GOVERNMENT OF PUERTO RICO
PUBLIC SERVICE REGULATORY BOARD
PUERTO RICO ENERGY BUREAU

IN RE: PUERTO RICO ELECTRIC POWER AUTHORITY RATE REVIEW	**CASE NO.:** NEPR-AP-2023-0003 **SUBJECT:** Hearing Examiner's Order Submitting Expert Reports of Energy Bureau Consultants

Hearing Examiner's Order Submitting Expert Reports of Energy Bureau Consultants

Per the process established by my order of October 1, 2025, this Order marks for identification, to be admitted into evidence subject to objections, the following documents:

- PREB Consultants Exhibit 63, Renewable Integration Expert Report of Kathryn Bailey and Harold Judd

I direct Secretary Seda to place these reports on the Energy Bureau's case docket.

Be notified and published.

Scott Hempling
Hearing Examiner

CERTIFICATION

I certify that the Hearing Examiner, Scott Hempling, has so established on October 10, 2025. I also certify that on October 10, 2025, I have proceeded with the filing of the Order, and a copy was notified by electronic mail to: mvalle@gmlex.net; arivera@gmlex.net; jmartinez@gmlex.net; jgonzalez@gmlex.net; nzayas@gmlex.net; Gerard.Gil@ankura.com; Jorge.SanMiguel@ankura.com; Lucas.Porter@ankura.com; mdiconza@omm.com; golivera@omm.com; pfriedman@omm.com; msyassin@omm.com; msyassin@omm.com; katiuska.bolanos-lugo@us.dlapiper.com; Yahaira.delarosa@us.dlapiper.com; margarita.mercado@us.dlapiper.com; carolyn.clarkin@us.dlapiper.com; andrea.chambers@us.dlapiper.com; regulatory@genera-pr.com; legal@genera-pr.com; mvazquez@vvlawpr.com; gvilanova@vvlawpr.com; ratecase@genera-pr.com; jfr@sbgblaw.com; hrivera@jrsp.pr.gov; gerardo_cosme@solartekpr.net; contratistas@jrsp.pr.gov; victorluisgonzalez@yahoo.com; Cfl@mcvpr.com; nancy@emmanuelli.law; jrinconlopez@guidehouse.com; Josh.Llamas@fticonsulting.com;

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I sign this in San Juan, Puerto Rico, on October 10, 2025.

NEGOCIADO DE ENERGÍA DE PUERTO RICO — NEPR — JUNTA REGLAMENTADORA DE SERVICIO PÚBLICO

Sonia Seda Gaztambide
Clerk

Report on Integration of Renewable Generation and Battery Storage in Case No. NEPR-AP-2023-0003

Report of PREB Consultants Kathryn Bailey and Harold Judd
Accion Group, LLC

October 10, 2025

Contents

Executive Summary

Puerto Rico law requires electricity generation to be 100% renewable before 2050. This report explains the need to address how LUMA will integrate renewable energy into the transmission system, before LUMA commits billions of dollars implementing a transmission plan whose facilities will remain in service beyond 2050.

LUMA's proposed revenue requirement does not reflect this integration need. Addressing this omission is essential to making fully informed, cost-effective decisions about transmission investments. Otherwise, customers are at risk of paying more than necessary to satisfy the 2050 mandate.

Part I of this report examines how LUMA can align its ongoing reconstruction of the transmission system to meet the 2050 mandate. It provides information and analysis to help the Energy Bureau determine whether incorporating renewable integration features into the current transmission rebuild is more cost-effective than adding necessary transmission resources later through incremental upgrades.

LUMA's proposed capital program focuses on rebuilding transmission lines and substations to restore safety and reliability in the near term. This program does not explicitly incorporate renewable integration as a design criterion. As the Energy Bureau evaluates how to achieve long-term renewable integration, it must decide both when to include renewable-ready features in the transmission rebuild program, and how to recover the associated costs.[1] The report compares two approaches:

> (1) a customer-funded approach in which LUMA includes renewable-ready features as part of the reconstruction effort; and
>
> (2) an IPP-financed approach in which network and substation upgrades are added incrementally as new projects interconnect, with the associated costs recovered through each Independent Power Producer's Power Purchase Agreement with PREPA.

The analysis shows that the coordinated, customer-funded approach provides greater long-term value by reducing lifecycle costs, accelerating renewable deployment, and supporting Puerto Rico's statutory goal of achieving 100% renewable generation by 2050.

The report also distinguishes between (a) the integration of renewables in the short-term that are required by the PSP Order, and (b) the long-term planning for the integration of 100% renewable generation by 2050.

Part II of this report addresses the use of battery energy storage systems ("BESS" or "battery storage") to support generation and transmission as the power system transitions from fossil generation to 100% renewables. It outlines the approaches, planning elements, and coordination needed to ensure reliable, resilient, and cost-effective deployment across generation and transmission systems.

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[1] Ultimately, the Energy Bureau must also determine which design elements should be included in a transmission plan to prepare the system for renewable integration, such as appropriate transformer sizing, number of spare bays, and other renewable-ready features. These design determinations are outside the scope of this report.

This report is authored by Kathryn (Kate) Bailey, and Harold Judd, consultants to the Puerto Rico Energy Bureau ("PREB" or "Energy Bureau"). Kate is a senior consultant with Accion Group, LLC. Accion served as the Independent Coordinator for the Tranche 2-4 renewable energy and battery storage resource solicitations. She was a Commissioner on the New Hampshire Public Utilities Commission, before which she was the Commission's Chief Engineer. She was a Manager on the ISO New England's States Committee on Electricity, that oversaw transmission planning and wholesale market design. She has an undergraduate degree in electrical engineering. Her curriculum vitae is attached as PC Ex. 63.01.

Mr. Judd is the president and co-founder of Accion Group LLC. He has over 40 years of diverse experience and expertise with regulated industries and emerging electricity markets. He has served as a state consumer advocate, Energy Advisor to the Special Assistant to President Carter, Assistant Solicitor for the Department of Energy, and Economic Development Advisor to the Congress of the Federated States of Micronesia and Special Counsel to the President Hagelelegon. Prior to founding Accion Group, LLC, Harry served as the Senior Assistant Attorney General representing the State of New Hampshire in bankruptcy proceedings for two of the state's electric utilities, and as in-house counsel to Southern Energy Inc. and PG&E Energy Services. Mr. Judd holds a J.D. from the University of New Hampshire School of Law (formerly Franklin Pierce Law Center), and a B.A. from the University of Wisconsin at Madison. His curriculum vitae is attached as PC Ex. 63.02.

I. Integration of renewable generation

Integration of renewable generation means preparing the electric system to safely and reliably accept electricity produced by renewable energy sources; namely solar and wind, supported by battery storage.[2] This work includes updating infrastructure, controls, and operating practices to manage the variable and location-specific nature of renewable energy and battery storage. Key activities include ensuring sufficient transmission capacity, maintaining voltage and frequency stability, coordinating protection systems, and adapting transmission system operations to match renewable output with customer demand. Successful integration allows renewable resources to replace or reduce reliance on fossil-fuel generation while maintaining system reliability and power quality.

A. Background

Puerto Rico's Energy Public Policy Act (Act 17-2019) established renewable energy targets of 40% by 2025, 60% by 2040, and 100% by 2050. Although Act 1-2025 eliminated those interim benchmarks, the binding 100% renewable goal remains. This statutory mandate for 100% renewable generation by 2050 creates a unique planning requirement: every transmission asset rebuilt today will be part of a renewable-only system in 25 years.

As modified and approved by the Energy Bureau, PREPA's Integrated Resource Plan ("IRP") was designed to advance the requirements of Act 17-2019. Under the 2018 IRP, the

[2] Renewable resources also include hydropower, biomass, and ocean energy. The focus of this report is primarily on intermittent resources and battery storage.

Energy Bureau developed a procurement plan to acquire 3,750 MW of renewable energy to comply with Puerto Rico's Renewable Portfolio Standard ("RPS"). PREPA planned to procure these resources in six phases, called tranches. In Tranches 1 and 2, PREPA procured 800 MW and 60 MW of solar photovoltaic generation, respectively, from independent power producers ("IPPs") that sell the output to PREPA under long-term contracts.

By Resolution and Order, the Energy Bureau established a two-year Electric System Priority Stabilization Plan. ("PSP Order").[3] This Order requires near-term transmission rebuilds immediately necessary to improve safety and reliability. Specifically, the PSP Order requires LUMA to complete transmission line hardening and maintenance on 51 transmission segments by the end of 2025, and to immediately begin LUMA's substation rebuild program. The PSP Order focuses on restoring safety and reliability, including the addition of firm dispatchable generation resources to reduce the island's dependency on manual load shedding.

The PSP Order also required LUMA to interconnect approved IPP-owned, utility-scale solar generation, and standalone storage projects, by the end of 2026. To meet that deadline, LUMA must complete several tasks to interconnect and integrate those resources safely and reliably. Those tasks include:

- interconnection studies to identify necessary upgrades at substations where new resources will interconnect with the transmission system;
- interconnection studies to identify necessary upgrades to the transmission system;
- construction of upgrades and expansions at existing substations;
- construction of network upgrades to the transmission system; and
- engineering review, oversight, and testing of new substations that IPPs construct.

The Energy Bureau approved long-term PPAs between PREPA and IPPs in Tranches 1, 2, and 4, in addition to two PPAs (60 MW with Xzerta and 90 MW with Ciro One) approved before Tranche 1. Under those contracts, IPPs pay LUMA to complete the above-listed tasks necessary to interconnect their resources.

LUMA provided interconnection cost estimates to the IPPs for the above-listed tasks. The Energy Bureau set those estimates as the maximum amount IPPs would recover in their price charged to PREPA. Because those costs are estimated, LUMA's actual cost to perform the tasks may be higher or lower than the estimate.[4] If LUMA prudently incurs costs above those recovered through the PPA, LUMA may petition the Energy Bureau for approval to recover the difference from customers, through the Power Purchase Cost Adjustment ("PPCA") rider.

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[3] Resolution and Order Establishing Electric System Priority Stabilization Two-Year Plan, Case No. NEPR-MI-2024-0005, March 28, 2025.

[4] This discussion is limited to the case where LUMA's actual costs are greater than the costs recovered in the PPA.

B. Parties' Positions

LUMA's capital plans include programs for rebuilding transmission lines and substations, identified as PBUT 33 (LUMA Ex. 5.05 Transmission Line Rebuilds) and PBUT 8 (LUMA Ex. 5.07 Substation Rebuilds). LUMA presents these projects as reliability improvements made necessary by decades of underinvestment and recent storm damage. LUMA says that the rebuilt lines and substations will improve capacity and resilience, thereby facilitating renewable interconnections. LUMA did not, however, include renewable integration as a design criterion in its rebuild programs.

Transmission rebuilds: LUMA's Program Brief for Transmission Line Rebuilds (LUMA Ex. 5.05) states that the planned transmission line rebuilds are designed to repair and restore failed and out-of-service transmission facilities. Restored facilities will meet industry transfer capability standards, and improve resilience by rebuilding to higher design criteria aligned with NERC requirements.[5] LUMA asserts that these steps ensure that the system can accommodate new injections from renewable generation and batteries while reducing congestion. [Response to PC-of-LUMA-TRS-1 included in PC Ex. 63.03.]

Substation rebuilds: LUMA's Program Brief for substation rebuilds (LUMA Ex. 5.07) describes extensive modernization and repairs. LUMA is rebuilding substations to include new control buildings, new cabling, and upgraded high-voltage equipment such as circuit breakers and switchgear. Many of Puerto Rico's substations, which currently use straight-bus configurations that can cause complete outages when a breaker fails, will be rebuilt with more resilient designs such as ring bus or breaker-and-a-half configurations. LUMA notes that the breaker-and-a-half configuration enhances reliability and allows for future expansion. These steps, LUMA says, will not only reduce the risk of widespread outages when components fail; they will also make it easier to add new renewable generation without disruptive outages.

Revenue requirement: LUMA's proposed revenue requirement does not include the costs of interconnecting large-scale renewables. As well, LUMA did not separately identify the operational cost of operating and maintaining renewable generation. LUMA anticipates and assumes that IPPs will continue to be responsible, project by project, for the cost of network and substation upgrades. LUMA highlights FEMA-funded work that overlaps with renewable needs, such as the TL700 rebuild, the Santa Isabel transformer expansion, and the Jobos and Aguirre site expansions as examples of benefits to renewable integration but identifies them primarily as restoration or asset replacement projects.

In its Constrained Budget, LUMA proposed to reduce the transmission line rebuild program (PBUT 33) by 30 percent. The reduction takes the form of delaying certain projects. These delays would reduce available capacity for new interconnections. The Constrained Budget, LUMA says, would not affect Purchased Power Expense for Renewables. Specifically, LUMA Schedule C-2 shows that under both the Optimal and Constrained Budget, the Purchased Power Expense for Renewables is identical.

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[5] NERC, the North American Electric Reliability Corporation, is the regulatory body that sets and enforces reliability (and security) standards for the power system in the U.S., Canada, and part of Mexico.

Intervenor participation on this issue was limited. On behalf of bondholders, Patrick Hogan raised concerns about whether LUMA could execute its proposed capital projects during the rate period FY26 and FY27. No other intervenors addressed renewable integration costs directly.

C. Analysis

1. Planning

This section examines how transmission planning must adapt as Puerto Rico transitions from thermal generation to renewable resources. It highlights the differences between traditional and renewable-based planning, identifies challenges specific to inverter-based resources, and reviews key design and planning practices—such as substation configuration and capacity—that will determine how effectively the transmission system supports renewable integration.

a. Thermal-based planning vs. renewables-based planning

Historically, utilities designed transmission systems for traditional thermal generation, such as oil, coal, or natural gas plants, around large, centrally located facilities. These plants operated around the clock, producing steady, controllable power. Because their output was predictable and firm, planners focused on moving electricity from a few stable sources to population centers, with relatively straightforward requirements for capacity, voltage control, and protection systems.

Restoring Puerto Rico's existing thermal-based transmission system will improve reliability and resilience. But designing a transmission system for 100% renewable generation in 25 years requires major changes in planning and design. Renewable resources are smaller in capacity, geographically dispersed, and often located far from urban demand. Solar farms are sited where land and sunlight are available; wind projects depend on favorable wind corridors. This geographic mismatch between renewable resource zones and load centers creates the need for new transmission lines, in new locations, not just upgrades to existing lines.

The planning-and-design process therefore must anticipate variable generation output, enable two-way power flows, and incorporate new technologies to keep the system reliable. The resulting transmission circuits and substations must enable the movement of renewable power, at appropriate voltage levels, from dispersed generation sources to homes and businesses. The planning process must allow the delivery system to grow in step with, and at appropriate location for, renewable development. Doing so will reduce total cost, while spreading that cost fairly across the years during which the renewable sources will operate.

Transmission and substation assets typically last 40-65 years. Assets being rebuilt today therefore will still be in service when Puerto Rico reaches 100% renewable generation in 2050. If these assets are not renewable-ready, the Energy Bureau risks embedding costly inefficiencies, requiring duplicative retrofits, and jeopardizing system reliability in a renewable-only power system.

b. Challenges specific to renewables-based planning

Inverter-based resources, like solar and wind, produce variable output. The transmission system therefore must be able to accommodate rapid changes in supply while still delivering firm, reliable power to customers. Maintaining voltage and frequency stability is more challenging in a renewable-only power system. Large thermal generators naturally help steady the electrical system because their heavy spinning turbines act like flywheels, resisting sudden changes in frequency helping to keep the system stable. Renewable resources and batteries require advanced inverters, new control schemes, and stronger protection systems to provide similar services so that the power system remains secure under changing conditions.

By accepting, storing, and releasing energy, batteries can firm power supplies that are variable, but they add a new layer of complexity. Their entry requires planning the transmission system to handle both charging and discharging cycles. When there is excess renewable energy, batteries draw power from the transmission system to charge; when resources are scarce, the batteries discharge power back into the system. This two-way power flow requires additional, location-specific transmission capacity and flexible system operations, relative to a transmission built to accommodate thermal generation.

Identifying where new transmission lines are needed therefore requires LUMA to integrate resource planning with transmission planning. Failure to anticipate these needs risks bottlenecks, curtailment, and higher project costs. Greenfield transmission projects require significant lead time. Obtaining rights-of-way often takes years, involving environmental permitting, community engagement, coordination with landowners and agencies, and possible litigation where eminent domain is necessary to acquire the sites needed for the new facilities. Given Puerto Ricos 2050 mandate, planning must begin now to ensure transmission is in place when renewable projects are ready to interconnect.

Transmission planning typically addresses a 10-20+ year horizon, identifying corridors and substations needed to deliver generation to load centers. Best practices link Integrated Resource Planning with transmission planning, ensuring that generation and storage resources identified in the IRP can deliver their output to customers without bottlenecks. Transmission planning for regions anticipating large-scale renewable integration involves determining the location and capacity of transmission facilities (both circuits and substations) necessary to reliably accommodate renewable resources at the lowest overall cost. If renewable-ready transmission upgrades lag, renewable projects face curtailment, costly delays, or uneconomic interconnection requirements. Here are four examples of renewable-oriented planning:

- Colorado – Power Pathway: Xcel Energy is constructing a 560-mile, $1.7 billion backbone across eastern Colorado to connect 5,500 MW of new renewable resources.[6] Approved in advance of specific renewable projects, the Pathway demonstrates planning reduces long-term costs.
- MISO – Long-Range Transmission Plan: The Midcontinent Independent System Operator approved $10.3 billion of long-range transmission projects to accommodate renewable growth. Analyses project benefit-cost ratios above 2:1, confirming that portfolio-level planning reduces costs compared to piecemeal IPP-driven upgrades.
- Hawaii – Integrated Grid Planning ("IGP"): Hawaiian Electric integrates IRP-style resource modeling with transmission planning to sequence upgrades alongside renewable tranches. The IGP framework explicitly links renewable interconnections with backbone upgrades, avoiding costly bottlenecks experienced in prior years due to under-planned transmission.
- Texas – Competitive Renewable Energy Zones ("CREZ"): In anticipation of rapid wind development, Texas strategically built ~3,600 miles of high-voltage lines at a cost of $7 billion. Completed in 2013, CREZ enabled over 18 GW of wind capacity, reduced congestion, and lowered customer bills by giving access to low-cost generation.

c. ***Substation design choices***

For Puerto Rico's rebuild, two primary modern substation configurations are relevant: the ring bus design and the breaker-and-a-half design. Both are significant improvements over the outdated straight-bus designs that expose customers to full outages if a single breaker fails.

For smaller substations that interconnect a limited number of lines or generators, the ring bus is typically more economical and appropriate than the breaker-and-a-half design. It provides good reliability, sectionalizing capability, and flexibility for maintenance without full outages. However, the ring bus has limited expansion potential, because adding more circuits increases operational complexity and makes protection and control schemes more difficult to manage.

The breaker-and-a-half design, while more expensive initially, is essential for substations that, over time, will host multiple renewable interconnections. It provides superior flexibility and reliability, enabling the lines and generators to be added or switched in and out without disrupting service. This design is better suited to Puerto Rico's renewable integration needs because renewable projects will come on line incrementally, and often in clusters. Investing in breaker-and-a-half substations where renewables are likely to appear avoids repeated retrofits, reduces curtailment risk, and ensures long-term compatibility with a renewable-only system. Although more costly up front, the breaker-and-a-half design is the more prudent choice in locations identified as renewable hubs.

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[6] The original plan included five backbone segments plus a 90-mile extension. The five backbone segments are either in service or under construction and have added approximately 550 miles of new transmission. The Colorado PUC denied construction of the extension.

The result of this reasoning is a mixed standard: ring bus configurations are appropriate for smaller load-serving or remote locations with a limited number of expected renewable interconnections; breaker-and-a-half configurations are more appropriate at strategic points expected to interconnect significant renewable capacity. Applying breaker-and-a-half island-wide would be unnecessarily expensive, but failing to use it near load centers and renewable resource zones would result in higher lifecycle interconnection costs and reliability risks.

When planning the rebuild of a substation that will serve as a renewable hub, LUMA should include not only the basic rebuild but also strategic spare capacity and equipment. This approach means considering spare transformer capacity and additional breaker positions or bays for future renewable interconnections. Given the variability of renewable generation, LUMA should also evaluate voltage support equipment, such as capacitor banks or reactors. Renewable hubs constructed with these elements reduce interconnection costs, lower lifetime costs to customers, and strengthen system resilience by providing redundancy. These features enable faster recovery from equipment failures and ensure flexibility to integrate future renewable projects.

2. Funding

a. The choice: upfront IPP funding (paid for by customers later), project by project; or upfront customer funding guided by a long-term plan

At present, the Energy Bureau requires IPPs to finance the network upgrades and substation upgrades necessary to interconnect their projects and accommodate their output. Interconnection work at existing substations is performed by LUMA or its subcontractors. In Tranche 2 and Tranche 4, the Energy Bureau required IPPs to finance and construct new substations that will be transferred to and owned by PREPA and operated by LUMA.

Under current practice, IPPs reflect their upgrade costs in the PPA prices that they charge to PREPA. PREPA's electricity customers pay for those costs via the PPCA rider. IPPs add risk premiums to their PPA prices to account for the possibility of delay, curtailment, or early contract termination. These PPAs recover the costs of network and substation upgrades over the PPA's 25-year term rather than 40-65-year service life of the asset.

The alternative to upfront funding by the IPP is upfront funding by the customers. Either way, the customers pay. As explained below, evidence from other jurisdictions shows that upfront customer funding, guided by a systemwide plan, produces results that cost less over the long term, reduce lifecycle costs, avoid congestion and curtailment, and spread benefits equitably across all customers.

Today in Puerto Rico, upfront customer funding is not practical, primarily because PREPA has no access to the external financing that would allow the Energy Bureau to spread the capital investments over a multi-decade period. The Energy Bureau should look for a middle ground. LUMA and Genera should complete projects required by the PSP to continue system restoration, while planning for a comprehensive program that meets renewables-ready transmission system needs by 2050. A comprehensive plan would also provide the basis for seeking utility financing should it become available after PREPA's emergence from Title III. That way, customers can benefit from long-term financing over the life of the assets as the transmission system evolves.

b. The tradeoffs between the two funding approaches

The central funding question is whether to continue requiring IPPs to fund interconnection-related transmission and substation upgrades, or instead to adopt a strategic customer-funded approach that plans for a fully renewable power system, with all customers paying over time. As noted above, having IPPs finance improvements has inherent limitations and risks. The following table compares the advantages and disadvantages of each approach. Discussion of these points are below the table.

Comparative Table		
Criterion	**IPP-Funded Incremental Upgrades**	**Customer-Funded Renewable-Ready Investment**
Necessity	Focused only on immediate project needs; may under build long-term capacity.	Ensures that assets are renewable-ready by design, avoiding future retrofits.
Cost	Lower short-term utility costs; higher long-term PPA prices.	Higher near-term utility customer costs; lower lifecycle costs and fewer duplicative upgrades.
Feasibility	Depends on project timing; piecemeal and reactive. Retrofitting later is complex and costly.	Straightforward to add renewable-ready features during current rebuilds. Coordinated with system needs.
Equity	First IPPs bear costs for shared upgrades; later projects may benefit unfairly.	Costs spread across all customers, aligning benefits with system-wide cost recovery.
Risk	Early retirement of undersized upgrades designed to accommodate single interconnections as more renewables interconnect; bottlenecks emerge in renewable zones.	Reduces risk of congestion and curtailment; avoids stranded investments.

The comparisons show that customer funding is the most effective and equitable approach for transmission investment. Transmission assets built today will remain in service for decades and provide service into and through Puerto Rico's transition to 100% renewables. If the system is not intentionally designed for renewable integration, future projects may face higher interconnection and upgrade costs, along with likely delays and reliability challenges because they will need to retrofit or expand facilities that were not originally designed to accommodate large amounts of renewable generation. The incremental, IPP-funded approach does not guarantee renewable-ready infrastructure.

Intentional planning ensures that renewable integration is an integral design criterion from the start.

Cost: Incremental upgrades may appear less expensive in the short term, since IPPs fund them initially. In practice, customers ultimately pay more through higher long-term PPA prices. By contrast, deliberate, customer-funded investments spread costs across all customers, benefit from longer recovery periods, and avoid duplicative retrofits.

Feasibility: Adding renewable-ready features to substations and transmission lines already scheduled for rebuild is straightforward and cost-effective. Retrofitting later requires new outages, duplicative mobilizations, and additional regulatory approvals.

Equity among IPPs and customers: Under the current approach of adding incremental upgrades, the first IPP to interconnect bears high costs for network reinforcements that also benefit later projects. This "first mover penalty" distorts competition, discourages new entrants, and increases PPA prices.[7] Purposeful, customer-funded investment spreads costs equitably across all customers, aligns cost recovery with system-wide benefits, and ensures the transmission system is built for long-term needs rather than only the requirements of the next project.

Risk: Upgrades added via the incremental process can result in stranded assets when subsequent interconnections require larger facilities, forcing replacement of previously installed equipment before the end of its useful life. Project-specific upgrades are often repeated at the same locations, causing temporary outages and congestion when facilities are taken off line. Long-term planning avoids these inefficiencies by designing a backbone that anticipates renewable buildout. At the same time, customer-funded investment also carries some risk of stranded assets if renewable projects do not materialize at the locations where capacity has been built. For instance, if spare bays, relay protection, or transformer capacity are added at a substation expected to become a renewable hub, but IPPs ultimately choose other interconnection points, those assets may remain underused. These risks make careful transmission planning essential. Investment decisions must be guided by realistic forecasts, transparent assumptions about renewable development, and close coordination with resource planning to ensure that the investments align with where projects will most likely appear.

3. FEMA funding

Federal disaster recovery funds, including FEMA support, present a unique opportunity to modernize Puerto Rico's transmission system. While FEMA dollars are restricted to restoration and hardening, they may also be applied to upgrades that demonstrably improve system reliability. Many renewable-ready features, such as spare bays, expanded autotransformers, and high-capacity conductors, can be justified on that basis since they reduce outage risk and support stable system operation as renewables are added. Aligning federally funded reconstruction with reliability-enhancing, renewable-ready investments

[7] Another approach could include refunds to first-movers as other interconnections are made. That approach, however, does not address the issues caused by lack of long-term planning; namely the possibility of over-building and stranding assets, or underbuilding resulting in prematurely obsolete assets.

will lower long-term costs for customers. Coupling restoration and renewable expansion will avoid the delay and cost that occurs when retrofits are needed in the future.

D. Conclusions and recommendations on renewable integration

Long-term transmission planning, particularly of new transmission corridors and substations, must consider, include, and design features that anticipate the unique needs of a renewable-only power system. These needs include flexible bus configurations and space for multiple future interconnections, capacity sized not only for current projects but for anticipated build-out of resource zones, inverter-friendly protection and control systems, and the ability to host advanced technologies such as grid-forming inverters and battery storage. By incorporating these features up front, Puerto Rico can avoid costly retrofits, minimize delays for interconnecting IPPs, and ensure a smooth transition to a reliable 100% renewable system.

While customer-funded investment is more cost-effective over the long term, the benefits will materialize only if LUMA conducts transmission planning carefully and systematically. Poorly targeted upgrades risk leaving customers to pay for infrastructure that is underutilized or misaligned with renewable development. To avoid this outcome, transmission planning should result in a long-term roadmap grounded in clear inputs.

Key steps in careful transmission planning include:

- **Establishing a long-term roadmap to 100% renewable generation.** Transmission planning should be explicitly tied to Puerto Rico's 25-year transition to renewables.
- **Forecasting renewable development with realistic assumptions.** Plans should be based on credible projections of where wind, solar, and storage projects are most likely to be built, taking into account land availability, permitting constraints, and interconnection interest.
- **Coordinating transmission and resource planning.** Transmission planning should be integrated with generation and storage planning, so renewable hubs are developed in locations where projects are most likely to materialize.
- **Designing for flexibility.** Substations expected to serve as renewable hubs should include spare bays, redundant relay protection, and expandable configurations, so that they can accommodate future growth without costly rebuilds.
- **Evaluating risk of stranded assets.** When planning new transmission corridors or renewable substation hubs, each investment should be tested against scenarios in which renewable development occurs elsewhere. For each investment that includes customer funded non-federal capital, the Transmission Plan should explain how the investment provides value even if fewer or different interconnections occur.
- **Assessing storage needs.** Transmission planning should identify where storage can provide the greatest system value for voltage support, frequency stability, congestion management, and load shifting, complementing integrated resource planning that determines how much storage is needed overall.

- **Updating plans regularly.** Transmission planning should be iterative, with updates every few years to reflect new data on renewable project siting, customer demand, and evolving technologies.
- **Engaging stakeholders.** IPPs, regulators, customers, and utilities should all participate in the planning process to validate assumptions and build confidence that planned hubs will serve actual market needs.

These elements ensure that transmission investments are sized for long-term needs, sequenced to enable staged renewable buildout, and routed along corridors that can support future expansions without repeated reconstruction. While thermal resources are being added in the near term to ensure reliability and resource adequacy, transmission planning should still prioritize a roadmap that gradually transitions the system toward 100% renewables.

The Energy Bureau's PSP Order has already established the roadmap for 2026 and 2027 transmission investments. For that reason, the current impracticality of raising customer rates or additional non-federal capital from external sources, we recommend against more renewable integration investments beyond those already authorized. Renewable-ready upgrades should instead be prioritized as soon as possible to ensure that investments beyond those identified in the PSP align with Puerto Rico's long-term transition to 100% renewables.

LUMA will submit a Transmission Plan in April 2026. To complement that work, the Energy Bureau should require LUMA to prepare a supplemental Renewable Integrated Transmission Plan ("RITP"). The RITP would define a 25-year strategy to transition to 100% renewable energy by 2050. By comparing long-term renewable system needs with the resource and transmission plans already in place, the RITP would highlight additional upgrades and renewable-ready features that may not be captured in near-term planning horizons. Unlike FEMA-funded restoration plans, which focus on bringing damaged assets back into service, the RITP would look further ahead to map renewable hubs, transmission corridors, and substation standards needed for full renewable integration. Developing this forward-looking supplement in parallel with near-term restoration and IRP-driven resource additions will allow Puerto Rico to make the most of current reconstruction opportunities, avoid costly retrofits later, and ensure the transition to a renewable-only system is accomplished at the lowest long-term cost to customers.

An RITP should assume that customer rates will fund the transition. The Plan should include:

- **Identification of load centers and renewable zones.** The plan must map Puerto Rico's principal load centers—such as the San Juan metropolitan area—and the renewable generation zones most likely to host new solar, storage, and wind projects, such as the southern coast. This mapping defines the "from" and "to" points that transmission corridors must connect.
- **Transmission corridors and capacity targets.** The plan should specify which north–south and east–west corridors must be rebuilt or reconductored, what transformer capacity is required, and how much renewable headroom (in MW) each corridor must provide by 2030, 2040, and 2050.

- **Load forecasts.** The plan must incorporate long-term demand forecasts that extend over the 25-year transition period. These forecasts should capture expected changes in consumption from population and economic growth, electrification of transportation and buildings, and the adoption of distributed resources. Incorporating these trends ensures that renewable hubs, transmission corridors, and substations are sized appropriately to meet future needs without costly mid-course corrections.
- **Renewable hub substation strategy.** LUMA should identify where breaker-and-a-half substations are required to serve as renewable hubs, capable of accommodating multiple interconnections; and where ring-bus substations provide a more economical option for smaller sites. Each hub should include standardized interconnection bays, pre-installed relay panels, and SCADA capability so IPPs can interconnect without major redesigns.
- **Integration and operational readiness for 100% renewables.** The RITP should explicitly include an explanation of the following:
    - How new transmission lines and substations support the long-term transition to a renewable only power system.
    - Alignment with IRP procurement targets to ensure consistency between resource planning and transmission development.
    - Design features such as two-way power flow capability, expandable layouts, and equipment sized for expected future capacity.
    - Protection and control systems including inverter-based resource ("IBR") compatible relays.
    - System reliability requirements, including voltage and frequency stability support.
- **FEMA and non-federal funding.** The plan should specify which projects can be covered under FEMA's critical restoration scope and which renewable-ready elements require non-federal capital. Pairing FEMA and non-federal investments in a single construction window will maximize efficiency and minimize rework.

In summary, Puerto Rico's path to 100% renewable generation requires transmission planning that looks beyond immediate restoration and project-specific upgrades. A Renewable Integrated Transmission Plan would provide this long-term roadmap, ensuring today's investments align with tomorrow's system needs and reducing the risk of costly retrofits.

II. Integration of battery storage

A. Background

Battery energy storage provides multiple benefits to the power system, and to Puerto Rico's long-term renewable transition. It supports generation by supplementing variable output, and smoothing fluctuations in power supply. Batteries contribute to resource adequacy by storing energy during high-production periods and dispatching it when demand is high. Storage also provides fast frequency response, to correct sudden imbalances between supply and demand. When planned in coordination with generation resources, battery systems can reduce manual load shedding, ease ramping pressure on thermal units as solar output declines and enhance overall system reliability.

The PSP requires Genera to deploy 430 MW of battery storage to support generation at six power plant sites: Vega Baja, Cambalache, Aguirre, Costa Sur, Palo Seco, and Yabucoa. To deploy those resources, Genera expects to use federal FEMA disaster recovery funds authorized under Section 406 of the Stafford Act.

In parallel, the Energy Bureau approved long-term contracts for 645 MW of battery energy storage systems under Tranches 1, 2, and 4.[8] Procurements in Tranches 1 and 2 include 4-hour energy storage, while in Tranche 4 the procured storage duration is up to 6 hours. LUMA will charge and dispatch these units under energy storage service agreements with IPPs. Those agreements include monthly charges, by which PREPA pays the IPP for battery storage capacity. The PSP requires LUMA to complete interconnection of these batteries by the end of 2026.

Beyond these generation-support functions, battery storage is also used to strengthen the transmission system. At the transmission level, large batteries can sectionalize the transmission system, absorb disturbances, and stabilize frequency following a fault. By supporting black-start operations and enabling faster reconnection of renewable resources, storage enhances the ability to recover from severe weather events or system disruptions.

The PSP thus includes battery storage initiatives designed to strengthen transmission and distribution operations. It requires LUMA to deploy four 25 MW battery storage systems ("4x25 MW") at key substations to provide fast frequency response and voltage regulation. These installations will stabilize the transmission system, reduce manual load shedding, and maintain steady power delivery as renewable generation increases.

LUMA is also managing the Accelerated Storage Addition Program ("ASAP"). which includes batteries used for both generation and transmission support. The ASAP batteries provide generation-like services for transmission system stability and dispatch balance, while also enhancing operational reliability during ongoing transmission reconstruction.

B. Parties' Positions

The cost of Genera's 430 MW BESS deployment is included in FEMA Project Nos. 164988, 673691, and 335168. No non-federal capital is included in Genera's revenue requirement for these battery installations. The Optimal and Constrained Budgets for these FEMA funded Projects are the same. [Genera Exh 22.2]. Genera witness Joaquin Quinoy Ortiz stated that the total cost of deploying the 430 MW fast-response BESS, is $768.8 million.[9]

[8] Tranche 1 was conducted by PREPA. Tranches 2 and 4 were conducted by the Energy Bureau on behalf of PREPA.

[9] His testimony, Ex. 24 at 23, said $767 million. In PC-of-Genera-Gen-2 [included in PC Ex. 63.03], Genera estimated the cost of deployment to be almost $769 million.

Genera expects to fund about 90 percent of the project costs through grants from the FEMA Public Assistance Program. To cover the remaining 10 percent, Genera plans to use CDBG-DR ER1 funds administered by the Puerto Rico Housing Authority (PR-HUD). Genera said those funds, however, will not be available until 75 percent of the project is complete. As a result, Genera stated that it must recover the 10% non-federal cost share from customers. [PC-of-Genera-GEN-3 in PC Ex. 63.03]. PREB Consultant Mr. Guímel Cortes addresses FEMA funding and the 10% non-federal cost share in his expert report.

LUMA's Long Term Investment Plan, provided in the confidential response to NPFGC-of-LUMA-CAPEX-18, includes capital for the 4x25 MW battery installations over FY 26, FY 27, and FY 28 in its federally funded FEMA projects. LUMA did not include any non-federal capital for these projects.

The ASAP is not a LUMA or PREPA capital project. Development of additional battery storage under ASAP will be IPP-funded.[10]

LUMA said the operational expenses for the 430 MW and ASAP are minimal and included in its requested budget. Expenses to deploy the Tranche 1 and 2 storage projects and further ASAP development and implementation will flow through the PPCA rider. No incremental operating costs attributed to the 4x25 MW storage project are included in LUMA's operational expenses for the rate case. LUMA will develop those costs after RFP response and review. [PC-of-LUMA-OTH_OPEX-46 in PC Ex. 63.03].

LUMA's Program Brief PBUT 22 [LUMA Ex. 6.05] indicates review of battery storage integration in support of renewable generation in accordance with the IRP is in the planning phase.

C. Analysis

1. Revenue requirement for battery storage

No non-federal capital is included in LUMA or Genera's revenue requirement to deploy the batteries required by the PSP. According to LUMA the operational expense required to manage and operate these assets is minimal and included in the overall operating expense budget.

2. Systemwide planning for battery storage

Battery storage can provide exceptional value to Puerto Rico's electric system—but only if it is deployed as part of an integrated plan that considers how generation, transmission, and operations interact across the power system. Systemwide planning ensures that batteries are located, sized, and operated to deliver the greatest overall reliability and economic benefit, rather than serving narrow, project-specific needs.

When storage is planned as part of the overall power system, installations can be positioned to support both renewable generation and transmission stability. Strategically sited batteries can relieve transmission congestion, improve frequency and voltage control in critical areas, and balance renewable production across regions. Coordinated planning

[10] Resolution and Order in LUMA's Accelerated Storage Addition Program in Case No. NEPR-MI-2024-0002, dated May 8, 2024.

between LUMA and Genera is required to select battery durations and capacities that align with system peaks and renewable output patterns, ensuring that customer funding achieves the maximum reduction in curtailment, outages, and backup generation needs.

By contrast, if batteries are added incrementally, by IPPs choosing the locations, LUMA and Genera lose the ability to optimize deployment. Project-by-project additions may result in storage being concentrated in areas of high renewable potential rather than where it provides the most operational value. This practice leads to duplication of assets, inefficient use of transmission capacity, and higher long-term costs to customers. Uncoordinated development also can produce technical challenges, such as localized overcapacity or underutilized storage, that reduce transmission flexibility and system resiliency.

A coordinated systemwide approach induces LUMA and Genera to prioritize installations that deliver the highest system benefit—at substations that need voltage support, along transmission corridors prone to congestion, or in renewable zones requiring balancing capacity. Planned in this manner, storage investments that support generation will also strengthen transmission reliability and operational stability. The result is greater reliability, lower lifecycle cost, and more effective use of federal and customer funds. Deliberately planned investment in battery storage provides more benefit for each dollar than is achieved through isolated, uncoordinated installations.

3. Storage required for renewable transition

The transition to 100% renewable generation will require large amounts of battery storage, or equivalent flexible storage capacity. Currently, battery storage is the most practical and near-term solution capable of enabling the renewable transition while maintaining reliability and stability. Batteries can be deployed incrementally, sited strategically at substations and renewable hubs, and integrated into both IRP and transmission planning. Coordinated storage deployment will allow Puerto Rico to capture the full value of its renewable resources, make efficient use of customer funding, and ensure reliable service.

4. Coordinated long-term storage planning

Act 1-2025 mandates a transition to 100% renewables. The Energy Bureau must determine whether to require LUMA and Genera to prepare a coordinated, long-term plan that shows how Puerto Rico can transition to 100% renewable generation—including the timing, location, and cost of necessary storage—or to continue relying on short-term, project-specific planning without a defined path to full renewable integration. This decision will shape the framework for long-term investment and future rates, as the timing and scale of storage deployment directly influence customer costs.

D. Conclusion and Recommendations on Battery Storage

LUMA and Genera have initiated battery storage projects required by the PSP. Those planned deployments, and the stated need to review battery storage integration in support of renewable generation expressed in PBUT22, indicate recognition of the importance of storage. However, LUMA and Genera need a coordinated planning framework to ensure that future deployments are aligned, complementary, and sequenced to achieve the greatest overall system benefit.

Without alignment across generation, transmission, and distribution planning, individual storage installations risk being suboptimal in location, size, or control configuration. A battery placed in one area may help local voltage or congestion; but without coordination across generation, transmission, and system operations, its contribution to overall reliability is limited. LUMA and Genera should therefore plan storage resources within an integrated framework that aligns siting, capacity, and operational coordination to ensure that each installation performs as intended and contributes effectively to system reliability and renewable integration.

To ensure that Puerto Rico's transition to 100% renewable generation is both reliable and cost-effective, the Energy Bureau should require the RITP to include a comprehensive roadmap for battery storage deployment. This roadmap should define how much storage capacity will be needed over time, where it should be located and when it should be installed to align with renewable generation and transmission upgrades. The plan should quantify storage needs by function—such as frequency response, firm capacity, voltage regulation, and system restoration—and identify the most effective sites for each application. Establishing a clear, system-wide storage strategy will allow LUMA, Genera, and future renewable developers to align their efforts, minimize duplication, and ensure that storage investments directly support the reliability, resiliency, and operational flexibility required for a renewable-only power system.

We recommend the RITP specifically address the following:

- **Locational strategy:** Determine where storage will provide the greatest system value—whether co-located with generation, sited at substations, or distributed along transmission corridors. Locations should be prioritized based on their potential to improve renewable integration, reduce congestion, and strengthen system reliability.
- **Functional strategy:** Specify the purpose that each storage installation will serve—such as frequency regulation, ramping, firm capacity, load shifting, voltage regulation, congestion relief, or system restoration. The RITP should distinguish between storage deployed to support generation and storage designed to support transmission and distribution, while also recognizing that some projects can serve both where co-optimized operation provides the most cost-effective solution. Clearly identifying these functional roles will require coordinated planning between LUMA and Genera so as to ensure that each installation is designed and operated to deliver its full intended value.
- **Timing strategy:** Outline the sequence and pace of storage deployment needed to align with renewable generation additions, transmission upgrades, and the phased retirement of fossil units. The plan should establish near-, mid-, and long-term milestones that reflect evolving system needs—from early reliability support to long-duration energy shifting and capacity services.
- **Integration strategy:** Describe how storage planning will be incorporated into both resource and transmission planning processes so that performance, control systems, and operational coordination are addressed from the outset. The RITP should explain how storage assets will be jointly modeled, dispatched, and managed across the

generation–transmission interface to maximize reliability and minimize long-term system cost.

- **Cost:** Estimate the cost of each proposed storage project, including capital, interconnection, and operational expenses. The RITP should present these costs alongside expected system benefits—such as improved reliability, reduced curtailment, or deferred transmission upgrades—to support transparent evaluation and prioritization. Cost estimates should be consistent with the IRP and transmission planning assumptions and updated as project scopes and technologies evolve.

Battery storage is an essential component of Puerto Rico's renewable transition. The RITP will provide the framework for estimating how much storage will be required, where it should be located, and what it will cost to achieve 100% renewable generation. By quantifying these needs and associated costs, the RITP will give the Energy Bureau the information necessary to make informed decisions about future revenue requirements and long-term investment priorities, ensuring compliance with the statutory mandate to transition to renewables.

Overall Conclusion

The analysis in this report shows that coordinated planning between LUMA and Genera—integrating renewable resource development, battery storage, and transmission investments—offers the greatest long-term value to customers. More planning by LUMA and Genera is needed to understand the costs and technical requirements of Puerto Rico's transition to 100% renewable generation and to ensure that the transmission system is rebuilt in the most cost-effective manner possible. Although current investments focus on restoring service and improving reliability for the near-term, the report recommends that future rate adjustments be guided by a clear understanding of what renewable integration will require.

The Renewable Integrated Transmission Plan should identify the timing, location, and cost of transmission and storage additions necessary to achieve 100% renewable generation over the next 25 years. Developing such a plan will provide a transparent framework for decision-making and give the Energy Bureau the information it needs to evaluate the prudency of future investments while ensuring that the transmission system is rebuilt and modernized in a cost-effective and forward-looking manner.

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With more than 30 years of experience as an engineer in utility regulation, Ms. Bailey brings deep regulatory knowledge and analytic aptitude to the team. Throughout her career, Kate has used her engineering skills to evaluate the technical aspects of utility operations, leading to informed regulatory decisions on issues ranging from resource adequacy to broadband deployment. As a Commissioner of the New Hampshire Public Utilities Commission from 2015 to 2021, Ms. Bailey's technical skills were used to assess diverse issues, including competitive electric default service solicitations, integrated resource plans assimilating distributed energy resources, energy efficiency programs and funding, and net energy metering compensation proposals.

Experience

Senior Consultant, Accion Group, LLC - serving as Independent Coordinator, Independent Monitor, and Independent Evaluator of various competitive procurement solicitations

Commissioner, NHPUC – evaluated technical and policy aspects of utility filings making major regulatory decisions

Manager, New England States Committee on Electricity – state manager overseeing ISO New England's transmission planning and wholesale market design

Member, NH Site Evaluation Committee - evaluated electric transmission and energy facility siting proposals

Chief Engineer, NHPUC – regulatory oversight ensuring safe, adequate, reliable utility service

Director of Telecommunications, NHPUC – transitioned telephone industry through deregulation

Lieutenant, United States Air Force – communications engineer

Major Clients

Puerto Rico Energy Bureau
New Mexico Public Regulation Commission
Georgia Public Service Commission

Industry Specialization

Regulatory Law and Admin Rules
Rate Analysis
Resource Adequacy
Competitive Procurement
Rate Design
Facility Siting
Expert Testimony
Integrated Resource Planning
Bid Evaluation

Education

B.S., Electrical Engineering, Union College, Schenectady, NY

Relevant Experience

Competitive Procurement

Puerto Rico Energy Bureau: Conducted, coordinated, and managed competitive solicitation of renewable energy and energy storage resources.

New Mexico Public Regulation Commission: Serving as Independent Evaluator of competitive all-source solicitation

Georgia Public Service Commission: Member of IM team monitoring and evaluating competitive all-source solicitation and BioMass solicitation.

Regulation

New Hampshire Public Utilities Commission: Commissioner, and Staff member, 1989-2021

Renewable Energy Projects

New Hampshire Public Utilities Commission: Administered NH's Renewable Portfolio Standard and Renewable Energy Fund.
New Hampshire Public Utilities Commission: Administered and approved adjustments to Renewable Energy Incentive Program for commercial and industrial bulk fuel-fed wood pellet central heating systems.
New Hampshire Public Utilities Commission: Established and approved rates for net metering, resolving disputes over the rate components to which monthly excess export credits applied.
New Hampshire Site Evaluation Committee: Evaluated the siting of 30 MW wind generation project.

Restructuring

New Hampshire Public Utilities Commission: Oversaw auction design and approved sale of thermal and renewable generation assets to complete electric utility restructuring in New Hampshire.

Transmission and Distribution

New Hampshire Site Evaluation Committee: Evaluated the siting of 192-mile transmission project.
New Hampshire Public Utilities Commission: Evaluated and set distribution rates for electric utilities.

Utility Planning and Management

New Hampshire Public Utility Commission: Evaluated and approved electric utility Integrated Resource Plans.

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ACCION GROUP

With more than 40 years of diverse experience in regulated industries and emerging markets, Mr. Judd leads Accion Group's engagements in the evaluation of power and capacity procurements for competitive solicitations conducted by Accion across the country and has completed over 200 solicitations. His background includes serving as a consumer advocate, federal prosecutor, state's counsel, and counsel for utilities and regulators, allowing him to contribute thorough knowledge and seasoned leadership during Accion Group's consulting engagements. Mr. Judd also shares with Accion Group his detailed understanding of the issues involved in company and market restructuring, both to meet changing markets and in bankruptcy.

Experience

Independent Evaluator for energy and capacity acquisitions for major electric utilities
Managed nationwide regulatory and legislative deregulation initiatives for two major U.S. public utilities
Senior Assistant Attorney General, New Hampshire Office of the Attorney General
Chief negotiator in the bankruptcies of the Public Service Company of NH and the NH Electric Cooperative
State consumer advocate, federal prosecutor, and state's counsel
Economic development advisor to the President and Congress of a newly independent nation
Adjunct Professor of Law (Utility Regulation) – University of New Hampshire School of Law
Counsel to the Special Assistant to the President of the United States

Major Clients

Alabama Power Company
Arizona Corporation Commission
Arizona Public Service
Black Hills Energy
Bonneville Power Authority
Central Maine Power
Duke Energy
Entergy
Federated States of Micronesia
Georgia Public Service Commission
Green Mountain Power Corp.
Gulf Power Company
Hawaiian Electric Company, Inc.
Maui Electric Company
Mississippi Power Company
NH Attorney General's Office
NH Nuclear Decommissioning Finance Committee
NH Office of Consumer Affairs
NH Public Utilities Commission
NJ Board of Public Utilities
NY Energy & Research Development Authority
Northwestern Energy
Pacific Gas & Electric Company
PacifiCorp
PG&E Energy Services
Portland General Electric
Public Service of Colorado
Public Utilities Commission of Nevada
San Onofre Nuclear Generating Station
Southern California Edison
Southern Electric International
Town of Lempster, NH
Tucson Electric Power
U.S. Department of Energy
Vermont Department of Public Service
Vermont Electric Cooperative
White House Consumers Affairs Office
Xcel Energy

Industry Specialization

Business Restructuring
Competitive Procurement
Construction Monitoring
Debt Restructuring
Electric Market Analysis
Environmental Compliance
Expert Testimony
Government Relations
Legislative Affairs
Market Deregulation
Mediation
Mergers and Acquisitions
Nuclear Decommissioning
Regulatory Litigation
Risk Management
Strategy Management

Education

J.D., University of New Hampshire School of Law, formerly the Franklin Pierce Law Center
B.A., University of Wisconsin – Madison

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ACCION GROUP

Relevant Experience

Competitive Procurement

Arizona Corporation Commission: Led the design and implementation of the competitive solicitation process for wholesale energy by Arizona's two largest utilities. As the first RFP conducted under new ACC standards, designed the protocols currently used in Arizona. Facilitated agreement among a wide range of interest groups.

Black Hills Corporation: Led Accion's engagement for multiple renewable resource solicitations in Colorado since 2013. The solicitations sought energy and capacity proposals to meet system needs and addressing changing technology goals.

Duke Energy: Led Accion's multi-year and multi-state engagement of sequential renewable resource solicitation to address State renewable resource goals. The challenges of market and affiliate proposal competition was successfully addressed.

Entergy: Serving as Independent Monitor for competitive energy and capacity procurements in multiple jurisdictions.

Georgia Public Service Commission: Accion has been the IE for the Georgia Public Service Commission since 2002, helping to successfully implemented a competitive solicitation process.

Oversaw IE responsibilities for the solicitation of energy and capacity for RFPs with deliveries beginning in 2002 with solicitations including renewable technologies, thermal base-load generation and for two nuclear power units with purchase power contracting, self-build proposals and build to transfer projects.

Gulf Power Company: Led IE engagement for the solicitation of energy and capacity to meet system needs beginning in 2009 and for the Company's 2012 RFP. Oversaw the development of Gulf's RFP process, and participated in the development of all RFP documents.

Hawaiian Electric Company, Inc.: Served as IO for the solicitation of new generation on Maui beginning in 2012 and 2014. Served as main contact and consultant during the IO process for Hawaiian Electric Company's Feed-In Tariff program. Assisted in the review of Hawaiian Electric's participation in the Big Wind Project.

NorthWestern: Conducted a competitive solicitation to meet system needs via construction of conventional generation and renewable resources.

PacifiCorp: As the lead member of Accion's IE team, advised the Oregon Public Utility Commission on PacifiCorp's decisions relating to base load resources expansion, strategic planning for power supply and delivery, supply/customer contracts, and the appropriateness of energy and capacity choices made by the utility.

Portland General Electric: Oversaw six IE processes for PGE's renewable portfolio RFP. Proposals received included wind, bio-mass, geothermal, and wave-action generation. Conducted RFP for addition of conventional baseload generation.

Puerto Rico Energy Bureau: Starting in 2023 Accion has served as advisors to the Energy Bureau and conducted three sequential competitive solicitations designed to further the island's goal to reduce dependency on thermal generation. The solicitations were designed to coordinate with the restoration of a transmission system devastated by repeated hurricanes and creating standards for hardening renewable resources to meet future extreme weather conditions.

Public Service of Colorado: Provided IE services for multiple competitive solicitations for renewable resources, including the 2017 RFP that resulted in over 600 MW of storage proposals being selected. The 2017 RFP was conducted to provide resources to enable the retirement of a coal-fired generating facility.

San Diego Gas & Electric: Serves as IE a series of solicitations since 2012. Products sought include renewable resources. Coordinated the establishment of the California ReMAT and BioMAT programs for SDG&E through an on-line platform.

Southern California Edison: Continues to serve as IE for renewable resources since 2011**,** providing review of all protocols, documents and application of criteria for multiple RFO's. SCE utilized Accion's on-line platform for multiple RFP's, including its ReMAT and BioMAT websites, CHP, and RAM RFO's.

Tucson Electric Power Company: Served as IE for eight solicitations for renewable resources by TEP. Assisted TEP in designing protocols to meet Arizona's Renewable Energy Standard (RES). Conducted a solicitation for conversion of a generating facility from coal to gas-fired. Advised the Company on solicitation process and design, bidder definition and qualifications, and evaluation standards and protocols. Accion conducted a storage-only solicitation to meet system need and avoid construction of new transmission.

Xcel Energy: Served as IE for multiple solicitations in different jurisdictions for conventional and renewable resources, starting in 2015. Retirement and replacement of coal-fired units and integration of renewable technologies has been a major component of the solicitations. As the second IE ever employed in Colorado, refined protocols for the solicitation process to more closely align with national practices.

Nuclear

Nuclear Decommissioning Finance Committee: Provide full legal and consulting services to the NDFC, from drafting the controlling legislation through to the annual determination of funding contributions. Designed the comprehensive plan for nuclear decommissioning funding, including funding assurances from owners, protections in the event of premature cessation of operation, and funding by non-utility owners.

San Onofre Nuclear Generating Station: Advised the joint owners on the scope of the decommissioning plan, including disposal of GTCC waste and the selection of the decommissioning contractors.

Palo Verde Nuclear Power Station: Advised Arizona regulators on decommissioning costs for the Palo Verde units, including allocation among multi-state owners, sufficiency of ISFSI planning, funding assurances in the event of premature cessation of operation, and preparation for license extension.

Exelon: Advised New Jersey regulators regarding the acquisition of three nuclear units by Exelon. Review included decommissioning funding obligations, decommissioning trust sufficiency, and projected decommissioning costs.

Georgia Power Company: Led Accion's conduct of a competitive solicitation that resulted in the construction of Units 3 and 4 of the Vogtle Nuclear Station. Conducted construction review on behalf of the Georgia Public Service Commission.