STATE OF NEW JERSEY
BOARD OF PUBLIC UTILITIES

IN THE MATTER OF THE PETITION OF ROCKLAND ELECTRIC COMPANY FOR APPROVAL OF AN ADVANCED METERING PROGRAM; AND FOR OTHER RELIEF	**)** **)** **)** **)**	**BPU DOCKET NO. ER16060524**

DIRECT TESTIMONY OF TIM WOOLF ON BEHALF OF THE DIVISION OF RATE COUNSEL

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1. INTRODUCTION AND QUALIFICATIONS

Q. Please state your name, title, and employer.

A. My name is Tim Woolf. I am a Vice President at Synapse Energy Economics, located at 485 Massachusetts Avenue, Cambridge, MA 02139.

Q. Please describe Synapse Energy Economics.

A. Synapse Energy Economics (Synapse) is a research and consulting firm specializing in electricity and gas industry regulation, planning, and analysis. Our work covers a range of issues, including economic and technical assessments of demand-side and supply-side energy resources; energy efficiency policies and programs; integrated resource planning; electricity market modeling and assessment; renewable resource technologies and policies; and climate change strategies. Synapse works for a wide range of clients, including attorneys general, offices of consumer advocates, public utility commissions, environmental advocates, the U.S. Environmental Protection Agency, U.S. Department of Energy, U.S. Department of Justice, the Federal Trade Commission and the National Association of Regulatory Utility Commissioners. Synapse has over 25 professional staff with extensive experience in the electricity industry.

Q. Please summarize your professional and educational experience.

A. Before rejoining Synapse, I was a commissioner at the Massachusetts Department of Public Utilities (DPU) from 2007 to 2010. In that capacity, I was responsible for overseeing a variety of dockets before the commission, including several electric and gas utility rate cases. I also served as the President of the New England Conference of Public Utility Commissioners from 2009 to 2010, a board member on the Energy Facilities

Siting Board from 2007 to 2010, and a co-chair on the Utility Motivation Work Group of the State Energy Efficiency Action Network from 2009 to 2010.

Prior to being a commissioner at the Massachusetts DPU, I was employed as Vice President at Synapse; a Manager at Tellus Institute; the Research Director at the Association for the Conservation of Energy; a Staff Economist at the Massachusetts Department of Public Utilities; and a Policy Analyst at the Massachusetts Executive Office of Energy Resources.

I hold a Master's in Business Administration from Boston University, a Diploma in Economics from the London School of Economics, a BS in Mechanical Engineering and a BA in English from Tufts University. My resume, attached as Schedule TW-1, presents additional details of my professional and educational experience.

Q. On whose behalf are you testifying in this case?

A. I am testifying on behalf of the Division of Rate Counsel.

Q. Have you previously testified before the New Jersey Board of Public Utilities?

A. Yes. I testified regarding the petition of Rockland Electric Company (RECO or the Company) to implement and recover the costs of advanced metering infrastructure (AMI) in BPU Docket No. ER14030250.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to review RECO's current petition to install advanced meters throughout its New Jersey service territory.

Q. Do you intend to supplement your Direct Testimony? If so, why?

A. Yes, I do. On July 13, 2016, Rate Counsel issued discovery (RCR-AMI-2) asking the Company to provide a revenue requirement analysis of the AMI investment. In its response, the Company declined to provide this analysis. Rate Counsel again asked for this information in discovery issued August 12, 2016; the Company's response to this discovery was due on August 26, 2016. The Company eventually responded to this request on September 7, 2016, only two days before the filing of my Direct Testimony. I did not have sufficient time to review and incorporate this information into my Direct Testimony. Accordingly, once I have had time to review this information and conduct additional discovery if necessary, I will supplement my Direct Testimony.

2. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

Q. Please summarize the scope of this docket.

A. The Company is seeking the Board's approval for deployment of AMI in its entire service territory, which encompasses all or parts of Bergen, Passaic and Sussex counties, starting in 2017. The Company is not seeking cost recovery in this proceeding. According to the Board, this determination involves resolving the following issues:

1) Whether Board approval of the proposed Advanced Metering Program in advance of its implementation is necessary and/or appropriate.

2) Whether the Company should implement its proposed Advanced Metering Program, including the deployment of AMI and smart meters, with cost recovery and prudency to be addressed in future rate proceedings.[1]

[1] State of New Jersey Board of Public Utilities, Prehearing Order, Docket No. ER16060524.

Q. Please summarize your conclusions.

A. Board approval of the proposed Advanced Metering Program in advance of its implementation is not necessary or appropriate. If the Company finds that AMI is a prudent, cost-effective investment, then the Company should make that investment and then request recovery of those costs in the next rate case, in the same way that it requests recovery of other costs. Prudency could then be determined at that time based on a meaningful cost benefit analysis that takes into account all of the factors I discuss below.

Q. Please summarize your recommendations.

A. First, the Board should state that its approval of the proposed AMI Program is not necessary or appropriate in order for the Company to undertake its proposed AMI expenditures.

Second, the Board should deny the Company's request for Board authorization to undertake its proposed AMI expenditures. Instead, the Company should proceed with investments in the AMI Program if and when it determines that the program is cost-effective, reasonable, prudent, and in the customers' interest.

3. OVERVIEW OF RECO'S PROPOSAL

Q. Please summarize RECO's proposal.

A. On May 13, 2016, RECO filed a petition for approval of its AMI program as well as authorization to move forward with spending on this program. The Company is not

seeking cost recovery of these investments in this proceeding; it plans to address this issue in a future rate case.[2]

The Company proposes to upgrade its metering infrastructure throughout its New Jersey service territory, including Bergen, Passaic and Sussex counties. This would involve the replacement of 73,880 meters with smart meters over a three-year period (2017 through 2019).[3]

Q. What are the estimated costs and benefits of the AMI program proposal?

A. The Company estimates the cumulative cost of the AMI program to be $32.2 million, and the cumulative benefits to be $82.0 million. This would result in cumulative net benefits of $49.9 million.[4]

Q. Please explain how the company presented costs and benefits in its benefit cost analysis.

A. The Company provides the benefits and costs of the AMI program over a 20-year analysis period (2017-2036). The costs of the program include the purchase, installation and operation of the new meters. The Company also assumes that AMI operating costs will persist until the meters are assumed to retire—which is after the analysis period.

There is significant upfront spending in the early years when the meters are purchased and installed (2017-2019). These capital costs are assumed to be recovered over the assumed 20-year life of the meters. To account for the long-term recovery of the upfront

[2] RECO Verified Petition, p. 3.
[3] RECO Verified Petition, AMI Panel, p.8, lines 10-21.
[4] RECO response to RCR-AMI-27(a).

costs, the Company amortized these costs over the 20-year period. This amortization accounted for the depreciation of the costs, but initially did not include the other costs that will eventually be recovered from customers through revenue requirements, primarily the recovery of equity, debt, and taxes. Not until September 7, 2016 did the Company provide any accounting of revenue requirements, even though these had been requested on July 13, 2016 and again on August 12, 2016.

The benefits of the program are largely based on the Company's estimates of customer and corporate cost savings, which start to accrue after the meters are installed then trend slightly upward over time.

Q. Are the costs and benefits in the Company's analysis presented in terms of constant dollars or nominal dollars?

A. The costs and benefits are presented in terms of nominal dollars. I will address the difference between constant and nominal dollars in Section 5 of my testimony.

Q. Are the costs and benefits in the Company's analysis presented in terms of present value dollars?

A. The costs and benefits are presented in undiscounted dollars. I will address the role of discounting and present value dollars in Section 5 of my testimony.

Q. Please describe the type of benefits that the Company claims its AMI program will offer.

A. The Company claims that smart meters will provide numerous operational savings, organizational savings and other benefits. In particular, these benefits include: reduction in outage restoration costs;[5] Volt/VAR optimization; decrease in false dispatches; reduction in meter reading costs; lower connections and disconnection costs; reduction in field tests for high bills or zero usage; decrease in revenue losses from unoccupied premises and theft; reduction in the need for rebilling due to estimated meter readings; reduced carbon dioxide emissions; and fewer call center inquiries and bill complaints.[6]

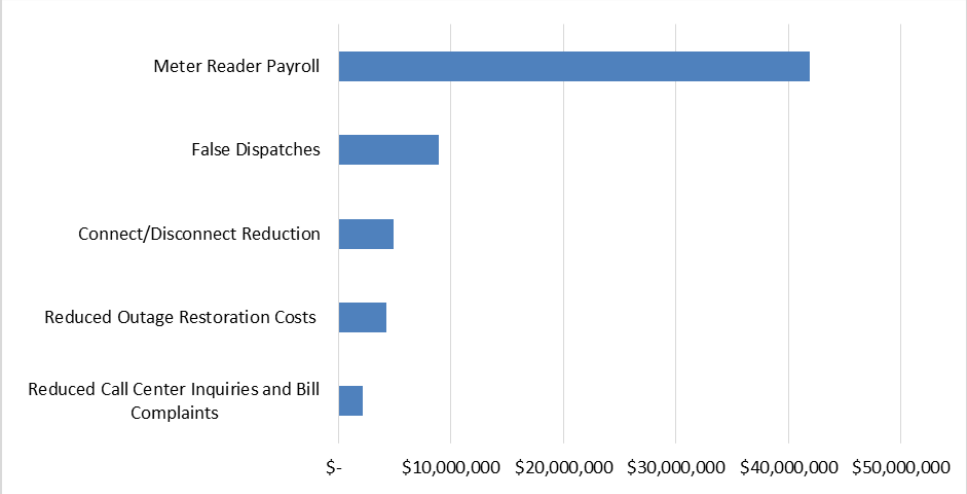
Q. Where does the Company estimate that most of the operational savings will come from?

A. Figure 1 presents a summary of the five primary operational benefit categories estimated by the Company. More than half of the savings stem from eliminating nine meter reader positions. The Company estimates that eliminating these meter reading positions will lead to annual savings ranging from approximately $1.9 million to $2.6 million per year following the full smart meter roll-out, for an undiscounted cumulative total of $41.9 million over 20 years.[7] The nine meter readers will not be laid off, but rather moved to other positions within the Company. [8]

[5] This is due to faster restoration time and associated savings in line crew costs.
[6] RECO response to RCR-AMI-1, "RCR -AMI -1.xls"
[7] RECO response to RCR-AMI-1, "RCR -AMI -1.xls"
[8] See RECO response to RCR-AMI-19(f).

Reductions in false dispatches, reduced outage restoration costs, reductions in connection/disconnection costs, and reduced call center costs comprise the remainder of the top five savings categories. These other primary benefits are dwarfed by the claimed reduction in meter reading costs, as shown in Figure 1. A host of other benefits are also quantified by the Company, but these benefits are of an even smaller magnitude than those categories shown below.

Figure 1. Cumulative 20-year Undiscounted Savings of Five Primary AMI Benefits[9]



4. APPROVAL OF AMI INVESTMENTS SHOULD BE DECIDED IN A RATE CASE

Q. Is the Board's pre-approval of the proposed AMI necessary or appropriate?

A. No. The request for pre-approval of AMI investments in this proceeding is unnecessary and inappropriate. If the Company believes that AMI is a cost-effective, prudent investment, then the Company should make that investment and then request recovery of those costs in the next rate case.

[9] RECO response to RCR-AMI-1, "RCR -AMI -1.xls.

Q. What is the conventional method for recovery of utility investments, such as AMI?

A. Under traditional rate base, rate of return regulation, utilities routinely make investments in their systems without seeking pre-approval for them. The conventional path is the following:

1) The utility identifies infrastructure investments that are reasonable, cost effective, and/or needed for reliability.

2) The utility makes the infrastructure investment.

3) The utility files for recovery of the infrastructure investment in a rate case.

4) The Board reviews the prudency and reasonableness of (a) the utility's decision to make the infrastructure investment, and (b) the utilities' implementation of that investment.

Q. Should the Company use this conventional approach in the case of AMI?

A. Yes. The Company has not offered any compelling reason for why the Board should take the extraordinary step of pre-approving a capital investment such as AMI. The Company's justification for treating AMI differently is the "significance of the undertaking and investment."[10] This is insufficient to support such a significant change of the cost recovery practices in New Jersey. AMI investments are not extraordinary and, therefore, should not get special treatment.

[10] RECO Verified Petition, AMI Panel, p. 39.

Q. Why is pre-approval unnecessary and inappropriate in this case?

A. First, it is utility management's responsibility to monitor industry developments and evaluate whether prospective utility infrastructure investments are reasonable and prudent in light of what is known at the time. This is a fundamental part of utility management's job.

Second, commissions generally prefer to review costs after they have been spent. This is why some commissions, including New Jersey, use historic test years with historic costs, and consider only known and measurable changes to those costs. This approach ensures that the costs involved are certain, and are not based on estimates, forecasts, or speculation.

Third, the benefits associated with RECO's proposal are uncertain. The claimed benefits in the Company's cost-benefit analysis are based on Company estimates. The parties won't know what the benefits actually are until after RECO implements AMI. Actual benefits may vary significantly from the estimates presented in the Company's petition. Addressing this issue in a rate case would provide the Board with less uncertainty regarding the estimated benefits of the AMI.

One example of how a rate case can significantly reduce uncertainty is the Company's claimed benefit from eliminating meter readers. Over half of the estimated benefits come from eliminating nine meter reader jobs. However, RECO is proposing to move the displaced meter-readers to other jobs within the Company.[11] This raises questions

[11] RECO response to RCR-AMI-19(f).

regarding whether those reduced job benefits will even be realized. This type of question should be addressed in a rate case, where the Board can investigate all of the Company's labor costs at once, to determine what the actual reduction in labor costs is likely to be.

Finally, the Company is expected to take some risk in making investments. This is especially true when, as here, the Company expects to earn a return on AMI investments equal to the return it earns on other investments.[12] The return on equity (ROE) earned by the Company compensates for the regulatory risk the Company takes. Given that the Company expects to earn the same rate of return as it does for other infrastructure investments, pre-approval is clearly inappropriate.

5. THE COMPANY HAS FAILED TO JUSTIFY THE AMI INVESTMENTS

Revenue Requirements

Q. Did the Company estimate revenue requirements to show how AMI costs and benefits would affect ratepayers?

A. Initially, the Company presented costs and benefits in terms of amortized expenditures per year without regard for the mechanism of financing these expenditures—including return on equity, debt payments, and taxes. These are critical elements of the revenue requirements that will be recovered from customers, and without them it is not possible to estimate whether AMI will be cost-effective for ratepayers. Not until September 7, 2016—only two days before the filing of my Direct Testimony—did the Company

[12] RECO response to RCR-AMI-2(b).

provide any accounting of revenue requirements, even though these had been requested in discovery issued on July 13, 2016 and again on August 12, 2016.

Q. **Have you reviewed the revenue requirements provided by the Company on September 7?**

A. No. I did not have sufficient time to review and incorporate this information into my Direct Testimony. Accordingly, once I have had time to review this information and conduct additional discovery if necessary, I will supplement my Direct Testimony.

Q. To your knowledge, is the Company planning to recover a rate of return on AMI investments?

A. Yes. The Company is planning to seek a rate of return on the AMI investments at a future rate case.

Q. Is the Company planning on recovering a rate of return on existing meters after they are replaced?

A. Yes. The Company claims that it will seek a rate of return on both new and existing meters.[13] According to the Company, the existing meters have a remaining book life of between 14 and 16 years (depending on the type). This means that the average ratepayer will be paying for two meters for the next 14 to 16 years.

Q. Should ratepayers have to pay a rate of return on both new and existing meters?

[13] RECO response to RCR-AMI-2(e).

A. No. Once existing meters are replaced, they are no longer used and useful. Therefore, these unused meters should not be included in rate base, nor should a rate of return on them be collected by the Company. This is a significant issue that should be addressed in a rate case.

Inflation and Nominal Dollars

Q. Were there any additional flaws in the Company's initial filing?

A. Yes. The Company used nominal dollars to claim that the project provides "a range of benefits through the introduction of new processes, applications, and technology infrastructure."[14] The Company estimated benefits and costs for 20 years (2017-2036) due to the project. However, in the testimony provided with the initial petition, the total costs and benefits were presented in the petition in "nominal" terms and then summed together.

Q. What is a nominal cost or benefit?

A. Nominal dollars are sometimes referred to as "current year dollars" because they are the dollar value in the year being presented. As we all know, prices of goods and services change over time due to inflation. The impacts of inflation should be properly taken into account when conducting a benefit-cost analysis.

Q. Why should one account for inflation?

A. If dollar costs or benefits that will occur in different years are combined, they should be adjusted for an assumed inflation rate in order to arrive at "real" or "constant" dollars.

[14] RECO Verified Petition, AMI Panel, p.5, lines 19-20.

For instance, dollars spent in 2017 should not be added to dollars spent in 2036 without adjusting for changes in inflation. Otherwise, changes in purchasing power over time are obscured.

Discount Rates and the Time Value of Money

Q. Please explain what you mean by the "time value of money."

A. Even when one accounts for the effect of inflation, costs and benefits in the future are not weighted the same as costs and benefits today. That is, a dollar received today is worth more than a dollar that one must wait ten years to receive.

Q. How does one account for the time value of money?

A. Investment decisions that have costs and benefits over multiple years are typically evaluated using a "discount rate," which places a value on foregoing benefits or costs for each additional year.[15] Using a discount rate to account for the time value of money allows one to evaluate the entire stream of benefits and costs on an equivalent basis.

Q. How does one use the discount rate to determine whether a project is beneficial?

A. Once one has applied the discount rate to future costs and benefits, one simply subtracts the cumulative discounted costs from the cumulative discounted benefits. This is referred to as the "net present value." This metric allows for comparison of different options that bear differing benefits and costs over a given time period. If the summation of the discounted benefits are greater than the summation of the discounted costs, then the net

[15] A discount rate can be in nominal or real terms. If the stream of dollars being discounted is in nominal dollars then a nominal discount rate is appropriate. If the stream of dollars being discounted is in real or constant dollars then a real discount rate is appropriate.

present value will be positive, and the project is considered to be cost-effective. This concept of net present value is widely used throughout the electricity industry, and elsewhere, as one of the primary indications of whether an investment's benefits exceeds its costs.

Q. Why is it important that costs and benefits of the AMI program be presented in net present value?

A. Without results that are presented in terms of present value of revenue requirements it is not possible to make a determination of the impacts of an investment on customers.

Q. Did the Company eventually provide discounted benefits and costs?

A. Yes. The Company provided discounted benefits and costs in response to a data request. However, in responding to this request the Company simply discounted the benefits and costs in its economic analysis, which were not put in terms of revenue requirements, as described above, and therefore did not present the impacts on ratepayers. In order to obtain regulatory approval for a large capital investment such as this, the economic analysis must consider the impact on ratepayers, in terms of the present value of revenue requirements. As I noted above, revenue requirement calculations were not provided until September 7, 2016.

6. RECOMMENDATIONS

Q. What do you recommend with regard to the Company's meter upgrade proposal?

A. For all the reasons stated in my testimony, the Board should find that approval of the proposed Advanced Metering Program in advance of its implementation is not necessary

or appropriate. Further, the Board should deny the Company's request for Board authorization to undertake its proposed AMI expenditures. If the Company finds that AMI is a prudent, cost-effective investment, then the Company should make that investment and then request recovery of those costs in the next rate case.

Q. Does this conclude your direct testimony?

A. Yes, it does, subject to any supplemental testimony I file after reviewing the Company's revenue requirement calculations.

Schedule TW-1

Resume of Tim Woolf

Tim Woolf, Vice President

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twoolf@synapse-energy.com

PROFESSIONAL EXPERIENCE

Synapse Energy Economics Inc., Cambridge, MA. *Vice President*, 2011 – present.

Provides expert consulting on the economic, regulatory, consumer, environmental, and public policy implications of the electricity and gas industries. The primary focus of work includes technical and economic analyses, electric power system planning, climate change strategies, energy efficiency programs and policies, renewable resources and related policies, power plant performance and economics, air quality, and many related aspects of consumer and environmental protection.

Massachusetts Department of Public Utilities, Boston, MA. *Commissioner*, 2007 – 2011.

Oversaw a significant expansion of clean energy policies as a consequence of the Massachusetts Green Communities Act, including an aggressive expansion of ratepayer-funded energy efficiency programs; the implementation of decoupled rates for electric and gas companies; an update of the DPU energy efficiency guidelines; the promulgation of net metering regulations; review of smart grid pilot programs; and review of long-term contracts for renewable power. Oversaw six rate case proceedings for Massachusetts electric and gas companies. Played an influential role in the development of price responsive demand proposals for the New England wholesale energy market. Served as President of the New England Conference of Public Utility Commissioners from 2009-2010. Served as board member on the Energy Facilities Siting Board from 2007-2010. Served as co-chair of the Steering Committee for the Northeast Energy Efficiency Partnership's Regional Evaluation, Measurement and Verification Forum.

Synapse Energy Economics Inc., Cambridge, MA. *Vice President*, 1997 – 2007.

Tellus Institute, Boston, MA. *Senior Scientist, Manager of Electricity Program*, 1992 – 1997.

Association for the Conservation of Energy, London, England. *Research Director*, 1991 – 1992.

Massachusetts Department of Public Utilities, Boston, MA. *Staff Economist*, 1989 – 1990.

Massachusetts Office of Energy Resources, Boston, MA. *Policy Analyst*, 1987 – 1989.

Energy Systems Research Group, Boston, MA. *Research Associate*, 1983 – 1987.

Union of Concerned Scientists, Cambridge, MA. *Energy Analyst*, 1982-1983.

EDUCATION

Boston University, Boston, MA
Master of Business Administration, 1993

London School of Economics, London, England
Diploma, Economics, 1991

Tufts University, Medford, MA
Bachelor of Science in Mechanical Engineering, 1982

Tufts University, Medford, MA
Bachelor of Arts in English, 1982

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Woolf, T. 2014. "The Resource Value Framework: Reforming Energy Efficiency Cost-Effectiveness Screening." Presentation at the ACEEE Summer Study, August 21, 2014.

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Woolf, T. 2013. "Energy Efficiency Screening: Accounting for 'Other Program Impacts' & Environmental Compliance Costs." Presentation for Regulatory Assistance Project Webinar, March 2013.

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Woolf T. 2013. "Best Practices in Energy Efficiency Program Screening." Presentation for SEE Action Webinar, March 2013.

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Woolf, T. 2012. "In Pursuit of All Cost-Effective Energy Efficiency." Presentation at Sierra Club Boot Camp, October 2012.

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Woolf, T. 2011. "Why Consumer Advocates Should Support Decoupling." Presentation at the 2011 ACEEE National Conference on Energy Efficiency as a Resource, September 2011.

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Woolf, T. 2009. “Price-Responsive Demand in the New England Wholesale Energy Market: Description of NECPUC’s Limited Supply-Side Proposal.” Presentation at the NEPOOL Markets Committee Meeting, November 2009.

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Woolf, T. 1998. “New England Tracking System Project: An Electricity Tracking System to Support a Wide Range of Restructuring-Related Policies.” Presentation at the Ninth Annual Energy Services Conference and Exposition in Orlando, FL, December 1998.

Woolf, T. 2000. “Comments of the Citizens Action Coalition of Indiana.” Presentation at Workshop on Alternatives to Traditional Generation Resources, June 2000.

Woolf, T. 1996. “Overview of IRP and Introduction to Electricity Industry Restructuring.” Training session provided to the staff of the Delaware Public Service Commission, April 1996.

Woolf, T. 1995. “Competition and Regulation in the UK Electric Industry.” Presentation at the Illinois Commerce Commission's workshop on Restructuring the Electric Industry, August 1995.

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TESTIMONY

Colorado Public Utilities Commission (Proceeding No. 16AL-0048E): Answer testimony regarding Public Service Company of Colorado’s rate design proposal. On behalf of Energy Outreach Colorado. June 6, 2016.

Massachusetts Department of Public Utilities (Docket No. 15-155): Joint direct and rebuttal testimony with M. Whited regarding National Grid’s rate design proposal. On behalf of Energy Freedom Coalition of America, LLC. March 18, 2016 and April 28, 2016.

Maine Public Utilities Commission (Docket No. 2015-00175): Direct testimony on Efficiency Maine Trust’s petition for approval of the Triennial Plan for Fiscal Years 2017-2019. On behalf of the Natural Resources Council of Maine and the Conservation Law Foundation. February 17, 2016.

Nevada Public Utilities Commission (Docket Nos. 15-07041 and 15-07042): Direct testimony on NV Energy’s application for approval of a cost of service study and net metering tariffs. On behalf of The Alliance for Solar Choice. October 27, 2015.

New Jersey Board of Public Utilities (Docket No. ER14030250): Direct testimony on Rockland Electric Company’s petition for investments in advanced metering infrastructure. On behalf of the New Jersey Division of Rate Counsel. September 4, 2015.

Utah Public Service Commission (Docket No. 14-035-114): Direct, rebuttal, and surrebuttal testimony on the benefit-cost framework for net energy metering. On behalf of Utah Clean Energy, the Alliance for Solar Choice, and Sierra Club. July 30, 2015, September 9, 2015, and September 29, 2015.

Nova Scotia Utility and Review Board (Matter No. M06733): Direct testimony on EfficiencyOne’s 2016-2018 demand-side management plan. On behalf of the Nova Scotia Utility and Review Board. June 2, 2015.

Missouri Public Service Commission (Case No. ER-2014-0370): Direct and surrebuttal testimony on the topic of Kansas City Power and Light’s rate design proposal. On behalf of Sierra Club. April 16, 2015 and June 5, 2015.

Missouri Public Service Commission (File No. EO-2015-0055): Rebuttal and surrebuttal testimony on the topic of Ameren Missouri’s 2016-2018 Energy Efficiency Plan. On behalf of Sierra Club. March 20, 2015 and April 27, 2015.

Florida Public Service Commission (Dockets No. 130199-EI et al.): Direct testimony on the topic of setting goals for increasing the efficiency of energy consumption and increasing the development of demand-side renewable energy systems. On behalf of the Sierra Club. May 19, 2014.

Massachusetts Department of Public Utilities (Docket No. DPU 14-__): Testimony regarding the cost of compliance with the Global Warming Solution Act. On behalf of the Massachusetts Department of Energy Resources and the Department of Environmental Protection. May 16, 2014.

Kentucky Public Service Commission (Case No. 2014-00003): Direct testimony regarding Louisville Gas and Electric Company and Kentucky Utilities Company's proposed 2015-2018 demand-side management and energy efficiency program plan. On behalf of Wallace McMullen and the Sierra Club. April 14, 2014.

Maine Public Utilities Commission (Docket No. 2013-168): Direct and surrebuttal testimony regarding policy issues raised by Central Maine Power's 2014 Alternative Rate Plan, including recovery of capital costs, a Revenue Index Mechanism proposal, and decoupling. On behalf of the Maine Public Advocate Office. December 12, 2013 and March 21, 2014.

Colorado Public Utilities Commission (Docket No. 13A-0686EG): Answer and surrebuttal testimony regarding Public Service Company of Colorado's proposed energy savings goals. On behalf of the Sierra Club. October 16, 2013 and January 21, 2014.

Kentucky Public Service Commission (Case No. 2012-00578): Direct testimony regarding Kentucky Power Company's economic analysis of the Mitchell Generating Station purchase. On behalf of the Sierra Club. April 1, 2013.

Nova Scotia Utility and Review Board (Matter No. M04819): Direct testimony regarding Efficiency Nova Scotia Corporation's Electricity Demand Side Management Plan for 2013 – 2015. On behalf of the Counsel to Nova Scotia Utility and Review Board. May 22, 2012.

Missouri Office of Public Counsel (Docket No. EO-2011-0271): Rebuttal testimony regarding IRP rule compliance. On behalf of the Missouri Office of the Public Counsel. October 28, 2011.

Nova Scotia Utility and Review Board (Matter No. M03669): Direct testimony regarding Efficiency Nova Scotia Corporation's Electricity Demand Side Management Plan for 2012. On behalf of the Counsel to Nova Scotia Utility and Review Board. April 8, 2011.

Rhode Island Public Utilities Commission (Docket No. 3790): Direct testimony regarding National Grid's Gas Energy Efficiency Programs. On behalf of the Division of Public Utilities and Carriers. April 2, 2007.

North Carolina Utilities Commission (Docket E-100, Sub 110): Filed comments with Anna Sommer regarding the Potential for Energy Efficiency Resources to Meet the Demand for Electricity in North Carolina. Synapse Energy Economics on behalf of the Southern Alliance for Clean Energy. February 2007.

Rhode Island Public Utilities Commission (Docket No. 3765): Direct and Surrebuttal testimony regarding National Grid's Renewable Energy Standard Procurement Plan. On behalf of the Division of Public Utilities and Carriers. January 17, 2007 and February 20, 2007.

Minnesota Public Utilities Commission (Docket Nos. CN-05-619 and TR-05-1275): Direct testimony regarding the potential for energy efficiency as an alternative to the proposed Big Stone II coal project.

On behalf of the Minnesota Center for Environmental Advocacy, Fresh Energy, Izaak Walton League of America, Wind on the Wires and the Union of Concerned Scientists. November 29, 2006.

Rhode Island Public Utilities Commission (Docket No. 3779): Oral testimony regarding the settlement of Narragansett Electric Company's 2007 Demand-Side Management Programs. On behalf of the Division of Public Utilities and Carriers. November 24, 2006.

Nevada Public Utilities Commission (Docket Nos. 06-04002 & 06-04005): Direct testimony regarding Nevada Power Company's and Sierra Pacific Power Company's Renewable Portfolio Standard Annual Report. On behalf of the Nevada Bureau of Consumer Protection. October 26, 2006

Nevada Public Utilities Commission (Docket No. 06-06051): Direct testimony regarding Nevada Power Company's Demand-Side Management Plan in the 2006 Integrated Resource Plan. On behalf of the Nevada Bureau of Consumer Protection. September 13, 2006.

Nevada Public Utilities Commission (Docket Nos. 06-03038 & 06-04018): Direct testimony regarding the Nevada Power Company's and Sierra Pacific Power Company's Demand-Side Management Plans. On behalf of the Nevada Bureau of Consumer Protection. June 20, 2006.

Nevada Public Utilities Commission (Docket No. 05-10021): Direct testimony regarding the Sierra Pacific Power Company's Gas Demand-Side Management Plan. On behalf of the Nevada Bureau of Consumer Protection. February 22, 2006.

South Dakota Public Utilities Commission (Docket No. EL04-016): Direct testimony regarding the avoided costs of the Java Wind Project. On behalf of the South Dakota Public Utilities Commission Staff. February 18, 2005.

Rhode Island Public Utilities Commission (Docket No. 3635): Oral testimony regarding the settlement of Narragansett Electric Company's 2005 Demand-Side Management Programs. On behalf of the Division of Public Utilities and Carriers. November 29, 2004.

British Columbia Utilities Commission. Direct testimony regarding the Power Smart programs contained in BC Hydro's Revenue Requirement Application 2004/05 and 2005/06. On behalf of the Sierra Club of Canada, BC Chapter. April 20, 2004.

Maryland Public Utilities Commission (Case No. 8973): Oral testimony regarding proposals for the PJM Generation Attributes Tracking System. On behalf of the Maryland Office of People's Counsel. December 3, 2003.

Rhode Island Public Utilities Commission (Docket No. 3463): Oral testimony regarding the settlement of Narragansett Electric Company's 2004 Demand-Side Management Programs. On behalf of the Division of Public Utilities and Carriers. November 21, 2003.

California Public Utilities Commission (Rulemaking 01-10-024): Direct testimony regarding the market price benchmark for the California renewable portfolio standard. On behalf of the Union of Concerned Scientists. April 1, 2003.

Québec Régie de l'énergie (Docket R-3473-01): Direct testimony with Philp Raphals regarding Hydro-Québec's Energy Efficiency Plan: 2003-2006. On behalf of Regroupment national des Conseils régionaux de l'environnement du Québec. February 5, 2003.

Connecticut Department of Public Utility Control (Docket No. 01-10-10): Direct testimony regarding the United Illuminating Company's service quality performance standards in their performance-based ratemaking mechanism. On behalf of the Connecticut Office of Consumer Counsel. April 2, 2002.

Nevada Public Utilities Commission (Docket No. 01-7016): Direct testimony regarding the Nevada Power Company's Demand-Side Management Plan. On behalf of the Bureau of Consumer Protection, Office of the Attorney General. September 26, 2001.

United States Department of Energy (Docket Number-EE-RM-500): Comments with Bruce Biewald, Daniel Allen, David White, and Lucy Johnston of Synapse Energy Economics regarding the Department of Energy's proposed rules for efficiency standards for central air conditioners and heat pumps. On behalf of the Appliance Standards Awareness Project. December 2000.

US Department of Energy (Docket EE-RM-500): Oral testimony at a public hearing on marginal price assumptions for assessing new appliance efficiency standards. On behalf of the Appliance Standards Awareness Project. November 2000.

Connecticut Department of Public Utility Control (Docket No. 99-09-03 Phase II): Direct testimony regarding Connecticut Natural Gas Company's proposed performance-based ratemaking mechanism. On behalf of the Connecticut Office of Consumer Counsel. September 25, 2000.

Mississippi Public Service Commission (Docket No. 96-UA-389): Oral testimony regarding generation pricing and performance-based ratemaking. On behalf of the Mississippi Attorney General. February 16, 2000.

Delaware Public Service Commission (Docket No. 99-328): Direct testimony regarding maintaining electric system reliability. On behalf of Delaware Public Service Commission Staff. February 2, 2000.

Delaware Public Service Commission (Docket No. 99-328): Filed expert report ("Investigation into the July 1999 Outages and General Service Reliability of Delmarva Power & Light Company," jointly authored with J. Duncan Glover and Alexander Kusko). Synapse Energy Economics and Exponent Failure Analysis Associates on behalf the Delaware Public Service Commission Staff. February 1, 2000.

New Hampshire Public Service Commission (Docket No. 99-099 Phase II): Oral testimony regarding standard offer services. On behalf of the Campaign for Ratepayers Rights. January 14, 2000.

West Virginia Public Service Commission (Case No. 98-0452-E-GI): Rebuttal testimony regarding codes of conduct. On behalf of the West Virginia Consumer Advocate Division. July 15, 1999.

West Virginia Public Service Commission (Case No. 98-0452-E-GI): Direct testimony regarding codes of conduct and other measures to protect consumers in a restructured electricity industry. On behalf of the West Virginia Consumer Advocate Division. June 15, 1999.

Public Service Commission of West Virginia (Case No. 98-0452-E-GI): Filed expert report ("Measures to Ensure Fair Competition and Protect Consumers in a Restructured Electricity Industry in West Virginia," jointly authored with Jean Ann Ramey and Theo MacGregor) in the matter of the General Investigation to determine whether West Virginia should adopt a plan for open access to the electric power supply market and for the development of a deregulation plan. Synapse Energy Economics and MacGregor Energy Consultancy on behalf of the West Virginia Consumer Advocate Division. June 1999.

Massachusetts Department of Telecommunications and Energy (DPU/DTE 97-111): Direct testimony regarding Commonwealth Electric Company's energy efficiency plan, and the role of municipal aggregators in delivering demand-side management programs. On behalf of Cape and Islands Self-Reliance Corporation. January 1998.

Delaware Public Service Commission (DPSC 97-58): Direct testimony regarding Delmarva Power and Light's request to merge with Atlantic City Electric. On behalf of Delaware Public Service Commission Staff. May 1997.

Delaware Public Service Commission (DPSC 95-172): Oral testimony regarding Delmarva's integrated resource plan and DSM programs. On behalf of the Delaware Public Service Commission Staff. May 1996.

Colorado Public Utilities Commission (5A-531EG): Direct testimony regarding the impact of proposed merger on DSM, renewable resources and low-income DSM. On behalf of the Colorado Office of Energy Conservation. April 1996.

Colorado Public Utilities Commission (3I-199EG): Direct testimony regarding the impacts of increased competition on DSM, and recommendations for how to provide utilities with incentives to implement DSM. On behalf of the Colorado Office of Energy Conservation. June 1995.

Colorado Public Utilities Commission (5R-071E): Oral testimony on the Commission's integrated resource planning rules. On behalf of the Colorado Office of Energy Conservation. July 1995.

Colorado Public Utilities Commission (3I-098E): Direct testimony on the Public Service Company of Colorado's DSM programs and integrated resource plans. On behalf of the Colorado Office of Energy Conservation. April 1994.

Delaware Public Service Commission (Docket No. 96-83): Filed comments regarding the Investigation of Restructuring the Electricity Industry in Delaware (Tellus Institute Study No. 96-99). On behalf of the Staff of the Delaware Public Service Commission. November 1996.

Colorado Public Utilities Commission (Docket No. 96Q-313E): Filed comments in response to the Questionnaire on Electricity Industry Restructuring (Tellus Institute Study No. 96-130-A3). On behalf of the Colorado Governor's Office of Energy Conservation. October 1996.

State of Vermont Public Service Board (Docket No. 5854): Filed expert report (Tellus Institute Study No. 95-308) regarding the Investigation into the Restructuring of the Electric Utility Industry in Vermont. On behalf of the Vermont Department of Public Service. March 1996.

Pennsylvania Public Utility Commission (Docket No. I-00940032): Filed comments (Tellus Institute Study No. 95-260) regarding an Investigation into Electric Power Competition. On behalf of The Pennsylvania Office of Consumer Advocate. November 1995.

New Jersey Board of Public Utilities (Docket No. EX94120585Y): Initial and reply comments ("Achieving Efficiency and Equity in the Electricity Industry Through Unbundling and Customer Choice," Tellus Institute Study No. 95-029-A3) regarding an investigation into the future structure of the electric power industry. On behalf of the New Jersey Division of Ratepayer Advocate. September 1995.

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