BEFORE THE
GEORGIA PUBLIC SERVICE COMMISSION

In Re:

GEORGIA POWER COMPANY'S APPLICATION FOR CERTIFICATION OF THE ROBINS, MOODY, HAMMOND, AND MCGRAU FORD PHASE I AND II BATTERY ENERGY STORAGE SYSTEMS	))))	**DOCKET NO. 55378**

DIRECT TESTIMONY

AND EXHIBITS

OF

DOUGLAS A. SMITH AND
KATHERINE PALACIOS

PUBLIC DISCLOSURE

On Behalf of the
Georgia Public Service Commission
Public Interest Advocacy Staff

October 11, 2024

DIRECT TESTIMONY OF
DOUGLAS A. SMITH AND KATHERINE PALACIOS

IN THE MATTER OF GEORGIA POWER COMPANY'S APPLICATION FOR THE CERTIFICATION OF THE ROBINS, MOODY, HAMMOND, AND MCGRAU FORD PHASE I AND II BATTERY ENERGY STORAGE SYSTEMS

DOCKET NO. 55378

I. INTRODUCTION

Q. PLEASE STATE YOUR NAMES AND BUSINESS ADDRESS.

A. This testimony is being jointly offered by Douglas A. Smith and Katherine Palacios, both from Daymark Energy Advisors, Inc. ("Daymark"). Mr. Smith is a Principal Consultant and Ms. Palacios is a Managing Consultant and registered professional engineer in the state of Texas. Our business address is 370 Main Street, Suite 325, Worcester, Massachusetts 01608.

Q. PLEASE SUMMARIZE DAYMARK'S BUSINESS.

A. Daymark provides energy planning, market analysis, and regulatory policy consulting and advisory services to support decision making within the electricity and natural gas industries. We serve a broad range of clients in North America, including private and public utilities, energy producers and traders, energy consumers and consumer advocates, regulatory agencies, and public policy and energy research organizations, and other industry stakeholders. Our technical skills include power market forecasting models and methods, economics, management, planning, rates and pricing, and energy procurement, and contracting. Our experience includes detailed analyses of energy and environmental

performance of the electric systems, economic planning for transmission, and market analytics.

Q. MR. SMITH, PLEASE SUMMARIZE YOUR EXPERIENCE AND QUALIFICATIONS.

A. I have over twenty years of experience in the energy industry, primarily supporting clients advance or review infrastructure projects. I have advised clients regarding competitive transmission project development, including determination of need, solution building and outreach to stakeholders. I have led evaluations of proposed transmission projects, including assessment of regional benefits, in SPP, PJM, NYISO, ISO-NE and in the province of Manitoba. I have also evaluated non-wires alternatives in Vermont and Maine. Additional detail on my experience and qualifications is provided in my resume, attached hereto as Public Interest Advocacy ("PIA") Staff Exhibit_SP-1.

Q. MR. SMITH, HAVE YOU PREVIOUSLY TESTIFIED BEFORE THIS COMMISSION?

A. Yes. I testified in this docket regarding Georgia Power Company's 2023 Integrated Resource Plan ("IRP") Update.

Q. MS. PALACIOS, PLEASE SUMMARIZE YOUR EXPERIENCE AND QUALIFICATIONS.

A. I am a professional Electrical Engineer with a license in Texas. I have over 14 years of experience working in the energy industry, 12 of which, I was working in various roles in the Transmission Planning department for a major utility in Texas where I would perform

various transmission analyses, set the planned 5-year budget, and develop supporting documentation to advance projects through rate case filing. Throughout my career, I have performed dozens of load and generator interconnection studies, conducting and leading both steady-state and stability analysis to assess the impact of the proposed changes and develop robust and cost-effective solutions if any issues were observed. My experience includes performing analysis and evaluating projects in ERCOT, ISO-NE, PJM, NYISO, MISO, and SPP. Additional detail on my experience and qualifications is provided in my resume, attached hereto as PIA Staff Exhibit_SP-2.

Q. MS. PALACIOS, HAVE YOU PREVIOUSLY TESTIFIED BEFORE THIS COMMISSION?

A. Yes. I testified in this docket regarding Georgia Power Company's 2023 IRP Update.

Q. ON WHOSE BEHALF ARE YOU TESTIFYING?

A. We are presenting testimony on behalf of the Commission's PIA Staff.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. The purpose of our testimony is to respond to Georgia Power Company's ("Company" or "Georgia Power") Application for Certification of Robins, Moody, Hammond, and McGrau Ford Phase II Battery Energy Storage Systems ("BESS") in Docket No. 55378 ("Application"). We address issues pertaining to the Company's screening analysis for potential BESS sites and their subsequent transmission analysis regarding the selected BESS sites.

We reviewed the Company's analysis and conclusions related to the transmission upgrades proposed in the BESS Certification filing. Our scope included a thorough review of the Company's assumptions, methodology, and conclusions, including a review of the power flow analyses, sizing of the projects, siting of the projects, and the interconnecting equipment specified in the Company's plans.

Q. PLEASE SUMMARIZE YOUR FINDINGS WITH RESPECT TO THE ISSUES BEFORE THE COMMISSION IN THIS PROCEEDING.

A. Based on our review of the Company's filings, testimony, data request responses, and other pertinent information for this case, we have the following recommendations for the Commission's consideration:

1. Our investigative analysis revealed that the identified thermal overloads are highly sensitive to generation dispatch scenarios. By adjusting the dispatch of certain generating units—specifically, units at the [redacted]—we observed that the overloads could be alleviated without the need for transmission upgrades. This indicates that operational adjustments may be sufficient to mitigate the minor overloads. We encourage Georgia Power to consider potential operational adjustments or dispatch changes first before embedding the upgrades identified in the McGrau Ford Phase II screening analysis into the 10-year plan.
2. Although not currently mandated in the transitional cluster study process, evaluating Alternative Transmission Technologies (ATTs) could provide cost-effective solutions to address potential transmission constraints. We encourage Georgia Power to

incorporate such evaluations in alignment with Federal Energy Regulatory Commission ("FERC") Order 2023 requirements for future studies.

3. Georgia Power's use of the conservative Area Max cases, while ensuring reliability under high generation deliverability conditions, may identify issues under unlikely or extreme conditions. This methodology may lead to the recommendation of transmission upgrades that are not necessary under normal operating conditions. The Commission should monitor the use of the Area Max cases in future filings.
4. The interconnection study for McGrau Ford Phase II BESS is currently ongoing as a part of the 2024 transitional cluster study process. The results of this study are expected in November 2024. We recommend that the Company provide Staff a copy of this study when complete, and an evaluation of how the results might impact the expected costs of the project.

Q. PLEASE DESCRIBE HOW THE REMAINDER OF YOUR TESTIMONY IS ORGANIZED.

A. Section II of our testimony provides an overview of the Company's filing as it pertains to the investment sought, and the process used by the Company to identify the final BESS project sites. Section III describes the transmission analysis for the interconnection of the BESS projects and their impacts on the system. Section IV addresses the Company's transmission analysis and conclusions of the required transmission upgrades for McGrau Ford Phase II. Section V concludes our testimony.

II. OVERVIEW OF COMPANY FILING

Q. PLEASE SUMMARIZE THE COMPANY'S FILING RELATED TO THE APPLICATION FOR THE CERTIFICATION OF THE ROBINS, MOODY, HAMMOND, AND MCGRAU FORD PHASE II BESS PROJECTS.

A. The Application contains a request for the approval of 500 megawatts ("MW") of Company owned BESS, consisting of the following 4-hour duration lithium-ion BESS resources:

- 128 MW Robins BESS in Bibb County, GA
- 49.5 MW Moody BESS in Lowndes County, GA
- 57.5 MW Hammond BESS in Floyd County, GA
- 265 MW McGrau Ford Phase II BESS in Cherokee County, GA

This filing is a result of the 2023 IRP Update Order which approved 500 MW of Company owned BESS. McGrau Ford Phase II will be sited with McGrau Ford Phase I, which was approved as a part of the 2022 IRP.

The McGrau Ford Phase I and II Projects share a single point of interconnection ("POI"). The Robins BESS Project will be co-located with the existing Robins 115 kV Photovoltaic ("PV") site, allowing the utilization of a single POI. Similarly, the proposed Moody's battery storage will be co-located with the existing Moody PV facility. Hammond is a stand-alone BESS and requires new interconnection facilities. Each of the proposed projects will be comprised of Tesla Megapack 2 XL Lithium-Ion batteries.

Q. PLEASE DESCRIBE THE PROCESS USED BY THE COMPANY TO IDENTIFY THE PROPOSED BESS SITES.

A. In the 2023 IRP Update Order which approved a stipulation, the Company received approval to pursue BESS at the sites of the Robins and Moody solar facilities.[1] In addition, the Company received approval to develop up to 500 MW of BESS, inclusive of the 178 MW planned for the Robins and Moody sites.

Prior to filing the 2023 IRP Update, the Company had already begun the process of identifying sites where new BESS capacity could be interconnected with limited transmission upgrades to quickly bring capacity online before the winter 2026/27 peak season.[2]

Initiated in October 2023, the process began with a high-level preliminary screening study to assess the feasibility of multiple sites across the service territory. As noted by the Company:

> *Given the limited time available to identify sites for a 2026 COD, the Company initiated preliminary transmission screens for the potential sites listed above. These preliminary screens offer guidance on size, location-specific issues, and interconnection voltage, as well as insight into issues related to meeting a COD as early as 2026. While not as detailed as full transmission planning studies, the review gave the Company initial feasibility insights on potential site locations and project timing for achieving COD. Importantly, comprehensive transmission planning studies take many months to conduct.*[3]

[1] Paragraphs 7 and 8 of the 2023 IRP Update Stipulation.
[2] Company's Response to Data Request STF-PIA-17-1.
[3] *Id.*

Q. WHICH SITES WERE EVALUATED IN THE PRELIMINARY SCREENING STUDY PHASE?

A. The Company evaluated [redacted]. These sites were selected due to "available land, potential incremental Inflation Reduction Act ("IRA") tax benefits related to energy communities, and potential transmission related benefits."[4]

Q. WHAT WERE THE CONCLUSIONS OF THE PRELIMINARY SCREENING STUDY?

A. The preliminary screening study determined that only the Hammond site could interconnect a new BESS by 2026, and that the charging capability at Hammond was limited.[5] [redacted]

Q. AFTER THE CONCLUSION OF THE PRELIMINARY SCREENING STUDY, HOW DID THE COMPANY IDENTIFY THE FINAL SITES?

A. When the Company determined that Hammond was the only feasible location to site a BESS project, and that there were some charging limitations at that site, it looked to other potential sites.[6] The Company conducted a screening analysis on the site of the McGrau

[4] *Id.*
[5] *Id.*
[6] *Id.*

Ford Phase I Project and determined that a second 265 MW phase could be added by winter 2026/27.

With the capacity from Robins, Moody, and McGrau Ford Phase II, the Company was short of the 500 MW by 57.5 MW. Since the Hammond site was the only remaining option for a 2026 COD, the Company moved forward with a full transmission study to assess whether the site could accommodate 57.5 MW.

Q. DO YOU AGREE WITH THE FINAL SITES IDENTIFIED IN THE PRELIMINARY SCREENING STUDY?

A. After reviewing the information provided by the Company in the screening study, we agree that the Company's siting of these projects is reasonable for interconnecting a significant number of BESS projects to the transmission system by 2026 with minimal transmission loading issues. Additionally, based on the data provided by the Company, the MW sizing of the BESS facilities at their selected locations is reasonable to prevent major thermal loading issues while interconnecting 500 MW of BESS to the transmission system before the 2026/27 winter peak season.

III. DISCUSSION OF THE TRANSMISSION ANALYSIS AND RESULTS

Q. PLEASE CHARACTERIZE THE COMPANY'S FILING WITH RESPECT TO THE TRANSMISSION ANALYSIS PERFORMED ON THE FOUR FINAL BESS SITES.

A. The Company's transmission analysis studied the Series 2024 Summer Peak (S), Off-Peak (O), Daylight Shoulder (D), and Dusk Shoulder (H) Base Cases for the study years 2027 – 2034 using base load levels.

Q. BASED ON YOUR REVIEW, DID THE COMPANY'S ANALYSIS FOLLOW ITS CONVENTIONAL PLANNING PROCESSES?

A. Yes. The Company's analysis is consistent with its conventional planning process in the study cases used and the methods for transmission analysis. The analysis included evaluating seasonal cases and scenarios for generating units out of service as well as additional cases known as "Area Max" scenarios.

Q. IS THE PROCESS USED BY THE COMPANY TO EVALUATE THESE PROJECTS CONSISTENT WITH INDUSTRY-STANDARD PLANNING PROCESSES?

A. Mostly, with a few notable exceptions. The use of four seasonal base case scenarios is consistent with standard planning processes. These cases represent the expected load and generation levels forecasted for the respective planning years. Summer Peak, Off-Peak, Daylight Shoulder, and Dusk Shoulder base cases were used to evaluate these projects. The Company uses standard procedures and software to evaluate the cases.

Based on our experience in other jurisdictions, we have identified a few elements of the Company's analysis that are less common transmission planning practices. The use of Area Max cases is a more conservative approach taken by the Company than that of many transmission utilities. In the Area Max scenarios, generation within a specific geographic area is evaluated at its maximum output, typically at or near Pmax[7] while N-1 contingency analysis[8] is performed to identify thermal overloads and voltage constraints. Area Max cases are developed by the Company for each season and planning year. Area Max cases are not a direct requirement under North American Electric Reliability Corporation ("NERC") reliability standards.[9] While these cases can identify overloads during extreme grid conditions, they represent potentially unlikely circumstances where a particular region is being dispatched at or near it's maximum rated limit. Typically, this is a low-probability circumstance, and thus reflects conservative planning.

Q. ARE OTHER SCENARIOS THAT WERE USED BY THE COMPANY TO EVALUATE THESE PROJECTS CONSISTENT WITH INDUSTRY-STANDARD PLANNING PROCESSES?

A. Yes. The Company also evaluates various generator outage scenarios for each planning year and season. In these analyses, an N-1 contingency analysis is performed with a pre-existing generator outage. These cases are known as N-G-1, with "G" signifying generator. The N-G-1 cases constitute a P3 contingency scenario as defined in NERC TPL-001-5

[7] Pmax is transmission planning software's definition of maximum facility output in megawatts.
[8] N-1 contingency analysis is a typical method for testing system reliability with the loss of a single element, such as a generator, transmission line, transformer or other facility.
[9] NERC reliability standards function as a minimum level of reliability required. Therefore, the Company is correct when it states that their inclusion of Area Max cases is consistent with NERC Standards. It is not required, however.

Transmission System Planning Performance Requirements. As part of the NERC Criteria, corrective re-dispatching of appropriate generation resources is allowed as a corrective action after the initial N-G scenario.

As discussed in Section IV, it is these two types of scenarios, Area Max and N-G-1, which caused the overloads that triggered the need for transmission system upgrades for McGrau Ford Phase II.

Q. DO YOU HAVE ANY OTHER OBSERVATIONS ABOUT THE COMPANY'S PLANNING PROCESS?

A. Yes. The Company submitted the interconnection request for the McGrau Ford Phase II Project prior to the April 2024 compliance deadline for FERC Order 2023, meaning that the study is currently ongoing as a part of the 2024 transitional cluster study process which began in June 2024. The results of this study are expected in November 2024. The results of this study could impact interconnection costs for the project. We recommend that the Company provide a copy of this study when complete, and an evaluation of how the results might impact the expected costs of the project.

In addition to the potential impact on costs, the transitional cluster study did not mandate that ATTs be evaluated to determine whether the overloads could be mitigated without the need for potentially more costly transmission network upgrades. Therefore, the Company did not evaluate any ATTs. The Company states that they will begin evaluating ATTs as mandated by FERC Order 2023 once annual cluster studies commence in 2025. This study

approach is consistent with the version of the tariff that was effective when the interconnection request was submitted for the McGrau Ford Phase II Project.

Finally, as was the case in the 2023 IRP Update transmission analysis, the transmission planning cases in this docket included certain generators that had been identified and ordered retired in the 2022 IRP. These generators were dispatched throughout this transmission analysis.

Q. WHAT WERE THE PRIMARY CONCLUSIONS OF THE COMPANY'S ANALYSIS OF THE FOUR BATTERY SITES?

A. The Company's analysis concluded that the Robins, Moody, and Hammond sites could be interconnected without any transmission upgrades but identified a need for two upgrades associated with the interconnection of the McGrau Ford Phase II Project.

IV. DISCUSSION OF TRANSMISSION ANALYSIS AND TRANSMISSION UPGRADES FOR MCGRAU FORD II

Q. PLEASE SUMMARIZE THE SPECIFIC CONCLUSIONS OF THE COMPANY'S TRANSMISSION SCREENING ANALYSIS AND THE COMPANY'S REQUESTS TO THE COMMISSION RELATED TO THE INTERCONNECTION OF THE MCGRAU FORD PHASE II BESS PROJECT.

A. The Company's transmission analysis identified two thermal overloads associated with the charging and discharging of the McGrau Ford Phase II BESS Project. No attributable transmission projects were identified for Moody, Robins, or Hammond. The BESS Certification requests that the overloads be mitigated by transmission projects required to

both deliver power and charge the project. The McGrau Ford Phase II BESS attributable transmission projects are the [redacted] as shown below in Table 1.

Table 1: Attributable Transmission Projects – McGrau Ford Phase II BESS[10]

Project	Cost Estimate	Lead Time (months)	Need Date
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
Total	$14,350,000		

Q. PLEASE DESCRIBE THE RESULTS OF THE COMPANY'S TRANSMISSION ANALYSIS AS IT PERTAINS TO THE MCGRAU FORD PHASE II PROJECT.

A. The analysis for McGrau Ford Phase II identified thermal loading constraints observed under two studied case scenarios. These thermal loadings are the results of scenarios that led to the identification of transmission constraints that identified a possible need for transmission upgrade projects. The scenarios are:

1. [redacted]
2. [redacted]

The [redacted] case led to overloads of [redacted] beginning in [redacted] while the [redacted] case led to an overload of [redacted] in [redacted].

These study results are in line with Southern Company's study methodology. However, it is notable that this methodology is more conservative than methodologies used in other

[10] Application, Appendix F – Transmission Analysis for Hammond and McGrau Ford Phase II BESS.

regions. The Area Max cases study a dispatch of generators in a given region, in this case [redacted], at or near their Pmax values and while the system is at its most stressed in the summer peaking case. Therefore, in this analysis, the McGrau Ford Phase II Project discharges at its designated 265 MW rating. Likewise, in the [redacted] case, the McGrau Ford Phase II Project is charging at its designated charging level of 133MW.

Q. ARE THERE ANY ADDITIONAL CONCERNS AS IT PERTAINS TO MCGRAU FORD PHASE II THERMAL LOADING RESULTS?

A. Yes. It is notable that the thermal loading issues identified for the addition of the McGrau Ford Phase II Project are relatively nominal, the [redacted]. In our professional experience, this is a minor exceedance that falls within the margin of error. Given the inherent uncertainties in power system studies – such as solution settings, tolerances in load forecasting differences, modeling assumptions, assumed generator dispatch, additional analysis and studies should determine whether such upgrades are truly necessary at this time. This sensitivity to dispatch and system changes is made evident by [redacted] included in the [redacted] which shows that the thermal loading issues are [redacted].

Q. DID DAYMARK PERFORM ANY INVESTIGATIVE ANALYSIS? IF SO, PLEASE DESCRIBE THE ANALYSIS?

A. Yes. The analysis included comparing the generation dispatch modeled within the [redacted] power flow cases. These two modeling scenarios were selected because the thermal results shared by Georgia Power showed that there was no thermal overload of the [redacted] line in the [redacted].

Q. PLEASE DESCRIBE THE FINDINGS OF YOUR ANALYSIS.

A. We observed that when the dispatch of key generators in the 2034 study was changed to match the dispatch of the 2033 study year model, the impact was significant enough to alleviate the observed [redacted] overload. It was noted that the [redacted] generating units [redacted] were offline in the 2033 case, which alleviated the thermal loading issue seen on the [redacted] and [redacted]. While this generation dispatch may not be the most optimal solution to solve a marginal thermal loading issue, it does reflect the sensitivity of generation dispatch and how it can impact the identified overloads. We recommend that additional analysis be performed by Georgia Power, including sensitivity studies with varied generation dispatch scenarios that will likely alleviate the thermal loading issues identified in the Company's analysis caused by the McGrau Ford Phase II Project.

V. CONCLUSION

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

PIA Staff Exhibit_ (SP-1).

DAYMARK® ENERGY ADVISORS

Douglas A. Smith

Vice President and Principal Consultant

Doug provides clients with strategic insights and customized analysis of the impacts of market dynamics and policy choices on infrastructure development. He advises project developers, utilities, and regulators who are navigating through new business opportunities and market environments. He has extensive experience forecasting wholesale electricity prices, leading market and power system analyses, and directing integrated resource planning processes and evaluations. Doug has appeared as an expert before U.S. state and Canadian provincial regulatory agencies.

SELECTED PROFESSIONAL EXPERIENCE

Power System Planning

- For a national not-for-profit, advised on the state of state, regional and national transmission development conditions, including barriers to development, efforts to change processes, and methods for engagement with key stakeholders. Produced multiple reports and presentations to staff and senior decision makers. Reviewed and assisted in the development of an engagement strategy.
- For Central Maine Power, led a team that provided analysis, advisory services, and testimony in support of the New England Clean Energy Connect (NECEC); provided market analytical modeling and analysis to assess cost implications, benefits, and risks to customer and the client; led presentations of results to internal and external parties. The effort led to filed reports with the Federal Energy Regulatory Commission and the Maine Public Utilities Commission as well as multiple rounds of oral and written testimony.
- For Central Maine Power, managed the analysis of a combined proposal for wind energy and transmission in northern New England; assisted team members in understanding the impacts of various quantities of wind energy and the respective transmission needed to deliver wind energy and crafted scenario analysis to quantify the range of potential benefits, all of which resulted in multiple public reports as components of the client's response to the 2016 Clean Energy RFP by Massachusetts, Connecticut and Rhode Island and the 2018 Section 83D RFP by Massachusetts.
- Led a team providing transmission planning and development advisory and analytical services to a confidential developer. Work spans multiple regions and involves consideration of multiple projects, alternatives, and integration with potential renewable generation developers.
- For multiple confidential developers, leads teams to provide electric market analytical modeling and analysis supporting the development of multiple bids into state procurement processes seeking renewable generation. Teams deliver reports detailing the economic benefits to the region of several separate portfolios of generating assets.
- For the Maryland Office of Peoples' Counsel (MD OPC), provided advisory evaluation services regarding a certificate of public convenience and necessity related to a proposed competitive transmission project in Maryland. Assisted the MD OPC through review of the regulatory record and consideration of potential testimony options. Resulted in multiple rounds of written and oral

testimony outlining the results of the review and potential alternative approaches to the transmission solution identified.

- Managed a team to advise a confidential transmission developer's business development team regarding a bid into a regional request for proposal. The work included advising the client on various financial and transmission tariff related matters to ensure the client could properly account for regulated transmission requirements when bidding into a competitive solicitation.
- Provided advisory services to a confidential distribution utility regarding a regional transmission constraint and potential solutions to that constraint. Designed key aspects of the benefit-cost screening tools used to evaluate the options identified. Advised the client on use of the screening tools and considerations important to their review of potential solutions. The effort resulted in utility action to champion support for several transmission upgrade projects.
- For NRG Energy Inc, analyzed the regional benefits of the proposed Canal 3 peaker plant; advised and managed the Daymark team regarding emissions impact scenarios, with the plant operating as either an energy unit or a reserve unit; investigated state emissions policies and their potential impact on plant operations.
- For a confidential client, led the creation of a proof of concept model of the Southern Company balancing authority and surrounding areas, including benchmarking to available public data and forecasting of potential future capacity expansion outcomes.
- As an input to several economic studies for NYSERDA, provided review and critical analysis of a third-party, long-term forecast of growth and pricing in New York's energy and capacity markets.
- Managed the review of a large generation owner's internal electric market price forecasting process relied upon to evaluate business decisions; provided recommendations for (1) process improvements designed to more-closely align forecasting efforts to better address internal requirements, (2) updated and extended the client's New York modeling capabilities using the AURORA production cost model, and (3) recommended key benchmarking tools that should be used to evaluate specific forecasting results.

Non-Transmission Alternative Assessments

- Assisted in evaluating non-transmission alternatives (NTAs) as compared to a set of proposed transmission upgrades in Vermont; assisted in the development of an economic scorecard designed to facilitate the comparison of transmission and non-transmission solutions on equal footing and compared potential rate impacts of the proposed solutions.
- Assisted in evaluating non-transmission alternatives (NTAs) as compared to a set of proposed transmission upgrades in Maine; evaluated the economics of transmission and non-transmission solutions and leveraged market simulation models to estimate the impact of solutions on energy clearing prices in Maine and in New England.
- On behalf of Vermont-based utility, developed and analyzed non-transmission alternatives (NTAs) to a set of proposed transmission upgrades that would impact the distribution-level supply system; developed an economic tool to evaluate the cost of operating "pre-contingency" generation options.

Clean Energy

- For a confidential developer, led a team that produced an offshore wind siting feasibility study related to a potential investment in offshore leasing. Investigated the project's interconnection and market risks and opportunities.

Asset Valuation'

- For a confidential client, led a valuation of storage as a transmission asset designed to enhance transfer capability. Advised on potential operational outcomes and method for valuing impact on regional energy and capacity markets.
- For a confidential client, led a valuation of a hydropower asset in consideration of a potential sale. Evaluated the asset considering multiple potential ownership structures and reported the range of valuation.
- For Calpine Corporation, led a team that assessed the financial condition and cashflows of several nuclear plants located in New Jersey, Ohio, and Pennsylvania in light of the stranded cost payments determined at the time of the initial stranded cost determinations in 1999 and 2001 and compared them to the financial conditions as estimated based on actual market outcomes.
- For multiple clients, advised on and assisted with the creation of financial models of natural gas and hydro-electric facilities for tax valuation.

Competitive Procurement

- Oversaw development of and currently managing the quantitative evaluation for a procurement process for SaskPower to procure low-carbon energy for delivery over an expanded transmission line between SPP and Saskatchewan. (Ongoing)
- Advisor to Southwest Louisiana Electric Membership Corporation (SLEMCO), Pointe Coupee Electric, and Concordia Electric Cooperative for an appropriate long-term contracting plan for energy and capacity by developing, documenting, and recommending a planning process and the resulting steps needed to acquire its next sources of power supply. Prepared the quantitative review for the responses to a Request for Proposal (RFP) to solicit diverse offerings to meet load. Prepared and delivered multiple rounds of testimony.
- For a confidential developer, led multiple investigations into potential competitive bid requests for proposal to assess client's likely competitive position relative to the market. This effort included assessment of RFP conditions, potential solutions, cost evaluation, evaluation of net benefits and advising on potential competition. The outcome of each effort was a bid / no bid decision in part based on the overall team recommendation.

Regulatory Economics

- For the Georgia PSC Public Interest Advocacy Staff, reviewed and provided testimony regarding transmission and interconnection issues regarding the Georgia Power 2023 IRP Update filing. Reviewed the Company's methodology and results. Oversaw a team of transmission planners who reviewed and tested the Company's results. Provided recommendations regarding the analysis and results of the Company's transmission plan for new generation requested in the IRP Update.
- Served as an Independent Expert Consultant to the Manitoba Public Utilities Board to provide an independent expert opinion of Manitoba Hydro's export revenue forecast as part of the utility's 2017/18 & 2018/19 General Rate Application (GRA) and the 2023/24 GRA. Directed the review of

Manitoba Hydro's long-term market price forecast, its projection of surplus energy, existing contracts, the markets fundamentals, and a comprehensive review of the economics and decision-making behind one power sale and transmission construction project. Reviewed utility's hedge trading and risk policies and its performance during drought. Thess accuracy and reasonableness reviews culminated in public and confidential independent expert reports and oral testimony that together were key inputs to regulators' consideration of the utility's rate increase request.

- For the Arkansas Public Service Commission Staff, led the review of a utility's proposal to use a tax equity partner in the acquisition of wind power plants. Analyzed the risks and benefits of the proposal to utility customers and reviewed potential alternative financing options. The analysis led to the provision of written testimony before the Arkansas Public Service Commission.
- Assisted in the assessment of a request to the Arkansas Public Service Commission for a declaratory order; the request sought a finding that installation of environmental controls at the Flint Creek power plant was in the public interest.
- For the Interconnection Rights Holders (IRH) Management Committee (IMC) of an HVDC transmission facility between HQ and ISO-NE, led a team to prepare a cost-benefits study to assess the merits of extending the agreement for a period of up to twenty years. The purpose of the study was to measure both ratepayer and shareholder impacts by isolating the net benefits that would potentially accrue to the contract holders. Project resulted in a comprehensive report documenting the cost and benefit analysis approach, assumptions, results, and conclusions.
- For the Southern Environmental Law Center (SELC), led a team that reviewed the Integrated Resource Planning (IRP) performed by Duke Energy Carolinas and Duke Energy Progress and identified, modeled, and compiled results of alternative resource plans that illustrated the benefits of a more aggressive renewable generation focus. Provided a report that was relied upon by SELC to craft testimony for submission in the docketed case.

EMPLOYMENT HISTORY

Daymark Energy Advisors, Inc.	Worcester, MA
Principal Consultant	2021 – Present
Treasurer	2016 – Present
Managing Consultant	2017 – 2021
Various consulting positions	2004 – 2017
The Sports Authority	Ft. Lauderdale, FL
Senior POS/EDP Programmer/Analyst	2002 – 2004
SHL USA Inc.	Boulder, CO
Software Engineer	2000 – 2001
Strategic Technologies Group	Boulder, CO
Senior Consultant	1995 – 2000

EDUCATION

Syracuse University	Syracuse, NY
B.S., Accounting, Summa Cum Laude	1991

PUBLICATIONS & TESTIMONY

Invited Speaker

- *Webinar on Northeast transmission*

Publications

- *Independent Expert Consultant Report: SaskPower Contract-Economic Review;* Confidential Report prepared for the Manitoba Public Utilities Board regarding Manitoba Hydro's 20-year power contract with SaskPower and associated transmission, December 15, 2017. Contributing Author.

- *Independent Expert Consultant Report: Export Pricing and Revenues Review;* Confidential Report prepared for the Manitoba Public Utilities Board regarding Manitoba Hydro's 20-year forecast of its export revenues submitted in its 2017/18 and 2018/19 General Rate Application, November 16, 2017. Contributing Author.

- *MCPC Project Benefits; Quantitative and Qualitative Benefits,* Confidential Report prepared for Central Maine Power regarding the benefits of the Maine Clean Power Connection, a 345-kV transmission expansion accompanied by 1100 MW of wind energy project development offered in the Massachusetts RFP for Clean Energy Resources, July 27, 2017. Contributing Author.

- *NECEC Project Benefits; Quantitative and Qualitative Benefits,* Confidential Report prepared for Central Maine Power and H.Q. Energy Services regarding the benefits of the New England Clean Energy Connection, 1200 MW HVDC transmission expansion accompanied by 1090 MW of hydropower and wind energy project development offered in the Massachusetts RFP for Clean Energy Resources, July 27, 2017. Contributing Author.

- *MREI Project Benefits; Direct, Indirect, Qualitative and Other Benefits,* prepared for Central Maine Power Company and Emera Maine regarding the benefits of the Maine Renewable Energy Initiative, a 345 kV transmission expansion accompanied by 1200 MW of wind energy project development, January 28, 2016. Contributing Author.

- *MCPC Project Benefits; Direct, Indirect, Qualitative and Other Benefits",* prepared for Central Maine Power Company regarding the benefits of the Maine Clean Power Connection, a 345-kV transmission expansion accompanied by nearly 600 MW of wind energy project development, January 28, 2016. Contributing Author.

- *Maine Power Connection: Analysis of Benefits in Maine and New England,* Report for Central Maine Power. September 5, 2014. Contributing Author.

Expert Testimony

FORUM	ON BEHALF OF	MATTER
Georgia Public Service Commission	Georgia PSC Public Interest Advocacy Staff	Prefiled Direct testimony and expert witnessing regarding the transmission and interconnection analyses and results from the Georgia Power 2023 Integrated Resource Plan Update. Docket 5538
The Louisiana Public Service Commission	Southwest Louisiana Membership Corporation (SLEMCO), Concordia Electric Cooperative (Concordia), and Point Coupee Electric Cooperative (PC Electric)	Prefiled Direct and Surrebuttal testimony and expert witnessing regarding the Application of SLEMCO, Concordia, and PC Electric to enter into contracts for full requirements power services and solar PPAs. Docket No. U-36514, U-36515, and U-36516. August 2022, May 2023.
The Public Utilities Board of Manitoba	Daymark Energy Advisors *(independent expert consultant, under contract to the Public Utilities Board)*	Manitoba Hydro 2023/24 General Rate Application - independent expert for the review of specific issues regarding Manitoba Hydro's forecast of export revenues, review of MH power contracts, evaluation of utility hedging and risk policies and review of utility performance during drought. Testimony addressed reasonableness of forecast methods and results. May 2023
Rhode Island Division of Public Utilities and Carriers	Rhode Island Division of Public Utilities and Carriers (RIDPUC Staff)	Prefiled Direct testimony in the form of a report to the RIDPUC and brief accompanying testimony. Testimony related to utility's filing for approval to join a revolving credit facility and evaluation of potential impacts to ratepayers. Docket No. D-22-13 January 2023
The Maryland Public Service Commission	The Maryland Office of Consumer Advocates	Prefiled Direct and Surrebuttal testimony and expert witnessing regarding the Application of Transource Maryland, LLC for a CPCN to construct new transmission lines in Maryland. Testimony related to proposed settlement and stipulation and addressed applicant's forecasted economic impacts of proposed transmission. Docket No. 9471. April 2019, May 2019, June 2019, December 2019, February 2020
The Arkansas Public Service Commission	The General Staff of the Arkansas Public Service Commission	Application of the Empire District Electric Company for Approval to Acquire Renewable Wind Generation Facilities and to Establish a Regulatory Asset. Testimony addressed reasonableness of applicant's proposal to use tax equity financing. Docket No. 17-61-U. February 2018
The Arkansas Public Service Commission	The General Staff of the Arkansas Public Service Commission	Application of the Empire District Electric Company for Approval to Acquire Renewable Wind Generation Facilities and to Establish a Regulatory Asset. Testimony addressed reasonableness of applicant's proposal to use tax equity financing. Docket No. 17-61-U. February 2018

FORUM	ON BEHALF OF	MATTER
The Public Utilities Board of Manitoba	Daymark Energy Advisors *(independent expert consultant, under contract to the Public Utilities Board)*	Manitoba Hydro 2017/18 & 2018/19 General Rate Application - independent expert for the review of specific issues regarding Manitoba Hydro's forecast of export revenues and review of MH power contracts. Testimony addressed reasonableness of forecast methods and results. January 2018
Maine Public Utilities Commission	Central Maine Power	Witness in support of CMP's request for approval of a certificate of finding of public convenience and necessity for the New England Clean Energy Connect construction of a 1,200 MW HVDC transmission line from the Quebec-Maine border to Lewiston, Maine. Testimony addressed the economic benefits associated with interregional transmission connection and associated clean energy development benefits. Docket No. 2017-00232. December 2017, April 2018, August 2018, November 2018, January 2019
Maine Public Utilities Commission	Central Maine Power	Emera Maine's application for approval of the Maine Power Connection Transmission project. Testimony addressed the economic benefits associated with interregional transmission connection and associated wind energy development benefits. Docket No. 2014-00048. September 2014

PIA Staff Exhibit_ (SP-2).

DAYMARK® ENERGY ADVISORS

Katherine Palacios, PE

Managing Consultant

Kate leads our grid services team. She works closely with clients to provide strategic power system solutions. She advises project developers and utilities who are navigating new business opportunities and evolving market environments. Her expertise includes renewable energy, energy storage interconnection, and transmission planning. Kate is a registered professional engineer.

SELECTED PROFESSIONAL EXPERIENCE

Transmission Planning

- Testified on behalf of Georgia PSC as an expert witness in the 2023 IRP Update.
- Leveraged QGIS and Powerflow results to correlate transmission power flow results with transmission lines on a map, effectively identifying high-congestion regions within the grid.
- Identified locations where gas lines and transmission lines intersected with high-capacity lines using, ensuring efficient connectivity.
- Developed Transmission Planning Models for company area which included over 400 Transmission and Distribution substations in coordination with the ERCOT Steady State Working Group (SSWG) to develop new modeling techniques. Developed procedures and tools for steady-state model validation and tracking.
    - Worked with ERCOT SSWG to develop quarterly updates to the state-wide transmission system model.
    - Active role in SSWG meetings, advocating for company's needs and ultimately taking part in writing ERCOT procedure manual revisions.
    - Developed first CenterPoint nodal based planning model. Worked with real-time engineers to integrate NMMS data into system planning model.
    - Developed Python and VBA tools to automate steady-state analysis, increasing the number of projects delivered for the entire team.

Interconnection Studies

- Used QGIS to perform comprehensive analysis and determine optimal locations for Point of Interconnection (POI) for a new generator developer.
- Developed a methodology that incorporated the use of QGIS, proprietary maps, open-source land use data, and statistical analysis to identify the most viable POI locations.
- Developed Full Interconnection Studies for multiple wind, solar, and natural gas generation customers in parallel. Developed solutions for transmission level upgrades and reconfigurations to meet NERC TPL, and ERCOT requirements. Worked in internal compliance task forces, providing evidence and creating procedures for CIP compliance tracking.

- Created interconnection studies for large (50 MW – 500 MW) transmission level load interconnections. Developed solutions for Transmission level upgrades and reconfigurations to meet NERC TPL standards. Managed capital projects budget of over $300 Million for Transmission Planning based on electrical and financial needs.
- Completed FIS packages for 7 renewable generation stations, (150 MW – 750 MW), 4 battery storage facilities, 3 natural gas facilities; including:
    - Steady state impact analysis
        - Developed equivalent steady state models, performed contingency analysis using NERC TPL, ERCOT, and CenterPoint standards. Short Circuit Modeling and Analysis using ANSI standards.
        - Created solutions and worked with customers to develop the best cost-effective option for interconnection.
    - Transient stability analysis
        - Integrated dynamic data parameters from datasheets and customer provided sources into PSSE analytical models.
        - Performed Voltage Ride Through analysis and model validation analysis.
        - Worked with customer to provide updates and changes to models if necessary.
        - Provided a clear and concise report that summarizes the impact analysis to all stakeholders.
- Developed transmission upgrade and reconfiguration solutions and proposed several $30 Million projects to perform necessary system upgrades identified through analysis which included:
    - Power flow analysis, motor start and voltage droop mitigation analysis, short circuit ANSI studies, reactive device and voltage support, PV and QV analysis, N-1-1, long-term autotransformer replacement outages.
- Worked with internal Asset Management team to develop standards of project priority ranking based on the DCA per MW for the entire Transmission Planning project portfolio.
- Presented large transmission level projects at public meetings to advocate for the company's project need.
- Developed with executives and management, the annual 5-year forecasted budget for Transmission Planning sponsored projects totaling over $300 Million. Provided critical evidence for transmission projects' needs depending on NERC TPL criteria and internal criteria.
- Presented large project updates with executives in quarterly meetings, showcasing presentation capabilities across all levels of the organization.

Power System Modeling

- Developed a Python automation tool to expediate the FIS process. Integrated Excel input and created automated plot reporting tools that utilize parallel multiprocessing, increasing the workflow for the Special Studies group.
- Performed model validation analysis to check existing generators' new models with MOD-025, MOD-026, and MOD-027 standards.

- Performed steady state analysis for projects converting older 69kV lines to 138kV. Developed PSSE and system modeling skills with the help of excellent mentors. Developed tools in Python and PSSE to automate breaker-level load rollover into the bus-branch PSSE model.

EMPLOYMENT HISTORY

Daymark Energy Advisors, Inc. — Worcester, MA
Managing Consultant — 2023 – *Present*
Senior Consultant — 2021 – 2023

Centerpoint Energy — Houston, TX
Staff Engineer – Special Studies — 2018 – 2021
Staff Engineer – Transmission Planning — 2014 – 2018
Engineer – Transmission Planning System Modeling — 2010 - 2014
Associate Engineer – Transmission Planning — 2009 - 2010

EDUCATION

Texas A&M — College Station, TX
B.S., Electrical Engineering — 2009

Continuing Education

- Advanced PSSE Training, Advanced Dynamics PSSE Training, PSSE Version 34 Training
- Siemens Digital Grid Summit 2019 Courses, Siemens PTI MOD Training, Siemens PTI NMMS Training
- Integrating Python and PSSE Training
- ERCOT Dynamics Working Group, ERCOT Steady State Working Group

LICENSES

Texas Certified Professional Engineer License#118980 (current)