**Matter No. M09898**

# In the Matter of NS Power 2021 Annually Adjusted Rates (AARs)

**EVIDENCE OF**

**JOHN D. WILSON**

**ON BEHALF OF**

**THE CONSUMER ADVOCATE**

Resource Insight, Inc.

**JANUARY 7, 2021**

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## I. Identification

**Q: Mr. Wilson, please state your name, occupation, and business address.**

A: I am John D. Wilson. I am the research director of Resource Insight, Inc., 5 Water St., Arlington, Massachusetts.

**Q: Summarize your professional education and experience.**

A: I received a BA degree from Rice University in 1990, with majors in physics and history, and an MPP degree from the Harvard Kennedy School of Government with an emphasis in energy and environmental policy, and economic and analytic methods.

I was deputy director of regulatory policy at the Southern Alliance for Clean Energy for more than twelve years, where I was the senior staff member responsible for SACE's utility regulatory research and advocacy, as well as energy resource analysis. I engaged with southeastern utilities through regulatory proceedings, formal workgroups, informal consultations, and research-driven advocacy.

I have been in my current position since November of 2019. My clients have included a variety of consumer advocate, energy industry, and environmental advocacy organizations.

My work has considered, among other things, the cost-effectiveness of prospective new electric generation plants and transmission lines, retrospective review of generation-planning decisions, conservation program design, ratemaking and cost recovery for utility efficiency programs, allocation of costs of service between rate classes and jurisdictions, design of retail rates, and performance-based ratemaking for electric utilities.

My professional qualifications are further summarized in Exhibit JDW-1.

**Q: Have you testified previously in utility proceedings?**

A: Yes. I have testified more than twenty times before utility regulators in California and the Southeast U.S. and appeared numerous additional times before various regulatory and legislative bodies.

**Q: Have you previously testified in other proceedings before this Board?**

A: Yes. I have filed testimony in six proceedings. I have also assisted the Consumer Advocate in preparing comments and developing positions in numerous proceedings and stakeholder processes.

## II. Introduction and Summary

**Q: On whose behalf are you testifying?**

A: My testimony is sponsored by the Nova Scotia Consumer Advocate.

**Q: What is the purpose of your testimony?**

A: I review aspects of NS Power's proposed updates to the Annually Adjusted Rates (AARs). Specifically, my testimony addresses the following topics:

- NS Power's treatment of purchases over the Maritime Link in estimating the marginal energy costs of serving the AARs.
- Unit modeling assumptions used in creating the marginal fuel cost forecast.
- The treatment of variable capital costs (VCC).
- Application of Time-Varying Pricing to AARs.

**Q: Please summarize your recommendations.**

A: I recommend that the Board should require NS Power to:

- Promptly update marginal energy costs in the AARs if Nalcor projects any further significant delay in delivery of the NS Block or ML Surplus power;

- Request the advice of its dispatch study consultant regarding its process for updating its modeling assumptions, and report back on this in its 2022 AARs application;
- Utilize the ELIADC rate for variable capital costs (VCCs) for the GRLF and BUTU tariffs, or to develop an appropriate rate as discussed below.
- Propose time-varying rates for most, if not all, AARs tariffs in its next AARs application.

## III. The Effect of Maritime Link Purchases

**Q: How has NS Power's expectation regarding the delivery of Maritime Link power changed since the last AARs proceeding?**

A: In the 2020 AARs proceeding, NS Power projected that Maritime Link power would start flowing at essentially full capacity in June 2020. Now, NS Power is relying on Nalcor's September 28, 2020 schedule update which projects that commercial power will be achieved by May 31, 2021 and that energy will be available to NS Power at a later date.

In my colleague Mr. Chernick's evidence on the 2020 AARs, he identified two concerns with the schedule. First, that the Labrador Island Link (LIL) was unlikely to operate at full capacity. Second, that the synchronous condensers at Soldiers Pond has substantial problems.

According to Nalcor's September 28, 2020 update, several milestones are not expected to be achieved by the anticipated energy delivery date. These include full power including unit 4, converter stations, bipole dynamic testing, and synchronous condensers. There is still significant uncertainty regarding the synchronous condensers foundation remediation.

**Q: Did the 2020 AARs accurately reflect the marginal energy cost?**

A: No. In its 2020 response to KDC IR-4, NS Power estimated that the marginal energy cost would be $0.75/MWh higher without the Maritime Link power. The Board declined to provide for an adjustment to the AARs. Since Maritime Link power was not delivered in 2020, NS Power's 2020 response to KDC IR-4 indicates that costs to FAM customer classes increased by $300,000.

In Ms. Derksen's evidence, she noted that this difference would amount to about 11% of the 2020 AARs forecasted revenue. However, Ms. Derksen questioned the materiality of this issue, since her view was that the total amount was "inconsequential in the context of total fuel costs."

**Q: What do you recommend?**

A. In 2020, customers paying AARs likely paid substantially less than actual fuel costs, resulting in a subsidy from FAM customers to AARs customers.[1] In the circumstances, I recommend that the Board require NS Power to promptly update the marginal energy costs for the remaining months of 2021 if Nalcor projects any significant further delay in delivery of the NS Block or ML Surplus power.

Alternatively, the Board could require NS Power to refund the undercollection from AARs to FAM customers.

[1] "If the delay in the arrival of Muskrat Falls energy results in an increase in marginal costs compared to forecast, the difference would be recovered through the FAM." NS Power, response to KDC IR-2, p. 2.

## IV. Unit Modeling Assumptions

**Q: Please explain the relevance of modeling assumptions to AARs.**

A: In order to calculate forecast marginal energy costs, NS Power utilizes the Plexos model. NS Power provided the main modeling assumptions in Appendix A4. These modeling assumptions include heat rates, ramp up rates, startup/shutdown costs and other relevant operational guidelines. If these modeling assumptions are inaccurate, then the modeled system dispatch will be incorrect. Furthermore, if inaccurate operational values are used in actual dispatch, then the dispatch will be suboptimal.

**Q: Do you have any concerns about the modeling assumptions?**

A: Yes. First, I noticed that many of the modeling assumptions have not changed in many years. This may be accurate, or NS Power may not have a review process to update these values. For example, it seems unlikely to me that startup/shutdown costs would remain at exactly the same value year after year.

Second, in my evidence on the 2018-2019 FAM Audit, I discussed NS Power's proposal for a dispatch study. As the role of variable energy resources on the NS Power system increases, NS Power proposes to study how additional automation may assist in optimizing system dispatch to reflect the "multitude of near-real-time system constraints." NS Power proposes to "focus on near-term time frames and include day-ahead business processes for unit commitment and real-time processes for economic dispatch."[2] In addition to several specific processes, NS Power proposes to explore "opportunities for aligning operational dispatch practices and [procurement and resource] planning model studies."[3]

[2] NS Power, Matter No. M09548, Exhibit N-8, response to CA-IR-4(a).

[3] NS Power, Matter No. M09548, Exhibit N-8, response to CA-IR-4(a)(i).

In my evidence in the FAM Audit proceeding (M09548), I recommended several modifications to the scope based on evidence available in that proceeding. If the Board adopts my recommendations, it is possible that NS Power may update operational practices and its planning models to optimize dispatch. The AARs are one area in which such updates could be beneficial.

For example, I recommended that the dispatch study include in its scope a specific charge to the consultant to conduct an initial review of NS Power's operational constraints on economic dispatch, comparing the design of those constraints to best practices. Where significant divergence is evident, the consultant should investigate to better understand NS Power's rationale for its existing practices, and then include specific recommendations where warranted.

These modeling assumptions are examples of the operational constraints on economic dispatch that should be reviewed and updated. NS Power's practices should include regular review and update of these operational constraints and assumptions that affect both planning and actual dispatch.

**Q: What do you recommend?**

A: I recommend that the Board direct NS Power to request the advice of its dispatch study consultant regarding its process for updating its modeling assumptions, and report back on this in its 2022 AARs application.

## V. Variable Capital Costs (VCCs)

**Q: Does NS Power include any variable capital costs in the AARs?**

A: Yes. NS Power states that,

> The ELIADC Energy Charge includes a Variable Capital Charge (VCC) for the cost of NS Power's incremental generation and delivery of electricity for PHP. It is calculated by comparing NS Power's generation fleet dispatch with and without PHP on the system.[4]

The proposed VCC for the ELIADC rate is $1.79 /MWh.[5]

**Q: What is NS Power's position regarding VCCs in other AARs?**

A: NS Power agreed to consider VCCs for the GRLF and BUTU tariffs for 2021. However, NS Power finds that the loads served by those tariffs are "within the level of precision of the dispatch model and associated VCC methodology [and] are not expected to change unit commitment decisions."[6]

**Q: Do you agree with NS Power's rationale for not including recovery of VCCs in other AARs?**

A: No. I do not agree that the size of the load served by a tariff is a reasonable criterion for determining whether a charge is to be collected or not. In its 2020 Reply Evidence, NS Power agreed that since the GRLF and BUTU tariffs do not have fixed cost adders, it would be appropriate to consider including VCCs in the rate. VCCs should be collected because they reflect variable O&M costs that qualify under NS Power's capital expenditure criteria. Even though the load of a single customer or of a group of customers under a single tariff may not be sufficient to change unit commitment decisions, the load of every customer contributes to the rate at which VCCs must be incurred. Thus, it is appropriate to collect this charge since the costs are caused by the load on a marginal basis.

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[4] NS Power, Application, p. 32, lines 22-24.

[5] NS Power, Application, p. 32, line 7.

[6] NS Power, Application, p. 11, lines 7-10. See also NS Power, response to KDC IR-9.

**Q: What VCC rate should NS Power set for the GRLF and BUTU tariffs?**

A: NS Power should utilize the ELIADC rate of $1.79/MWh for the GRLF and BUTU tariffs. This is reasonable since the rate is not likely to differ much between these customer types.

Another approach would be to combine the loads associated with GRLF and BUTU with the loads associated with the 1P-RTP, Shore Power and other rates that do have fixed cost adders for analytical purposes, but only apply the resulting rate to the GRLF and BUTU tariffs. The approach of developing marginal costs based on the use of larger-than-anticipated loads is common. For example, several large utilities I am familiar with develop avoided costs for units less than 80 MW using load modifiers that are much larger than 80 MW (e.g., +/- 1,000 MW).

## VI. Application of Time-Varying Pricing to AARs

**Q: How does NS Power determine the annual energy cost rate in AARs?**

A: With the exception of the Real Time Pricing tariffs, energy costs in AARs are a fixed annual rate based on the marginal fuel cost forecast. As shown in Appendix A2 of the Application, the marginal fuel cost forecast uses monthly on-peak and off-peak rates.

**Q: Would there be significant benefit from using the on-peak and off-peak rates?**

A: Yes, for two reasons. First, cost recovery would be more precisely aligned with customer use. At present, the marginal fuel cost rate is lower than the forecast fuel costs in some months and hours, but higher in others. Only customers who maintain level load across the entire year are paying the intended cost.

Customers who use more power during peak periods (and less power during off-peak periods) are getting a discount on their fuel costs. This is particularly relevant to BUTU customers, who are more likely to be using this power during net peak load hours, and thus likely to get a discount from NS Power's actual costs.

Second, customers have no price incentive to shift demand to off-peak periods. While the real time pricing tariff provides the best price signal, even a simple TOU rate would likely be effective at shifting some demand to off-peak periods. Customers on these rates are among NS Power's most sophisticated customers, and would be in a position to apply cost control practices in response to even modest pricing signals.

**Q: What do you recommend with respect to time-varying pricing?**

A: I recommend that in its next application for AARs, NS Power should propose time-varying pricing rates for most, if not all, of the tariffs. If NS Power believes that some tariffs should remain on a fixed annual rate, it should provide a justification for that recommendation.

Waiting until the next filing may provide NS Power with the opportunity to coordinate these rates with the decision in the Time-Varying Pricing proceeding (Matter No. 09777) in which NS Power has proposed Critical Peak Pricing and Time of Use rates for residential and small commercial customers.

**Q: Does this conclude your testimony?**

A: Yes.

**Exhibit JDW-1**

# JOHN D. WILSON

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## SUMMARY OF PROFESSIONAL EXPERIENCE

*2019–Present* **Research Director, Resource Insight, Inc.** Provides research, technical assistance, and expert testimony on electric- and gas-utility planning, economics, and regulation. Reviews electric-utility rate design. Designs and evaluates conservation programs for electric utilities, including conservation cost recovery mechanisms and performance incentives. Evaluates performance of renewable resources and designs performance evaluation systems for procurement. Designs and assesses resource planning and procurement strategies for regulated and competitive markets.

*2007-19* **Deputy Director for Regulatory Policy, Southern Alliance for Clean Energy.** Managed regulatory policy, including supervision of experts in areas of energy efficiency, renewable energy, and market data. Provided expert witness testimony on topics of resource planning, renewable energy, energy efficiency to utility regulators. Directed litigation activities, including support of expert witnesses in the areas of rate design, resource planning, renewable energy, energy efficiency, and resource procurement. Conducted supporting research and policy development. Represented SACE on numerous legislative, utility, and private committees across a wide range of climate and energy related topics.

*2001–06* **Executive Director, Galveston-Houston Association for Smog Prevention.** Directed advocacy and regulatory policy related to air pollution reduction, including ozone, air toxics, and other related pollutants in the industrial, utility, and transportation sectors. Served on the Regional Air Quality Planning Committee, Transportation Policy Technical Advisory Committee, and Steering Committee of the TCEQ Interim Science Committee.

*2000–01* **Senior Associate, The Goodman Corporation.** Provided transportation and urban planning consultant services to cities and business districts across Texas.

*1997–99* **Senior Legislative Analyst and Technology Projects Coordinator, Office of Program Policy Analysis and Government Accountability, Florida Legislature.** Author or team member for reports on water supply policy, environmental permitting, community development corporations, school district financial management and other issues – most recommendations implemented by the 1998 and 1999 Florida Legislatures. Edited statewide government accountability newsletter and coordinated online and internal technical projects.

*1997* **Environmental Management Consultant, Florida State University.** Project staff for Florida Assessment of Coastal Trends.

*1992-96* **Research Associate, Center for Global Studies, Houston Advanced Research Center.** Coordinated and led research for projects assessing environmental and resource issues in the Rio Grande / Rio Bravo river basin and across the Greater Houston region. Coordinated task force and edited book on climate change in Texas.

## EDUCATION

BA, Physics (with honors) and history, Rice University, 1990.

MPP, John F. Kennedy School of Government, Harvard University, 1992. Concentration areas: Environment, negotiation, economic and analytic methods.

## PUBLICATIONS

"Urban Areas," with Judith Clarkson and Wolfgang Roeseler, in Gerald R. North, Jurgen Schmandt and Judith Clarkson, *The Impact of Global Warming on Texas: A Report of the Task Force on Climate Change in Texas*, 1995.

"Quality of Life and Comparative Risk in Houston," with Janet E. Kohlhase and Sabrina Strawn, *Urban Ecosystems*, Vol. 3, Issue 2, July 1999.

"Seeking Consistency in Performance Incentives for Utility Energy Efficiency Programs," with Tom Franks and J. Richard Hornby, *2010 American Council for an Energy-Efficient Economy Summer Study on Energy Efficiency in Buildings*, August 2010.

"Monopsony Behavior in the Power Generation Market," with Mike O'Boyle and Ron Lehr, *Electricity Journal*, August-September 2020.

## REPORTS

"Policy Options: Responding to Climate Change in Texas," Houston Advanced Research Center, US EPA and Texas Water Commission, October 1993.

Houston Environmental Foresight Science Panel, *Houston Environment 1995*, Houston Advanced Research Center, 1996.

Houston Environmental Foresight Committee, *Seeking Environmental Improvement*, Houston Advanced Research Center, January 1996.

Florida Coastal Management Program, *Florida Assessment of Coastal Trends*, June 1997.

Office of Program Policy Analysis and Government Accountability, *Best Financial Management Practices for Florida School Districts*, Report No. 97-08, October 1997.

Office of Program Policy Analysis and Government Accountability, *Review of the Community Development Corporation Support and Assistance Program*, Report No. 97-45, February 1998.

Office of Program Policy Analysis and Government Accountability, *Review of the Expedited Permitting Process Coordinated by the Governor's Office of Tourism, Trade, and Economic Development,* Report No. 98-17, October 1998.

Office of Program Policy Analysis and Government Accountability, *Florida Water Policy: Discouraging Competing Applications for Water Permits; Encouraging Cost-Effective Water Development,* Report No. 99-06, August 1999.

"Smoke in the Water: Air Pollution Hidden in the Water Vapor from Cooling Towers – Agencies Fail to Enforce Against Polluters," Galveston Houston Association for Smog Prevention, February 2004.

"Reducing Air Pollution from Houston-Area School Buses," Galveston Houston Association for Smog Prevention, March 2004.

"Who's Counting: The Systematic Underreporting of Toxic Air Emissions," Environmental Integrity Project and Galveston Houston Association for Smog Prevention, June 2004.

"Mercury in Galveston and Houston Fish: Contamination by Neurotoxin Places Children at Risk," Galveston Houston Association for Smog Prevention, October 2004.

"Exceeding the Limit: Industry Violations of New Rule Almost Slid Under State's Radar," Galveston Houston Association for Smog Prevention, January 2006.

"Whiners Matter! Citizen Complaints Lead to Improved Regional Air Quality Control," Galveston Houston Association for Smog Prevention, June 2006.

"Bringing Clean Energy to the Southeastern United States: Achieving the Federal Renewable Energy Standard," Southern Alliance for Clean Energy, February 2008.

"Cornerstones: Building a Secure Foundation for North Carolina's Energy Future," Southern Alliance for Clean Energy, May 2008.

"Yes We Can: Southern Solutions for a National Renewable Energy Standard," Southern Alliance for Clean Energy, February 2009.

"Green in the Grid: Renewable Electricity Opportunities in the Southeast United States," with Dennis Creech, Eliot Metzger, and Samantha Putt Del Pino, World Resources Institute Issue Briefs, April 2009.

"Local Clean Power," with Dennis Creech, Eliot Metzger, and Samantha Putt Del Pino, World Resources Institute Issue Briefs, April 2009.

"Energy Efficiency Program Impacts and Policies in the Southeast," Southern Alliance for Clean Energy, May 2009.

"Recommendations for Feed-In-Tariff Program Implementation In The Southeast Region To Accelerate Renewable Energy Development," Southern Alliance for Clean Energy, March 2011.

"Renewable Energy Standard Offer: A Tennessee Valley Authority Case Study," Southern Alliance for Clean Energy, November 2012.

"Increased Levels of Renewable Energy Will Be Compatible with Reliable Electric Service in the Southeast," Southern Alliance for Clean Energy, November 2014.

"Cleaner Energy for Southern Company: Finding a Low Cost Path to Clean Power Plan Compliance," Southern Alliance for Clean Energy, July 2015.

"Analysis of Solar Capacity Equivalent Values for Duke Energy Carolinas and Duke Energy Progress Systems," prepared for and filed by Southern Alliance for Clean Energy, Natural Resources Defense Council, and Sierra Club in North Carolina NCUC Docket No. E-100, Sub 147, February 17, 2017.

"Seasonal Electric Demand in the Southeastern United States," Southern Alliance for Clean Energy, March 2017.

"Analysis of Solar Capacity Equivalent Values for the South Carolina Electric and Gas System," Southern Alliance for Clean Energy, March 2017.

"Solar in the Southeast, 2017 Annual Report," with Bryan Jacob, Southern Alliance for Clean Energy, February 2018.

"Energy Efficiency in the Southeast, 2018 Annual Report," with Forest Bradley-Wright, Southern Alliance for Clean Energy, December 2018.

"Solar in the Southeast, 2018 Annual Report," with Bryan Jacob, Southern Alliance for Clean Energy, April 2018.

"Tracking Decarbonization in the Southeast, 2019 Generation and $CO_2$ Emissions Report," with Heather Pohnan and Maggie Shober, Southern Alliance for Clean Energy, August 2019.

"Seasonal Electric Demand in the Southeastern United States," with Maggie Shober, Southern Alliance for Clean Energy, April 2020.

"Making the Most of the Power Plant Market: Best Practices for All-Source Electric Generation Procurement," with Mike O'Boyle, Ron Lehr, and Mark Detsky, Energy Innovation Policy & Technology LLC and Southern Alliance for Clean Energy, April 2020.

## PRESENTATIONS

"Clean Energy Solutions for Western North Carolina," presentation to Progress Energy Carolinas WNC Community Energy Advisory Council, February 7, 2008.

"Energy Efficiency: Regulating Cost-Effectiveness," Florida Public Service Commission undocketed workshop, April 25, 2008.

"Utility-Scale Renewable Energy," presentation on behalf of Southern Alliance for Clean Energy to the Board of the Tennessee Valley Authority, March 5, 2008.

"An Advocates Perspective on the Duke Save-a-Watt Approach," ACEEE 5th National Conference on Energy Efficiency as a Resource, September 2009.

"Building the Energy Efficiency Resource for the TVA Region," presentation on behalf of Southern Alliance for Clean Energy to the Tennessee Valley Authority Integrated Resource Planning Stakeholder Review Group, December 10, 2009.

"Florida Energy Policy Discussion," testimony before Energy & Utilities Policy Committee, Florida House of Representatives, January 2010.

"The Changing Face of Energy Supply in Florida (and the Southeast)," 37th Annual PURC Conference, February 2010.

"Bringing Energy Efficiency to Southerners," Environmental and Energy Study Institute panel on "Energy Efficiency in the South," April 10, 2010.

"Energy Efficiency: The Southeast Considers its Options," NAESCO Southeast Regional Workshop, September 2010.

"Energy Efficiency Delivers Growth and Savings for Florida," testimony before Energy & Utilities Subcommittee, Florida House of Representatives, February 2011.

"Rates vs. Energy Efficiency," 2013 ACEEE National Conference on Energy Efficiency as a Resource, September 2013.

"TVA IRP Update," TenneSEIA Annual Meeting, November 19, 2014.

"Views on TVA EE Modeling Approach," presentation with Natalie Mims to Tennessee Valley Authority's Evaluating Energy Efficiency in Utility Resource Planning Meeting, February 10, 2015.

"The Clean Power Plan Can Be Implemented While Maintaining Reliable Electric Service in the Southeast," FERC Eastern Region Technical Conference on EPA's Clean Power Plan Proposed Rule, March 11, 2015.

"Renewable Energy & Reliability," 5th Annual Southeast Clean Power Summit, EUCI, March 2016.

"Challenges to a Southeast Carbon Market," 5th Annual Southeast Clean Power Summit, EUCI, March 2016.

"Solar Capacity Value: Preview of Analysis to Date," Florida Alliance for Accelerating Solar and Storage Technology Readiness (FAASSTeR) meeting, Orlando, FL, November 2017.

"Making the Most of the Power Plant Market: Best Practices for All-Source Electric Generation Procurement," Southeast Energy and Environmental Leadership Forum, Nicholas Institute for Environmental Policy Solutions, August 2020.

## EXPERT TESTIMONY

*2008* **South Carolina PSC** Docket No. 2007-358-E, surrebuttal testimony on behalf of Environmental Defense, the South Carolina Coastal Conservation League, Southern Alliance for Clean Energy and the Southern Environmental Law Center. Cost recovery mechanism for energy efficiency, including shareholder incentive and lost revenue adjustment mechanism.

*2009* **North Carolina NCUC** Docket No. E-7, Sub 831, direct testimony on behalf of Environmental Defense Fund, Natural Resources Defense Council, Southern Alliance for Clean Energy, and Southern Environmental Law Center. Cost recovery mechanism for energy efficiency, including shareholder incentive and lost revenue adjustment mechanism.

**Florida PSC** Docket Nos. 080407-EG through 080413-EG, direct testimony on behalf of Southern Alliance for Clean Energy and the Natural Resources Defense Council. Energy efficiency potential and utility program goals.

**South Carolina PSC** Docket No. 2009-226-E, direct testimony in general rate case on behalf of Environmental Defense, the Natural Resources Defense Council, the South Carolina Coastal Conservation League, Southern Alliance for Clean Energy and the Southern Environmental Law Center. Cost recovery mechanism for energy efficiency, including shareholder incentive and lost revenue adjustment mechanism.

*2010* **North Carolina NCUC** Docket No. E-100, Sub 124, direct testimony on behalf of Environmental Defense Fund, the Sierra Club, Southern Alliance for Clean Energy, and Southern Environmental Law Center. Adequacy of consideration of energy efficiency in Duke Energy Carolinas and Progress Energy Carolinas' 2009 integrated resource plans.

**Georgia PSC** Docket No. 31081, direct testimony on behalf of Southern Alliance for Clean Energy. Adequacy of consideration of energy efficiency in Georgia Power's 2010 integrated resource plan, including cost effectiveness, rate and bill impacts, and lost revenues.

**Georgia PSC** Docket No. 31082, direct testimony on behalf of Southern Alliance for Clean Energy. Adequacy of consideration of energy efficiency in Georgia Power's 2010 demand side management plan, including program revisions, planning process, stakeholder engagement, and shareholder incentive mechanism.

*2011* **South Carolina PSC** Docket No. 2011-09-E, allowable ex parte briefing on behalf of Southern Alliance for Clean Energy, South Carolina Coastal Conservation League, and Upstate Forever. Adequacy of South Carolina Electric & Gas's 2011 integrated resource plan, including resource mix, sensitivity analysis, alternative supply and demand side options, and load growth scenarios.

**South Carolina PSC** Docket Nos. 2011-08-E and 2011-10-E, allowable ex parte briefing on behalf of Southern Alliance for Clean Energy, South Carolina Coastal Conservation League, and Upstate Forever. Adequacy of Progress Energy Carolinas and Duke Energy Carolinas' 2011 integrated resource plans, including resource mix, sensitivity analysis, alternative supply and demand side options, cost escalation, uncertainty of nuclear and economic impact modeling.

*2013* **Georgia PSC** Docket No. 36498, direct testimony on behalf of Southern Alliance for Clean Energy. Adequacy of consideration of energy efficiency in Georgia Power's 2013 integrated resource plan, including cost effectiveness, rate and bill impacts, and lost revenues, economics of fuel switching and renewable resources.

**South Carolina PSC** Docket No. 2013-392-E, direct testimony with Hamilton Davis in Duke Energy Carolinas need certification case on behalf of the South Carolina Coastal Conservation League and Southern Alliance for Clean Energy. Need for capacity, adequacy of energy efficiency and renewable energy alternatives, and use of solar power as an energy resource.

*2014* **South Carolina PSC** Docket No. 2014-246-E, direct testimony generic proceeding on behalf of the South Carolina Coastal Conservation League and Southern Alliance for Clean Energy. Methods for calculating dependable capacity credit for renewable resources and application to determination of avoided cost.

*2015* **Florida PSC** Docket No. 150196-EI, direct testimony in Florida Power & Light need certification case on behalf of Southern Alliance for Clean Energy. Appropriate reserve margin and system reliability need.

*2016* **Georgia PSC** Docket No. 40161, direct testimony on behalf of Southern Alliance for Clean Energy. Adequacy of consideration of renewable energy in Georgia Power's 2016 integrated resource plan, including portfolio diversity, operational and implementation risk, analysis of project-specific costs and benefits (including location and technology considerations), and methods for calculating dependable capacity credit for renewable resources.

*2019* **Georgia PSC** Docket Nos. 42310 and 42311, direct testimony with Bryan A. Jacob in Georgia Power's 2019 integrated resource plan and demand side management plan on behalf of Southern Alliance for Clean Energy. Adequacy of consideration of renewable energy in IRP, retirement of uneconomic plants, and use of all-source procurement process. Shareholder incentive mechanism for both renewable energy and DSM plan.

*2020* **Nova Scotia UARB** Matter No. M09519, direct testimony with Paul Chernick in Nova Scotia Power's application for approval of the Smart Grid Nova Scotia Project on behalf of the Nova Scotia Consumer Advocate. Cost classification, decommissioning costs, justification for software vendor selection, and suggested changes to project scope.

**Nova Scotia UARB** Matter No. M09499, direct testimony with Paul Chernick in Nova Scotia Power's 2020 annual capital expenditure plan on behalf of the Nova Scotia Consumer Advocate. Potential to decommission hydroelectric systems, review of annually recurring capital projects, use of project contingencies, and cost minimization practices.

**Nova Scotia UARB** Matter No. M09579, direct testimony with Paul Chernick in Nova Scotia Power's application for the Gaspereau Dam Safety Remedial Works on behalf of the Nova Scotia Consumer Advocate. Alternatives to proposed project, project contingency factor, estimation of archaeological costs, and replacement energy cost calculation.

**Nova Scotia UARB** Matter No. M09609, direct testimony with Paul Chernick in Nova Scotia Power's application for the Advanced Distribution Management System Upgrade on behalf of the Nova Scotia Consumer Advocate. Need for the ADMS and integration with the Distributed Energy Resources Management System.

**Nova Scotia UARB** Matter No. M09707, direct testimony with Paul Chernick on Nova Scotia Power's 2020 Load Forecast on behalf of the Nova Scotia Consumer Advocate. Impacts of recession, application of end-use studies, improvements to forecast components, and impact of time-varying pricing.

**California PUC** Docket A.19-10-012, direct and rebuttal testimony with Paul Chernick in San Diego Gas & Electric's application for the Power Your Drive Electric Vehicle Charging Program on behalf of the Small Business Utility Advocates. Ensuring that utility-installed chargers advance California goal for electric vehicles. Budget controls. Reporting requirements. Evaluation, monitoring and verification processes. Outreach to small business customers.

**California PUC** Docket A.19-08-012, direct testimony in Southern California Edison's 2021 general rate case (track 2) on behalf of the Small Business Utility Advocates. Reasonableness of remedial software costs to be included in authorized revenue requirement.

**Georgia PSC** Docket Nos. 4822, 16573 and 19279, direct, rebuttal and surrebuttal testimony in Georgia Power Company's PURPA avoided cost review on behalf of the Georgia Large Scale Solar Association. Reviewing compliance with prior Commission orders. Application of capacity need forecast in projection of avoided capacity cost. Calculation of cost of new capacity. Proposal of standard offer contract.