Environmental Studies.

"Maryland Office of People's Counsel's Comments on Staff Restructuring Report: Case No. 8738." 1997. Filed by the Maryland Office of People's Counsel in PSC Case No. 8738.

"Protest and Request for Hearing of Maryland Office of People's Counsel." 1997. Filed by the Maryland Office of People's Counsel in PSC Docket Nos. EC97-46-000, ER97-4050-000, and ER97-4051-000.

"Restructuring the Electric Utilities of Maryland: Protecting and Advancing Consumer Interests" (with Paul Chernick, Susan Geller, John Plunkett, Roger Colton, Peter Bradford,

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Bruce Biewald, and David Wise). 1997. Baltimore, Maryland: Maryland Office of People's Counsel.

"Comments of the New Hampshire Office of Consumer Advocate on Restructuring New Hampshire's Electric-Utility Industry" (with Bruce Biewald and Paul Chernick). 1996. Concord, N.H.: NH OCA.

"Estimation of Market Value, Stranded Investment, and Restructuring Gains for Major Massachusetts Utilities" (with Paul Chernick, Susan Geller, Rachel Brailove, and Adam Auster). 1996. On behalf of the Massachusetts Attorney General (Boston).

"Report on Entergy's 1995 Integrated Resource Plan." 1996. On behalf of the Alliance for Affordable Energy (New Orleans).

"Preliminary Review of Entergy's 1995 Integrated Resource Plan." 1995. On behalf of the Alliance for Affordable Energy (New Orleans).

"Comments on NOPSI and LP&L's Motion to Modify Certain DSM Programs." 1995. On behalf of the Alliance for Affordable Energy (New Orleans).

"Demand-Side Management Technical Market Potential Progress Report." 1993. On behalf of the Legal Environmental Assistance Foundation (Tallahassee)

"Technical Information." 1993. Appendix to "Energy Efficiency Down to Details: A Response to the Director General of Electricity Supply's Request for Comments on Energy Efficiency Performance Standards" (UK). On behalf of the Foundation for International Environmental Law and Development and the Conservation Law Foundation (Boston).

"Integrating Demand Management into Utility Resource Planning: An Overview." 1993. Vol. 1 of "From Here to Efficiency: Securing Demand-Management Resources" (with Paul Chernick and John Plunkett). Harrisburg, Pa.:Pennsylvania Energy Office

"Making Efficient Markets." 1993. Vol. 2 of "From Here to Efficiency: Securing Demand-Management Resources" (with Paul Chernick and John Plunkett). Harrisburg, Pa.: Pennsylvania Energy Office.

"Analysis Findings, Conclusions, and Recommendations." 1992. Vol. 1 of "Correcting the Imbalance of Power: Report on Integrated Resource Planning for Ontario Hydro" (with Paul Chernick and John Plunkett).

"Demand-Management Programs: Targets and Strategies." 1992. Vol. 1 of "Building Ontario Hydro's Conservation Power Plant" (with John Plunkett, James Peters, and Blair Hamilton).

"Review of the Elizabethtown Gas Company's 1992 DSM Plan and the Demand-Side Management Rules" (with Paul Chernick, John Plunkett, James Peters, Susan Geller, Blair Hamilton, and Andrew Shapiro). 1992. Report to the New Jersey Department of Public Advocate.

"Comments of Public Interest Intervenors on the 1993–1994 Annual and Long-Range Demand-Side Management and Integrated Resource Plans of New York Electric Utilities" (with Ken Keating et al.) 1992.

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"Review of Jersey Central Power & Light's 1992 DSM Plan and the Demand-Side Management Rules" (with Paul Chernick et al.). 1992. Report to the New Jersey Department of Public Advocate.

"Review of Rockland Electric Company's 1992 DSM Plan and the Demand-Side Management Rules" (with Paul Chernick et al.). 1992.

"Initial Review of Ontario Hydro's Demand-Supply Plan Update" (with David Argue et al.). 1992.

"Comments on the Utility Responses to Commission's November 27, 1990 Order and Proposed Revisions to the 1991–1992 Annual and Long Range Demand Side Management Plans" (with John Plunkett et al.). 1991.

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"Profitability Assessment of Packaged Cogeneration Systems in the New York City Area." 1989. Principal investigator.

"Statistical Analysis of U.S. Nuclear Plant Capacity Factors, Operation and Maintenance Costs, and Capital Additions." 1989.

"The Economics of Completing and Operating the Vogtle Generating Facility." 1985. ESRG Study No. 85-51A.

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"Customer Programs to Moderate Demand Growth on the Arizona Public Service Company System: Identifying Additional Cost-Effective Program Options." 1982. ESRG Study No. 82-14C.

"The Economics of Alternative Space and Water Heating Systems in New Construction in the Jersey Central Power and Light Service Area, A Report to the Public Advocate." 1982. ESRG Study No. 82-31.

"Review of the Kentucky-American Water Company Capacity Expansion Program, A Report to the Kentucky Public Service Commission." 1982. ESRG Study No. 82-45.

"Long Range Forecast of Sierra Pacific Power Company Electric Energy Requirements and Peak Demands, A Report to the Public Service Commission of Nevada." 1982. ESRG Study No. 81-42B.

"Utility Promotion of Residential Customer Conservation, A Report to Massachusetts Public Interest Research Group." 1981. ESRG Study No. 81-47

PRESENTATIONS

"Office of People's Counsel Case No. 9117" (with William Fields). Presentation to the Maryland Public Utilities Commission in Case No. 9117, December 2008.

"Electricity Market Design: Incentives for Efficient Bidding, Opportunities for Gaming." NASUCA Northeast Market Seminar, Albany, N.Y., February 2001.

"Direct Access Implementation: The California Experience." Presentation to the Maryland Restructuring Technical Implementation Group on behalf of the Maryland Office of People's Counsel. June 1998.

"Reflecting Market Expectations in Estimates of Stranded Costs," speaker, and workshop moderator of "Effectively Valuing Assets and Calculating Stranded Costs." Conference sponsored by International Business Communications, Washington, D.C., June 1997.

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EXPERT TESTIMONY

1989 **Mass. DPU** on behalf of the Massachusetts Executive Office of Energy Resources. Docket No. 89-100. Joint testimony with Paul Chernick relating to statistical analysis of U.S. nuclear-plant capacity factors, operation and maintenance costs, and capital additions; and to projections of capacity factor, O&M, and capital additions for the Pilgrim nuclear plant.

1994 **NY PSC** on behalf of the Pace Energy Project, Natural Resources Defense Council, and Citizen's Advisory Panel. Case No. 93-E-1123. Joint testimony with John Plunkett critiques proposed modifications to Long Island Lighting Company's DSM programs from the perspective of least-cost-planning principles.

1994 **Vt. PSB** on behalf of the Vermont Department of Public Service. Docket No. 5270-CV-1 and 5270-CV-3. Testimony and rebuttal testimony discusses rate and bill effects from DSM spending and sponsors load shapes for measure- and program-screening analyses.

1996 **New Orleans City Council** on behalf of the Alliance for Affordable Energy. Docket Nos. UD-92-2A, UD-92-2B, and UD-95-1. Rates, charges, and integrated resource planning for Louisiana Power & Lights and New Orleans Public Service, Inc.

1996 **New Orleans City Council** Docket Nos. UD-92-2A, UD-92-2B, and UD-95-1. Rates, charges, and integrated resource planning for Louisiana Power & Lights and New Orleans Public Service, Inc.; Alliance for Affordable Energy. April, 1996.

Prudence of utilities' IRP decisions; costs of utilities' failure to follow City Council directives; possible cost disallowances and penalties; survey of penalties for similar failures in other jurisdictions.

1998 **Massachusetts Department of Telecommunications and Energy** Docket No. 97-111, Commonwealth Energy proposed restructuring; Cape Cod Light Compact. Joint testimony with Paul Chernick, January, 1998.

Critique of proposed restructuring plan filed to satisfy requirements of the electric-utility restructuring act of 1997. Failure of the plan to foster competition and promote the public interest.

Massachusetts Department of Telecommunications and Energy Docket No. 97-120, Western Massachusetts Electric Company proposed restructuring; Massachusetts Attorney General. Joint testimony with Paul Chernick, October, 1998. Joint surrebuttal with Paul Chernick, January, 1999.

Market value of the three Millstone nuclear units under varying assumptions of plant performance and market prices. Independent forecast of wholesale market prices. Value of Pilgrim and TMI-1 asset sales.

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1999 **Maryland PSC** Case No. 8795, Delmarva Power & Light comprehensive restructuring agreement, Maryland Office of People's Counsel. July 1999.

Support of proposed comprehensive restructuring settlement agreement

Maryland PSC Case Nos. 8794 and 8808, Baltimore Gas & Electric Company comprehensive restructuring agreement, Maryland Office of People's Counsel. Initial Testimony July 1999; Reply Testimony August 1999; Surrebuttal Testimony August 1999.

Support of proposed comprehensive restructuring settlement agreement

Maryland PSC Case No. 8797, comprehensive restructuring agreement for Potomac Edison Company, Maryland Office of People's Counsel. October 1999.

Support of proposed comprehensive restructuring settlement agreement

Connecticut DPUC Docket No. 99-03-35, United Illuminating standard offer, Connecticut Office of Consumer Counsel. November 1999.

Reasonableness of proposed revisions to standard-offer-supply energy costs. Implications of revisions for other elements of proposed settlement.

2000 **U.S. FERC** Docket No. RT01-02-000, Order No. 2000 compliance filing, Joint Consumer Advocates intervenors. Affidavit, November 2000.

Evaluation of innovative rate proposal by PJM transmission owners.

2001 **Maryland PSC** Case No. 8852, Charges for electricity-supplier services for Potomac Electric Power Company, Maryland Office of People's Counsel. March 2001.

Reasonableness of proposed fees for electricity-supplier services.

Maryland PSC Case No. 8890, Merger of Potomac Electric Power Company and Delmarva Power and Light Company, Maryland Office of People's Counsel. September 2001; surrebuttal, October 2001. In support of settlement: Supplemental, December 2001; rejoinder, January 2002.

Costs and benefits to ratepayers. Assessment of public interest.

Maryland PSC Case No. 8796, Potomac Electric Power Company stranded costs and rates, Maryland Office of People's Counsel. December 2001; surrebuttal, February 2002.

Allocation of benefits from sale of generation assets and power-purchase contracts.

2002 **Maryland PSC** Case No. 8908, Maryland electric utilities' standard offer and supply procurement, Maryland Office of People's Counsel. Direct, November 2002; Rebuttal December 2002.

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Benefits of proposed settlement to ratepayers. Standard-offer service. Procurement of supply.

2003 **Maryland PSC** Case No. 8980, adequacy of capacity in restructured electricity markets; Maryland Office of People's Counsel. Direct, December 2003; Reply December 2003.

Purpose of capacity-adequacy requirements. PJM capacity rules and practices. Implications of various restructuring proposals for system reliability.

2004 **Maryland PSC** Case No. 8995, Potomac Electric Power Company recovery of generation-related uncollectibles; Maryland Office of People's Counsel. Direct, March 2004; Supplemental March 2004, Surrebuttal April 2004.

Calculation and allocation of costs. Effect on administrative charge pursuant to settlement.

Maryland PSC Case No. 8994, Delmarva Power & Light recovery of generation-related uncollectibles; Maryland Office of People's Counsel. Direct, March 2004; Supplemental April 2004.

Calculation and allocation of costs. Effect on administrative charge pursuant to settlement.

Maryland PSC Case No. 8985, Southern Maryland Electric Coop standard-offer service; Maryland Office of People's Counsel. Direct, July 2004.

Reasonableness and risks of resource-procurement plan.

2005 **FERC** Docket No. ER05-428-000, revisions to ICAP demand curves; City of New York. Statement, March 2005.

Net-revenue offset to cost of new capacity. Winter-summer adjustment factor. Market power and in-City ICAP price trends.

FERC Docket No. PL05-7-000, capacity markets in PJM; Maryland Office of People's Counsel. Statement, June 2005.

Inefficiencies and risks associated with use of administratively determined demand curve. Incompatibility of four-year procurement plan with Maryland standard-offer service.

FERC Dockets Nos. ER05-1410-000 & EL05-148-000, proposed market-clearing mechanism for capacity markets in PJM; Coalition of Consumers for Reliability, Affidavit October 2005, Supplemental Affidavit October 2006.

Inefficiencies and risks associated with use of administratively determined demand curve. Effect of proposed reliability-pricing model on capacity costs.

2006 **Maryland PSC** Case No. 9052, Baltimore Gas & Electric rates and market-transition plan; Maryland Office of People's Counsel, February 2006.

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Transition to market-based residential rates. Price volatility, bill complexity, and cost-deferral mechanisms.

Maryland PSC Case No. 9056, default service for commercial and industrial customers; Maryland Office of People's Counsel, April 2006.

Assessment of proposals to modify default service for commercial and industrial customers.

Maryland PSC Case No. 9054, merger of Constellation Energy Group and FPL Group; Maryland Office of People's Counsel, June 2006.

Assessment of effects and risks of proposed merger on ratepayers.

Illinois Commerce Commission Docket No. 06-0411, Commonwealth Edison Company residential rate plan; Citizens Utility Board, Cook County State's Attorney's Office, and City of Chicago, Direct July 2006, Reply August 2006.

Transition to market-based rates. Securitization of power costs. Rate of return on deferred assets.

Maryland PSC Case No. 9064, default service for residential and small commercial customers; Maryland Office of People's Counsel, Rebuttal Testimony, September 2006.

Procurement of standard-offer power. Structure and format of bidding. Risk and cost recovery.

FERC Dockets Nos. ER05-1410-000 & EL05-148-000, proposed market-clearing mechanism for capacity markets in PJM; Maryland Office of the People's Counsel, Supplemental Affidavit October 2006.

Distorting effects of proposed reliability-pricing model on clearing prices. Economically efficient alternative treatment.

Maryland PSC Case No. 9063, optimal structure of electric industry; Maryland Office of People's Counsel, Direct Testimony, October 2006; Rebuttal November 2006; surrebuttal November 2006.

Procurement of standard-offer power. Risk and gas-price volatility, and their effect on prices and market performance. Alternative procurement strategies.

Maryland PSC Case No. 9073, stranded costs from electric-industry restructuring; Maryland Office of People's Counsel, Direct Testimony, December 2006.

Review of estimates of stranded costs for Baltimore Gas & Electric.

2007 **Maryland PSC** Case No. 9091, rate-stabilization and market-transition plan for the Potomac Edison Company; Maryland Office of People's Counsel, Direct Testimony, March 2007.

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Rate-stabilization plan.

Maryland PSC Case No. 9092, rates and rate mechanisms for the Potomac Electric Power Company; Maryland Office of People's Counsel, Direct Testimony, March 2007.

Cost allocation and rate design. Revenue decoupling mechanism.

Maryland PSC Case No. 9093, rates and rate mechanisms for Delmarva Power & Light; Maryland Office of People's Counsel, Direct Testimony, March 2007.

Cost allocation and rate design. Revenue decoupling mechanism.

Maryland PSC Case No. 9099, rate-stabilization plan for Baltimore Gas & Electric; Maryland Office of People's Counsel, Direct, March 2007; Surrebuttal April 2007.

Review of standard-offer-service-procurement plan. Rate stabilization plan.

Connecticut DPUC Docket No. 07-04-24, review of capacity contracts under Energy Independence Act; Connecticut Office of Consumer Counsel, Joint Direct Testimony June 2007.

Assessment of proposed capacity contracts.

Maryland PSC Case No. 9117, residential and small-commercial standard-offer service; Maryland Office of People's Counsel. Direct and Reply, September 2007; Supplemental Reply, November 2007; Additional Reply, December 2007; presentation, December 2008.

Benefits of long-term planning and procurement. Proposed aggregation of customers.

Maryland PSC Case No. 9117, Phase II, residential and small-commercial standard-offer service; Maryland Office of People's Counsel. Direct, October 2007.

Energy efficiency as part of standard-offer-service planning and procurement. Procurement of generation or long-term contracts to meet reliability needs.

2008 **Connecticut DPUC 08-01-01**, peaking generation projects; Connecticut Office of Consumer Counsel. Direct (with Paul Chernick), April 2008.

Assessment of proposed peaking projects. Valuation of peaking capacity. Modeling of energy margin, forward reserves, other project benefits.

Ontario EB-2007-0707, Ontario Power Authority integrated system plan; Green Energy Coalition, Penimba Institute, and Ontario Sustainable Energy Association. Evidence (with Paul Chernick and Richard Mazzini), August 2008.

Critique of integrated system plan. Resource cost and characteristics; finance cost. Development of least-cost green-energy portfolio.

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2009 **Maryland PSC** Case No. 9192, Delmarva Power & Lights rates; Maryland Office of People's Counsel. Direct, August 2009; Rebuttal, Surrebuttal, September 2009.

Cost allocation and rate design.

Wisconsin PSC Docket No. 6630-CE-302, Glacier Hills Wind Park certificate; Citizens Utility Board of Wisconsin. Direct and Surrebuttal, October 2009.

Reasonableness of proposed wind facility.

PUC of Ohio Case No 09-906-EL-SSO, standard-service-offer bidding for three Ohio electric companies; Office of the Ohio Consumers' Counsel. Direct, December 2009.

Design of auctions for SSO power supply. Implications of migration of First-Energy from MISO to PJM.

2010 **PUC of Ohio** Case No 10-388-EL-SSO, standard-service offer for three Ohio electric companies; Office of the Ohio Consumers' Counsel. Direct, July 2010.

Design of auctions for SSO power supply.

Maryland PSC Case No. 9232, Potomac Electric Power Co. administrative charge for standard-offer service; Maryland Office of People's Counsel. Reply, Rebuttal, August 2010.

Proposed rates for components of the Administrative Charge for residential standard-offer service.

Maryland PSC Case No. 9226, Delmarva Power & Light administrative charge for standard-offer service; Maryland Office of People's Counsel. Reply, Rebuttal, August 2010.

Proposed rates for components of the Administrative Charge for residential standard-offer service.

Maryland PSC Case No. 9221, Baltimore Gas & Electric cost recovery; Maryland Office of People's Counsel. Reply, August 2010; Rebuttal, September 2010; Surrebuttal, November 2010

Proposed rates for components of the Administrative Charge for residential standard-offer service.

Wisconsin PSC Docket No. 3270-UR-117, Madison Gas & Electric gas and electric rates; Citizens Utility Board of Wisconsin. Direct, Rebuttal, Surrebuttal, September 2010.

Standby rate design. Treatment of uneconomic dispatch costs.

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Nova Scotia UARB Case No. NSUARB P-887(2), fuel-adjustment mechanism; Nova Scotia Consumer Advocate. Direct, September 2010.

Effectiveness of fuel-adjustment incentive mechanism.

Manitoba PUB, Manitoba Hydro rates; Resource Conservation Manitoba and Time to Respect Earth's Ecosystems. Direct, December 2010.

Assessment of drought-related financial risk.

2011 **Mass. DPU 10-170,** NStar–Northeast Utilities merger; Cape Light Compact. Direct, May 2011.

Merger and competitive markets. Competitively neutral recovery of utility investments in new generation.

Mass. DPU 11-5, -6, -7, NStar wind contracts; Cape Light Compact. Direct, May 2011.

Assessment of utility proposal for recovery of contract costs.

Wisc. PSC Docket No. 4220-UR-117, electric and gas rates of Northern States Power: Citizens Utility Board of Wisconsin. Direct, Rebuttals (2) October 2011; Surrebuttal, Oral Sur-Surrebutal November 2011;

Cost allocation and rate design. Allocation of DOE settlement payment.

Wisc. PSC Docket No. 6680-FR-104, fuel-cost-related rate adjustments for Wisconsin Power and Light Company: Citizens Utility Board of Wisconsin. Direct, October 2011; Rebuttal, Surrebuttal, November 2011

Costs to comply with Cross State Air Pollution Rule.

2012 **Maryland PSC** Case No. 9149, Maryland IOUs' development of RFPs for new generation; Maryland Office of People's Counsel. March 2012.

Failure of demand-response provider to perform per contract. Estimation of cost to ratepayers.

PUCO Cases Nos. 11-346-EL-SSO, 11-348-EL-SSO, 11-349-EL-AAM, 11-350-EL-AAM, transition to competitive markets for Columbus Southern Power Company and Ohio Power Company; Ohio Consumers' Counsel. May 2012

Structure of auctions, credits, and capacity pricing as part of transition to competitive electricity markets.

Wisconsin PSC Docket No. 3270-UR-118, Madison Gas & Electric rates, Wisconsin Citizens Utility Board. Direct, August 2012; Rebuttal, September 2012.

Cost allocation and rate design (electric).

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Wisconsin PSC Docket No. 05-UR-106, We Energies rates, Wisconsin Citizens Utility Board. Direct, Rebuttal, September 2012.

Cost allocation and rate design (electric).

Wisconsin PSC Docket No. 4220-UR-118, Northern States Power rates, Wisconsin Citizens Utility Board. Direct, Rebuttal, October 2012; Surrebuttal, November 2012.

Recovery of environmental remediation costs at a manufactured gas plant. Cost allocation and rate design.

2013 **Corporation Commission of Oklahoma** Cause No. PUD 201200054, Public Service Company of Oklahoma environmental compliance and cost recovery, Sierra Club. Direct, January 2013; rebuttal, February 2013; surrebuttal, March 2013.

Economic evaluation of alternative environmental-compliance plans. Effects of energy efficiency and renewable resources on cost and risk.

Maryland PSC Case No. 9324, Starion Energy marketing, Maryland Office of People's Counsel. September 2013.

Estimation of retail costs of electricity supply.

Wisconsin PSC Docket No. 6690-UR-122, Wisconsin Public Service Corporation gas and electric rates, Wisconsin Citizens Utility Board. Direct, August 2013; Rebuttal, Surrebuttal September 2013.

Cost allocation and rate design; rate-stabilization mechanism.

Wisconsin PSC Docket No. 4220-UR-119, Northern States Power Company gas and electric rates, Wisconsin Citizens Utility Board. Direct, Rebuttal, Surrebuttal, October 2013.

Cost allocation and rate design.

Michigan PSC Case No. U-17429, Consumers Energy Company approval for new gas plant, Natural Resources Defense Council. Corrected Direct, October 2013.

Need for new capacity. Economic assessment of alternative resource options.

2014 **Maryland PSC** Cases Nos. 9226 & 9232, administrative charge for standard-offer service; Maryland Office of People's Counsel. Reply, April 2014; surrebuttal, May 2014.

Proposed rates for components of the Administrative Charge for residential standard-offer service.

Conn. PURA Docket No. 13-07-18, rules for retail electricity markets; Office of Consumer Counsel. Direct, April 2014.

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Estimation of retail costs of power supply for residential standard-offer service.

PUC Ohio Cases Nos. 13-2385-EL-SSO, 13-2386-EL-AAM; Ohio Power Company standard-offer service; Office of the Ohio Consumers' Counsel. Direct, May 2014.

Allocation of distribution-rider costs.

Wisc. PSC Docket No. 6690-UR-123, Wisconsin Public Service Corporation electric and gas rates; Citizens Utility Board of Wisconsin. Direct, Rebuttal, August 2014; Surrebuttal, September 2014.

Cost allocation and rate design.

Wisc. PSC Docket No. 05-UR-107, We Energy biennial review of electric and gas costs and rates; Citizens Utility Board of Wisconsin. Direct, August 2014; Rebuttal, Surrebuttal September 2014.

Cost allocation and rate design.

Wisc. PSC Docket No. 3270-UR-120, Madison Gas and Electric Co. electric and gas rates; Citizens Utility Board of Wisconsin. Direct, Rebuttal, September 2014.

Cost allocation and rate design.

Nova Scotia UARB Case No. NSUARB P-887(6), Nova Scotia Power fuel-adjustment mechanism; Nova Scotia Consumer Advocate. Evidence, December 2014.

Allocation of fuel-adjustment costs.

2015 **Maryland PSC** Case No. 9221, Baltimore Gas & Electric cost recovery; Maryland Office of People's Counsel. Second Reply, June 2015; Second Rebuttal, July 2015.

Proposed rates for components of the Administrative Charge for residential standard-offer service.

Wisconsin PSC Docket No. 6690-UR-124, Wisconsin Public Service Corporation electric and gas rates, Citizens Utility Board of Wisconsin. Direct, Rebuttal, September 2015; Surrebuttal, October 2015.

Cost allocation and rate design.

Wisconsin PSC Docket No. 4220-UR-121, Northern States Power Company gas and electric rates, Citizens Utility Board of Wisconsin. Direct, Rebuttal, Surrebuttal, October 2015.

Cost allocation and rate design.

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