DEFINITIVE PROPOSAL FORM 1.4

APPROACH TO O&M SERVICES

Luma Energy (the Qualified Respondent) hereby acknowledges and affirms that the attached documentation (i) constitutes its full and complete submission for Definitive Proposal Form 1.4, (ii) meets the requirements described in Section 4.1.4 (*Approach to O&M Services*) of the RFP and (iii) addresses the topics below, at a minimum.

Capitalized terms not defined herein shall have the meaning set forth in the Request for Proposals for Puerto Rico Electric Power Transmission and Distribution System issued by the Puerto Rico Public-Private Partnerships Authority on February 1, 2019 (as amended, the "**RFP**") or the final form of the Puerto Rico Transmission and Distribution System Operation and Maintenance Agreement (the "**O&M Agreement**"). If there is a term defined in both, and their definitions conflict, the definition in the O&M Agreement shall prevail.

1. Detailed description of the proposed approach to the O&M Services (Annex I (*Scope of Services*) of the O&M Agreement) including, at minimum, the following:
    a. T&D System Operations
    b. Capital and Operational Improvements to the T&D System
    c. Government, Public & Media Relations
    d. Testing, Reporting and Records
    e. Customer Service
    f. Human Resources
    g. Information Technology
    h. Supply Procurement
    i. Financial Management and Accounting
    j. Emergency Response
    k. Development of Integrated Resource Plan
    l. Asset Management & Maintenance
    m. Safety Management
    n. Administration of System Contracts
    o. Environmental Management

2. Detailed description of the experience and credentials of the Qualified Respondent's proposed management team.

3. Federal funding experience and plan for management and procurement of federal funds.

4. Corporate culture and description of alignment of the same with the Project's objectives.

5. Role and responsibilities of each member of the consortia, as applicable.

6. Organizational Structure of ManagementCo and ServCo.

7. Commitment to the social welfare of the people and communities of Puerto Rico.

8. Commitment to use of local resources and approach to involve local Puerto Rican entities.

[*Signature page follows*]

Luma Energy

QUALIFIED RESPONDENT
Company Name

Gerald Albert Ducey, Jr.

Name of Qualified Respondent's
Authorized Official

Authorized Representative

Title

Signature of Qualified Respondent's
Authorized Official

November, 25th 2019

Date

DEFINITIVE PROPOSAL FORM 1.4

APPROACH TO O&M SERVICES

November 25, 2019

CONTENTS

TABLES & FIGURES

1. PROPOSED APPROACH TO O&M SERVICES

A. T&D OPERATIONS

1.0 OVERVIEW

With industry-leading skills and training for both construction and day-to-day maintenance activities, our Consortium has a proven record of world-class utility operations and a geographic footprint that spans North America, Latin America and Australia. We look forward to bringing our deep transmission and distribution (T&D) operations expertise and world-class execution practices to the new Operator, Luma Energy (LUMA or the Operator).

Our core philosophy is that safety takes precedence over all business pursuits and work practices, and our success hinges on our commitment to ensuring that our people get home safely to their families. Quanta is a founding member of the Occupational Safety and Health Administration (OSHA) Electrical Transmission & Distribution Partnership, a formal collaboration of industry stakeholders working together to improve safety for workers in the electric power industry. ATCO is a member of the Alberta Safety Codes Council and is chartered to inspect and approve all electrical installations we perform.

Quanta's T&D Experience

Quanta has brought this safety focus to the more than 200 companies we have acquired since 1997. Quanta's unique, decentralized model has allowed us to become a leading specialty contractor with the largest craft-skilled labor force in North America, providing fully integrated infrastructure solutions for the utility, pipeline, energy and communications industries. With a history that through acquired companies spans more than a hundred years, Quanta's experience and established customer relationships form the backbone of the company's identity and future, supporting and growing with customers.

In addition to quick access and mobilization capabilities, Quanta has the people and equipment to collaborate with its customers. The company has the largest craft-skilled workforce in North America, with more than 46,000 employees — including 30,000 electrical infrastructure construction workers — and more than 60,000 pieces of specialized equipment. Electric power customers benefit from Quanta's ability to work without interrupting power service, through energized services or live-line techniques. Unique in the industry, Quanta also has an in-house, centralized organization that manages and coordinates aviation operations. This team provides oversight and standardizes work procedures, controls, operations and scheduling for all helicopter operations to maintain high levels of safety and compliance. Quanta's aviation services comprise:

- A fleet of 17 available fixed-wing and 38 rotary-wing aircraft;
- Basic and tiered aviation training;
- IS-BAO Stage III certification;
- An FAA-certified Part 135 air carrier;
- Medium- and heavy-lift rotary-wing aircraft services;
- Maintenance and construction support (including OPGW); and

- Aerial tree trimming.

Quanta also provides industry-leading expertise in transmission system strategy, capital expansion planning, operational analysis and contingency and risk assessment. Quanta's transmission experts assist clients with interconnection queues, regional planning, cost recovery, economic studies and control center upgrades, as well as transmission systems analysis such as steady-state and dynamic analysis, planning and operations and support for regulatory services.

As a leader in this space, many utilities receive assistance from Quanta in integrating distributed energy resources (DERs), distributed energy storage, plug-in hybrid electric vehicles (PEVs) and microgrids. Distribution planning and operations, real-time monitoring and control and load forecasting and automation are solutions to optimize the distribution system and improve the utility's service to its customers. Quanta distribution experts also support utilities with evaluating and implementing distributed resources and energy demand management, enabling technologies such as smart metering, demand response, programmable and communicating devices (e.g., smart thermostats and load cycling switchers), advanced energy storage and PEVs.

ATCO's T&D Experience

A cornerstone of ATCO's diverse businesses is our electricity business. The company transmits and distributes safe, reliable electricity to 242 individual communities in Alberta, the Yukon and the Northwest Territories. In Alberta, we own and operate extensive T&D systems, totaling more than 54,000 miles. ATCO's network consists of more than 6,800 miles of transmission lines and approximately 45,000 miles of distribution lines, in addition to 2,500 miles of distribution lines owned by Rural Electrification Associations but operated by ATCO.

Figure 1: ATCO's isolated operations in Canada's North

ATCO has a reputation as a trusted, reliable electricity operator. Over the past several years, a number of Rural Electrification Associations have turned to ATCO to operate and maintain their communities' electricity systems. In the Northwest Territories, ATCO partners with Denendeh Investments, which represents 27 Dene First Nations, in the ownership of Northland Utilities. ATCO prides ourselves in partnering with local businesses and Indigenous communities in Canada in operating our business. In addition to our role as a regulated utility, ATCO pursues non-

regulated electricity projects globally, delivering top-quality, reliable and cost-effective electrical infrastructure for industry.

As a T&D grid operator, ATCO offers expertise in engineering, construction, commissioning methods and tools to meet changing customer needs. Like Quanta, ATCO performs protection system modeling, sensitivity studies, coordination studies and protection system risk assessments using methods aligned with NERC and FERC standards and recognized and accepted by companies operating in the U.S. electric T&D business.

ATCO also operates a meter asset management system, a meter quality assurance program and a meter data management (MDM) system. The MDM was implemented in the 1990s, with the most recent version coming in 2010. Since 1999, ATCO has owned a meter shop accredited by Measurement Canada, an organization whose regulations on quality assurance and metering are the most stringent in North America.

Having successfully and cost-effectively operated the public lighting system in our Alberta service territory for more than eight decades, ATCO is an industry leader in LED and smart lighting implementation. We have economically converted over 200,000 lights to LED and, in 2018, received the Illuminating Engineering Society Illumination Award of Excellence for Energy & Environmental Lighting Design for a lighting-on-demand system that is realizing an 80 percent reduction in energy use for our client. This award recognizes quality lighting installations that incorporate advanced energy-saving strategies and environmentally responsible solutions into the design.

ATCO is also a retail energy company in Alberta, selling electricity to residential and commercial customers in a competitive market through flexible plans offering real savings and exceptional customer service.

Above all else, ATCO's performance is measured by the people we have the privilege to serve. In 2018, within ATCO's Alberta electricity distribution utility, more than 95% of customers surveyed agreed that the company provided good service, and 93% agreed that the company has a strong reputation in the community. Beyond the day-to-day calls, ATCO frequently seeks to understand and improve the customer experience, including surveys and focus groups to measure service quality. The company's highly trained crews are also on the job, day and night, to respond to power outages and other unplanned electrical emergencies — often in remote environments and inclement weather conditions.

ATCO understands that success depends on strong relationships in the communities we serve. That means ATCO is transparent about what we do and we plan for the future. ATCO listens to what our neighbors and community partners have to say and looks for opportunities to give back through community involvement and investment initiatives.

Our Combined Expertise

The Consortium's reach is further enhanced with the sixth-largest fleet in North America, coming in behind groups such as UPS and Fed-Ex — a combined 100,000 fleet assets (vehicles and equipment) across North America, South America and Australia. This includes large supplier networks

and procurement programs to secure capital purchases, parts, materials and fuel, and one of the largest GPS and telematics programs ever rolled out, reaching 42,000 fleet assets.

Our specialized expertise and attention to detail extend to facility maintenance, including vegetation management through mowing/mastication, environmentally conscious herbicide applications and traditional line clearance work, whether through our in-house line clearance crews or contractors. The vegetation management program leverages spatial data related to T&D infrastructure and land cover classifications to define workloads and identify maintenance needs. Field-enabled technology will be used in condition assessment work to develop preventive maintenance recommendations and assign and manage vegetation maintenance projects. It will also be used to maintain records and report on performance and productivity.

2.0 WHAT WE FOUND

Puerto Rico's T&D system requires rebuilding and upgrading. The following observations represent notable findings based on our team's site visits, information provided in formal presentations and a total review of the documents in the data room.

PREPA's Engineering and Management personnel were engaged and committed to rebuilding the grid and better serving the people of Puerto Rico. Though overall staff numbers were adequate, there was an imbalance in the workforce for T&D operations relative to organizational needs, which has affected the team's ability to meet their objectives.

Data & Reporting

Incomplete data and inconsistent asset management has also hindered PREPA's ability to meet operational needs. Data returned from field maintenance is recorded on paper forms or in proprietary, vendor databases (e.g., Doble Engineering DTA) not linked back to an asset management program. Further, only a handful of individuals manage the asset nameplate data, resulting in reduced access and visibility among transmission operators. Operations will benefit from more extensive asset management and maintenance routines that are proactive rather than reactive.

Though PREPA uses ABB's Ability Asset Suite, its use is currently limited to work order creation and tracking. Deploying it for work management, resource scheduling and work aggregation would best optimize its use and align with Asset Suite's designed purpose.

While the transmission control center is centralized, the distribution control centers are regional and do not coordinate their activities. Daily and hourly system configurations seem to be based on individual experience and informally shared knowledge, rather than sound, documented operating procedures. Because of this, there is no standard operating procedure governing the outage management system.

Safety

Improving housekeeping in substations and operations yards would help mitigate the safety and security risks associated with wire reels, abandoned equipment, ground wires and excess materials that are stored at these sites. These materials create tripping hazards, and the proximity of equipment

to fences enables easier access to substations, resulting in theft of key materials such as copper. Controlling the inventory of spare parts and disposing of damaged and failed equipment will help reduce the likelihood of airborne debris that could contact electrical equipment or injure the public or personnel during severe weather events. For additional safety standards and training programs, see Section 1.M.

Damaged Equipment

In terms of the electrical assets, there is a lack of information on the condition of substation power transformers. We conducted a visual assessment of the transformers and obtained operational information, such as the functionality of winding, temperature gauges and cooling equipment. PREPA has been using a reputable vendor, Doble, for dissolved gas analysis (DGA), but information is not available for all transformers, and several units had leaks at gasketed surfaces, chipped bushings and inoperable cooling components.

Despite the substantial efforts of PREPA staff to repair and modernize the grid after Hurricanes Maria and Irma, we observed locations where structural components were still damaged or missing. Guy wires were loose or missing, steel transmission structures were rusting and there were concerns with guy wire anchoring and missing static wires. Though many steel, lattice and concrete structures were in good condition, the lack of a maintenance program has negatively affected the condition of wood poles. We observed numerous third-party attachments on distribution poles, which affect the structural integrity of these assets.

Vegetation Management

We observed several areas where vegetation encroached within minimum clearance distances, in some cases making contact with conductors. There was growth around and within substation fences and rights of way that were not cleared. Overall, a robust vegetation management program would significantly improve the system's reliability and ability to withstand weather events.

Reliability

System reliability can be improved by increasing the distribution system's sectionalizing capabilities. PREPA is currently limited to single-phase manual operating devices. LUMA will move toward three-phase automatic sectionalizing devices such as re-closers and switches.

PREPA's system currently has a large number of electromechanical relays and older relays that are obsolete and prone to mis-operation. These will need to be replaced to enhance the reliability of the system.

3.0 WHAT WE PROPOSE

Deploying new technologies and ensuring operational excellence will be the foundation of modernizing Puerto Rico's energy sector. The shift to world-class utility service will fuel economic opportunity across Puerto Rico. For this reason, our approach to T&D Operations will focus on six core principles.

Table 1: Core principles for T&D operations

PRINCIPLE	STRATEGY
Safety 	LUMA will infuse a safety focus throughout the entire organization and integrate safety in everything we do to ensure the safety of our employees and the public.
Customer Centricity 	Residents and businesses will be able to choose how to best address their energy needs, resulting in increased engagement with the utility.
Affordability 	Operational efficiency and financial stability will help make electric service more economically accessible for all customers.
Reliability 	Increased service reliability will improve customer well-being and foster economic development.
Resilience 	The utility will improve its capacity to withstand adverse events and improve its emergency preparedness and response.
Sustainability 	Establishing a transparent regulatory framework, environmental leadership and a trained and engaged workforce with a strong safety culture will realize improvements across the business.

Our overall approach to T&D field operations will include a sustained focus on safely delivering reliable electric service to customers through efficient and cost-effective engineering, construction, operations and maintenance. It will include detailed initiatives to address the considerations we have summarized in the following sections.

Safety

Public and employee safety is paramount to utility operations. The first priority is to ensure that any physical hazards on the system and/or in the workplace have been identified and addressed so all employees can work in a safe environment and go home safely each night. Training is a key component of safety, and our world-class training will be implemented for all employees.

Customer Centricity

We will improve customer experience through our day-to-day interactions with our customer-facing teams and by delivering superior customer service through all functions of T&D operations. By weaving our six core principles into all aspects of T&D operations, customers will see a higher level of

responsiveness from our employees, better reliability and a safer electrical system, resulting in an immediate improvement in their electricity supply.

Affordability

We will make prudent investments in the T&D system to provide the infrastructure for high-quality operations, leading to more affordable electrical services. This higher-quality grid will cost less to maintain and lead to reduced costs to customers. In addition, by executing the projects and improvements in the Grid Modernization Plan (GridMod Plan), Integrated Resource Plan (IRP) and System Remediation Plan, the future electric power system in Puerto Rico will rely on more renewable energy resources such as wind and solar, incorporate new distributed energy resource technologies such as energy storage and microgrids and help make energy more affordable.

Reliability

Our approach to improving reliability will include a long-term plan to meet the SAIFI, SAIDI, CAIDI, MAIFI and CEMI performance metrics, paired with a short-term plan that prioritizes the areas of greatest concern for improvement. Both plans will be accomplished using proven, industry-leading practices currently employed by the Consortium.

To ensure a reliable system for years to come, we will implement maintenance programs for underground and overhead distribution lines, underground and overhead transmission lines and all substations. This will include a formal inspection of substation equipment and five-year inspection plans for T&D overhead and underground lines. Twenty percent of the assets will be inspected annually, and every asset will be inspected every five years. These inspection programs include data collection, tracking/scheduling of inspection and corrective actions to increase accountability throughout the organization.

Resiliency

The components of a resilient system are physical strength and hardened infrastructure, as well as the ability to recover and restore service to customers after major events. We will accomplish this by using industry-recognized design standards, proven engineering and construction practices, appropriate material and equipment specifications and implementing automation.

We will establish the engineering standards and material specifications required for a resilient grid long term. These standards will be implemented in parallel with any short-term reliability work or where routine construction, maintenance and capital improvements are performed as part of an everyday approach to system improvement.

Sustainability

Our approach to workforce management is to ensure a flexible, well-trained and equipped workforce with industry-leading workforce management processes to facilitate operational efficiency and environmental performance. Developing people and processes with a focus on training will allow us to support customer responsiveness, reliability and employee engagement. To ensure organizational

alignment, workforce management will include methods to communicate goals and regularly report on progress.

CASE STUDY: FORT MCMURRAY WEST 500 KV TRANSMISSION PROJECT

A true testament to the power of the Consortium's cooperation is the Fort McMurray West 500 kV project (WFMAC). The largest P3 contract in Canadian history, this project is valued at $1.2 billion. Our open, transparent, inclusive and respectful approach to collaboration was key to us completing the project on budget and three months ahead of schedule. Our achievements led two top global publications in project finance to name WFMAC North America's P3 Deal of the Year.

Competing against 30 parties from around the world, ATCO and Quanta were selected to develop, design, build, finance, own, operate and maintain the 508 km transmission line between Wabamun and Fort McMurray. As part of the project's bid requirements, we developed a 35-year lifecycle approach to operate and maintain the project that allows it to exceed performance and reliability requirements. We undertook a detailed probabilistic analysis of similarly sized transmission projects built in similar terrain, and used our extensive history of building transmission lines around the world to identify risks and develop appropriate mitigation strategies. Our lifecycle approach is a first for an Alberta transmission project.

The Asset Management Strategy involves three key focus areas: quality infrastructure with a reliability-driven design; a highly skilled, experienced, competent and strategically located workforce; and an asset risk-based management system supported with appropriate tools, policies and procedures.

Throughout the planning phase of the project we held more than 3,000 face-to-face meetings, incorporating residents' feedback into our route and construction plans. We also engaged local communities as active participants in the project, providing opportunities for jobs, skills training and local economic development.

4.0 HOW WE WILL DELIVER

4.1 Reliability

During an outage, a large portion of the SAIDI impact often occurs before the crew is on site for repairs. The annual SAIDI target will be divided on a per-month basis as a strategy to meet or exceed the annual goal. Adequate labor resources are a key element to meeting the SAIDI goals. The following techniques are some that will be implemented to improve SAIDI.

An “Outage Prediction Model” will be implemented to ensure that adequate field labor resources are available to restore electric service after any significant storm. We will train internal resources to improve outage response from the time the outage begins until repairs have been made (estimated time to restoration). Switch-before-fix processes will also be implemented.

We will engineer and install line reclosers at optimal distribution and 38 kV circuit locations, determined using existing reliability data. System reliability (i.e., SAIDI and SAIFI) can be greatly improved with a distribution automation system that incorporates intelligent and adaptive reclosers and switches coordinated with an appropriate fusing scheme. This automation can isolate faults into smaller customer segment counts, thus improving grid reliability.

Figure 2 below provides an illustration of how installing reclosers to sectionalize a line will help reduce customer interruptions. If a fault occurs to the right of the recloser, the system of fuses and the recloser can act in sequence to isolate the fault to the 500 customers to the right of the recloser. After the recloser stays open, the other 500 customers on the left side of the recloser would be able to continue to receive energy from the substation source. Without the recloser and fuse scheme this fault would have affected all 1000 customers. With the scheme installed and functioning, the customers affected by this type of fault has been cut in half.

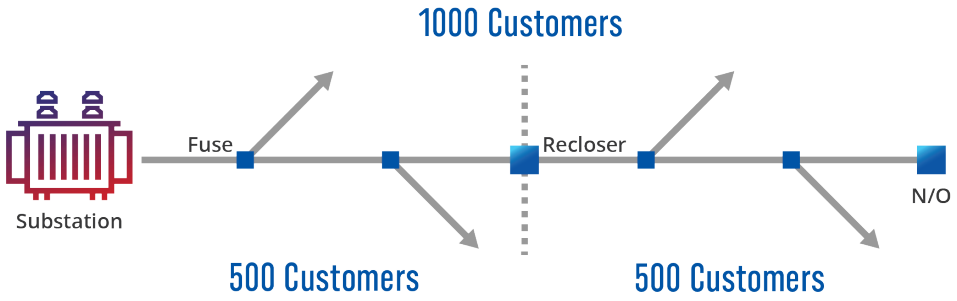
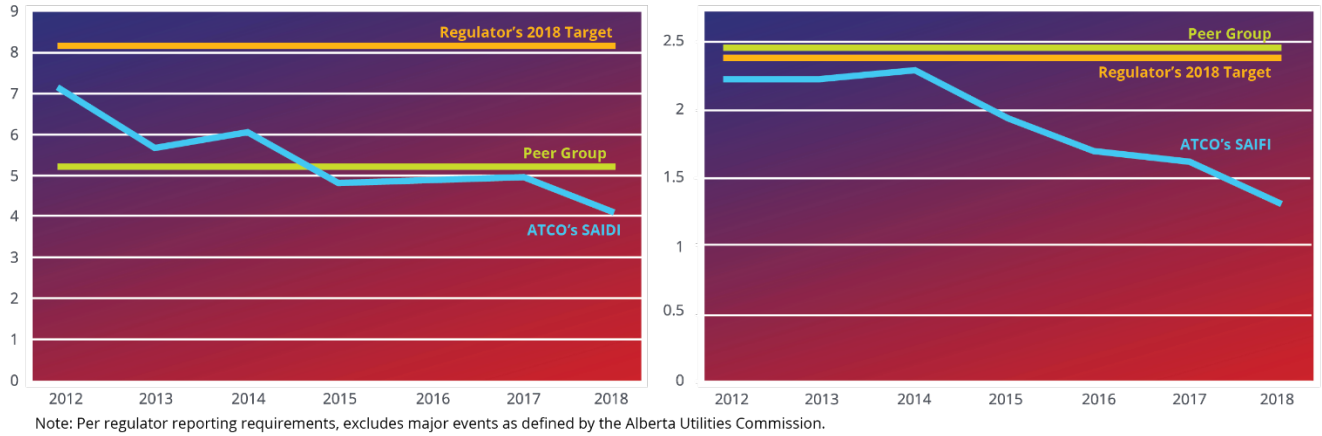


Figure 2: Improve reliability and reduce customer interruptions by 30 – 40 percent per recloser.

We will implement a distribution automation network based on engineering studies and will develop a predictive reliability model (as described in Section 1.L, Asset Management, below) that will assist with identifying the sequence of projects and prioritizing feeders. This plan will include developing standards for and procuring reclosers that will be installed at prioritized circuit midpoints, starting with the highest-priority feeders. More detailed recloser installations will be based on our additional system understanding year over year. We will also identify opportunities for self-healing systems, auto-transfer schemes and single-phase tripping devices through reliability modeling.

To ensure success in Puerto Rico, we intend to use our proven standards and procedures for preventative maintenance and system assessment, including documentation, accountability and a "train the trainer" approach to developing skills for system health assessment. These methods have proven successful, as evidenced by the sustained improvements in ATCO's SAIDI and SAIFI metrics reflected in the graphs below (Figure 3). Formalized preventative maintenance programs will be developed for implementation in Year 1 for distribution underground and overhead lines, transmission underground and overhead lines, substations and protection and control assets. Preventative maintenance will enhance reliability and provide key inputs to assist with prioritizing asset replacement/refurbishment strategies for the various asset families identified in the Asset Management process described below.



Note: Per regulator reporting requirements, excludes major events as defined by the Alberta Utilities Commission.

Figure 3: ATCO's SAIDI (left) & SAIFI metrics (right) to 2018

The preventative maintenance program will be supported by a computerized maintenance management system (CMMS) for:

- Asset information;
- Scheduling and planning maintenance;
- Collecting inspection and corrective maintenance information; and
- Calculating maintenance-related costs.

PREPA currently uses ABB's Asset Suite application with limited functionality; the full capabilities are not currently enabled. Our due diligence reviews and discussions with ABB have indicated that Asset Suite has the required functionality and capabilities for a world-class CMMS system. We will conduct an evaluation during the transition period to identify gaps and develop a plan to address them.

4.2 Resiliency

A successful resiliency strategy requires engineering standards, and we will develop these standards to deliver improved performance through the following seven initiatives.

4.2.1 Initiative 1: Design Standards

PREPA is currently developing design standards that LUMA will assess against industry best practices to determine if further development is necessary. ATCO has particular expertise in this area

and has been recognized for our innovative approach to standards development. In an ongoing effort to digitize documentation, ATCO converted our construction standards into 3D format. The 3D drawings reduce errors during construction, drive consistency in construction practices and decrease the potential for rework from deficiencies found during commissioning. The Consortium will bring this industry-leading design standard approach to Puerto Rico.

One of the key elements in ATCO's successful transition to digital documentation was communication. ATCO gathered feedback from users and maximized opportunities to communicate objectives at a high level. ATCO continues to listen to users and monitor advancements in technology to address any gaps and provide ongoing service enhancements. In recognition of ATCO's success with this initiative, we were profiled in T&D World magazine and invited to present at the Western Energy Initiative Operations Conference.

LUMA can use this experience and expertise to help expand and improve PREPA's existing engineering standards. Having effective standards in place improves transparency between teams and converting PREPA's standards to a 3D format will help improve their use during construction.

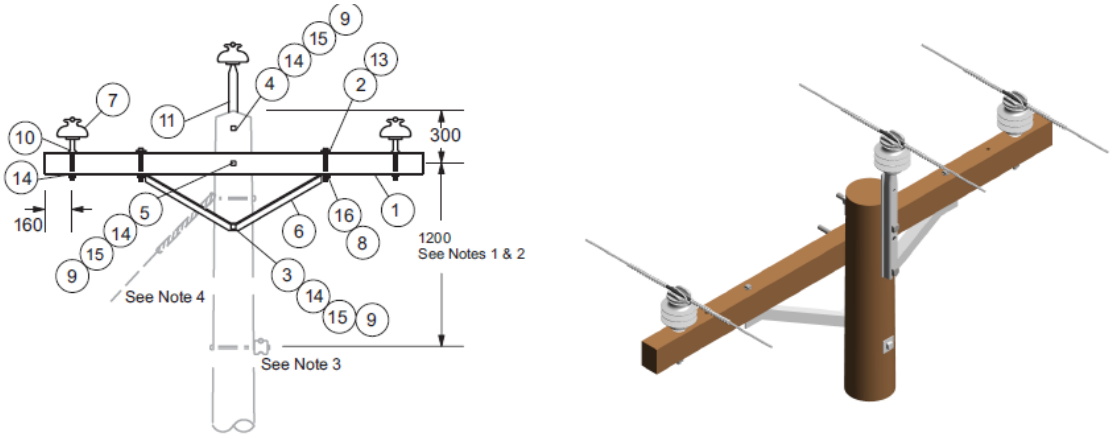


Figure 4: A typical 2D structure (left) and an ATCO 3D print (right)

CASE STUDY: GOING DIGITAL

ATCO has digitized construction prints in 3D to keep users up to date with the latest standards. Employees can access the latest version of prints from laptops in their vehicles, even when no network connection is available. The 3D visualization enables the construction and engineering teams to interact with a structure drawing virtually by rotating it to view from any angle, zooming and panning, assembling and disassembling, as well as isolating key parts or details for a closer look. The 3D prints are drafted down to the smallest details, leaving nothing to the imagination when building the structures.

The 3D drawings also feature 2D spacing and drilling details and notes for design application and construction. Any point-to-point measurement of interest is available within the 3D PDF using the built-in 3D measurement tool. The material list of components is automatically generated on the prints, so there is no way for a quantity to be wrong or for an incorrect material component to be listed if it is not needed to build the structure. Overall, the 3D drawings help to reduce errors during construction, drive consistency in construction practices and reduce the potential for rework from deficiencies found during commissioning.

In addition to standards development, LUMA will identify more targeted resiliency initiatives to address specific concerns, such as those outlined in the Grid Modernization Plan. For example, risk mitigation for the 17 substations identified in the GridMod Plan as high-risk flood locations will involve using barriers where their application is deemed the best fit-for-purpose solution. Based on the other projects and programs being executed in the area, other solutions may include relocation, retirement or raising equipment. Solutions will also include replacing substations with GIS technology.

4.2.2 Initiative 2: Storm-Hardening Practices

Storm hardening is critical for future operations in Puerto Rico. In addition to being ready to quickly respond in the case of another storm, we have extensive plans to strengthen the T&D infrastructure accordingly.

Quanta has helped dozens of utilities address nearly every aspect of storm hardening. Utilities in general are being encouraged to have resilient systems that consider hardening along with protection, switching, vegetation management and other factors. Quanta's storm-hardening projects are tailored to specific customer needs, but the typical engagement areas have been as follows.

- **Post-storm audits:** Post-storm, respond to media and regulatory investigations while simultaneously identifying opportunities for improvement in data collection, storm response and hardening.
- **System hardening:** Comprehensive inspection and identification of areas most susceptible to damage during major storms, including issues related to trees, pole strength, pole loading and small wire and underground conversion.
- **System resiliency:** Decrease interruptions to customers during major storms and allow for quicker restoration. This includes hardening and issues such as line switching, automation, right-of-way access, restoration sequencing, inventory management and contractor management.
- **Storm modeling:** Estimate the type, amount and locations of damage so crews can be stocked and pre-dispatched. Storm modeling helps identify the most cost-effective ways to achieve specific hardening and resiliency goals.
- **Training:** Quanta is one of the few organizations in the world to offer a complete course in electricity infrastructure storm hardening. Typical training areas include weather modeling, failure modes, hardening tactics, resiliency tactics, vegetation management, extreme wind ratings and developing a hardening roadmap.

Storm hardening of T&D facilities has been ongoing for many years, most often in response to severe weather events. Severe ice storms in various parts of the U.S. and Canada; hurricanes in the Southeast, Gulf and Mid-Atlantic regions; tornadoes in the Midwest and Plains regions; and wildfires in the West have all had significant effects on utility infrastructure and operations. Responses to these events have varied depending on their type, severity and the frequency with which a geographic area experiences extreme events.

LUMA will undertake the following activities to harden T&D infrastructure in Puerto Rico.

Hardening the Electric Network

We will use several methods to proactively bring circuits up to the extreme wind loading standard, including using larger, stronger, higher-classification poles and towers. We will analyze each circuit to determine what actions can be applied to bring the entire circuits up to extreme wind loading. Other methods to strengthen circuits include storm guying, intermediate span poles and towers, relocating pole-mounted equipment and selective undergrounding. LUMA will develop a design tool to determine the most cost-effective way to achieve the desired circuit hardening and create guidelines to assist with establishing size and span length with consideration for conductor size, wind load criteria and foreign attachments, among other factors.

In addition to hardening, we plan to install automated switches and other devices associated with smart-grid technology. Monitoring system operations with smart-grid technologies will improve our ability to deploy repair teams more swiftly.

Investing in Underground Conversions

Where required, undergrounding will be a hardening approach. As part of the program, LUMA will investigate cost sharing with municipalities to address areas where towns desire underground facilities.

Our Consortium has built many underground electric T&D facilities and has a strong technical background in this area. Quanta has several specialized underground contractors. Each year, ATCO designs and executes an average of 1,500 small- to medium-sized distribution projects and 50 larger, more complex distribution projects. These range from customers' new extensions to complex system rebuilds such as multiple-circuit duct bank systems, overhead to underground conversion projects and system non-standard designs.

Figure 5: 25 kV three-phase underground feeders out of our Mowat Substation (left) and installing a pullbox and transformer at a customer site (right)

Pole Inspections

Structures damaged by hurricanes will require inspection, including their guying and anchors. Where applicable, we will implement a distribution-pole and transmission structure inspection program with a frequency cycle that is best suited for Puerto Rico's island climate. A survey will be conducted to address third-party attachments to T&D poles and structures, including design guidelines, attachment processes and billing and tracking of attachments.

We will assist in developing a strategy to create connections between feeders across the distribution system to improve its resiliency and reliability for customers.

Clearing/Vegetation Management

Hardening initiatives include implementing a vegetation management program; we discuss our proposed vegetation management program and initiatives in Section 4.2.4 below.

4.2.3 Initiative 3: Control Centers

Based on our experience in T&D operations management, state-of-the-art, well-integrated control centers are a crucial part of system resiliency. We will identify areas of overlap and opportunities to better integrate T&D control centers, to improve communication and coordination of operations.

ATCO's System Control Center is a modern and sophisticated centralized control center with real-time oversight of the ATCO system. It operates 24 hours per day, 365 days per year, and fully complies with NERC standards.

The control center has been constructed to meet or exceed the operational and security requirements of current industry best practices. The facility has multiple physical security barriers, including perimeter fencing, card locks on all exterior doors and gates and two-factor authentication to gain to access to the control room area. ATCO's control center uses the Monarch Platform from Open Systems International as our SCADA/EMS system; it supports open and legacy remote terminal unit (RTU) protocols and fully manages SCADA data requirements. This system has the necessary checks and balances to support NERC CIP Compliance.

The specific advantages our Consortium brings include our ability to leverage existing best-in-class techniques for PREPA's system. More specifically, we will implement a robust and reliable SCADA/telecommunication system based on state-of-the-art technology that provides the tools for operation and real-time analysis of the T&D systems. RTUs will be migrated from serial to IP communications and we will integrate features such as access control and video surveillance for critical sites to realize additional benefits associated with this technology. In addition, cybersecurity is critical to the T&D system's safe and efficient operation. Supporting infrastructure and operations will align with NERC CIP security requirements as required under the O&M Agreement.

Supporting the distribution control center's operation will be a new distribution automation (DA) system that can integrate minigrids/microgrids into operations and use these connected systems for resiliency. Together with a properly set up outage management system, the DA system will be a foundation for improving the grid's reliability and recovery capacity.

We will modify control center infrastructure to comply with the required standard to withstand Category 4/5 hurricanes. We will also deploy a state-of-the-art backup control center that will keep continuity of the grid through remote operation under extreme weather conditions or major emergency events.

Within the control centers, we will provide the ergonomic and environmental quality expected for a high-performance control center. We will allow desktop-monitor-to-video-wall switching for optimized 2D visualization of the power grid and geographic information. Integrated information and visual details will be high resolution to allow for more accurate monitoring, contact collaboration and proper responses to situations that have an ever-increasing number of sources, authentication mechanisms and applications to control.

4.2.4 Initiative 4: Vegetation Management

Vegetation management (VM) has emerged as a critical factor in effective operations. The Consortium has implemented strong vegetation management programs for our own systems in recent years to effectively protect the T&D network.

ATCO manages an annual vegetation management program for more than 54,000 miles of power lines and 50,000 miles of pipeline across Alberta to help maintain reliability and ensure the safety of employees and the public. Our electricity and natural gas service territories cover the province's entire land base, with many densely forested and rural areas and some accessible only by helicopter, tracked vehicles or by foot. We work on a range of land bases, including private property, provincial crown land, federal reserves and national parks, as well as native grass prairie, boreal forests, mountains and urbanized cities. These challenges better prepare ATCO to manage vegetation in Puerto Rico, as we have developed unique strategies to efficiently and effectively manage assets and rights of way in difficult terrain while considering the environment.

Each year, the ATCO forestry team identifies necessary work areas throughout Alberta and uses a combination of methods (aerial trimming, mechanical clearing, manual clearing) to prevent trees in and adjacent to the rights of way from growing near powerlines. Leveraging this experience, LUMA will establish a formal, state-of-the-art vegetation management program based on industry standards, best management practices and the Consortium's extensive knowledge of utility operations across North America.

Our VM program will draw from ATCO's experience using technology such as LiDAR and satellite imagery to leverage spatial data related to electric infrastructure and land cover classifications. This will allow us to reduce the need for site visits by remotely identifying areas that need attention. Comparative data also allows us to track the rate of vegetation growth, enabling us to better plan resource distribution.

We will manage the vegetation management program using a team with centralized responsibilities and authority. The work of re-establishing sustainable and maintainable vegetation cover on rights of way will be completed in three phases:

- **Reactive maintenance** identifies current risk to public safety and system stability (completed in three to six months);
- **Reclamation maintenance** reduces tree-related risks to public safety and improves the system's stability and capacity (24 – 36 months); and
- **Preventive maintenance** employs a wide variety of methods, including manual and mechanical pruning, mechanized mowing and herbicides. It considers alternatives to simply doing more tree work as a means of risk abatement or mitigation.

The proposed approach to vegetation management is science-based and grounded on the principles of tree biology and biomechanics, plant community ecology and electrical engineering.

Our strategy is to improve T&D system availability, reliability and safety by applying our knowledge of how trees create risks. Using a variety of methods to accomplish this work, we will establish sustainable conditions that can be efficiently maintained while demonstrating environmental stewardship. For instance, we often use herbicides (tested and confirmed to be safe for wildlife and sensitive environmental features) to eliminate the need for heavy clearing equipment. This mitigates risks such as rutting, pipeline ruptures, hydraulic leaks and impacts to wildlife that can drive costs higher in addition to affecting the environment.

Our vegetation management engagement is not about simply controlling vegetation, but actively managing it to acceptable outcomes using a variety of specialized methods not previously used by PREPA. We are proposing significant changes on an aggressive schedule. The Consortium has a wealth of experience in managing this degree of change and in engaging and mobilizing specialty services.

The extent and intensity of the vegetation maintenance work completed in a project's reclamation phase will have a significant aesthetic impact on the landscapes of Puerto Rico. Our vegetation management program will feature a major commitment to public education and communications. Efforts will include an internet presence, public relations plan, customer outreach processes and community tree-planting programs to achieve public support and buy in for vegetation management. A concerted effort will also be made to proactively engage with public sector officials and develop relationships with green allies and other interest groups.

4.2.5 Initiative 5: Metering

The Consortium has a depth of expertise in advanced metering infrastructure (AMI) and smart meter deployment. Since 1999, ATCO has owned a meter shop that conforms with ISO 9001 and is accredited by Measurement Canada, an organization whose regulations on quality assurance and metering are the most stringent in North America. ATCO has also developed and operates a meter asset management (MAM) system to complement meter shop processes, and has experience developing and operating meter data management (MDM) systems.

Quanta has worked with hundreds of diverse utilities on their AMI portfolios, including functional requirements, system integration, organization impacts and rollout plans. For instance, beginning in 2008, Quanta led the deployment of 2.4 million smart grid and smart meters for CenterPoint, one of

the first large-scale rollouts of its type for a U.S. utility. With this expertise and support from our vendors, LUMA will develop an AMI strategy to replace the legacy two-way automatic communication system (TWACS) power line carrier (PLC) system.

Given the volume of aging equipment that must also be replaced every year, replacing the TWACS PLC system will be challenging. Our wealth of experience with similar challenges and engagements will help streamline the process.

Over the first five years, LUMA will develop AMI infrastructure and install smart meters. In the initial year of operation, we will identify and acquire a new meter shop facility. Leveraging our experience and commitment to quality, we will establish Operator standards and metering work procedures. Once operating, the facility will house new multi-meter test boards and serve as a full-service shop to manage sample testing, meter asset tracking and quality assurance programs to adhere to required weights and measures.

In conjunction with the setup of meter shop processes, LUMA will implement new MAM and MDM systems. With AMI and smart metering, time-of-use, interval meter reads, prepayment and complex billing will become available to utility customers.

4.2.6 Initiative 6: Public Lighting

The Consortium has a long and established history of innovative public lighting initiatives. As a stable utility company that has designed, constructed/installed, operated and maintained electrical and lighting infrastructure in Alberta for eight decades, ATCO is keenly aware of the need to optimize total lifecycle costs and save our customers money in the long-term while reducing carbon footprints. We have consistently achieved high levels of customer satisfaction with the municipalities and customers we serve.

ATCO is an industry leader in LED implementation, having converted more than 200,000 LED lights throughout our service territories. As an owner and operator, ATCO is uniquely aware of the challenges operating utilities face in maintaining an appropriate inventory of replacement materials for facility repair and the importance of streamlining installations with an eye to inventory requirements for replacement parts. ATCO's approach is one that does not uniformly apply lighting level studies to like-for-like luminaire replacement. Instead, it seeks opportunities to reduce operational expense by optimizing asset utilization where acceptable and minimizing the use of alternative luminaires to control emergency stock requirements.

ATCO maintains licenses to industry-leading third-party software (AGi32) used for lighting simulations and designs. Our in-house lighting design experts understand the latest lighting design codes and standards and have established relationships with industry-leading LED product manufacturers. These relationships afford ATCO direct-from-manufacturer bulk pricing, enabling us to pass savings on to our customers.

Innovation is a cornerstone of ATCO's business strategy: our R&D team has successfully implemented several initiatives to improve lighting operations and better serve our customers. ATCO is currently working with several municipalities to pilot an exciting Wi-Fi streetlight meshing project

and, in 2018, implemented a “My Electricity” app that allows members of the public to easily report outages. ATCO has successfully piloted several solar and smart streetlighting options across several lighting customer classes, including our award-winning lighting-on-demand project for the City of Lloydminster: using wireless motion sensors and a control system, the LED streetlights dim during off-peak hours and brighten when they detect vehicles, cyclists and pedestrians. ATCO was one of only 14 companies around the world to receive the prestigious IES Illumination Award of Excellence for Energy & Environmental Lighting Design.

As a first step, LUMA will implement an aggressive strategy to repair damaged or burned out streetlights to earn public confidence and improve safety. Doing so will increase customer satisfaction with the new utility by visibly demonstrating that we have heard and will act on their complaints. It will also reduce public safety incidents caused by non-working lights.

We understand the importance of controlling costs and have therefore identified a labor strategy for streetlight repairs and maintenance. We will efficiently repair lights by having night crews work during downtime, by seeking lower-cost non-journeyman lineworker options and by contracting out repairs during peak periods.

The conversion to LED lighting is very important for Puerto Rico to achieve environmentally responsible and cost-effective lighting. LUMA will implement the current LED strategy, which consists of converting all the HPS lights to higher-efficiency LED heads. LED deployment pace will be an area of focus during the development of the System Remediation Plan to ensure an efficient and cost-effective transition. As LED lighting technologies evolve and customer needs change, we will need to develop different rates and work with PREPA and the PREB to implement an LED rate to decrease customer costs.

Over a two-year operational period, LUMA will complete an audit on all public lighting assets. A unique identifier will be attached to each asset to support the detailed inventory. During this inventory, T&D Operations and the Customer Service groups will work closely to complete a billing audit.

4.2.7 Initiative 7: Fleet

We have a proven track record of success with robust fleet programs. Together, ATCO and Quanta manage over 100,000 pieces of well-maintained equipment. Our Consortium has been able to maintain low overall fleet costs and maintain reliability while making employee and public safety the highest priority. Our achievements are notable, as they were attained while operating in some of the most extreme, difficult terrain in North America.

Our approach for Puerto Rico is to further assess the conditions and performance of PREPA’s aged fleet. We will improve current fleet operations to drive safety, Department of Transportation compliance and fleet availability — and to ensure that purchasing cycles meet field operations’ needs.

By leveraging our buying power and relationships with top suppliers, we can build a fleet organization with industry-leading technologies for day-to-day operations and emergency response. This will enhance parts procurement to reduce equipment downtime and overall operating costs.

We intend to prioritize fleet operations for every position in the organization through training, development, employee engagement and other identified improvements, such as telematics, third-party rental opportunities, cost-negotiated and accountable fuel procurement, preventative maintenance and operational excellence. We will employ our industry-leading fleet management capabilities to optimize the fleet program, including greening the fleet where appropriate and economic.

This transformation will be driven by the following initiatives:

- Centralize aspects of fleet operations to drive consistency and accountability;
- Use a fleet management system and fleet work order management;
- Consult with operations leadership to understand their fleet requirements and future needs (this will drive standards and ensure the teams have the correct equipment for the work);
- Structure shop management to improve efficiency and measurement of productivity, and implement a level of authority for repairs and prioritization; and
- Optimize the fleet replacement cycle and improve procurement practices to achieve value for capital replacement.

4.3 Power Supply Dispatch

The Operator will be responsible for planning and scheduling the dispatch of electric energy, capacity and ancillary services products. Initially, this will involve a simple transfer of activities previously performed by PREPA. However, within a year or two, this function will have to adapt to a new operating environment, particularly as new solar generation is added to the system.

The future operating environment will require a dynamic, flexible dispatch model that incorporates the growing role of short-term weather fluctuations and variable solar production, as well as real-time load conditions and pricing signals that may change within a single hour. The system operator will need to coordinate and reconcile different forecasts and models to deliver the least-cost power supply to end-use customers and to efficiently manage the dispatch of existing baseload thermal generation assets.

One of the first, most important priorities will be to review dispatch protocols and incorporate recommendations from subject-matter experts to define formalized, written dispatch procedures. These procedures will need to address steady-state operating conditions and storm planning and execution events, while recognizing the increased complexity and importance of real-time decision making.

Our team will review fuel and plant production trends for individual plants and the total fleet during the GridCo-GenCo PPOA negotiation process in order to identify key bottlenecks or operational limits that increase cost or limit total production. Analysis presented in the fiscal plan suggests that improved system dispatch could save $24 million annually. LUMA will work to validate these savings so that they can be passed on to ratepayers.

The dispatch center will have to develop contingency plans for scenarios of high solar penetration and potential curtailment procedures. Termed the “duck curve,” this is an increasing concern for most independent system operators as variable penetration increases. Given Puerto Rico’s general lack of

resource diversity and inability to share resources with other systems, issues related to over-generation or curtailments could eventually become a significant issue.

B. CAPITAL & OPERATIONAL IMPROVEMENTS TO THE T&D SYSTEM

Puerto Rico's electric system is at a critical juncture after the destruction caused by Hurricanes Maria and Irma. Capital and operational improvements must be implemented to restore, harden and modernize the existing grid. All three members of the Consortium have decades of experience with this type of critical infrastructure enhancement. By bringing together superior electric utility services and project execution from Quanta, operational excellence as a utility from ATCO and the experience of IEM in federal funds management, we are poised to create a more robust T&D system and will be disciplined in implementing targeted improvements, efficient operations and superior customer service.

1.0 WHAT WE FOUND

Our preliminary investigations of PREPA identified several opportunities to improve capital and operational aspects of the company's infrastructure in order to boost utility performance.

The Consortium team's due diligence in visiting PREPA T&D sites revealed capital infrastructure deficiencies ripe for positive enhancement. The team visits also identified infrastructure in various stages of damage and maintenance neglect. What we could not ascertain is the electrical condition of the assets.

On the operations side, we found several areas to enhance the customer experience. Call centers must be updated to be effective in the aftermath of a disaster. Meters needs fixing and updating to align with the latest operations and reduce non-technical losses. In addition, current data-cleansing processes contain too many inaccuracies.

2.0 WHAT WE PROPOSE

As part of our steadfast commitment to delivering world-class utility operations management in Puerto Rico, we recognize the need to implement a comprehensive series of upgrades. The upgrades involve both capital expenditure and operational improvements. The identified capital and operational improvements will form part of the wider System Remediation Plan, the approach to which can be found in the Front-End Transition Plan (Definitive Proposal Form 1.5, Section 3).

We have studied the Sargent and Lundy 10-year capital expenditure report, Grid Modernization Report and IRP. We are also aware through conversations with Sargent and Lundy that their report was based primarily on visual analysis on a sampling of the assets. They did not conduct field condition testing of the critical equipment.

As the Operator, we will have multiple workstreams with inter-departmental coordination to accelerate the transition of the company in accordance with waves of the rollout timeline identified in the GridMod plan, as coordinated in the System Remediation Plan.

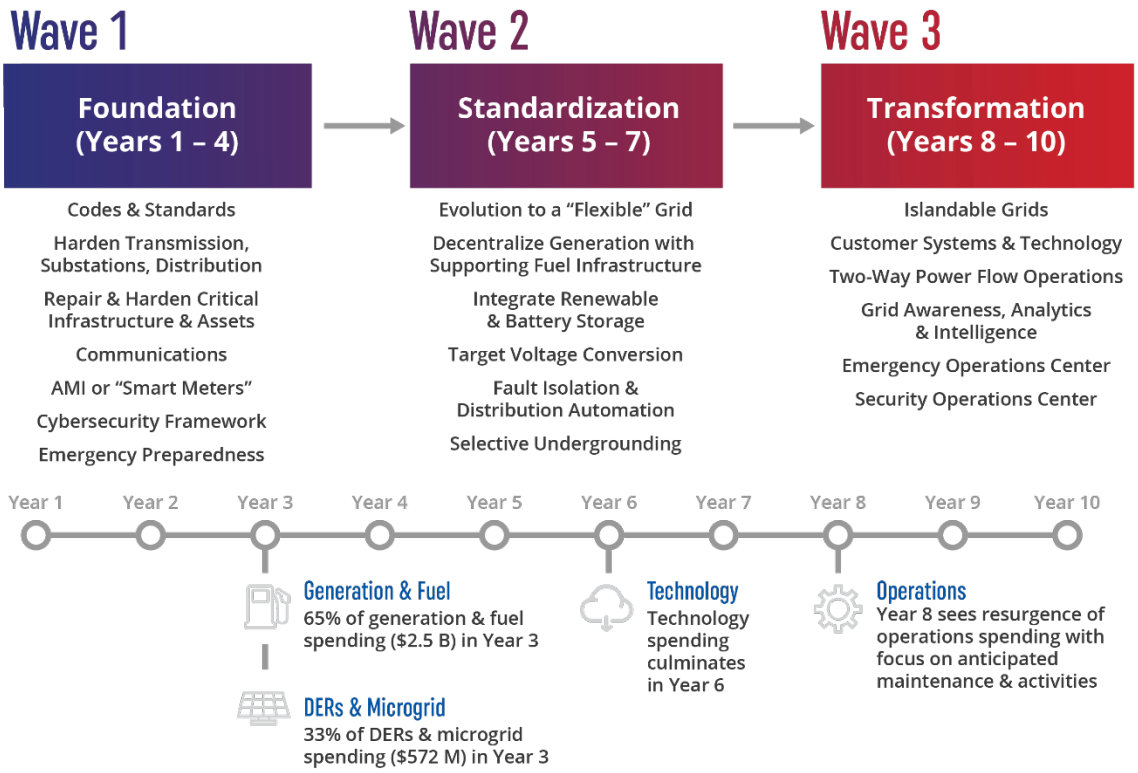


Figure 6: GridMod Plan

In addition to the focus items listed for the first year of Wave 1 (Foundation), we will complete the following activities.

- Perform condition-based testing of all critical equipment to baseline the health of the equipment.
- Start a pole inspection and assessment program developed in the System Remediation Plan to identify pre-defined criteria. The inspection will serve as base documentation for the asset management program and GIS mapping system. It will also identify third-party attachments so as to correctly collect revenues from the third-party attachments.
- Identify and correct deficiencies in critical assets and infrastructure prior to the start of the hurricane season.

Operational improvements such as better responsiveness through daily operations calls will also see quick wins. Longer-term performance improvements such as integrated vegetation management are at the heart of our plan to produce a world-class utility. We will concentrate our operational improvements in the areas of:

- Training;
- Automation;
- Data cleansing;
- Inspection and maintenance;
- Design standards;
- Vegetation management;

- Control centers;
- Lighting;
- Metering; and
- Fleet management.

3.0 HOW WE WILL DELIVER

3.1 Reliability Improvement

We will implement a reliability improvement program focused on training, automation, data cleansing and inspection and maintenance activities.

Training

We believe it is important to train lineworkers in relevant, reliability-focused topics such as Switch-before-Fix, understanding and using cause codes for tracking and estimating time to restoration (ETR). Implementing a switch-before-fix methodology, including appropriate processes and procedures, maximizes the number of customers we can restore as quickly as possible. Further, establishing an ETR provides transparent data on outages. This builds accountability between linemen and the control center, improves customer service and fosters customer trust.

We will train control center operators to be proficient in outage management system functionality and outage processes and procedures in order to escalate core reliability issues to the responsible individuals as soon as possible. This will improve outage response by efficiently dispatching crews to areas with the greatest number of affected customers or to critical customers.

Until we achieve a steady state, we will implement a daily morning-operations call, facilitated by the System Operations team, with the highest-level executive within Operations leading the call. Each call will last approximately

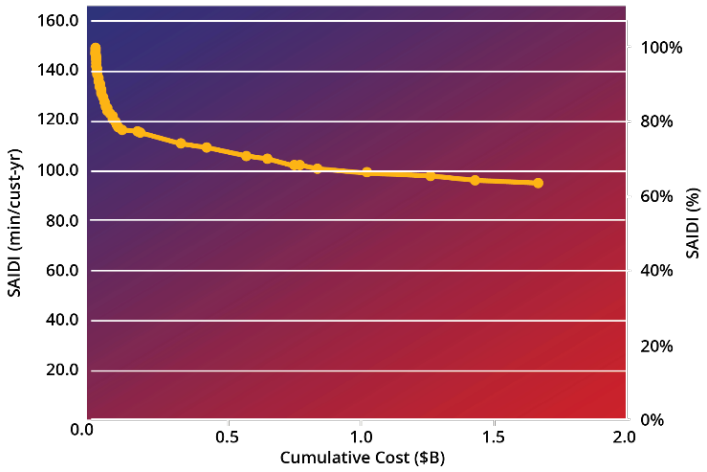


Figure 7: Cost-Benefit Analysis Systemwide for SAIDI

CASE STUDY: RELIABILITY

Quanta conducted a 10-year reliability improvement study for a major utility, with the aim of identifying measures to reduce SAIDI and SAIFI and improve distribution system reliability. Quanta and the utility jointly developed the study methodology, giving special focus to the reliability metrics and performance targets set by local regulators. A predictive reliability analysis study for the distribution system was completed using a data set of 25 representative feeders. Results were extrapolated to the entire feeder population and used to develop a prioritized list of cost-effective reliability improvement programs sorted by expected SAIDI and SAIFI reduction and the cost to implement. The analysis indicated that SAIDI and SAIFI would best be improved by addressing two principal factors: trees and equipment failure. Capital requirements to achieve this objective were estimated at $1 billion.

one hour and will alert each functional group to its daily activities. The call will include designated representatives from the following groups:

- Engineering/field operations representatives from each district, region and company level;
- Customer care/call center;
- Public/government relations;
- Safety;
- Reliability planning; and
- System planning and emergency management.

On each call, we will review:

- Safety moment and previous-day safety results;
- The previous day's critical events (if any) from all represented areas and our plans for mitigation and accountability;
- Staffing levels and crew availability for all operational areas, including the call center;
- Current and future forecasted load and weather; and
- Various detailed operational metrics, such as the:
  - Number of circuits out of configuration and the expected restoration date;
  - Number of circuits meeting the restoration date;
  - Number of circuits not meeting the restoration date (including the reason, mitigation plan and latest expected return date); and
  - Equipment and number of devices out of service (including the reason, mitigation plan and expected restoration date).

Automation

We plan to install automated switches and other devices associated with smart-grid technology. Monitoring system operations with smart-grid technologies will improve our ability to deploy repair teams more swiftly. A fleet tracking system will provide transparency and visibility of fleet vehicles and resources in Puerto Rico, which will improve outage response durations, productivity and safety.

System reliability (i.e., SAIDI and SAIFI) can be greatly improved with a distribution automation system that incorporates intelligent and adaptive reclosers and switches coordinated with an appropriate fusing scheme. We will engineer and install line reclosers at optimal distribution and 38 kV circuit locations, determined using existing reliability data. This automation can isolate faults into smaller customer segment counts, thus improving grid reliability.

The System Planning team will prioritize the areas within the system that have the highest number of faults. Solutions could include installing electronic reclosers or looping radial feeds together to isolate faults.

Data Cleansing

We will improve data cleansing accuracy (the daily checking and validation of data) and transparency in outage data, which both drive corrective actions. This will enable us to improve the quality of our

data — in detailed reports at company, regional and district levels — allowing for analysis planning and forecasting. As a result, our responsiveness to our customers' needs will improve.

Inspection & Maintenance

We will carry out robust preventative maintenance programs for substations, transmission lines, distribution lines and protection/telecom systems. These will allow us to proactively identify existing and emergent T&D infrastructure issues and concerns, which will reduce the frequency and duration of reliability events.

We will also implement programs to manage equipment asset classes throughout their lifecycle. This includes testing, replacement, repair and refurbishment strategies such as non-destructive cable (VLF) testing on underground cables and manhole inspections.

We will initiate a Reliability Roadshow program through which representative(s) from the System Planning team visit each district operations office to identify reliability and operational issues in that area. Feedback from these meetings will be used to identify reliability improvements, develop and execute action plans and address deficiencies.

On an annual basis, we will analyze the performance of feeders to determine the relative ranking of each feeder from the most to the least reliable. From this ranking, we will select the least-reliable two percent of feeders to repair or improve.

3.2 Resiliency Improvement

We will improve the resiliency of the current system by focusing on design standards, vegetation management, control centers, metering, public lighting and fleet management.

Design Standards

We have particular expertise in design and engineering standards and have been recognized for our innovative approach to standards development. LUMA will use ATCO's design standards as a base starting point to develop line design standards specific to Puerto Rico hardening requirements.

To improve storm and overall system resiliency, we will use several methods to bring feeders up to the extreme wind loading standard, including using larger, stronger, higher-classification poles. We will analyze each feeder to determine what actions can be applied to bring the entire main feeder up to extreme wind loading. Other methods to strengthen feeders include storm guying, using intermediate-span poles, relocating pole-mounted equipment and selective undergrounding.

Undergrounding will be used where required and, as part of the program, LUMA will investigate cost sharing with municipalities to address areas where towns desire underground facilities. We have built many underground electric T&D facilities and understand the nuances of operating and maintaining these facilities over their full lifecycles.

Structures damaged by hurricanes will require inspection, including of their guying and anchors. Where applicable, we will implement a distribution-pole and transmission-structure inspection program with a frequency cycle that is best suited for Puerto Rico's island climate.

Vegetation Management

We will identify and mitigate areas at risk of vegetation contact leading to momentary and sustained outages to reduce the frequency of these events.

LUMA will complete reclamation maintenance work on T&D rights of way (ROW) to reduce tree-related risks to public safety, and the stability and capacity of the system. This work will involve heavy clearing and mowing on T-ROW and include some widening of T- ROW to meet clearance requirements and reduce future O&M costs. Work on D-ROW will re-establish easy-to-maintain clearances.

Once the vegetation management program enters a "steady state," the principles of integrated vegetation management (IVM) will apply, including manual and mechanical pruning, mechanized mowing and herbicides.

Control Centers

We will leverage our existing best-in-class techniques to implement a robust and reliable SCADA/telecommunication system based on state-of-the-art technology that provides the tools for operation and real-time analysis of the T&D systems. In addition, cybersecurity is critical to the T&D system's safe and efficient operation. Supporting infrastructure and operations will align with NERC CIP security requirements as required under the O&M Agreement.

We will install a distribution automation (DA) system in the distribution control centers. Coupled with a robust outage management system, the DA system will integrate minigrids/microgrids into operations and use these connected systems to improve resiliency and recovery capacity.

We will modify control center infrastructure to comply with the required standard to withstand Category 4/5 hurricanes. We will also deploy a state-of-the-art backup control center that will keep continuity of the grid through remote operation under extreme weather conditions or major emergency events.

Within the control centers, we will provide the ergonomic and environmental quality expected for a high-performance control center. We will allow desktop-monitor-to-video-wall switching for optimized 2D visualization of the power grid and geographic information. Integrated information and visual details will be high resolution to allow for more accurate monitoring, contact collaboration and proper responses to situations that have an ever-increasing number of sources, authentication mechanisms and applications to control.

Metering

We will develop automated metering infrastructure (AMI) and install smart meters. In the initial year of operation, we will identify the equipment needed for a premier utility meter shop and implement the

upgrades. Once operating, the facility will house new multi-meter test boards and serve as a full-service shop to manage sample testing, meter asset tracking and quality assurance programs to adhere to the Department of Consumer Affairs' weights and measures. We will also implement new meter data management and meter asset management systems. AMI and smart metering will allow for time-of-use, interval meter reads, prepayment and complex billing to become available to utility customers.

Public Lighting

We will implement an aggressive strategy to repair damaged or burned-out streetlights. LUMA will implement the current LED strategy, which consists of converting all high-pressure sodium lights to higher-efficiency LED heads.

Fleet Management

We intend to prioritize fleet operations for every position in the organization through training, development, and employee engagement. Other identified improvements include telematics, third-party rental opportunities, cost-negotiated and accountable fuel procurement and preventative maintenance. We will employ our industry-leading fleet management capabilities to optimize the fleet program. This optimization will include:

- Centralizing aspects of fleet operations to drive consistency and accountability;
- Using a fleet management system and fleet work-order management;
- Consulting with operations leadership to understand their fleet requirements and future needs;
- Structuring shop management to improve efficiency and measurement of productivity, and to implement a level of authority for repairs and prioritization;
- Optimizing the fleet replacement cycle and improve procurement practices to achieve value for capital replacement; and
- Assessing a comprehensive initiative to green the fleet.

C. GOVERNMENT, PUBLIC & MEDIA RELATIONS

With over 100 years combined experience, we have a long, successful track record of communicating operational excellence to our stakeholders. The Consortium will draw from our wide-reaching and effective communications teams and strategies. We will leverage our industry-leading capabilities and experience to develop a strategic approach to external relations for LUMA. Our approach will aim to drive successful communication with government entities, regulators, media, customers and the general public.

We are committed to building strong relationships with all stakeholders in Puerto Rico based on a commitment of connection, collaboration, transparency and integrity. LUMA will share accurate information with the residents of Puerto Rico in a timely fashion, and we will seek feedback from stakeholders to better understand how we can best serve our customers and contribute to Puerto Rico's growth and prosperity.

LUMA will significantly improve real-time communications during emergencies and catastrophic outages. We have extensive experience responding to disasters and communicating the status to customers, officials and vendors. The Consortium knows that communication with employees, emergency personnel and municipal and state/Commonwealth EOCs is critical to a smooth response. For example, the provincial government and Edison Electric Institute praised ATCO for providing timely and useful information to officials and the public in responding to the 2016 wildfires in our Alberta service area. Our use of various tools to target important audiences meant that stakeholders knew what was happening during the response and recovery.

1.0 WHAT WE FOUND

Without a clear method for consistent communication with the public, and given that this communication is not prioritized, public confidence in PREPA has been steadily declining. Efforts are further constrained by a lack of resources. PREPA uses its website and social media to broadcast information about outages or publicize key announcements. Social media does not seem tailored to specific audiences. Press coverage often has coverage of PREPA without a PREPA spokesperson being quoted or without information directly from PREPA.

As a government entity, PREPA has not established a Government Relations office, as would be typical at a private utility company, and there is no apparent budget for such activity.

To accurately inform our path forward, we began by conducting research to gain a deeper understanding of perspectives on current issues facing Puerto Rico. A qualitative survey among 500 general population Puerto Ricans ages 18+ is being conducted.

2.0 WHAT WE PROPOSE

We will implement strategies to drive effective communication with government entities, regulators, media, customers and the general public. We will use all communication methods available to reach our audiences — including press coverage, editorials, web- and app-based platforms and social

media, targeted to our key audiences — in our effort to relay important information and improve public perception.

We have engaged a world-class communications firm that is helping us develop a plan to reach employees, customers, officials and other stakeholders. We plan to conduct meetings in the communities across Puerto Rico to further assess actions that need to be taken. We will be responsive and transparent when stakeholders reach out and ensure that, if we make a commitment, there is follow up. Some issues will be faster and easier to fix than others, but open communication will ensure a smooth and honest process to move forward to achieve a better solution for all stakeholders. Furthermore, we will work with government agencies, external entities and trade associations to promote Puerto Rico's economic transformation.

We believe it is critical to ensure that customers and stakeholders are aware of how the system is operating and know that their issues will be heard and resolved. Our message will revolve around our six core values of safety, customer centricity, affordability, reliability, resiliency and sustainability.

3.0 HOW WE WILL DELIVER

We will develop a world-class external communications program similar to those the Consortium has previously developed. It will include strategies to drive effective communication with government entities, regulators, media, customers and the public.

We will leverage our capabilities and experience to deliver messaging that improves public perception of utility service. We want to reverse the prevalent opinion that decisions about the electric system are made in a closed and secretive manner. We will favor processes that provide information and disclosures to the people of Puerto Rico about their power system. Trust and transparency will be cornerstones.

We will emphasize that we are not "taking over" Puerto Rico's system, but are improving it so that the residents of Puerto Rico have sustainable, world-class utility service. Achieving tangible improvements early on and communicating these successes will reinforce a message that the sector transformation supports Puerto Rico's economic growth and will improve the lives of its citizens.

We plan to hold a series of community meetings throughout Puerto Rico to give residents the opportunity to share their experiences with PREPA, discuss any issues that may pose a safety threat, have conversations about renewable energy and identify anything they wish to bring to our attention.

The Consortium will undertake a multi-month effort to reach out to the legislature, mayors, trade associations and other local officials who will want to understand our objectives. We will schedule meetings and ask for committee time to discuss our findings and solutions.

In addition, completing the following activities will allow us to better understand and tailor our overall approach.

- Set up meetings to introduce new leadership to Puerto Rico elected officials and Commonwealth and federal agencies.

- Set up meetings in communities across Puerto Rico to get public feedback and concerns.
- Identify local communications-support contractors.
- Develop new transparent and responsive protocols for external and internal communications.
- Conduct meetings between leadership and trade associations.
- Develop a communications plan for vegetation management activities.
- Build supportive coalitions.
- Develop storylines to highlight Operator employees who contribute in their community.
- Promote the new lineworker training center and campus.

We will also build effective stakeholder and media communication into any emergency response/crisis communications plan. We describe this in our plan for Emergency Response in Section 1.J.

D. TESTING, REPORTING & RECORDS

1.0 MONTHLY OPERATIONS REPORT

Our intention is to start with the existing PREPA content for the Monthly Operations Report. During the transition period, we will be reviewing and identifying key data elements and reporting information available as the system currently exists. To the extent that we identify key informational metrics that can be incorporated into the monthly report from the existing system configurations, we will do so. Over time we expect to add any key data elements that are not currently available. The objective is to add key elements to the existing report as quickly as possible in order to publish some or all of the following metrics on a monthly basis. Please note that this is a representative sample.

- Customer service (customer satisfaction, first call resolution, average handled time).
- Reliability (SAIDI, SAIFI, CAIDI).
- Safety (TIIR, DART, LTIR).
- Financial performance (summary income statement).
- Budget tracking.
- Key narrative of operational activity, including:
  - Workforce management (headcount, turnover, overtime);
  - Overview of ongoing capital projects; and
  - Strategic Initiative Updates.
- Regulatory Activities.

The intention of the monthly operations report, over time, is to deliver a comprehensive look into the business with an emphasis on transparency and relevancy as we work together and collaborate with the P3 Authority (Administrator) to make the business operate as efficiently and cost effectively as possible.

2.0 TESTING & DELIVERY OF INFORMATION

The Consortium intends to enhance current reporting capabilities to support PREPA's transformation and the Administrator's ability to determine LUMA's performance under the agreement. We will provide timely, accurate and insightful reporting on a weekly, monthly, quarterly, annual and ad-hoc basis as the Administrator has requested.

At the reasonable request of Administrator, and subject to Operator's policies and procedures and consent, LUMA will apply the Consortium's experience developing an efficient audit framework and working with auditors and regulators to address the following tasks:

- Make available all necessary information related to T&D system O&M services;
- Collaborate with any testing or audit in connection with the T&D system or the O&M services; and

- Collaborate with PREPA, the Administrator, PREB, COR[3] or the Department of Homeland Security Office of Inspector General on any partial or full audit related to all federally funded capital improvements.

Our approach will be to leverage PREPA's existing reports, reporting processes and structures to the extent that they remain complementary and useful to internal and external stakeholders' objectives. As we provide this reporting, we will apply the Consortium's experience to accomplish the following additional tasks:

- Interview internal and external stakeholders to identify gaps, determine the population and frequency of the existing reports and compile a list of report expectations not currently being met;
- To the extent possible, begin to address these expectations during the front-end transition period and continue to work on this task through and after commencement;
- As the front-end transition work progresses, identify and align new reporting opportunities that bring value to the organization; and
- Address quick-win reporting opportunities on a priority basis.

3.0 DOCUMENT MANAGEMENT

LUMA will develop a secure document management program to enable PREPA's key business and regulatory requirements. We will start by conducting interviews and research to clearly define document management processes from our core requirements. This will lead to the establishment of guidelines for standardized data forms, naming/tagging nomenclature, retention policies and an information hierarchy that aligns with the organization's functional objectives. The Consortium will combine our own industry expertise with the historical knowledge of PREPA employees to implement near-term and longer-term integrated solutions for records capture, search and retrieval, tagging and integration with adjacent applications.

E. CUSTOMER SERVICE

The Consortium understands that the main barriers to exceptional customer service are resource constraints and outdated technology, not the staff's dedication. Pairing PREPA's fundamental desire to meet customers' service delivery expectations with our tools and experience will enable LUMA to reduce wait times, reduce customer effort, improve billing quality and execute an exceptional customer service experience.

We deliver energy and related services to millions of customers worldwide. Each of our customers has their own requirements but, in all cases, the Consortium must meet those expectations. Though the services and geographies differ throughout our global operations, we have consistently proven our commitment to delivering an exceptional customer experience with world-class customer satisfaction ratings of more than 93%, and a net promoter scores of more than 26 for the last four years; this is noteworthy, as the average net promoter score for major utilities is just 15.

For this initiative, to expand the service offering for the customers in Puerto Rico and improve confidence in the electric utility, we will draw on ATCO's experience with the unbundling of the generation, T&D delivery and the retail energy market in Alberta.[1] As both a regulated utility and competitive energy retailer, ATCO must compete for business. In just three years since entering the competitive retail energy industry, ATCO's customer-centric approach has enabled us to become the one of the most successful retailers in Alberta, surpassing companies that have been in the market for more than a decade.

Much of ATCO's rapid growth in its retail energy business can be attributed to our engagement with Albertans. A series of unique, customer-centric and data-driven marketing campaigns helped Albertans get to know ATCO and sign up for our services in a highly competitive energy market. For example, in 2018, customer engagement through webchat and social media channels increased by 69 percent from the year before. To tailor messages to the growing base of current and potential customers, and to reach them with greater speed and accuracy, ATCO implemented a new customer relationship management tool. In addition, ATCO automated the internal process for managing new customer agreements, resulting in cost savings over the last three months of 2018, which has already recovered implementation costs. LUMA will leverage ATCO's experience in not only entering a new market but also in excellent customer-service delivery to meet the needs of customers in Puerto Rico.

[1] Alberta is a unique market in North America, combining regulation with competitive, deregulated service to drive innovation and cost discipline. The province is divided among set utility service providers who construct, operate and maintain T&D infrastructure for their assigned regions. Consumers can choose to purchase electricity and natural gas from either the regulated rate company for their region or from a competitive price company.

Fundamentally, if the Consortium does not meet our customers' expectations, we risk losing them. The combination of meeting and even exceeding both utility and non-utility customer expectations, and the investments we have made to achieve this, offers the unique perspective to go beyond a traditional utility mindset and truly deliver world-class customer service.

1.0 WHAT WE FOUND

Over the past decade, PREPA has seen demand drop due to power quality, price volatility and service interruption, leading to a corresponding decrease in revenue. PREPA has identified customer service as a major contributing challenge, as customers do not have confidence in their bills or in the services they are provided. High volumes of customer requests in district offices and in-person requirements for certain processes contribute to long wait times and poor customer satisfaction scores. Resource constraints and antiquated Avaya technology at call centers have resulted in a 50% call abandon rate. The Customer Service team's lack of integration with T&D Operations has meant that customers do not have access to service restoration times and there are delays in addressing customer metering and billing complaints and in meeting customers' modern expectations through proactive service provision and communication. LUMA will benefit from maturing PREPA's customer service approach from reactive to proactive.

Recognizing the need for customer centricity, PREPA has been improving the company's customer-service culture, achieving 50% signup for electronic billing and implementing an online customer service portal that allows for some self-service and real-time updates into the billing engine. PREPA's long-term strategy is to continue to decentralize customer service processes and enlist third-party call centers with more advanced technology.

2.0 WHAT WE PROPOSE

Our overall approach is to accelerate the progress PREPA has made to drive quality, cost reductions and customer centricity throughout the organization. We will make customer centricity a priority for every position in the organization through training, customer and employee engagement and other improvements as described below.

We will take all steps necessary to transform Puerto Rico consumers into prosumers — that is, informed, empowered and active "producing customers" who will consume and produce energy through sustainability programs.

The improvements throughout operations will be customer driven, with all roads ultimately leading to customer satisfaction. Our goal is to make PREPA a best-in-class customer service organization. We will adapt our comprehensive customer service programs for Puerto Rico by redefining the call center experience, improving billing processes and implementing solutions for easier customer payment and interaction.

3.0 HOW WE WILL DELIVER

We will develop a best-in-class customer service organization that delivers an exceptional customer experience through:

- First contact resolution resulting in high customer satisfaction and reduced operating costs;
- Strong "Voice of the Customer" (see Figure 8 below) programs that are shared throughout the organization;
- Omni-channel contact centers that allow customers to engage with customer service representatives in their preferred method;
- Digital self-serve tools that enable customers to complete transactions and interact with the company efficiently and on their terms, coupled with education on how to use the tools;
- Proactive customer communication that ensures customers are armed with the information they need before they need it;
- Delivering on promises made to create and maintain a trusting relationship;
- Highly engaged employees who are committed to resolving customer contacts, and delivering quality service from end to end;
- An effective complaint and escalation processes that acknowledges the customer's negative experience and works to ensure it is not repeated; and
- Taking an outside-in view of people, process, policy and technology practices that is based on customer feedback.

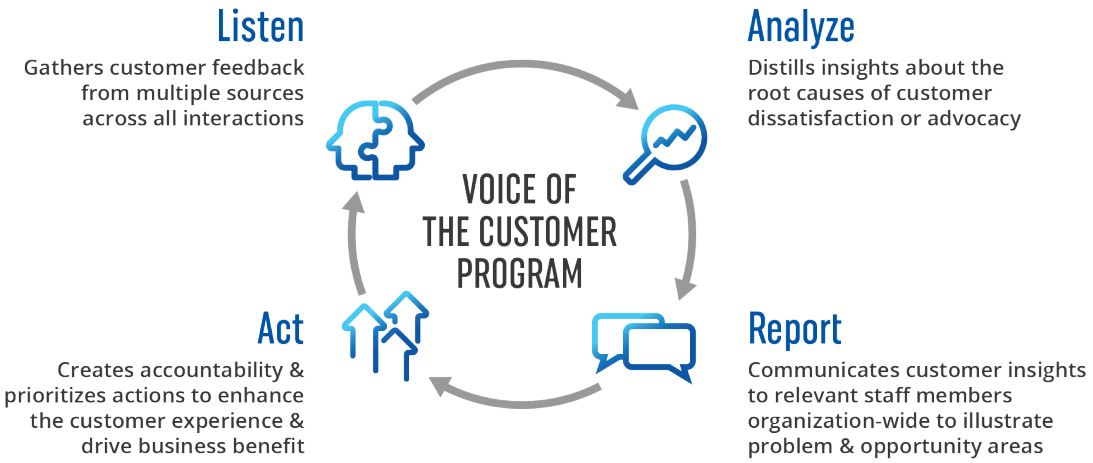


Figure 8: Our proposed Voice of the Customer program

Our customer service transformation strategy focuses on three primary areas: developing a customer-centric culture, enhancing the customer experience and leveraging technology.

3.1 Customer-Centric Culture

Training

To ensure exceptional customer service across the organization, all departments will jointly own the customer experience and jointly care about the quality of service delivered to customers. Every employee throughout the organization must deliver an exceptional and unwavering standard of customer service. To achieve this, all employees will receive customer service training to set the foundation for a customer-centric culture. This training will focus on quality, organizational goals, attention and responsiveness to customers' concerns and education on how individual actions and decisions can affect operations and, in turn, our customers.

Employee Engagement

We will deploy strategies to develop a highly engaged customer service team through involved leadership, learning opportunities and actioned feedback. A study conducted by Queen's Centre for Business Venturing shows the high cost of disengaged employees, noting that the business cost per disengaged employee in an organization is about $10,000 per year. The findings also note that organizations with the most engaged employees achieve 26% less employee turnover, 15% greater employee productivity and up to 30% greater customer satisfaction levels[2], all contributing to a successful customer-centric culture. We will act on results from employee engagement surveys to improve employee satisfaction, which will contribute to increased earnings year over year.

3.2 Enhancing the Customer Experience

Customer Satisfaction

A key aspect of our approach will be defining what the customer experience should be and delivering it. We will leverage personnel in PREPA's current employee base to uncover challenges and develop solutions, taking the time to listen fully rather than jumping to solutions that may not solve core issues.

To deliver a high-quality customer experience, we will measure customer satisfaction through monthly customer satisfaction surveys; speech analytics (an automated review of all customer calls); daily call listening programs; customer complaint analysis; and quality assurance of written correspondence.

We will implement a Customer Experience Program that integrates with the company's overall business strategy and enables the business to move at the speed of customer expectations. LUMA will identify and roll out customer experience tools that incorporate non-survey data into "Voice of the Customer" analysis and action planning/process improvement. This will allow for a targeted approach to customer service based on overall customer feedback and enable effective and accurate communication of information with customers (e.g., service restoration times, planned outages, education of self-service tools). The Customer Experience Program includes:

- Continuous customer listening, artful analysis and swift insight sharing;
- Momentum through small, frequent improvements as opposed to larger infrequent ones;
- Limiting initiatives to those that deliver perceived value for customers;
- Collaborative cross-department teamwork and accountability; and
- Curiosity — a process of persistent questioning, building and learning.

[2] Shelley Pleiter, Engaging Employees, Smith School of Business Magazine, Winter 2014

We will create simple and proactive customer touchpoints to personalize service, such as enabling customer-service representatives to listen for customer cues and capture the relevant details. This will allow them to send customers an e-card on their birthdays, when they've purchased a new home and if they have a baby or are under the weather.

Providing opportunities for teams to meet regularly on specific customer interactions helps uncover new ways to serve customers better. In this vein, a cross-functional customer board will gather each week in a data-driven, immersive, fast-paced, decision-making environment.

CASE STUDY: CUSTOMER CONNECTION MODEL

At ATCO, customer centricity is taking every opportunity to create customer value and never ceasing to look for ways to improve. We always apply our "winning aspiration" — to improve the lives of our customers by providing inspired solutions for a better world. That means making energy easy.

In 2018, ATCO overhauled our project execution process for electric distribution projects by implementing a new customer connection model (CCM). The objective of the CCM is to reduce costs for ATCO and our customers, and to improve the customer experience. Through the CCM framework of leveraging risk, consolidating roles, using contemporary technologies and empowering key staff, customers are enjoying an average cost reduction of 15% and seeing a 40% reduction in connection time (measured from customer acceptance to energization).

Call Center

We will bring the current 50% abandoned call rate to 25% or less. The initial concern for the call center will be to ensure that 80% of calls are answered in 20 seconds or less, and that 100% of calls are answered within one minute or less by the first day of the service contract.

To meet this goal, we will fully leverage the existing contracts with outsourced vendors; however, our long-term strategy for the call center is to maintain an in-house, company-operated center. Many best-in-class brands like IBM, Lululemon, Nieman Marcus, Siemens, Zumiez and TaskRabbit have seen improvement in their customer experience with in-house, cloud-based call centers. This call center trend has led to an increase in customer satisfaction, first-contact resolution, control over vital business functions and profit. ATCO has experience with both outsourced and in-house call centers. In 2015, ATCO brought the distribution call center back into the main business and has since achieved a 3% increase in already high customer satisfaction results (2018 results are 95.22%).

Though outsourcing call centers may in some cases be cost efficient, the costs associated with unresolved problems and angry customers typically offset the savings in salaries. In addition, advancement in cloud-based call center technology enables agents to work remotely or from various locations, which has drastically reduced the cost of call center operations. A recent Forrester report estimated that 34% of U.S. companies plan to invest in at-home agents.

We will review the potential deployment of a call center work-from-home initiative to improve employee engagement and satisfaction, reduce operating costs and increase employment opportunities in rural areas. We will also explore the feasibility of locating call centers in some of the district offices across Puerto Rico.

Reduction in Customer Effort

We will establish customer-centric processes for customer interactions such as payment, payment arrangements and form completion, which will reduce the customer's effort in doing business with us. Overall, emphasis will be put on reducing wait times and completing customer transactions in a timely manner to ensure that their time is respected.

To start, LUMA will enable multi-channel customer engagement tools and processes: customers will be able to communicate with the utility in their preferred methods — whether by phone, email, webchat, SMS text or in person. We will develop an online approach to all customer service processes, including payment arrangement contracts and document verification, and install iPads for customer self-service at local offices to improve wait times and show customers that their needs can be met online.

To ease the payment process, once all automated meter readers (AMR) are operational, we will implement bi-weekly automated payments to align with customers' pay schedules and allow for pre-authorized credit card payment. We will also assess the feasibility of implementing a pay-as-you-go program to reduce arrears and enable customers to manage their electricity costs.

As part of our improvement roadmap, LUMA will establish an improved emergency and outage reporting process that will reduce or eliminate customer call-in times, ensure that customer reports are managed consistently and enable customers to receive proactive outage communications.

Rates

As part of the customer-centric culture, the customer service team will focus on:

- Reducing operating costs;
- Collecting outstanding revenue through stringent collection processes;
- Strict quality assurance controls to ensure accurate reporting and data processing (e.g., accurate billing, CILT, subsidies, meter read/consumption); and
- Prudent capital spending.

All efforts will contribute to lower customer rates. By using best-in-class debt collection processes, ATCO's customer bad debt is less than 1%.

Our acute focus on first contact resolution (FCR) will also drive a reduction in operating costs. For every 1% improvement in FCR, a contact center reduces its operating costs by 1%. It is important to understand that, if a call center performs at the industry average of 70%, potentially 30% of customers will have to call back because their issue was not resolved on the first call. Also important is the fact that, for the call center industry average, 1.5 calls are required to resolve a customer inquiry or

problem; however, for customers who do not achieve FCR, an average of 2.5 calls are needed to resolve their issue. This is an area of enormous opportunity for operating cost reductions, as repeat calls represent 23% of the average call center's operating budget.

Collaboration

We will develop collaborative processes for Customer Service to interact with all other workgroups. The goal of these joint work processes will be to eliminate bottlenecks and increase inter-departmental communications to enable improvements in customer service delivery. Developing integrated work management systems will formalize planned work, support requirements and provide continuous feedback on workforce effectiveness, thereby increasing opportunities to exchange knowledge and collaborate.

We will establish collaboration between workgroups through T&D Operations and supporting departments' daily meetings to ensure that both the customer service and field teams are informed of expected plans, known interruptions and power outages and incidents affecting schedules. Clear communication between teams will result in improved communication to customers. Collaborative processes between T&D Operations and Customer Services at ATCO have enabled an average speed-of-answer time of 95 seconds, and an average handle time of 135 seconds over the last three years, resulting in reduced customer effort and improved customer experience.

Customer Recovery Process

LUMA will apply a customer recovery process for when things go wrong. It will include:

- Proactively communicating issues to customers and sustaining communications through resolution and beyond;
- Listening and acting, including determining the impacts of the event on the customer;
- Making things easy for the customer and doing what it takes to mitigate impacts without being asked;
- Valuing the customer and demonstrating this by apologizing and taking ownership; and
- Empowering customer-service representatives to complete these steps.

3.3 Leveraging Technology

Bridging Existing Applications

Initially, we will rebrand the current website and customer service portal but will ultimately work to implement a new online portal by the end of the first year, with full integration within 18 months.

We will also review the billing and meter data management systems during the transition period and determine what billing and metering technology will be required to meet upgraded standards.

As meter technology is upgraded over time, AMI will enable our implementation of the "Green Button," a tool that gives customers access to their energy data via online clickthrough. Green Button is an industry-led effort enabling customers to download their household or building energy data to create energy awareness as a catalyst for customers to manage their energy needs and create savings for

customers. In addition to direct customer benefits, the Green Button enables environmental benefits through reduced energy use and peak shaving to mitigate climate change. Collective peak-hour use shifting can enable LUMA to reduce the use of diesel generators, resulting in cost reductions for utility customers. The Green Button will also improve customer engagement, as a reduction in O&M costs will result in a rate reduction for all customers.

Implementing New Technologies

Where feasible, and with consideration to capital and O&M costs, we will leverage innovative technology that will improve service delivery. Cloud-based call center technology (Talkdesk™ software) will enable call/staffing forecasts, call recording, call quality reviews, speech analytics, real-time customer satisfaction reporting and other quality control metrics that contribute to overall customer satisfaction. It has a 100% uptime service level and features a live customer sentiment alert so the best resource can be assigned to manage each call. Implementing a cloud-based technology like Talkdesk™ has another advantage: it has a built-in business continuity plan so that, during a major event, operations can be transferred to another location — even on the mainland U.S. or in Canada — without any service interruptions.

4.0 PREPARING FOR THE FUTURE

Maintaining customer centricity within LUMA's organization means keeping up with customer expectations by continuously improving customer journeys and business processes. The Consortium is well practiced in Lean and Six Sigma quality methodology, which will help LUMA implement, maintain and improve initiatives.

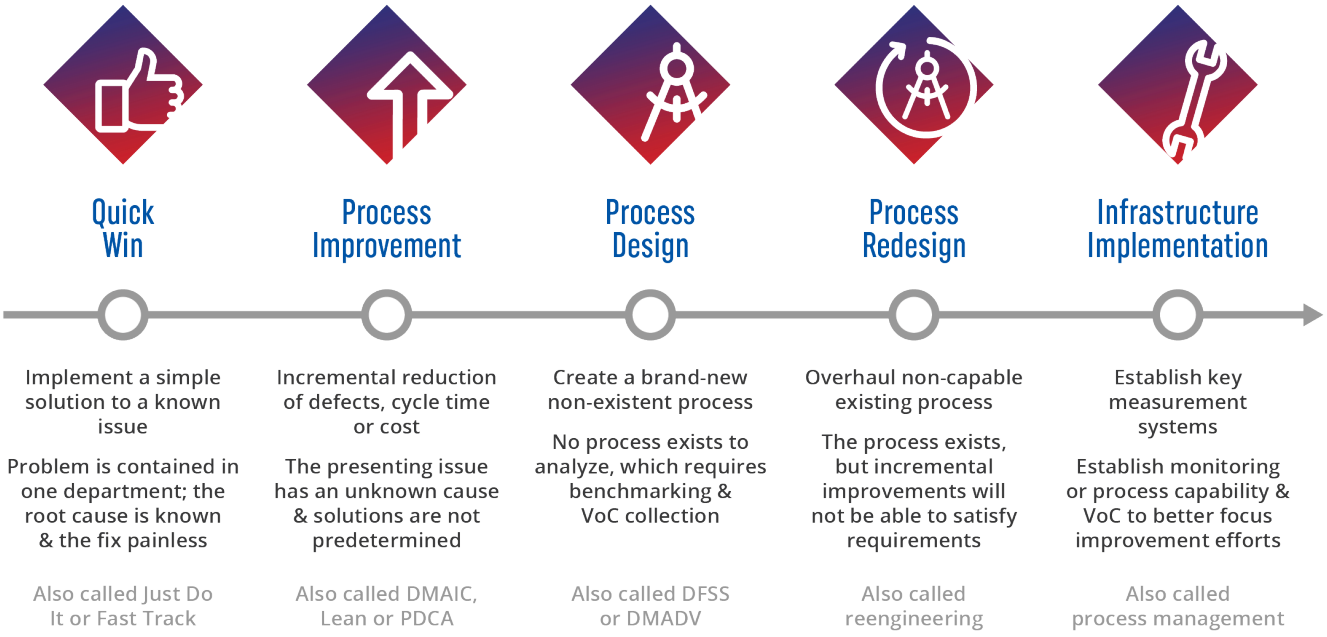


Figure 9: The customer service continuous improvement process

We will enable a Quality Control and Continuous Improvement process that is built on integrity and able to report strengths and weaknesses from the field to both T&D Operations and Customer Service

departments, allowing for analyses of trends and causal effects. The process will highlight performance results via a balanced scorecard, establishing controls and performance measures.

We will implement an Integrated Process Improvement program that compares performance from similar utility companies, drives improvement projects and acts on employee feedback, customer satisfaction surveys, customer complaints, performance measurements and quality assurance/control reports. The program will enable LUMA to track and report the status of in-process, completed and verified corrective and preventative actions identified during gap assessments. Communication and transparency with the public will be prompt and clear on target dates to reestablish trust and increase loyalty.

F. HUMAN RESOURCES

1.0 HUMAN RESOURCES

The Consortium has world-class employees at the core of every job, project or service we provide. Combined, we have more than 50,000 employees representing the largest craft-skilled workforce in North America, with best-in-class safety programs, unparalleled project execution and exceptional customer service.

The Consortium strives to treat all employees, wherever they are located, as family. Those in Puerto Rico will be no different. This is at the very heart of the Consortium's culture and will be woven throughout every aspect of LUMA's activity in Puerto Rico.

For this opportunity, LUMA will leverage the Consortium's high level of expertise in all Human Resources (HR) functions for utility operations, construction and services. Our Consortium has engaged in many mergers and acquisitions, gaining substantial experience assessing people and organizational structure. This expertise will support HR in determining the best path to integration by focusing on:

- Company culture;
- Employee communication and engagement;
- Total rewards (compensation, health and welfare benefits and retirement benefits);
- Talent acquisition (strategic workforce planning, recruiting and onboarding);
- Compliance with U.S. federal, state/Commonwealth and local laws;
- Labor relations;
- Training and development; and
- A strong commitment to giving back to the communities in which we live and serve.

The Consortium recognizes and champions what we see as the most important resources in any organization — the people. We are a people industry; attracting and retaining top talent is one of our highest priorities and is instrumental to our success. To attract the best, we provide our employees with an engaging environment where they can grow their careers and be rewarded for high performance. Our culture ensures that employees feel like part of the family. We celebrate diverse backgrounds and ideas and trust our employees to innovate with integrity. Fundamentally, it is happy, healthy and productive employees who will make the difference in better serving the people of Puerto Rico and in creating a more prosperous future.

1.1 What We Found

Workforce

PREPA has faced high turnover and early retirement rates, and highly craft-skilled positions are understaffed as a result. Higher wages in other parts of the U.S. and with local contractors have made it difficult to retain local talent. Despite decreased hiring in the public sector due to Puerto Rico's bankruptcy, a sufficiently large talent pool remains. PREPA recently held a hiring event for its

lineworker school and, despite stricter than normal requirements, received over 800 qualified applicants.

Unions

PREPA's and Puerto Rico's bankruptcy has created significant strain on the workforce and has affected the renewal of collective bargaining agreements (CBAs), all four of which have expired. PREPA has been limited ability to negotiate clauses with an economic impact due to the bankruptcy, and approximately 4,000 grievances are still outstanding.

Pensions

Existing PREPA employees participate in a severely underfunded defined benefit plan. Problems with legacy retirement systems are not unique to PREPA. In fact, both traditional forms of employer retirement programs (defined benefit plans and defined contribution plans) face challenges. A significant financial commitment will be needed to support the legacy liability. We understand that this will be addressed through a Transition Charge assessed to ratepayers.

While the long-term structure will depend on the outcome of the bankruptcy process, the pension plan for PREPA employees still carries significant risk. The currently scheduled Transition Charge may not be sufficient to address legacy obligations. Though the O&M Agreement prevents the Consortium or Operator from bearing higher costs based on the PREPA plan, LUMA may still face disruption to the workforce or ratepayers, or from the political environment. A particular concern for us as an employer is that poorly funded plans may hurt the benefit security of participants, who are ServCo employees. Participants may suffer negative consequences, including benefit reductions and cuts to other programs linked to the PREPA pension plan.

Wages

The labor and employment field is highly regulated in Puerto Rico. PREPA is a government-owned entity and has not been held to typical standards that apply to private U.S. employers, such as FLSA & Wage and Hour, I-9 verification of employee identity and their authorization to be employed in the U.S., hiring and terminations, EEOC, ERISA, ACA and FMLA, among others. PREPA is currently exempt from the National Labor Relations Act (NLRA). As a result, there are a number of compliance issues that must be addressed to reduce legal liability and modernize operations.

In general, we observed employee morale and engagement issues throughout the organization. This is due to PREPA's current challenges with wages, pension and collective bargaining.

1.2 What We Propose

Our goal is to attract, recruit, develop and retain the best people across multiple disciplines. By encouraging collaboration and innovation, we will not only transform operations; we will establish the organization as a great place to work where our people feel valued. In the Consortium's operating model, we surround ourselves with people who have different backgrounds and ideas, so we end up with the best, most well-rounded result. We will do the same in Puerto Rico, striving to be a best-in-class employer through the following initiatives.

Establish a Strong Employer Brand

LUMA will establish a strong brand that resonates with current and future employees. The employer brand will determine our ability to attract and inspire the right types of people for the organization.

Define Employee Value Proposition

We will create a clear employee value proposition — our promise to them. This promise will help to decrease turnover, improve commitment from employees and inspire loyalty, pride and engagement from all employees.

Know & Realize Target Audience

We will spend as much time as necessary in getting to know the employees. We need to understand our employee audience to communicate authentically and speak to why LUMA will be an employer of choice in Puerto Rico.

Promote Employer Brand

LUMA will develop and promote the Employer Brand through a multitude of channels, including social media. For instance, we will leverage our relationships with LinkedIn and Glassdoor.

Build a Corps of Brand Champions

We will seek Brand Champions from among the employees. They will help champion the company in the community, as well as the labor market.

Retain the Best Talent

Once we have the best talent, we will work concertedly to retain them. We will not make assumptions about what people want from their careers, but will seek to understand employees' aspirations and provide the right opportunities to achieve them. We want our employees to feel that they are continuously growing and improving themselves and their skillsets.

1.3 How We Will Deliver

Based on our preliminary analysis, the Consortium has developed an action plan for critical HR areas of employee communication and engagement, community, labor relations, talent acquisition, training and development, total rewards and compliance. Our team will focus on these areas to plan, acquire, engage, develop, deploy, lead and retain the workforce necessary to achieve a more reliable, customer-centric grid.

Communication & Engagement

We intend to make communication a key part of our comprehensive people strategies for Puerto Rico. Shifts in leadership and direction can present serious challenges to employee engagement; however, we have learned to mitigate these challenges with a robust communication and engagement plan.

We understand how important it will be to engage the employees as soon as possible. LUMA will implement an overall Employee Engagement Plan so employees can adjust to the new leadership

and direction. We will define the company's culture, mission and core values, and ensure that employees understand they will have opportunities at LUMA. This will generate excitement about being a member of the new Operator family.

The Engagement Plan will create a schedule of employee events, both for employees and for their families, to begin immediately after commencement. We will provide opportunities for employee engagement with employee events such as family picnics and volunteer opportunities in the community.

Early on, leadership will identify influencers for the organization — intended to be both legacy PREPA employees and Operator leadership — to assist with distributing communication throughout the organization. Communicating honestly and frequently, expressing empathy, involving employees in important decisions and ensuring that employees have a voice without threat of reprisal will go a long way toward keeping employees motivated and productive, during the transition as well as in the critical first weeks of launching the new organization.

We will continuously inform employees through multiple avenues (e.g., one-on-one meetings, group sessions, town halls, newsletters, intranet updates). Transparent and frequent communication will promote positive change and progress by highlighting projects, changes that impact employees and successes for the organization.

To encourage openness and transparency, we will solicit ongoing feedback from employees through an employee hotline and ombudsman, employee engagement surveys and touch point surveys. We will follow up with employees at one–, three– and six-month increments to take the pulse of employee acclimation to the new organization. LUMA will ensure that employees understand that we are committed to identifying and resolving challenges as quickly as possible.

For the success of integration, we will provide opportunities for Consortium employees working in Puerto Rico to learn Spanish. We will also make sure that translators are in place when needed for meetings and in the field. All communications to employees will be delivered in Spanish.

Community

The Consortium considers the communities where we live and work to be part of our family. We embrace a culture where each of us — and our company as a whole — can make a significant impact on each other and our communities. Strong communities are built through hard work and real investment, and we seek to be a good neighbor through community involvement and sponsorships. We will ensure that employees have opportunities to volunteer in their communities and remain committed to responsibly using the resources we have to make the world around us better.

Labor Relations

We will develop an enhanced Labor & People Strategy, quickly determining our approach to bargaining in good faith with the union workforce and ensuring that we are creating career paths and opportunities for the non-union population as well. Our intention is to communicate clearly and comprehensively as we come to the negotiating table. We will pay attention to the needs of

employees, while striving to achieve CBAs that enable ServCo to meet the requirements of the O&M Agreement and achieve the transformation objectives set by the GOPR. The CBAs should allow us to provide a safe workplace for workers, deliver reliable and affordable electricity and provide excellent customer service.

Once new CBAs are reached, LUMA will be diligent in communicating to managers and supervisors the details of the new CBAs and expectations as a leadership group. We will work collaboratively with employees and the unions in advance if needs arise to change policies, work rules or benefits to ease concerns, eliminate surprises and realize positive results. We will practice frequent active listening and provide feedback to employees or union representatives to remain open, consistent, collaborative and fair.

Talent Acquisition

Our initial approach is to develop job descriptions for all roles during the Front-End Transition. The descriptions will indicate the experience, skills, competencies and/or licensure needed for each position. As individuals apply for these positions, we will assess their skills using industry assessment tools and evaluations, interviews and observation of competencies. Based on these assessments, HR will work with each department to create a talent acquisition plan. This will include working with leadership in each functional area to understand the gaps and needs specific to their areas, as well as a long-term strategy that includes developing future talent. As a part of our overall talent strategy, we will develop succession planning for each area. Succession planning will help ensure that LUMA has a continuous and future pipeline of talent available for any turnover, including retirement.

Training & Development

Our Labor & People Strategy will include onboarding solutions to get ServCo employees up to speed and offer multiple training opportunities for their development. While we will continue to use classroom courses, we will also implement a learning management system that enables web-based training programs and can track training records by employee.

We are heavily invested in ensuring that the frontline leadership is sufficiently trained and equipped to supervise the workforce. We will implement frontline leadership courses that articulate:

- Fundamentals for first-time managers;
- Basics of business acumen;
- Situational leadership;
- Generational differences;
- Diversity and inclusion;
- Interviewing techniques;
- Performance management; and
- Compliance.

These courses will generate excitement and ultimately allow leaders to understand how they fit into the larger business strategy.

Total Rewards

Our Total Rewards Program will define who we are as an organization and make us market-competitive with other Puerto Rican employers. This program will include:

- A competitive compensation package consisting of new compensation terms and conditions;
- Comprehensive health and welfare benefits, including medical, dental, vision, life, disability, supplemental insurance, an Employee Assistance Program (EAP) and a wellbeing program; and
- Stable retirement benefits for all employees.

We will provide a robust communication campaign to help educate employees on their new benefit offerings.

Compliance

LUMA will schedule onboarding and communications for all new programs, policies and procedures. We will partner with a consulting team to help transition through assessments and execute on our Labor & People Strategy. We will maintain a heavy focus on development (e.g., compliance training, safety training, Operator training, supervisory training) while beginning to measure performance and execute and communicate our retention strategies.

1.3.1 Shared Services Model

To ensure continuity for all employees, LUMA is committed to maintaining and providing the administrative HR support requirements to GenCo for the length of time agreed to in the Shared Services Agreement. LUMA's HR department will deliver HR professional services and our high level of expertise and industry experience for GenCo to run their operations effectively.

To further support this effort, the Human Resources Shared Services Model will be organized into centralized and business-center areas.

Service Center and Center of Excellence

The Service Center is a central unit for HR-related administrative and transactional tasks that employees, retirees and business-unit managers (both GenCo and the Operator) may access via phone. Through a company portal/intranet, the Service Center's many customers — employees, their families, retirees, line managers and business-unit managers — will have an easy way to navigate processes, policies and procedures with easy-to-find information related to their employment. Service Center representatives will include HR staff who are competent, professional and committed, and who will provide the very best in customer service.

The Center of Excellence (COE) will include HR subject-matter experts in the main office, who work on issues across the organization. These specialists in areas such as staffing (recruiting), compensation, talent development and training, benefits, labor relations and payroll will work with business leaders to support their operational and business goals. COE will allow HR leaders to provide HR services efficiently, with greater consistency and accuracy, throughout LUMA.

HR Business Partners

Business partners are HR staff members who work directly with business-unit managers at the business-unit location. They will ensure that HR policies and procedures fit the needs and aims of the business units and Operator leadership. The business partners focus more on general needs of the business unit and less on administration, compliance and management, as this is handled through the COE. We anticipate that there will be at least one dedicated HR business partner at GenCo.

The Shared Services model will allow the HR function to align with the business while serving as an employee champion. This gives HR its distinctive value.

2.0 CRAFT-SKILLED WORKFORCE DEVELOPMENT

For 26 years, the Quanta-owned Northwest Lineman College (NLC) has been the leader in education and training for the industry in the North America. Our relationship with the accredited college uniquely positions the Consortium to bring NLC's skills to Puerto Rico.

NLC has proven recruiting strategies, pre-apprentice training programs, apprenticeship programs and additional training courses across a variety of technical, safety and leadership topics. Training for power, telecommunications and gas distribution industries can be delivered at nearly any location through a Mobile Training Team or at any of NLC's four U.S. campus locations. As one of our initial commitments to Puerto Rican employees and residents, we will invest in building a state-of-the-art training center in Puerto Rico.

NLC offers a variety of programs and unique services, such as:

- Electrical line worker pre-apprenticeship and apprenticeship programs;
- Telecommunications pre-apprenticeship program;
- Gas distribution pre-apprenticeship program;
- Substation technician certification program;
- System operator certification program;
- Numerous technical training courses;
- Leadership and soft-skill training courses;
- OSHA training courses;
- Safety education and training;
- An intentional people-first culture; and
- Mobile delivery of education and training services.

NLC will enhance workforce development in Puerto Rico through the delivery of proven, benchmark training and education to all industry-related, craft-skilled trade employees. The Consortium will establish a standardized training program and path for each industry, trade and work group and implement a clearer training structure at all levels of the organization for long-term training. Higher levels of craft-skilled workforce training for local employees will raise retention levels, strengthening the relationship between LUMA and communities in Puerto Rico.

Public and employee safety are paramount to utility operations. We will initiate workforce competency requirements focused on building capacity and safety best practices grounded in the SHEQ integrated management system (see Section 1.M, Safety Management) while delivering excellence in our products and services.

In addition to NLC, Quanta has top-of-the-line training capabilities within the Advanced Training Center at the Lazy Q Ranch in La Grange, Texas. The Lazy Q Ranch is a 2,300-acre ranch that has been transformed into a world-class training facility. Lazy Q delivers the highest level of training by constantly innovating its training methods with the latest research and technology.

Figure 10: Quanta's Lazy Q Ranch, which delivers the highest level of training

2.1 What We Found

Competition with higher-paying private sector jobs has led to low retention and labor shortages at PREPA. Experienced and knowledgeable line workers appear to be among the most affected groups of employees. PREPA's collective bargaining agreements constrain resource deployment and are inflexible on a variety of contractual terms, including hours of work.

PREPA offers several training courses, but does not currently have the clear and consistent career path and workforce development plan for craft-skilled trade workers that will enable the utility to meet current objectives. PREPA has two existing training facilities. The northern one has adequate classrooms but limited yard space for the training needs there. The southern facility would have to be rebuilt completely to meet current and projected needs.

PREPA training staff appear motivated and competent. Resources like curriculum, equipment and others do not seem sufficient to successfully educate and train PREPA's craft-skilled labor workforce.

2.2 What We Propose

LUMA will take a holistic approach to craft-skilled labor workforce development that includes recruitment, education, training, organizational structure, systems, resources and craft-skilled labor knowledge, skills and behavior.

By observing and assessing the current state of PREPA craft-skilled workforce labor during the Front-End Transition period, we can develop and implement a workforce development plan that enables LUMA to successfully educate and train our craft-skilled workforce. Key initiatives that we will develop and implement during Transition and after commencement include:

- Establishing a state-of-the-art training facility that will incorporate a customized NLC curriculum for the safety and benefit of employees and Puerto Rico as a whole;
- Providing recommendations for craft-skilled labor and training policies, standards, practices, curriculum and facilities;
- Onboarding and providing foundational awareness and training to all new and existing T&D crews;
- Developing a defined career path with continuity of quality education and training;
- Establishing a continuous improvement plan focused on quality, efficiency, safety, matching labor requirements and community engagement;
- Implementing a staffing and resource plan that enables Operator training staff to fully and successfully maintain these craft-skilled labor training requirements; and
- Supporting, monitoring and reporting on strategic initiatives based on performance metrics and trends.

LUMA will leverage NLC's education and training programs to enhance the lives of employees and Puerto Ricans more generally. As LUMA's new organizational structure, systems and processes mature over time, we expect to decrease the direct involvement of trainers from Consortium affiliates. We are committed to recruiting strategies that focus on the local population and education and training that result in a safe and productive craft-skilled Puerto Rican workforce.

2.3 How We Will Deliver

Along with our support for all Operator activities, we are committed to constructing a brand-new NLC campus training center in Puerto Rico. This represents a significant investment and is a game-changing value-add. The Puerto Rico NLC campus will be critical for improving workforce retention by providing best-in-class curriculum and training programs locally.

We plan to incorporate PREPA's existing training programs into customized NLC training and education for Operator employees.

NLC uses a three-phase educational model that focuses on knowledge, skills and behavior. Combined with an in-house curriculum development team, award-winning video department,

countless subject-matter experts, operational excellence and customer service, this educational model distinguishes NLC as the leader across our industries.

Quanta training facilities have trained and educated more than 50,000 students to date. Since Quanta acquired NLC in 2018, the impact to employees and to the industry workforce has been significant. In 2017, NLC trained 3,263 students. In 2018, that number nearly doubled to 6,091. So far, in 2019, NLC campuses and mobile units have trained nearly 12,000 students across North America.

A safer workforce begins with better training, and we are committed to ensuring that our employees have that advantage. Our commitment extends to the communities in which we work and live, as the culture of workplace safety will extend to the home and throughout our employees' lives. Using the NLC approach to training in Puerto Rico will allow Operator craft-skilled workers like lineworkers to considerably improve their knowledge base, skills and performance. This adds to employee engagement, as well as to the safety of the workforce.

G. INFORMATION TECHNOLOGY

The Consortium has developed sustainable Information Technology (IT) organizations focused on supporting the reliable delivery of utility services to our customers; providing modern and responsive customer service through accurate, timely and convenient channels; and maintaining efficient financial and regulatory processes to ensure cost-effective operations. We draw on our people, infrastructure, project and portfolio management, and business and external partnerships to provide world-class IT solutions. We have dedicated implementation teams and repeatable, standards-based processes to streamline organizational transformation.

Our approach takes a holistic view of LUMA's information systems (IS) needs. IT, operational technology (OT) and cybersecurity are the three critical sub-teams that comprise an effective overall IS organization.

Quanta has acquired more than 200 companies, absorbing and transforming organizations at significantly varied stages of information systems maturity. Quanta has successfully improved and modernized several acquired companies' hardware, software and processes from a starting point similar to PREPA's current state.

ATCO's in-house IT group has successfully supported NERC CIP-compliant utility operations for decades. ATCO has also supported some of the most sensitive information systems in the world. For over 15 years, the company has served NATO and the European Union Force in the Balkans, ensuring that their crypto-classified networks are secure. ATCO manages and maintains all areas of cyber systems and telecommunications for 3,000 multinational users, including operational and administrative functions for all secure and non-secure networks.

Supporting infrastructure well beyond implementation, the Consortium's internal delivery teams have a high degree of knowledge and accountability. We are very

- 10+ years using Oracle E-Business, including processing pay rules across six organizations (with union staff)
- 12+ years using Hexagon G/Technology, including the Outage Management Suite to dispatch emergency/retail tickets to mobile office-enabled field crews and provide real-time information to call centers 24/7
- 30 years deploying, upgrading & enhancing ACLARA TWACS Powerline Carrier (primary meter reading technology platform)
- We operate a cloud-based OSISoft Pi Historian system with a variety of field devices that collect data
- We fully migrated to Microsoft Office 365 to reduce storage costs and improve security and collaboration
- During 2016's Fort McMurray Wildfire, ATCO rapidly deployed a world-class site-by-site outage information map combining Hexagon and ESRI (on premise & ArcGIS Online) technology, as well as operational data from our AMR and SCADA networks
- 10+ years using Kronos, including deployment across all staff, upgrades, transfers and new installations
- We implemented VTScada, a unique architecture integrating all core HMI SCADA software features in one package that can be hosted in the cloud
- We've reused components across ERP systems, including HR, finance, procurement, customer care and billing. All use Oracle products and services very similar to PREPA's

familiar with extensive customization; have successfully managed multiple system upgrades, divestitures and business unit acquisitions; and deliver cost-effective solutions.

The Consortium places heavy emphasis on cost management in technology service delivery and will provide the right solutions on time and on budget to strategically enable Operations teams to perform at the highest level possible.

Technology transformation must start with a strong foundation based on leading people, processes, infrastructure, security and core information systems. We will leverage our world-class experience, processes and tools to ensure that LUMA is a customer-centric technology organization capable of reliably supporting the entire organization.

1.0 WHAT WE FOUND

PREPA's IT team undertook a significant effort to restore 250 servers and the accompanying applications and data following a security breach in 2018. Out-of-date technology, lack of documented standards and insufficient maintenance have only increased demands on a budget- and resource-constrained workforce that faces a long backlog of projects. This has impeded skill development with current technology and affected employee morale, and PREPA has struggled to retain key employees.

Competing project priorities and budget constraints have meant that equipment (including desktops and laptops), facilities and software systems were not properly maintained. Using unsupported technology introduces significant and unnecessary security and operational risks. The core network is running on aging technology and is not built for security or resiliency, and potential outages including planned and unplanned cyber events may affect the availability of key systems. We discovered facilities that were not locked or kept clean, and which had moisture control issues and inadequate cooling. Servers and storage in the backup data center are aging and out of support. All these factors mean that it would be difficult for PREPA to handle a failover from the primary data center were there a service disruption or natural disaster.

PREPA's existing distribution grid is essentially blind, with little to no remote-control capability. As a result, PREPA has not been able to properly assess the maximum potential of resources, such as solar PV and battery energy storage, in an enhanced grid. The grid must move from accommodating grid-edge energy sources to integrating them.

In our due diligence, we observed an inadequate security posture and controls, which allowed penetration by an external attacker. The current operational technology environment is not designed to align with any regulatory standards, such as North American Electric Reliability Corporation Critical Infrastructure Protection (CIP) standards, and very few controls follow National Institutes for Standards and Technology (NIST) Cyber Security Framework (CSF). Insufficient communication with other business groups has often resulted in misalignment with internal customer needs. During multiple site visits, we had discussions with leaders across PREPA to identify how existing technology systems are either enabling or hindering them. They highlighted that the existing systems are not based on open designs or standards-based architecture and, most importantly, the proposed

technology plans appear to stand apart from the business. As technology cannot itself bring efficiencies and top-quartile utility performance, it must be integrated with and support the overall business transformation strategy.

2.0 WHAT WE PROPOSE

PREPA and the Administrator have identified a need to transform the IT, OT and cybersecurity organizations to better meet business needs, deliver projects on time and on budget, better manage disaster recovery and other resiliency efforts and maintain a safe and secure system, all while enabling productivity gains in the workforce. To achieve this goal, communication and strategic alignment between IT and stakeholders are imperative.

As is the theme throughout our proposal, we intend to invest in and empower PREPA's in-house resources by providing training and other programs that not only meet each of these objectives, but that ultimately transform the company into a self-sustaining utility that does not rely on expensive third-party consultants.

LUMA requires a world-class IS organization. This organization should provide IT operational services that align with strategic goals and business requirements, including the interoperability and flexibility of open design, standards-based data architecture and compliance with requirements for technical architecture, data modeling and the software development lifecycle. Business processes should have end-to-end integration and applications and processes should be standardized.

The IS team will safeguard the system, software and data through:

- IT and cybersecurity best practices for the design, implementation and operation of IT services;
- Protection against unplanned or malicious cyber-attacks against IT and OT applications systems and assets;
- Ensuring that provided systems and services run on current, supported and maintained hardware and applications; and
- Delivering projects on time, on budget and so they provide the agreed-upon business benefits.

The IS organization should also provide network and IT services that fundamentally underpin T&D operations. We expect to reuse existing utility application best practices where relevant and appropriate. In the event of a natural disaster or man-made/cyber-related attacks, IS must have capabilities to provide recovery services for IT systems and services.

The IS team will target highly available solutions (e.g., 99.99% availability) where prudent and cost effective, providing best-of-breed utility application services. Using appropriate cloud-based solutions will enable LUMA to scale utility applications both up and down.

We will not only bring the current systems up to standard but will also ensure that the people and processes needed to maintain and continually improve these systems are in place. Our goal is to evolve PREPA into a self-sustaining utility with the internal capabilities to self-manage. The IS staff will have opportunities to learn, train and progress their careers within the IT, OT and cybersecurity

functions. With appropriate resources, LUMA's IT, OT and cybersecurity functions will give critical support to utility operations.

3.0 HOW WE WILL DELIVER

The Consortium has substantial experience with IT, OT and cybersecurity/information security office function transformations, and will implement appropriate, cost-effective technology solutions to realize productivity gains and train existing IT staff to position them for success. We will reduce technical complexity to eliminate non-essential spending, maximize staff productivity and reduce overall operational costs. We will plan to create a first-class IS organization by focusing on four core elements of project delivery:

- Training;
- Documented standards and scalable, repeatable processes;
- Integration with operations; and
- Increased visibility to increase accountability.

We summarize our approach below and then provide specific implementation plans for IT, OT and the cybersecurity/ISO.

3.1 Project Delivery

Training

We recognize that budget constraints have affected the IS team's ability to meet T&D customer needs and that a lack of internal capabilities has increased reliance on expensive third-party consultants. Our solution is to build internal capabilities. We will provide employees with learning, cross-training and career progression opportunities to develop, empower *and retain* the best people. We will first establish a training program for existing systems that includes progression to next-level systems. Potential courses will include business analyst training, peer-to-peer and mentorship programs and train-the-trainer initiatives.

Documented Standards & Scalable, Repeatable Processes

Proper execution methodologies can produce major productivity gains in all areas of a utility's operations by empowering employees to make considered decisions for the benefit of the organization. For this reason, a key IS initiative will be defining processes and increasing standardization.

World-class organizations of any type are process oriented, with an eye for continuous improvement. Our team plans to implement the plan-do-check-act process to, over time, transform IS into a process-driven, continuously improving organization.

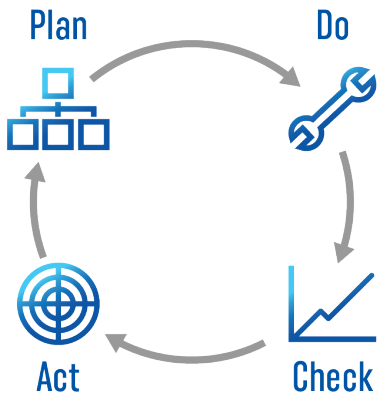


Figure 11: The Deming Cycle

During the commencement phase, the Consortium will implement an industry-hardened set of operational processes backed by the Information Technology Infrastructure Library (ITIL) framework, which defines how IS interacts with the organization. ITIL describes processes, procedures, tasks and checklists that are neither organization-specific nor technology-specific, but can be applied by an organization for strategy generation to deliver value and to maintain a high level of competency. It allows the organization to establish a baseline from which it can plan, implement and measure, and is used to demonstrate compliance and measure improvement.

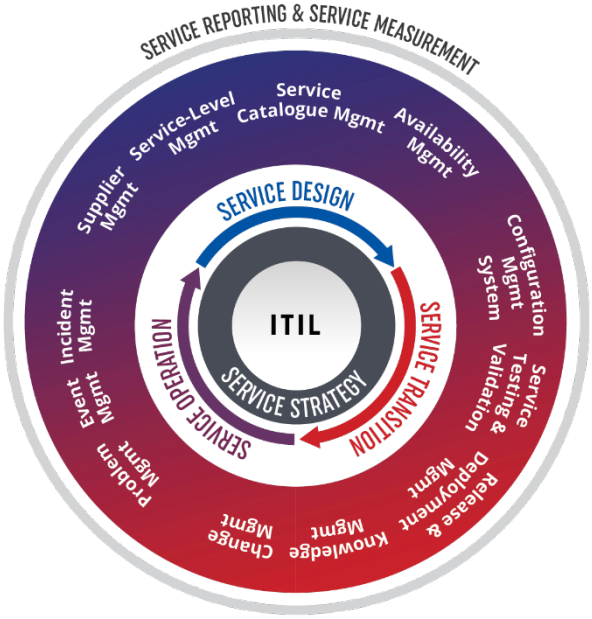


Figure 12: ITIL framework

We will establish a design authority board comprising business and IS executives who align business and IS strategies, as well as an Enterprise Architecture (EA) function that will align technology decisions with the business strategy and requirements, which also ensures that all departments of the business follow the same IT strategy. The EA function differentiates the Consortium from other utility operators: ATCO recently consolidated IT systems that differed across multiple departments into one seamless system.

The EA team's role will be to ensure that business, application, data and technology models are documented and well communicated — and that existing IS investment, business process and technology components are reused wherever possible. Using business architects for the EA function will allow business processes to be more readily understood and translated directly into the design of the enterprise system. Because of the Consortium's extensive experience with EA, we are ready to begin implementing EA in Puerto Rico very soon after the commencement of operations under the O&M Agreement, enabling aligned systems and processes across all business units.

A project enablement forum that aligns with the program and IS project portfolio management office (PPMO) described below will be used to review project initiatives both at the conceptual stage and during a project's lifecycle. This will minimize scenarios where project teams "reinvent the wheel" because there was no knowledge of an existing component elsewhere in the business. IS will also work with project teams so the capabilities one project delivers can be recycled into the overall enterprise architecture of the organization and reused where applicable in other solutions. In this way, the business will receive the best value from investments made. The Consortium has successfully used this methodology on numerous projects to ensure consistency across our business units.

For individual projects, we will draw on knowledge from the Consortium's Project Management Institute (PMI)-based project implementation models. This will include staffing up and establishing a program and PPMO to standardize the technology implementation methodology and ensure a more streamlined approach. Delivering programs through a PPMO will enable IS to manage customer needs through two-way communication and effective and consistent project delivery.

Shortly after commencement, we will develop a project request, intake, scoring and prioritization process to provide a transparent mechanism to evaluate the viability of projects and programs needed to modernize delivery capabilities. We will allow time for planning, requirements gathering and budgeting of new initiatives and business ideas.

Depending on the technology implemented, we will use either an Agile– or Waterfall-based approach.

Agile projects will use six distinct phases:

- **Ideation**: projects are envisioned and prioritized;
- **Inception**: team members are identified and initial environments and requirements discussed;
- **Iteration/construction**: the development team works to deliver operational software based on iteration requirements and feedback;
- **Release:** quality assurance (QA) testing, internal and external training, documentation development and final release of the iteration into production;
- **Production**: ongoing support of the software; and
- **Retirement**: end-of-life activities, including customer notification and migration.

Waterfall projects will use the following six distinct phases:

- **Ideation**: projects are envisioned and prioritized;
- **Design**: a technology solution is chosen, diagrams are created and software architecture is planned;
- **Build**: systems configuration and development;
- **Test**: software is tested and confirmed to be functioning as specified and without adverse effects;
- **Deliver**: production cutover and end-user training; and
- **Operate**: the software is deployed into a production environment and supported.

For both our agile and waterfall implementations, we will develop and enable phase stage-gate criteria for each project type and phase. Though every project will be unique, using a standard project framework will increase the likelihood of success.

This scalable and repeatable execution model will ensure that every stakeholder understands how the project will be executed and where they will have opportunity for input. We will also offer training and change management programs to assist employees in adopting this more process-oriented mindset.

Integration with Operations

For IS to be a more customer-centric organization, it must understand who its customers are within LUMA and what they are asking for, in addition to delivering on those needs. We will therefore implement several new programs to improve communications and build trust between IS and the rest of the organization.

- Customer satisfaction surveys (internal to IS and external to IS);

- Regularly occurring “all-hands town halls” for all staff and other mass communication events for IS;
- Cascading messages that reinforce various topics through town halls, team meetings and one-to-one meetings where open feedback is encouraged;
- Trust building and other group dynamic programs through offsite team meetings, innovation workshops, ideation and prioritization sessions with cross-department teams; and
- Partnering with customer service to integrate voice of the customer/employee and other employee engagement efforts in the culture of IS.

At a more granular level, we will involve the appropriate business unit (e.g., T&D operations, customer service, finance) in the implementation and development lifecycles, so they are embedded throughout the process. By involving the department or business unit in decision making, testing and acceptance of any systems, we will avoid implementing unnecessary technology. We will provide opportunities for every team member to share innovative ideas for solutions and technology and improve communication across the organization through regular team meetings, town halls and peer-to-peer reviews across utility business units. This will allow employees across different departments and in different locations to meet, share ideas and reach even better solutions.

We will hold monthly and quarterly business review meetings with key stakeholders to build a process for updating IS’s understanding of the organizational business and operations needs. An output of these meetings will be a refinement exercise that includes assessing established processes and creating process improvement plans.

Increase Visibility to Increase Accountability

Improving data availability through technology will enable reporting and business intelligence that improves transparency and allows for new processes and tools to be adopted. PREPA currently has several business intelligence tools that our team will assess and build up if possible. We intend to use existing systems to their fullest capacity and seek opportunities to streamline. Our goal is to develop KPI dashboards that provide stakeholders visibility into project execution and initiatives while allowing staff to spend more time using information, rather than collecting and sorting data.

We will engage senior management in project reviews, and key stakeholders in the company will have a voice in project delivery and have visibility on progress. This will improve accountability but also streamline the process, as our PPMO process will have pre-determined stage-gates to ensure that the right people are engaged at the right time to have the greatest impact.

To help instill transparency within the IS organization, we will use service-level agreements for important, internally focused customer services to ensure alignment with overall business strategic outcomes. The IT Service Delivery team will ensure that response times are documented, communicated and owned, and that regular reviews are conducted.

3.2 IT Equipment, Facilities & Software Systems

The System Remediation Plan developed during the transition plan will inform our overall strategy for equipment, facilities and software systems. We will develop a five-year roadmap to bring technology

to a reliable state, establishing operations and maintenance budgets and a process to compare budgets to actuals. Once funding has been appropriately allocated, we will establish hardware and software replacement cycles, patching and maintenance processes and implement/install critical infrastructure replacements (hardware and servers, but also physical buildings) to improve system stability.

3.3 OT Equipment, Facilities & Software Systems

Transportation network electrification, continued cost reductions for solar PV and battery energy storage, a focus on social responsibility regarding climate change and aging infrastructure are four key areas driving dramatic change for utilities around the world. OT technologies, and especially distribution technologies such as smart meters, remote sensing and strong communication networks, have the ability to meet challenges associated with this change.

The Consortium will focus on technologies for a strong OT grid today, while also preparing for tomorrow's challenges and opportunities, such as augmented reality, distributed ledgers and overall Internet of Things devices. Deploying systems and services to control centers, substations and distribution networks will improve system visibility and enable swifter response to issues. This will ultimately improve SAIDI and CAIDI scores.

3.4 Cyber & Physical Security

The new organization must be ready to handle any event that can affect the resiliency of the critical systems needed for the utility to operate under adverse conditions. The Consortium has this expertise and intends to deploy it as quickly as possible post-commencement.

We understand that the cost and complexity of implementing cybersecurity programs today can be challenging. Our experience will allow us to streamline the process to create a secure, more efficient environment while cutting down program build-time costs. We have designed, built and managed security programs for IT and OT business units that incorporate technologies such as SIEM logging collection and management, identity and access management programs (e.g., Okta), vulnerability assessment programs (e.g., Nessus) and network segmentation. Ultimately, implementing affordable systems with appropriate cost controls will prevent the spread of malicious activities and cyber-attacks, and ensure that electric rates are kept as low as possible while improving service reliability.

During the first years, we will partner with stakeholders, including the operations, customer service and other departments to develop a risk matrix and, subsequently, a risks management program and means to manage various adverse conditions that impact system reliability.

Proactive Security Tools

Our team will implement proactive security tools to manage zero-day risks — i.e., those for which we have no defense. The first line of defense is to be proactive, not reactive. Comprehensive security software like Carbon Black can detect changes or anomalies in standard computer use without the need for anti-virus signatures.

To improve responsiveness to attacks, the IS team will implement a threat intelligence program, building out a self-healing environment and unified threat environment (UTM). Self-healing networks respond to internal and external cyber-attacks autonomously, so the network maintains a connection to all services needed to keep the business running. Installing UTM will provide LUMA with powerful centralized management tools to enable a self-healing environment.

Cybersecurity Standards

We will also put in place a baseline security program with tools, technology, software and processes to move the Operator toward NERC CIP (to meet regulatory standards) and NIST CSF (to meet industry best practices for secure frameworks) compliance. Working toward NERC CIP and NIST CSF standards will improve LUMA's ability to anticipate, absorb, adapt to and rapidly recovery from disruptive events.

Today, utilities invest a great deal of time and energy in interpreting NERC CIP standards and defining the policies, processes, roles and responsibilities and technical controls needed to ensure compliance. In this context, some of the greatest challenges include categorizing assets, identifying compliance requirements, managing collections of evidence, identifying where gaps exist, documenting auditable results, ensuring robust management and reporting on those gaps and defining and executing remediation plans to address the gaps in a consistent and timely fashion. We will leverage the work ATCO has already done to develop regulatory security standards to build a customized regulatory posture for LUMA.

We will also establish physical security mechanisms for all computing locations and implement a physical computing room transformation plan to ensure that all computing rooms are clean, cool, secure and monitored.

Disaster Preparedness

The IT team will work with Operations to integrate the IS-specific disaster recovery (DR) business continuity plan (BCP) with the enterprise BCP and IRP.

We will implement a highly available and redundant cyber architecture (99.9%) on critical systems to ensure a resilient environment that can failover during a negative cyber event. Where it makes sense for the business, we will consolidate current tools and develop others for the cloud environment. We will also implement managed zones in the OT environment, so there is redundancy if one zone fails. Ensuring recoverability in the event of a system outage will be key to delivering resilient cyber systems. It will allow employees to work from anywhere and ensure that customers' needs continue to be met.

At the end of the first year of operations, we will execute disaster recovery testing and analyze lessons learned.

4.0 PREPARING FOR THE FUTURE

In addition to the continuous improvement strategy that underlies our implementation strategy, LUMA will undertake several targeted initiatives to create self-sufficiency and promote innovation.

We have recently seen great success with promoting innovation through technology innovation hubs, Shark Tank-style funded opportunities and initiatives that employees create themselves. We will also look to deploy new solutions and services using a minimal viable product approach. A set of agreed-to core features is released first, and the solution is consistently iterated using an agile methodology for the highest-priority features and improvements.

Tracking our implementation success rate will be key to establishing a self-sustaining improvement culture. We will document our results and the return on investment for each opportunity and initiative. Not only will this allow us to evaluate and adjust to meet the organization's changing needs, but it will allow us to communicate employee successes across the organization. Understanding the impact of each improvement will be vital for engaging employees in the process. It shows them that even the smallest, most incremental changes are worthwhile.

We will also track engagement and activity levels to show the depth and breadth of our improvement culture, allowing us to identify bottlenecks to the improvement process before they impede progress, and providing time to coach and adjust as needed. Wins will be celebrated through programs such as spot recognition and other people-friendly awards to help reinforce the positive changes in the organization.

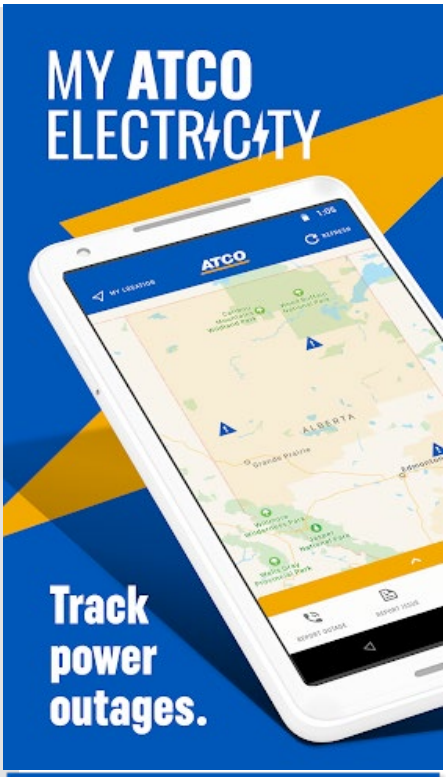
CASE STUDY: MOBILE APPS

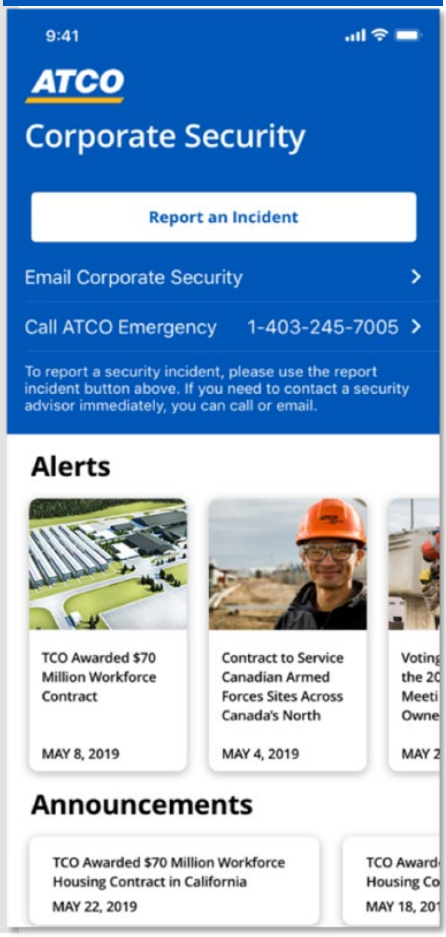
ATCO's in-house Innovation team takes ideas from among employees to create helpful apps for our customers and employees. The "My ATCO Electricity" app keeps customers informed by providing up-to-the-minute updates on service disruptions. Customers can view an interactive map of current non-scheduled, scheduled and planned power outages; report disruptions, streetlight issues and other problems; and receive email, text or app push notification updates on estimated restoration time, status and outage cause. Since implementing the app, ATCO has seen a one-third reduction in phone calls routed through our customer outage call centers, which allows call center agents to respond more quickly to customer needs.

For Micro Combined Heat & Power (mCHP) customers, the "mCHP" app provides a simple dashboard to monitor energy generation and other mCHP unit operating parameters.

"ATCO for Site" assists employees with navigation to remote locations to help them work safely on site. It includes a database of all facilities, so employees can quickly find where they need to go. While on site, employees can use the app to review site-specific safety information such as emergency contacts and the location of the nearest hospital. The app streamlines several processes. Staff can fill out forms such as near-miss reports, incident reports and journey management plans in the app rather than completing paperwork. Prior to app deployment, employees had to call the operations center when entering or leaving a facility. Now they can check in and out via the app, keeping the operations center from being inundated with calls at the start and end of every shift. The app also enables staff to review the details of their assigned work orders, report asset deficiencies and close out completed work orders without having to use a laptop in the field.

ATCO SAFE (Securing Assets, Facilities & Employees) aims to be a single solution for all who need to report a security incident. Reporting methods can vary across an organization, which makes it difficult for a corporate security team to triage and gather analytics. The app will ensure that all incident information is captured the first time, reducing the need for follow up, and will store all data in a centralized database.





H. SUPPLY PROCUREMENT

As a builder and connector of essentials in the regions and communities where we operate, the Consortium has tremendous expertise in connecting supply and demand in ways that are consistent with — and very often a step ahead of — global trends.

In constructing more than $52 billion in substations and powerlines since 2010, the Consortium has established strong and strategic ties with vendors around the world. We have established ourselves as the largest procurer of T&D equipment in North America. The volume of our equipment ordering affords us an advantage with material sourcing, as well as the ability to positively drive both price and delivery timelines. the Consortium boasts an efficient international supply chain (including major manufacturers producing in North America, India, Brazil, Turkey and China) with established quality control and bulk-order contracts for meters, conductors, apparatus and steel structures. These strategic relationships will be a key resource for LUMA to achieve low costs and efficient logistics for important materials needed in construction and maintenance operations. We will commit to finding the best vendor solution for the job, and the Consortium's breadth of operations ensures that we have relationships with all major vendors to benefit our stakeholders.

We are committed to providing exceptional customer service in supply chain performance. For this initiative, we will draw on our end-to-end supply chain experience supporting efficient T&D operations, even in the extreme weather conditions and with the numerous logistical challenges found in our often remote locations. We will leverage our experience and leadership to enhance the work that has been accomplished by the existing teams in Puerto Rico.

1.0 WHAT WE FOUND

Though PREPA's supply chain teams know the value they add overall, they want to be active contributors to streamlining a more efficient process, such as enhanced communications between T&D and Warehouse Operations and greater visibility of material issued to projects to ensure that appropriate inventory is available to support maintenance schedules. The lack of communication between teams coupled with low inventory levels have led to a challenging recovery from Hurricane Maria. Protracted RFP processes, long lead times for material and lack of demand planning have also affected PREPA's ability to meet project timelines.

Compounding these issues is the high burden of process in procurement activities due to PREPA's bankruptcy proceedings, and the extensive rigor needed for the FEMA procurement process. These added requirements, as well as the resource constraints facing a procurement team that relies on manual processes, have had an impact on employee morale.

2.0 WHAT WE PROPOSE

We believe that a best-in-class supply chain service organization is fundamental to delivering an exceptional customer experience. Ensuring that materials needed to execute projects arrive on time and as specified is central to a project team's ability to meet in-service dates and construct safe,

reliable electrical infrastructure. We will evolve PREPA's supply chain team, capitalizing on current strengths while developing best-in-class capabilities. Our strategic priorities will include:

- Instilling a commitment to customer service both internally and externally (this means fostering highly focused employees who really care to deliver service quality from end to end);
- Demonstrating integrity through all procurement activities for materials and services;
- Effectively delivering on inventory control, inventory management, warehousing and logistics and meeting reporting requirements;
- Building relationships with vendors who advocate service as a top priority; and
- Taking an outside-in view of people, process, policy and technology practices that is based on (internal and external) customer feedback.

PREPA has minimized procurement risks by using the delivery-duty-paid model of contract, and the Project Management Office is adding a separate team dedicated to major procurement projects to manage supply issues. We plan to build on the PMO's initiative and incorporate successful processes into the day-to-day procurement team and procurement processes for major capital investments. The expectation is that, with the streamlined processes LUMA will implement, the procurement team will have the tools needed to ensure alignment with T&D and deliver on the priorities.

LUMA's supply procurement strategy will enable us to meet several goals. A supply-chain operating model that meets the needs of T&D operations will ensure that reliability and resiliency programs can proceed without equipment and material delays while balancing cash flow needs. A reliable inventory strategy for steady state that includes demand planning will improve our ability to negotiate for bulk purchase discounts from suppliers (among other benefits), and a strategy that includes the unique needs for hurricane season will improve emergency preparedness.

By promoting employee engagement, we will improve customer service and customer centricity, and T&D Operations will be better equipped to meet externally driven in-service dates and provide reliable service to customers.

Through warehousing and materials management efforts, we will establish guidelines for the following activities, processes and transactions to deliver the required inventory control throughout the warehousing and logistics network:

- Purchase order receipts;
- Vendor return;
- Inter-organizational transfer receipts;
- Stock placement;
- Spares management (physical segregation);
- Warehouse organization;
- Cycle counts (daily);
- Inter-organizational transfers out;
- Project and operations issue;
- Project and operations receipt return and salvage;

- Asset recovery and disposal;
- Non-stock project receipt and staging/consolidation; and
- Non-stock project receipt and cross-docking/consolidation.

3.0 HOW WE WILL DELIVER

Our team's overall approach to meeting these supply chain service requirements is an end-to-end view of the Procure-to-Pay value stream, inclusive of procurement for materials and services, inventory control and inventory management, warehousing and logistics.

Our transformation strategy will create a reliable supply chain. We will focus on three primary areas — a customer-centric workplace culture with a focus on safety and integrity, a reliable supply chain and a sustainable inventory strategy — to stabilize the supply chain end-to-end process. This will allow us to deliver reliable support to T&D as we rebuild the Puerto Rican electrical network.

3.1 Customer-Centric Culture with a Focus on Safety

Customer Service Training

Exemplary customer service is important across an organization and includes implementing a customer-focus for both internal and external customers. This means fostering highly focused employees who really care to deliver service quality from end to end.

Every employee involved in the supply chain will therefore receive customer service training to set the foundation for a customer-centric culture and instill a sense of urgency to perform well. This training will establish expectations for the following:

- The timeline to complete work;
- Delivery schedules;
- Quality;
- Organizational goals;
- Customer concerns; and
- The impact of individual actions.

Develop Strong Safety Culture

We believe in a strong safety culture for the entire workforce. The supply chain team supporting warehousing, material handling and supply personnel will be accountable for following best practices for safety. We will ingrain this safety focus through the initiatives described below.

- Develop a safety training program that is woven into the day-to-day routine and embedded within the broader SHEQ IMS (see Section 1.M).
- Ensure that employees conduct safety tailboards (pre-job risk assessments), deliver "safety moments" at the start of team meetings to highlight safety issues, conduct team incident reviews and participate in a joint safety committee.
- Ensure that all employees have personal protective equipment, fire-retardant clothing and industrial hygiene tools (e.g., eyewash stations) appropriate for their positions.

- Promote warehouse safety practices, including warehouse cleanliness and organization, material storage practices and appropriate fire-suppression systems.
- Though LUMA will work to bring staffing levels up to appropriate levels at the warehouses, we will also develop a working alone procedure that will apply to those with resource constraints.

3.2 Reliable Supply Chain

Collaboration

We will significantly improve collaboration to efficiently enhance processes that support T&D work schedules. This will expedite the shift to meeting promised in-service dates and, ultimately, to customer-centric thinking and improved customer satisfaction.

Build Process Control in the Source-to-Pay Value Stream

Our team will develop a contract governance strategy and oversight that will result in reduced bureaucracy and improve trust in the source-to-pay process. A cross-functional team will review and baseline the existing source-to-pay process and identify any existing gaps to ensure compliance with regulations, adherence to internal controls, assessment of processing times and opportunities for improvement. The end result will focus on timely payment for verified materials and services procured. This will help ensure our corporate value of integrity throughout all procurement activities.

We anticipate that streamlining procurement through process control will improve employee engagement by demonstrating our trust in their work. Our team was impressed by the evident pride PREPA staff took in their work and their perseverance while operating under difficult conditions resulting from Hurricane Maria, bankruptcy, retirements and the P3 process.

We respect PREPA employees' expertise and resilience and will leverage their strong understanding of business requirements and the logistics of moving equipment and materials around Puerto Rico. We will work with them to streamline current processes for practical application to their positions, while introducing applicable learnings from the Consortium's experience with supplying electrical infrastructure projects in difficult-to-access locations.

Leverage the Consortium's Buying Power & Develop Vendor Initiatives that Provide the Required Scale & Scope

While complying with Puerto Rico's procurement practices and local laws, we will identify opportunities to leverage the Consortium's buying power for materials and/or services. The Consortium is unique in our access to a wide set of vendor relationships across North America and beyond, creating an extensive, far-reaching and diverse network of vendors throughout our global supply chain. We will review the current materials used and services required to determine what opportunities are available to leverage our buying power. We will also use vendor material consignment or vendor-managed inventory programs where possible.

Our vast network of vendors will be a critical component to ensuring a constant and uninterrupted supply of materials for our projects. We will engage vendors who advocate service as a top priority to

schedule and stage regular deliveries to ensure a constant flow of materials, understanding that there will be consolidation requirements on the U.S. mainland to ensure economical shipping and delivery.

Part of maintaining strong relationships will be paying vendors on time. The Supply Procurement team will collaborate closely with Finance to balance cash flow with demand and ensure that our vendor community remains a key priority to continue to deliver stability to the recovery and meet T&D Operations' requirements.

Contract Negotiation & Management

Procurement will develop strategies to negotiate and manage agreements for materials and services RFPs to maximize buying power for the benefit of the operation (cost and delivery schedules). We will achieve these objectives through cross-team communications aimed at building a collaborative procurement negotiation strategy. The procurement team will also leverage market, spend, supplier and contract analyses, along with the required reporting and benchmarking, to establish key stakeholders' preferred outcomes throughout the process, such as lower cost or material availability. The team will present their approach for each RFP in a documented business case for alignment and approval. This approach and stakeholder objectives will inform the selection criteria, as well as the negotiation approach.

Supply Chain/Logistics Emergency Preparedness Planning & Critical Spares Strategy

In anticipation of future severe weather events, we believe that seeking alternative methods to secure and stage materials near ports on the U.S. mainland, along with staged materials in Puerto Rico, will provide the best opportunities to keep material available for T&D restoration plans. To provide a scalable solution for recovery, LUMA will leverage our global logistics support, including import/export and freight forwarding, for a storm recovery protocol from mainland U.S. *and* Puerto Rico. In addition to higher elevation laydown yards in Puerto Rico, we can use mainland material staging to support the overall reliability rebuild plan. This will avoid congestion and use a zone-planning concept to allow many projects to run in parallel without paralyzing individual regions. Effective material staging will also help minimize damage/loss of material.

We have provided a letter of intent from ATCO's global import/export partner, C.H. Robinson, in Appendix 5. C.H. Robinson has committed to supporting our team with material staging, particularly in the event of a hurricane. In the event of the most extreme weather events that prevent critical materials from being delivered by ship, C.H. Robinson also has access to the Antonov AN-225 cargo plane, the world's largest cargo plane capable of carrying up to 1.41 million pounds maximum gross weight. There

Figure 13: Antonov AN-225 cargo plane

are only 55 in use globally. The images below depict two current coastal C.H. Robinson facilities. These are examples of the type of facilities that LUMA could contract with to provide greater support to Puerto Rican restoration activities.

Figure 14: C.H. Robinson laydown yard (left) & vessel offloading to laydown yard (right)

Together with T&D Operations, the Inventory Control team will establish the critical spare strategy. At a minimum, it will include a list of materials, minimum quantities required, storage locations, frequency of material count verifications and any requirements for preventive maintenance. This approach will ensure both the equipment and storage vessels needed to meet critical sparing requirements.

3.3 Sustainable Inventory Strategy

Planning

LUMA will develop a demand planning process for inventory replenishment in support of T&D maintenance operations. This process will consider in-service dates, supply lead times, sparing requirements, material storage and hurricane strategies. The goal of these joint work processes will be to minimize work delays, optimize inventory planning and warehousing storage, create reliable replenishment cycles, reduce service failures and optimize working capital.

Delivering on Warehousing & Logistics Requirements

As we embark on new offerings or new product technologies for our customers, it will be imperative that we align storage requirements, specifically indoor and potentially temperature-controlled facilities for electronics that adhere to product and equipment guidelines.

The destruction from Hurricane Maria is still evident in many warehouse facilities. As they are rebuilt, consideration may be given to requirements for the next product generations, especially in the space of solar panels. LUMA will prioritize a safe operating environment in the warehouses.

We will also assess opportunities for technological improvement at the warehouses, such as implementing bar coding and a bin locator process. Minimizing time-consuming manual processes will free up staff members to undertake improvement initiatives and meet the high burden of process for procurement efforts that will be required.

Meeting Reporting Requirements

We intend to use Asset Suite, creating reports from a data extract, to meet the reporting requirements for inventory control that have been identified in the RFP. Our transformation strategy will include optimizing PREPA's use of Asset Suite and updating the software as applicable to enable automated reporting.

4.0 PREPARING FOR THE FUTURE

LUMA will rely on the Consortium's Lean methodology expertise throughout our warehousing facilities and within our processes to ultimately drive efficiencies and safe warehouse practices. Our history of using Six Sigma methodology will reinforce our ability to deliver process accuracy each time. These techniques will provide us with the baseline that will feed into our key metrics to support operational efficiency through best-in-class inventory control and order fill rates.

Figure 15: Our vendor network will allow for uninterrupted supply of critical parts

After initial FEMA funding is used to repair warehousing facilities, the vast Consortium vendor network allows for uninterrupted supply of critical parts to ensure proper maintenance of repaired facilities so that they remain Category 5 resistant for their useful life.

I. FINANCIAL MANAGEMENT & ACCOUNTING

Our Consortium has a decades-long history of successful financial management and providing business operations support in the regulated utility and commercial/contracting services industries. We have a professional services culture based on a strong tone from the top for ethical behavior and a robust internal control framework that commits our organizations to timely and effective reporting, regulatory compliance, operations and stakeholder support, performance management and ongoing strategic planning.

Our proven track record of effective change management includes operational integration and financial transformation of more than 200 acquisitions ranging from $10 million to $3 billion, many of which were undertaken with the same experienced resources who will be deployed to assist with the transformation of the T&D system in Puerto Rico. The acquisitions have allowed the Consortium to build extensive expertise in assessing the state of a company and improve our financial status and operating performance. We operate to meet the multiple reporting requirements of publicly traded companies and will bring that process discipline and accuracy to LUMA. We will use our knowledge to improve the existing financial management systems and build a strong finance and administration team.

Our acquisitions also required multiple systems integrations that span JD Edwards, Oracle Hyperion Essbase/Planning/Strategy Finance, Oracle Cloud, Ecosys and others. We use proven tools and methods that are considered best in class and effective at gathering, organizing, processing, reporting and managing data from disparate sources to provide useful information for multiple users. These tools and methods have been critical for maintaining growth and producing measurable results.

We will draw on our Consortium's experience developing information flow and reporting solutions for business users to realize quick wins as we implement field-tested practices at LUMA that are highly customizable. This will result in more analytical and strategic communication with stakeholders to leverage a growing wealth of financial data and provide predictive insights for Operator managers and stakeholders.

Our attention to clear and effective risk management and leadership in designing, building and operating critical electrical infrastructure around the world in a financially prudent manner have resulted in direct benefits for our customers. One example is the Consortium's recent Fort McMurray West 500 kV Transmission Project, the largest public-private partnership bond in Canadian history, which was named the Best Financial Structure in the 2018 P3 Awards.

The Consortium's holistic experience under multiple regulatory structures will allow us to quickly position Operator's financial team for success in the new contractual structure set by the Operations & Maintenance Agreement.

LUMA will leverage PREPA's and the Consortium's expertise to perform a comprehensive finance process review and risk assessment and establish ongoing communication with stakeholders that will be maintained throughout the overall process. We will provide timely, accurate analytical services and

reporting that will enable LUMA to meet core business objectives and fulfill the goals set by the Administrator and PREB.

1.0 WHAT WE FOUND

Our observations of PREPA's Finance team indicate a strong alignment with our approach to O&M Services. They provide consistent stakeholder reporting and remain committed to quality and care in day-to-day transaction operations, even while affected by a reduced headcount, strained resources, sub-optimal data, aging technology, competing stakeholder priorities and an uncertain outlook.

Despite the finance team's achievements, there is a clear need for effective change management. Our finance and administration team will work closely with the PREPA team and respectfully drive the transformation to ensure that Operator can effectively deliver on its finance and administrative requirements.

2.0 WHAT WE PROPOSE

The reporting requirements laid out in the O&M Agreement are reasonable and part of the Consortium's standard operating practices.

We will create a control environment that establishes the overall tone and is the foundation for all other components of internal control. We will assess the organizational structure, existing employees, enforcement of ethical standards, roles and responsibilities and fraud prevention and detection efforts.

We will establish and implement an effective resource management plan for the finance and administrative support team that will achieve:

- A commitment to integrity, ethics and compliance;
- Quality and reliability of information;
- Structured regulatory reporting;
- An effectively designed internal control framework and structured business processes;
- Competent resources;
- An independent internal audit monitoring function;
- Technology to leverage for efficiency, insight and greater management capability; and
- Robust risk management and change management protocols.

With this type of resource management plan, we will be able to improve the Finance team's capabilities to support the T&D system transformation and meet requirements for timely, accurate and insightful reporting on the weekly, monthly, quarterly, annual and ad-hoc bases requested by the Administrator.

We will identify data, process and resource gaps as listed below.

First, we will identify gaps in data capture. For example, field data collection — such as work order, cost code, cost type and units produced — could help manage employee productivity and create

efficiencies in other finance/reporting processes downstream (e.g., job costing, allocations, capitalization).

Second, we will identify gaps in data integration and common sourcing for process. These are areas where we can more efficiently leverage information and avoid redundant reproduction, which will be key to financial modeling, budgeting, forecasting, analysis and ad-hoc reporting.

Third, we will identify segregation of duties, including delineating reviews/approvers to ensure quality control.

Last, we will identify gaps in process integration due to employee turnover and recent disruptions. These are the ad-hoc solutions employees have created for daily problems, but which the organization has not had the opportunity to comprehensively review for efficiency and redundancy.

Our team will then use a risk-based approach with input from stakeholders to develop solutions for immediate and long-term, regulatory and operational business requirements.

The Consortium will deliver a budgeting and reporting structure that enables effective management and continuous improvement of the organization's business activities. This will provide stakeholders with the necessary comfort and confidence in the Finance team's performance.

The budgeting and reporting structure will comprise a performance-based evaluation framework that establishes concrete targets and priorities based on the year's strategy goals. By establishing a firm evaluation framework for all stakeholders, LUMA will be able to make faster decisions and minimize budget negotiation issues arising from competing interests and priorities.

3.0 HOW WE WILL DELIVER

Our strategy is organized around reviewing, leveraging and addressing the results of the Finance and Accounting health check, which will be performed during the Front-End Transition Period. The strategy will include the improvement initiatives listed below.

Reporting Compliance

The Consortium will review and improve the financial closing process by defining clear roles and responsibilities, ensuring key balances and transactions are analyzed periodically throughout the year and minimizing the number of post-closing journal entries recorded. This will feed into our broader strategy of establishing and promoting timely, routine reporting and analysis to PREPA, the Administrator and other stakeholders.

We will also review and, if necessary, change and implement key policies and procedures, as well as training programs to ensure understanding and compliance.

Internal Control Environment

To address the risk of material misstatement due to error or fraud, and minimize these risks over the financial reporting process, we will complete a detailed risk assessment of the current control

framework. We will then develop a robust and formalized framework based on this analysis, which is similar to the U.S. Committee on Sponsoring Organizations (COSO) model that the Consortium currently uses. It encompasses:

- A control environment founded on integrity and ethics, competence, oversight, policies and procedures;
- A structured risk-assessment program that includes enterprise-wide strategy and objectives, process-level objectives and change management. It will formally and on a routine basis identify key risks to organizational objectives and map the risk mitigation programs to key business processes;
- A detailed business process control listing for key policies and procedures, application and information security, change management and segregation of duties;
- Information and communication best practices regarding the quality of information and communication to business users and stakeholders; and
- Monitoring of the control environment through ongoing improvement and effectiveness evaluations.

We will also look for opportunities within the existing Enterprise Resource Planning (ERP) system to introduce analytics technology to the budget process, which could improve Operator's budgeting, forecasting and performance management capabilities.

Integrated & Effective Budget/Forecast and Business Planning Capability

The Consortium has identified an opportunity to link the annual planning process to rolling forecasts and management reporting, ensuring active business and employee engagement in the budget process.

Our best-in-class methods of developing top/down and bottom/up budgets and forecasts for multi-divisional/multi-entity operations will allow us to evaluate and redesign existing processes and procedures. By structuring the data to align with strategic goals, we will improve resource allocation, asset use and forecast accuracy, in addition to maximizing opportunities to achieve financial targets.

Integrated & Effective Performance Management Across Matrix Organization

Developing process improvement initiatives that create a more integrated information environment will allow for faster delivery of information to decision makers for both day-to-day functional management and long-term strategic planning. Current financial information suites at both ATCO and Quanta are Oracle-based and complementary to PREPA's current systems. Properly updated and implemented, these systems are best in class and effective at organizing and managing data from disparate sources for multiple end users.

Each of these initiatives for improvement is intended to empower employees, with the ultimate goal of creating a work environment where they are encouraged to take an innovative approach to meeting stakeholders' needs while championing adherence to regulatory and accounting principles.

4.0 PREPARING FOR THE FUTURE

The Consortium understands that change management is critical to Operator's continuous improvement. Our goals include maintaining an effective system of internal control, compliance with regulatory accounting/reporting requirements and providing useful information and insightful analysis to management and stakeholders.

To do this, we believe that robust and formalized control framework will be critical to maintaining performance after a successful transformation. The control framework will be modeled on the COSO framework, which views change management as an integral component of a broader framework of effective internal control. The approach should focus on the following areas.

Control Environment

The control environment establishes the overall tone for LUMA and is the foundation for all other components of internal control. LUMA will continue to assess the organizational structure, the need for competent employees, the need to demonstrate a requirement for high ethical standards, clearly defined roles and responsibilities and fraud prevention and detection efforts.

Risk Assessment

LUMA will continuously assess and review key business processes to determine and consider the implications of relevant risks that could hinder the achievement of objectives, with consideration given to financial risks inherent to key business processes and reporting, as well as fraud risks.

Control Activities

Control policies and procedures will help to ensure that management's directives are implemented. LUMA will consider preventive controls, detective controls, manual controls, computer controls and management oversight controls.

Information & Communication

Proper communication includes identifying, capturing and exchanging information in a form and timeframe that enables personnel to carry out their responsibilities. This will allow financial reports to be generated accurately and through systems that support this process. LUMA will consider both internal and external data and review accounting systems, policies, reports, meetings and training sessions, and assess whether information was appropriate, timely, accurate and accessible.

Monitoring

LUMA will use a robust monitoring process to assess the quality of internal control performance over time. It will include activities such as internal audit, management reviews, audit committee activities, disclosure committee activities and self-assessments.

J. EMERGENCY RESPONSE

PREPA is still in the midst of confronting the widespread impacts following Hurricanes Irma and Maria. It is imperative that the organization effectively respond to, recover from and ultimately restore critical electrical utility services when extreme weather events occur. During these events, electric utilities rely on their readiness and capacity to respond safely and effectively to widespread power outages and severely damaged electric system infrastructure.

Drawing from our Consortium's combined expertise, LUMA will establish a robust Emergency Management and Business Continuity Program to support operational readiness and provide the capacity to respond effectively and efficiently during future disasters.

1.0 OUR EXPERIENCE

1.1 Quanta

As the largest utility contractor in North America, Quanta is an industry partner to all utilities, municipalities and cooperatives in the continental U.S. The partnership extends to emergency restoration, for which Quanta can deploy thousands of line workers in a 24-hour period. In the last few years, after multiple major hurricanes made landfall within a short period of time, Quanta had up to 6,000 lineworkers, at one time, performing storm restoration work for partner utilities. This level of response also applies to myriad natural disasters Quanta's customers have experienced, including the recent devastating wildfires in California. Quanta is able to quickly ramp up and respond anywhere in the U.S.

For several decades, Quanta has provided restoration support as a member of EEI's National Response Event, the American Public Power Association (APPA) Mutual Aid Network and various regional mutual assistance groups. These include the Southeastern Electrical Exchange, North Atlantic Mutual Assistance Group, Midwest Mutual Assistance Group, Great Lakes Mutual Assistance Group, Texas Mutual Assistance Group and the Western Energy Institute. Were a future event to affect Puerto Rico's electrical grid, Quanta commits the full support of all available resources, and will collaborate with these groups to release as many resources to support restoration efforts. Quanta's unsurpassed aviation program can also be leveraged to access hard-to-reach locations for quick response.

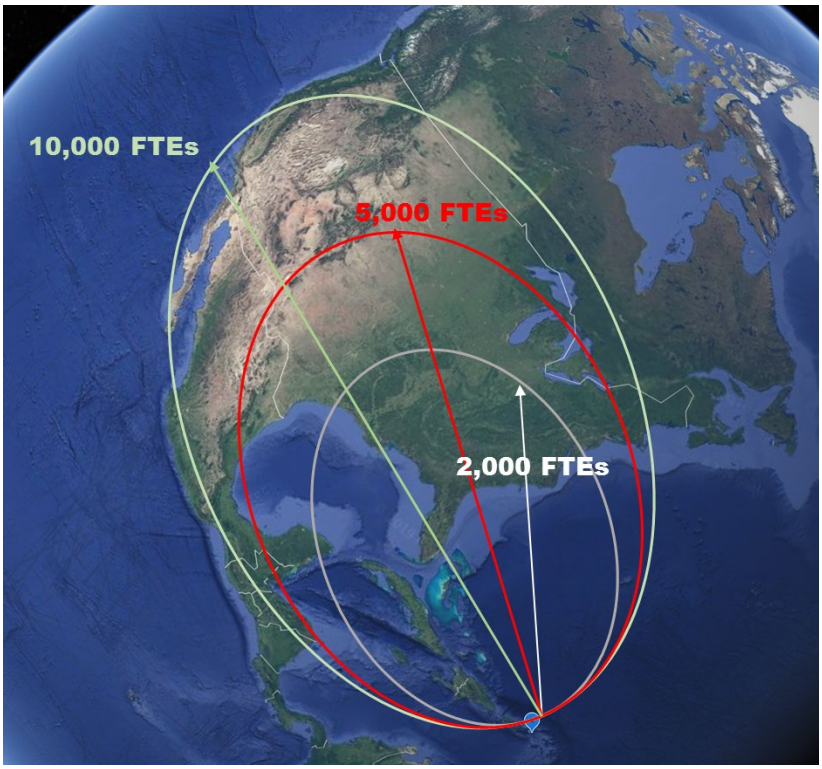


Figure 16: North American resource availability to support Puerto Rican emergency events

1.2 ATCO

Public safety and emergency preparedness are vital to ATCO's operations. With millions of people relying on our natural gas and electric utilities, ATCO's emergency response and incident management must be effective and efficient. Minutes matter. That's why we take a proactive approach to potential incidents, tracking risks such as extreme weather and readying our response. We work quickly to restore services and support first responders. After incidents, we debrief to learn how we can improve.

To further support our residential and commercial customers, ATCO launched an online outage notification system in 2017. The system provides information on all planned and unplanned outages, and updates to status and estimated restoration time every 15 minutes, based on real-time information provided by our people.

We demonstrated our emergency response capabilities following a significant wildfire in 2016 that affected northeastern Alberta. The fire burned 1.5 million acres in and around Fort McMurray, a major oil and gas region. Our team's understanding of emergency response plans and rigorous preparation allowed 3,000 employees to quickly respond to restore damaged electrical infrastructure after 80,000 residences were evacuated. The total loss and damages to the T&D system amounted to more than $21 million. In less than four weeks, our crews replaced more than 790 powerline structures and restored all mainline and critical feeder. This event was the largest of its kind for insurable claims in Canadian history.

Another example was in 2017, when a significant winter storm hit central Alberta. The storm damaged significant infrastructure across 10,000 square miles of land. Our teams worked around the clock in frozen conditions to repair all the homes and businesses within three days, without any safety incidents.

For decades, ATCO has had emergency coordination and incident management plans that are overseen by crisis management teams within our business units and escalated to our enterprise-wide Crisis Management Committee when required. Following the 2016 Fort McMurray wildfire, we reviewed our response and updated the Crisis and Incident Management System. It now provides a framework for an integrated “One ATCO” response that leverages our full organizational capabilities, coordinating efforts and resources across our electricity, natural gas and structures/logistics business units for deployment anywhere in the world.

ATCO Frontec — a business line dedicated to disaster and emergency management services — has been a valued partner in countless responses, from the 2005 earthquake in Pakistan to Hurricanes Maria and Irma in Puerto Rico, and we support the Canadian Armed Forces, NATO and various non-government organizations in areas of humanitarian need. As extreme weather events become more frequent, our consulting and training services are a growing dimension of Frontec’s operations, as we share our expertise from preparedness planning to disaster recovery efforts.

1.3 IEM

IEM is a North Carolina–headquartered comprehensive emergency management and disaster recovery firm. As the largest woman-owned firm specializing in these areas in the U.S., IEM has over 30 years of experience supporting states and localities in enhancing their level of preparedness, responding effectively, mitigating their risks and implementing disaster recovery programs funded by federal, state and local funding sources. IEM’s core mission of helping government and critical infrastructure sector agencies prepare for, respond to and recover from natural, technological and human-caused disasters is vital. IEM understands the elements needed to make public sector entities and the communities they serve whole again — speed, accuracy and compliance. IEM will focus on these elements as we work closely with all stakeholders should a disaster occur.

Speed

Following any major disaster, survivors want desperately to get back to their lives and some sense of normalcy. Government and major public institutions must be prepared to deal with immediate needs, resuming operations as quickly as possible to minimize impact and drive quick recovery. The estimated damage to the U.S. from Hurricane Maria was $91.61 billion, most of which occurred in Puerto Rico. By February 2018, an estimated 28 percent of customers remained without power, and power was not officially restored to all customers until August 2018, 11 months after Maria’s landfall. With IEM’s expertise of managing emergency funding, supplemented with the other Consortium members’ workforce and equipment, IEM will mobilize quickly, targeting disaster zones and efficiently restoring power by executing emergency response plans. This organized effort will allow for quick re-energization of significantly large customer outages.

Accuracy

Quality management and a focus on thoroughly gathering and storing the right data ensure a solid basis for data-driven decisions. Improving processes and providing more accurate data to clients, the state/Commonwealth and FEMA reduces costs for rework, and more grant money is used for recovery.

Compliance

Federal mitigation and recovery funds come with stringent regulations and rules. Compliance is necessary to ensure that, at the end, no funds are clawed back. IEM ensures that our staff are properly trained on federal grant program requirements and guidance associated with the services we provide. IEM knows what types of projects are eligible under FEMA, U.S. Department of Housing and Urban Development (HUD) and other grant programs. IEM team also comprise experts at helping our clients leverage all federal funds to not just build back, but build back better and more resilient than before. As a result of IEM's expansive experience in managing grant funding, supporting FEMA in technical assistance programs and working with state and local emergency management agencies in planning support, we not only know how to ensure compliance for disaster relief in Public Assistance and Hazard Mitigation FEMA funding, but we also understand the FEMA process for acquiring planning funding, such as Community Development Block Grants (CDBGs) and the State Homeland Security Grant Program (SHGP).

IEM's core business is emergency management and homeland security. For many of our competitors, these are simply two of the many business areas where they operate. The IEM team offers significant experience with projects spanning the full range of natural and technological hazards. IEM staff are supporting the City of Fayetteville, North Carolina, and the Fayetteville Public Works Commission with post-Hurricane Matthew recovery efforts. In addition, IEM developed operations plans and Emergency Operations Center (EOC) training for the Raleigh-Durham International Airport and is currently supporting the CDBG-DR Rebuild NC program that administers assistance to homeowners throughout the state.

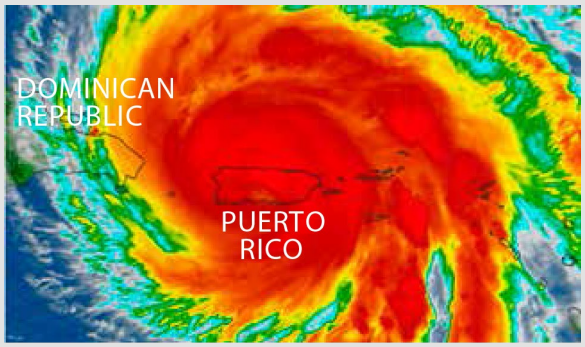
IEM brings local planning best practices from dozens of communities across the country. IEM has provided support to FEMA's planning technical assistance (TA) program for over 10 years. As part of this contract, IEM developed more than 600 information resources, models, templates, samples and delivery tools for local governments to implement 60 different planning areas. IEM planners and subject-matter experts (SMEs) used these tools to conduct more than 290 onsite planning workshops spanning 46 states, the District of Columbia, four U.S. territories and several Indigenous tribal nations. As part of IEM's development of the Recovery Planning TA program, planners created 27 products and conducted workshops for eight local and state jurisdictions. A sampling of the 60 different planning areas is as follows.

- Emergency Planning for Higher Education
- Emergency Operations Planning
- Capability Assessment & Gap Analysis
- Planning for Persons with Disabilities, Access & Functional Needs
- Continuity of Operations Planning
- Mass Casualty/Mass Fatality Planning

- Critical Infrastructure Mitigation
- Local Hazard Mitigation Planning
- Regional Disaster Housing Planning
- Debris Management Planning
- Mass Care/Mass Feeding Planning
- Social Media in Emergency Management
- Pandemic Influenza Planning
- Logistics & Resource Management Planning

CASE STUDY: HURRICANE & DISASTER RELIEF

In 2017, days after record downpours from Hurricane Harvey overwhelmed the Houston area, Hurricane Irma roared through the Caribbean, devastating the U.S. Virgin Islands and Florida Keys. Shortly thereafter, Hurricane Maria slammed into Puerto Rico, destroying the entire electrical grid and other critical infrastructure, homes and businesses.



This flurry of hurricane activity was unprecedented: never in recorded history have so many catastrophic hurricanes made landfall in the U.S. or the Caribbean in such rapid succession. In their aftermath, each member of the Consortium deployed rapidly to assist with recovery.

ATCO has years of experience helping communities around the globe recover from catastrophic events. In addition to deploying proven emergency response solutions to quickly restore infrastructure, the company provides essential support services to first responders, emergency crews and displaced residents. In the aftermath of Hurricane Maria, ATCO provided accommodation tents, washrooms and laundry facilities and produced 30,000 lbs. of ice per day.

Quanta prizes opportunities to touch people's lives in a positive way. With over 50 operating companies and 30,000 employees worldwide, the company has access to many resources. In the aftermath of the devastation, Quanta sprang into action to help restore normalcy to storm-ravaged communities as quickly as possible. For Harvey, resources were brought in from the Southeast and Midwest. During Irma, personnel were sourced from as far away as California and Canada, delivering over 4,000 lineworkers between the two storms. They worked 16-hour days in adverse conditions, battling heat and humidity and often sleeping in campsites, their trucks or nearby corporate facilities.

When weather-related disasters occur, the expertise companies like ATCO and Quanta provide is invaluable to the affected communities.

2.0 APPROACH & PLANNING

Puerto Rico has endured significant challenges when responding to and recovering from natural and human-caused disasters. These challenges require that LUMA have a comprehensive Emergency Management and Business Continuity Program to support readiness and ensure capacity to respond to future disasters.

2.1 Response

Category I: Severe Incidents

In the event of a severe incident, our Consortium will provide the preparation planning and urgent response needed to ensure sufficient labor, materials and equipment. This may include supplementing LUMA's on-island emergency restoration workforce with Consortium staff to address broader, more large-scale damage to the Owner's infrastructure. Restoration work plans will address overhead and underground electrical T&D repair and recovery, including traditional round wood, light-duty steel, concrete poles, lattice towers and substation/switchyard repair or reconstruction.

Work plans will also address the timely mobilization of labor, materials and equipment through prearranged mutual-aid agreements as weather forecasts dictate or immediately following storms. All plans and agreements will be developed to supplement LUMA's own workforce.

Category II: Localized Incidents

In the event of a more localized incident, LUMA will deploy trained island crews designated as emergency restoration workforce to address the targeted, smaller-scale damage to the Owner's infrastructure, and the Consortium will be ready to provide additional labor, materials and equipment as required.

Outage Prediction Modeling

A key component of our emergency response will be developing a Major Event Damage Prediction Model. Using machine learning, this model will capture historical weather data and up-to-date details on factors such as vegetation, seasonality, air pressure and soil moisture to estimate infrastructure damage based on the category of storm. LUMA will use this prediction model to estimate the resources, material and equipment needed and gear up to quickly restore service.

2.2 Support for Community Lifelines

It is difficult to accurately predict the location, frequency and scale of an emergency or disaster. It is possible, however, to plan and manage a logistics network and establish procedures that reduce the impact of an actual incident. An effective asset management and logistics plan integrates the demographic, geographic and socioeconomic information of a population, as well as the characteristics of the transportation infrastructure.

FEMA recently updated the National Response Framework with a re-emphasis on community lifelines. Incorporating community lifelines — safety and security; food, water and shelter; health and medical; utilities; communications; and transportation — into the logistics plan will help pre-identify the

needed and available capabilities and resources that will be required post-disaster. The urgent need to sustain operations supports community recovery. Hurricane Maria illustrated the impact on operations when basic necessities are denied due to disaster impact.

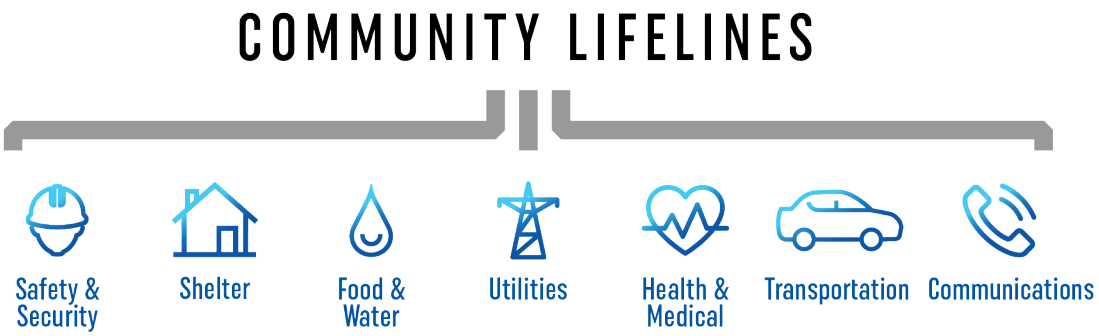


Figure 17: Community lifelines

In order for our crews to effectively complete our mission of power restoration, we will provide basic support to employee family members who are mobilized for power restoration. Knowing that their family members are safe and cared for frees mobilized crews to focus on the essential mission of power restoration.

2.3 Emergency Response Structure & Methodology

Our approach is to implement an Operator Emergency Management Team (OEMT). This team will bring the skillsets and necessary experience to build a sustainable Office of Emergency Management (OEM) (steady state). The office will provide a comprehensive set of emergency and continuity plans, as well as emergency management training and exercises tailored to the response effort required for Puerto Rico. The OEMT will be the only permanently constituted part of the emergency response structure and may assist with the formation of EOCs during events. For more information on the OEMT and OEM's structure and integration into the organization, please refer to Appendix 2.

Our OEMT will apply industry-proven methods from FEMA's Comprehensive Preparedness Guide (CPG 101), Homeland Security Exercise and Evaluation Program (HSEEP) and the Analysis, Design, Development, Implementation and Evaluation (ADDIE) training development process. We will first assess PREPA's existing response plans, training and exercise programs, mutual-assistance agreements and standard operating practices to develop and implement the following:

- Emergency Management and Business Continuity Program;
- Emergency and business continuity plans; and
- Training and exercises programs.

In addition, the OEMT will review the recently developed the Puerto Rico Joint Operational Catastrophic Incident Plan to ensure that the Owner's plans and priorities align with the Puerto Rico Emergency Management Bureau (PREMB), FEMA, state/Commonwealth agencies, local governments and critical private sector representatives.

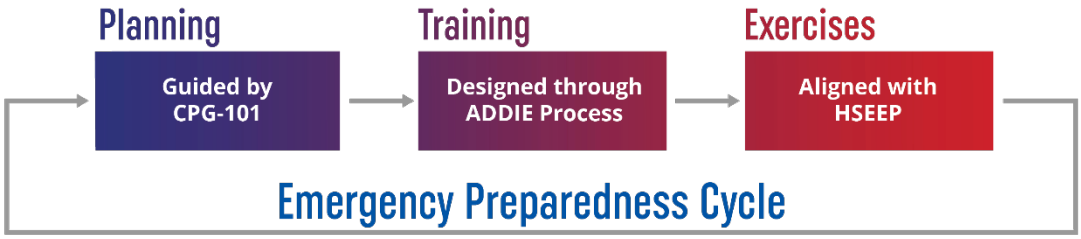


Figure 18: The Emergency Preparedness Cycle of planning, training and exercise and the OEMT's approach for each phase. Applying federal guidance (e.g., CPG 101 and HSEEP) and industry-proven methodologies like the ADDIE training development process provides superior products for our customers.

LUMA will create well-documented restoration management plans and schedules that are both aggressive and aligned with the APPA and their Public Power Mutual Aid Playbook for public power utilities and network coordinators. Our plans and aggressive restoration schedules will address the two categories of restoration services.

3.0 DISASTER PREPAREDNESS & EMERGENCY RESPONSE

The Consortium has broad experience with jurisdictions of all sizes and capacities. We understand the importance of plans, teams, training and exercises that build readiness and capacity within an organization, and we will apply lessons learned from past disasters and emergency management exercises.

We take a bottom-up approach to planning and will maximize input from stakeholders such as the Puerto Rico Energy Commission (PREC), Puerto Rico Emergency Management Bureau (PREMB), local municipal emergency and disaster management representatives and emergency first responders. Owners and operators of critical infrastructure in Puerto Rico will also be invited to participate in the planning process to ensure that LUMA's emergency response priorities for critical infrastructure are understood and documented. Our planning philosophy will ensure alignment with FEMA's National Incident Management System (NIMS), Incident Command System (ICS) principles and framework, FEMA's Comprehensive Preparedness Guide (CPG 101) and other applicable federal, commonwealth and local doctrine, guidance, laws, standards, regulations, ordinances and executive orders.

We recognize the need for alignment to industry best practices and International Organization for Standardization (ISO) and Disaster Recovery Institute International (DRII) professional practices. We have adopted the following definitions from ISO and the DRII.

- **Emergency management (ISO 22320)** is an overall approach to prevent emergencies and manage those that occur. In general, emergency management uses a risk-management approach to prevention, preparedness, response and recovery before, during and after potentially disabling and/or disruptive events. The OEMT's emergency management scope includes emergency operations plans (EOPs), EOC activations and senior policy group and multi-agency coordination and crisis communications.
- **Business continuity management (ISO 22301)** is a holistic management process that identifies potential threats to an organization and how they would affect business operations

were they to be realized. This provides a framework for building organizational resilience with capacity for effective response that safeguards the interests of key stakeholders, reputations and brand– and value-creating activites.

- **Disaster recovery (DRII)** is the technical aspect of business continuity and encompasses the resources and activities needed to re-establish IT services at an alternate site in the event of an IT service disruption. The OEMT's disaster recovery scope includes critical business function recovery planning and IT disaster recovery planning for systems that support critical business functions.

The OEMT will follow the six-step planning process as outlined in FEMA's Comprehensive Preparedness Guide (CPG 101) but tailored to align with Puerto Rico's stakeholders, priorities and requirements. The Consortium's expertise will be of considerable benefit to this process: IEM was instrumental in the development of CPG 101.

This six-step approach will develop effective plans that align with the Owner's requirements and allow electrical utility infrastructure to be restored efficiently when disasters occur. The CPG 101 planning steps are highlighted below and expanded on in Appendix 2.

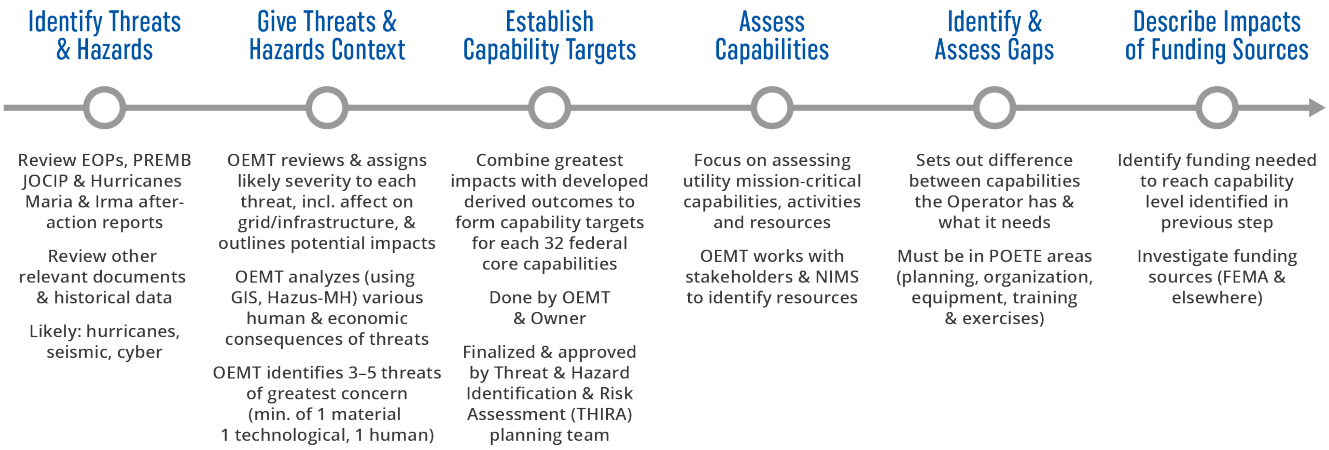


Figure 19: The Six-Step Planning Process. The latest edition of CPG 101 recommends this planning process. The Consortium is particularly familiar with this process as IEM supported the drafting and updating of CPG 101, and developed and Business Continuity Planning and delivered training for those updates

The Consortium has expertise and experience in providing planning for organizations and agencies of all sizes. The key to effective continuity planning is identifying multiple recovery strategies to make infrastructure resilient to disruption events — in other words, providing a Plan B in case Plan A fails. The OEMT will coordinate with LUMA to confirm that the strategies outlined in the final plan are implementable and consistent with LUMA's policies and procedures.

The OEMT's systematic method for developing business continuity plans (BCP) includes analyzing existing processes and procedures through discussions with department personnel, reviewing existing plan documents and organizing findings into an effective recovery strategy and BCP.

Most critical to successful plan development will be documenting how each department currently performs mission-essential functions (MEFs) and capturing or developing mitigation strategies for potential disruptions to each MEF. As part of an Operator BCP project, the OEMT will develop individual BCPs for each department and aggregate that data into an Operator-wide BCP. Each BCP will include the following components.

Table 2: Components of each BCP

COMPONENT	DETAILS INCLUDED
Readiness & Preparedness	▪ Outlines how departments will respond to a disruption event and how they will ensure the continuation of MEFs
Decision Process	▪ Provides guidance on who is responsible for activating the BCP and how and when it will be executed
Surge Staffing	▪ Identifies how employees might be cross trained to backfill and provide continuity assistance during a disruption event
Employee Safety	▪ Outlines how the Operator tracks and accounts for its employees. Will include methods to assist employees with preparing their families for disruption events
Business Continuity Roles & Responsibilities	▪ Outlines senior leadership responsible for continuity planning (including responsible program manager, continuity planners, training manager and communications manager) and the respective roles for each position.
Mission-Essential Records, Databases, Vendors & Dependencies	▪ Defines which vital records and databases must be available to support MEFs during a disruption event based on recovery-time objectives (RTOs) and vendor and dependency information
Supplies, Equipment & Data	▪ Defines which supplies, equipment and data must be available to support MEFs during a disruption event based on RTOs
Delegation of Authority	▪ Outlines the breadth and depth of authorities granted to successors during a continuity event
Human Resources	▪ Outlines how the Operator will communicate with employees and how pay and benefits will be administered during a continuity event
Continuity Communications	▪ Identifies alternate methods of communication if primary modes become unavailable
Reconstitution	▪ Outlines how agencies will resume normal operations in a pre-planned, organized manner if they have to relocate to another facility
Plan Maintenance	▪ Outlines who is responsible for plan updates, how often the plan will be updated and the organizational conditions requiring interim updates
Activation & Relocation	▪ Defines how the Operator will obtain operational capability at a continuity facility as soon as possible or by its first RTO
Notification	▪ Defines how the Operator notifies employees and stakeholders of the BCP activation and operational status
Memoranda of Understanding/ Agreement (MOU/MOA)	▪ Identifies current MOU/MOA for vendors, services and facilities and contains suggestions for future such agreements
MEFs	▪ Defines the essential functions that must be maintained during a disruption event
Information Systems	▪ Defines which information systems must be available to support MEFs
Orders of Succession	▪ Outlines the teams responsible for execution during a business continuity event and names successors for each position

COMPONENT	DETAILS INCLUDED
Business Continuity Teams & Assignments	▪ Outlines tasks that must be conducted by business continuity personnel
Continuity Facilities	▪ Identifies where all currently activated emergency response teams will relocate if the primary location becomes untenable
Devolution	▪ Outlines to whom MEFs will be devolved if the emergency response teams lose the functionality of their facilities
Training, Testing & Exercising	▪ Outlines the scope of the emergency response teams' training, testing and exercising program and identifies a schedule for each event
Dependencies/Supply-Chain Partners	▪ Defines the supply-chain partners and dependencies based on MEFs

4.0 TRAINING PROGRAM

To establish the Emergency Management Training Program, we will follow the ADDIE Process (Figure 19) in designing and implementing emergency management training courses for employees. No written plans, policies or procedures — regardless of how well-crafted and designed — can be implemented effectively without a successful training program to prepare participants for application. Our training approach combines emergency managers and subject-matter experts who have real-world experience to develop, deliver and evaluate training that is relevant to participants. Once this program is established, the OEM will manage it to ensure that ongoing emergency management training requirements are supported.

For all educational material produced, we will:

- **Analyze** program goals, objectives and implementation requirements;
- **Design** by outlining the instructional objectives at the outset;
- **Develop** instructional materials to meet those objectives;
- **Implement** the training materials; and
- **Evaluate** the materials through testing and monitoring to make sure the objectives have been met.

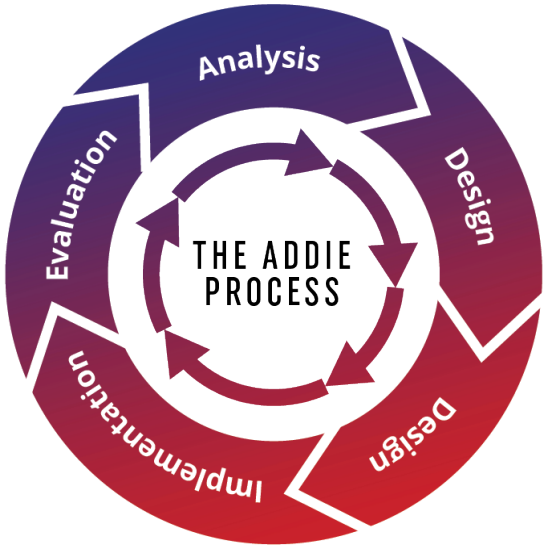


Figure 20: The ADDIE Process for Training Development. One of ADDIE's main benefits is that it lends itself to integration with the entire planning process

The Consortium has used the ADDIE process to develop customized training and is well-known for providing critical training services to government organizations and personnel at the local, state and federal levels. We recognize that everyone learns differently, and we therefore apply various learning methods, including video and interactive web-based training programs and scenario-based discussion, depending on the goals and objectives of the training. We are committed to a customized approach that will lead to success.

5.0 EXERCISE PROGRAM

To establish the Emergency Management Exercise Program, we will implement the Homeland Security Exercise and Evaluation Program (HSEEP) Exercise Program Management Cycle. Our approach to establishing exercise programs uses well-designed scenarios to test capabilities. We will design and develop exercise material for both table-top and function exercises based on realistic scenarios that Puerto Rico is likely to face. Once the exercise program is established, the OEM will manage it to ensure that ongoing emergency management exercise requirements are supported.

Exercises are a critical part of the preparedness cycle, and the success of any exercise depends on consistent execution of the HSEEP planning phases at each step, which will help to guide future planning development and improvement. We will apply the following exercise philosophy:

- **Compliance** with HSEEP guidance to enable flexible approaches to exercise objectives;
- **Customization** to the organization, taking into consideration the location and key infrastructure, top risks and hazards and realistic scenarios;
- **Collaboration** of exercise planners and participants to generate constructive learning and dialogue; and
- **A Stakeholder-driven approach** to make sure that stakeholders are involved early and often to ensure that the exercise achieves the intended objectives.

Figure 21: HSEEP Exercise Program Management Cycle

Exercise formats include discussion-based (tabletops and seminars), operations-based functional and full-scale exercises. We will go beyond HSEEP standards to enhance exercises with realism through:

- **Subject-matter experts** in all emergency management disciplines that ground exercise scenarios in real-life experience;
- **Graphics specialists** who will enhance the exercises and create professional visual aids, including super-imposed photos, videos and recordings; and
- **Modeling and GIS specialists** who analyze hypothetical scenarios and estimate potential impacts and consequences.

K. DEVELOPMENT OF INTEGRATED RESOURCE PLAN

The Consortium has a proven record of delivering projects on schedule and on budget while maintaining high quality. As an experienced builder (Quanta) and owner/operator (ATCO), we can maximize value during the design-and-build stage without risking reliability, availability and longevity of the system assets. The IRP/GridMod Plan work scope must be cohesively integrated with O&M budgets to achieve the integration of renewable energy sources and meet or exceed reliability targets.

1.0 WHAT WE FOUND

We understand the obligations to manage the IRP per the Request for Proposal (RFP) and the Puerto Rico Energy Transformation and RELIEF Act 57-2014. We have extensive experience in facility planning and large capital investment programs. Throughout the RFP process, we have monitored PREPA's preparation and filing of the 2019 IRP and the subsequent orders issued by PREB. We are committed to developing and executing the T&D portions of the Action Plan (per Reg. 9021 Section 2.03(K)(1)) during the contract period.

The Grid Modernization Plan (GridMod Plan) contained in the IRP identifies priority network additions and hardening of existing assets that serve critical loads. Larger grid projects can require up to 36 months to execute when permitting and equipment lead times are included. The grid modernization work must coincide with generation additions and retirements to fully realize the IRP's anticipated benefits.

Early in the RFP and due-diligence process, we identified critical assets and loads on the PREPA system and drafted capital expenditure scenarios (with and without FEMA funding) to prioritize projects suggested in the GridMod Plan as well as others, and the resulting cash flows. We further developed this plan following site visits to Puerto Rico, where we inspected a sample of the critical assets. Planning and scheduling these projects represent the initial effort to ensure that work is completed per the Action Plan while maintaining service to Puerto Rico.

Our plan provided a reference point in our review of the GridMod Plan that was released in late September. The following points summarize our review and findings of the GridMod Plan.

- There is alignment in the 230 kV and 115 kV transmission line work scope and timing. For example, the North-South 230 kV lines and associated substations represent the backbone of the PREPA grid and these must be resilient and reliable.
- We concur with the defense-in-depth approach to flood prevention as it is sound and proven.
- The 115 kV and 38 kV short-term reinforcements do address improving the reliability to critical island loads.
- Distribution automation for DER integration is essential for IRP execution.

We will optimize the IRP timelines by identifying opportunities for execution efficiency and cost reduction.

2.0 WHAT WE PROPOSE

The IRP is a document with a courageous vision for the future of the Puerto Rican power sector. It is the source of our drive to introduce cutting-edge thinking as we plan for the next few decades of development in Puerto Rico.

Globally, utilities are being asked to provide a broad range of energy services through a data-driven, customer-centric system operations platform capable of managing responsive loads, electric vehicles, storage devices and distributed energy resources (DERs). Utilities are expected to meet this expanded mandate in a way that aligns with the following global trends.

Energy Efficient

Extreme weather events and increased integration of distributed generation call for economic grid transformation and an investment strategy to achieve grid optimization. Grid optimization can be achieved by enhancing its utilization, increasing performance (through the reduction of losses) and reducing the financial burden on the ratepayer in an economically sustainable way. Utility photovoltaic solar (PV) and battery energy storage projects need to be delivered at the lowest possible cost to minimize their operating revenue requirement.

Energy Smart

The effects that energy production may have on climate change have led to wide integration of renewable energy sources. This creates the need for intelligent (smart) ways of planning, managing and controling power systems to shape the energy supply systems of the future. Advanced monitoring, metering and automation create data that can be converted into valuable information that grid operators and customers can use to optimize decision making. This need calls for new skillsets to develop intelligent monitoring systems and adaptive controls and processes. T&D energy sources will become intelligent data hubs, allowing customers to further benefit from energy efficiency. As customers transition from consumers to prosumers, they will increasingly require accurate energy consumption and billing information in real time.

Energy Secure

The security of the power system is further challenged from DER integration and extreme weather impacts. A resilient grid must be able to anticipate, withstand, respond and recover from disturbances with minimum service disruption to maintain reliability and meet customer expectations. With large integrated data-driven systems involving data from utility, DERs and customers, there is an increased risk of cyber-attack on the electric grid that calls for critical infrastructure protection. Looped distribution systems capable of adaptively responding to system needs must be implemented. Lastly, grid voltage and frequency control will need to be maintained as synchronous generators are replaced with inverter sources. Static VAr systems and synchronous condensers are possible solutions; however, they are complex undertakings and need to be balanced with transmission grid operating costs and the need to be reliable with minimal maintenance.

The GridMod Plan work scope is wholly dependent on FEMA funding being made available. As Operator, we will prepare detailed project plans, budgets and schedules that represent industry-

leading techniques for cost control and schedule adherence. Once funding is approved, our full and proven capabilities will be engaged for project execution.

To perform large project activities, LUMA will prioritize former PREPA employees or other Puerto Rican resources as the first option wherever and whenever possible. Once all available local resources are engaged, resources external to Puerto Rico will be deployed to complete the work per the Action Plan.

3.0 HOW WE WILL DELIVER

An approved IRP will include a year-by-year plan for generation retirements, conversions and additions. We will assume ownership of the IRP for execution and, if necessary, continuous improvement, followed by submission to PREB for approval.

As we assume ownership of the IRP, it is critical that we mature the current energy services management practices from reactive to proactive. We see opportunities where we can improve and enhance the GridMod Plan such that the goals of the GridMod Plan and IRP can be achieved in line with the global trends outlined above. The areas where we can align our implementation strategy with these global trends are set out below.

Energy Smart

The GridMod Plan proposes continued use of existing design standards in the short term for substation repairs and relocations. The GridMod Plan currently suggests pilot applications of the IEC 61850 communications protocol — an international standard defining communication protocols for intelligent electronic devices at electrical substations. In line with the global trend of smart power system management being implemented by leading utilities (see Energy Smart above), we will build on the pilot applications to ensure eventual universal application of IEC 61850 at all substations.

To achieve this, we believe that all short-term upgrades should employ platforms that are upwardly compatible from the outset with IEC 61850 Station Bus being at the forefront. We will rely on ATCO's experience adopting IEC 61850 Station Bus (building communications) as its control standard in 2018, with the first installations having one year in service. ATCO will be completing the full adoption of IEC 61850 in 2020 when Process Bus is implemented for substation yard devices.

Energy Secure

We will implement base platforms for substations and telecommunications networks. While these platforms can be continually updated in the future in response to changing requirements, they will be included in the short-term system improvements that we make.

Future grid operations will rely on substations as network "data hubs" for the aggregation of metering, grid-operation and distributed-generation information flows. The approach of allowing individual platforms and applications to be siloed in their data collection and usage will soon be obsolete, as effective energy management by generators, utilities and consumers will require that all information is available in real time (see Energy Secure above).

Energy Efficient

We believe that, with massive amounts of utility-scale or distributed renewables displacing conventional generation, LUMA will need to implement additional equipment at the transmission level to supplement the lost reactive support/voltage-control (see Energy Efficient above). As inverter-based resources displace conventional generation, as is called for in the IRP, there is likely to be a degradation in the amount of reactive support and fast automatic-voltage control available on the transmission system that is traditionally supplied by synchronous machines.

The IRP includes the conversion of retired generators at existing PREPA plants to synchronous condensers to ensure that this is sufficient, and we are anxious to continue these discussions and design specifications. Modern inverter-based generators have voltage-control/reactive support capabilities like static VAr compensators and thus can be enabled to provide voltage-control/reactive support.

In line with this global trend, we will investigate making the PREPA-constructed static VAr compensator at Bayamon TC operational. It can be further augmented by installing coordinated switched shunt compensation or additional dynamic reactive support (e.g., SVC, STATCOM or synchronous condenser).

DER Integration

We have extensive industry experience conducting distributed generation (DG) integration, impact and engineering studies in T&D systems, including identifying and evaluating the severity of impacts and proposing and verifying the effectiveness of mitigation measures. We have conducted these studies for a large variety of DG plants and electric utility T&D systems in North America, including the interconnection of individual utility-scale DG plants to T&D systems and system-wide proliferation of residential DG plants over a T&D utility service territory with hundreds of feeders and substations.

Steady-State Analyses

These studies include conducting detailed time-series steady-state analyses (e.g., power flow and short-circuit analyses) for a variety of system loading and DG production scenarios, with the objective of determining system performance (e.g., voltage profiles, line and equipment loading, system losses). Time-series simulations consist of comparing, via simulations, T&D system variables, such as voltages, equipment loading, active and reactive power flows and losses before and after DG plant interconnection. This will allow LUMA to identify DG impacts that may occur not only during annual peak and off-peak conditions, but also under immediate loading conditions and alternative system configurations. Such analyses can be extended as required to cover a selection of daily profiles (e.g., monthly or seasonal peak and off-peak conditions) or even annual simulations (i.e., on an 8,760-hour basis).

Dynamic, Transient & Power Quality Analyses

In the case of variable DG such as photovoltaic (PV) and wind technologies, after critical or extreme system conditions have been identified via steady-state simulations, detailed dynamic models will be developed, using specialized software tools such as PSCAD, to study the impact of DG output

intermittency on T&D system variables. This may include evaluating the impacts on T&D systems of variables such as flicker and increased operation of line voltage regulators, load tap changers (LTC) and switched capacitor banks (controlled by voltage and reactive power). This unique approach will allow us to categorize the severity of voltage fluctuations under such conditions and the respective impact on the lifecycle and maintenance of line voltage regulation and control equipment. Additional specialized studies may include harmonic, insulation coordination and arc flash analyses.

Collector & Substation Analysis and Design Review for Wind & Solar Farms

Wind farms and solar PV parks have become a prominent solution to meet changing energy needs. The increased penetration of distributed and renewable energy resources brings several engineering challenges, including interconnection impact and protection considerations. We have worked extensively with utilities and wind farm/PV system developers across North America to investigate these challenges and perform detailed transient studies to ensure that project designs and equipment specifications meet all standard requirements, utility practices and market rules.

Protection Analyses

We have extensive experience conducting T&D protection analyses and identifying solutions to impacts caused by DG interconnection using software tools such as ASPEN, CAPE, CYME, Synergi, Windmil/LightTable, PSCAD/EMTP, SKM and ETAP. We also have expertise in detailed and customized modeling of control and protection systems for DG plants and T&D equipment, which allows us to investigate aspects such as frequency and voltage ride through, assess the impact of islanding conditions on protection systems and DG operation, evaluate the severity of temporary overvoltages (TOV) and study how sudden connection/disconnection of DG plants affects T&D system operation and protection systems.

Mitigation Measures, Advanced Studies & Microgrids

Once steady-state and dynamic simulations have been completed and the respective impacts on T&D systems have been determined, LUMA will identify appropriate mitigation measures to alleviate any potentially adverse system conditions. Conventional and advanced solutions using existing and new infrastructure and equipment will be considered. Examples include modifying settings, locations and operation modes of voltage regulation and control equipment (e.g., LTCs, line voltage regulators and capacitor banks); operating DG plants at non-unity power factors (absorbing VARs using a power factor schedule); and using a dynamic volt-VAR compensation scheme. If we identify complex impacts and equipment interactions, LUMA can also study advanced mitigation measures such as implementing energy storage, SVCs and STATCOMs in T&D systems. We recommend these mitigation alternatives if significant impacts, complex equipment interactions and volt-VAR fluctuations due to the interconnection of DG plants are identified. Finally, we have experience in planning and implementing advanced combined applications of DG, energy storage, demand response, protection, control and automation, including microgrid applications.

Microgrid Control & Protection Development & Testing

The need for substation controls and automation is gaining more and more attention as the grid becomes more complex and newer smart-grid applications are introduced. Today, large-scale solar

farms, wind farms and MW-sized battery energy storage systems (BESSs) are integrated in many high– and medium-voltage substations as part of independent power producers' plants or by utilities to support grid operation. Due to their variable generation profile and uncertainty in operating points, these energy sources should be closely controlled with more precise and intelligent control schemes to minimize any adverse impact on the grid's operation. Various levels of protection and automation, as well as remote monitoring and controls through system operator commands, are needed to ensure grid integrity and stability during sudden changes in operating conditions and/or system contingencies.

Through our microgrid protection and control unit (MPAC), we are offering the next level of protection and control systems for microgrids, which can control and determine operating setpoints for solar and wind farms, BESSs, diesel generators and loads in a coordinated manner. The control system is designed according to IEC 61131-3 standard language and has a modular structure. The controller functionality is extensively tested and verified using a Real-Time Digital Simulator (RTDS) hardware-in-the-loop setup, in which multiple system conditions and various operating scenarios are simulated and evaluated.

MPAC incorporates control and protections for two separate modes — grid-connected mode (GCM) and standalone mode (SAM) — as well as managing transitions between the two modes. In GCM, the battery state-of-the-charge (SOC), substation capacitors and on-load tap changer (OLTC) are controlled to maintain proper voltage/reactive power profiles and reserve

Figure 22: ComEd's BCM in Chicago, IL

CASE STUDY: MICROGRIDS

Through its microgrid initiative, the U.S. Department of Energy (DOE) supports projects to develop commercial-scale microgrid systems capable of decreasing outage time, reducing emissions and improving system energy efficiencies. In 2018, Quanta worked with Chicago-based utility Commonwealth Edison (ComEd) on a DOE-supported microgrid cluster project in Chicago's Bronzeville neighborhood.

The Bronzeville Community Microgrid (BCM) is designed to serve residences, businesses and public institutions, including the headquarters of the Chicago Fire and Police Departments. In a field test to check the microgrid's resiliency in the event of a weather emergency or cybersecurity attack, the BCM operated in island mode, providing power even while disconnected from the grid at large. The test was an important milestone, successfully illustrating the potential of microgrids to benefit communities by promoting power distribution system resiliency, reliability and sustainability.

Quanta is committed to the advancing the use of microgrids and participating in projects that demonstrate their value and support their wide-scale adoption.

capacity. In SAM, or islanded mode, the controller acts as a supervisory control system as part of substation controls and protection to apply a power-balancing scheme with the aim of increasing the contribution of renewable resources (PV and wind).

L. ASSET MANAGEMENT & MAINTENANCE

The Consortium's approach to asset management focuses on ensuring prudent and efficient expenditures and delivering affordable, reliable service. LUMA's asset management will be supported by a robust, structured and transparent planning and governance framework that ensures that asset management decisions are well-informed and consistent with regulatory requirements, corporate strategies and good industry practice.

Figure 23: ATCO and Quanta combined our extensive electrical expertise and experience to develop a substation design for the Fort McMurray West 500 kV Transmission Project. This reliable substation is expected to exceed performance standards for many years.

Quanta's Asset Management Experience

As a leader in asset management consulting and the utility infrastructure industry, Quanta has identified the critical elements for successful management of a utility's asset base while balancing cost, performance and risk in order to meet multiple objectives. Quanta's Asset Management Group specializes in providing effective programs that identify and prioritize critical infrastructure requirements, leading to pragmatic and justifiable capital and maintenance spending plans.

Quanta serves the electric utility energy delivery companies, reliability organizations and regulatory bodies for all matters regarding T&D infrastructure, including asset management. Asset Management capabilities within Quanta include the following.

- **Maintenance management**: Using Quanta's industry and equipment knowledge, Quanta assists clients in defining and implementing maintenance programs based on current equipment condition, age, duty and other operational factors that define the maintenance requirement.
- **Equipment condition, health and risk assessment**: Quanta has expertise in quantifying the future impact of aging equipment and developing justified multi-year plans that are acceptable to regulators. Quanta provides services to evaluate the current condition of power delivery assets and assist utilities in their decision processes around capital equipment operations, refurbishment and replacement.
- **Models, tools and analytics**: Quanta favors no specific software packages; instead, Quanta prefers a comprehensive approach to data management and analytical models.

ATCO's Asset Management Experience

As an owner and operator of T&D infrastructure, ATCO has applied asset management principals to optimize our assets. We have maintenance, refurbishment and replacement programs for the various asset classes within the ATCO system to manage the total lifecycle of these assets.

ATCO has established processes and tools to support cost, risk and performance evaluations and decision making related to asset strategies. Results are documented and become part of our Asset Management System (AMS), which is used to support all facets of asset decision making throughout an asset's life. The AMS comprises Maximo-based applications to track and record asset data; SYCLO, a computerized field-based tool that allows us to efficiently capture information and easily download it into the AMS; TANDA, a database of field competencies; and Oracle Materials Management. These tools are effectively designed to capture the following.

- All maintenance strategies, including preventative and predictive maintenance routines, maintenance frequency and parameters for replacement. Preventative and predictive maintenance routines include detailed maintenance work plans (specific tasks to be conducted, such as inspections, sampling, measurement and major and minor maintenance). Work plans include work procedures outlining detailed steps to be undertaken by field staff, including safety and environmental considerations.
- All work plans required to address the failure of major apparatus.
- All results from field maintenance activities (e.g., inspections, sampling) to assist engineers in determining asset condition and risks (current and future) to help in adjusting the maintenance program as required. The AMS system further tracks all actions that result from any maintenance activities.
- All spare inventory, including manufacturer data, the location of the equipment, the condition of the spare equipment and routine maintenance activities to be conducted to ensure that spare equipment is kept in good condition.

ATCO's AMS is also designed to trigger all required maintenance activities, including both field and non-field tasks such as engineering reviews and studies (e.g., protective relaying scheme reviews).

1.0 WHAT WE FOUND

PREPA has a reactive approach to asset management. The current state of the utility allows for very few proactive or planned initiatives. We see an opportunity to build on some of PREPA's existing activities, adapting them to realize their full potential and moving the approach from reactive to risk-based.

PREPA's past asset management design practices generally allow assets to be in use for 40 years but, in many instances, existing assets have now surpassed their expected lives. Corrective maintenance (CM) or time-based maintenance (TBM) strategies require additional network capacity and redundancy so maintenance strategies can be planned, work scheduled and planned outages allowed to stand until work is completed.

However, CM and TBM strategies are becoming obsolete in today's utility economies. They create higher unit costs for maintenance activities than may be necessary and lead to inefficient resource use. CM/TBM are budget driven and restricted to what can be achieved within the allocated budget rather than what is needed to meet business or operational targets. In PREPA's case, it is inefficient to conduct ongoing repairs on equipment that is well past its useful life. To optimize asset performance and cost, LUMA will move from CM/TBM to an approach based on reliability and risk.

PREPA has not significantly leveraged new technologies needed to become a premier utility. Technology has been acquired and applied in very limited ways, primarily only to gather information and not to perform analysis that would improve decision making.

2.0 WHAT WE PROPOSE

To reduce costs, lower risks and improve public safety, LUMA will establish a clear understanding of the ongoing health and criticality of assets, implement an effective asset management decision model and create a T&D organization — in our structure including functions in the Operations department and Utility Transformation department — that is robust, optimized and well documented.

After identifying assets, LUMA will apply health ratings to each facility. The initial maintenance program will have an immediate focus on safety, customer experience and employee comfort. As the program progresses, we will execute long-term solutions to reduce maintenance costs while increasing each facility's life span. Our five-year strategy for Puerto Rico's energy sector transformation includes maturing asset management practices from reactive to proactive. We plan to increase use of ABB's Ability Asset Suite, the tool PREPA currently uses.

2.1 Organizational Structure

Once we assess the current engineering structure, LUMA will develop and implement a plan to reduce reporting hierarchies and minimize the number of distinct departments. This will improve connections between leaders and employees, reduce bureaucracy, improve agility and drive better outcomes. As part of the plan, LUMA will assess performance against established competencies from the human resources guidelines, identify gaps in competencies and develop a plan to address them through training and development.

2.2 Engineering Transformation

LUMA's plan will bring engineering expertise to creating a go-forward plan. The plan will involve identifying gaps, tools and applications used within engineering, standards, roles, responsibilities, projects and programs. Urgent gaps and deficiencies will be escalated and identified for remediation; remaining deficiencies will be documented to address as a future part of the plan.

The engineering transformation process will include a review of projects and programs that must be executed. In creating and implementing the System Remediation Plan, projects and programs will be compared to FEMA project worksheets and approvals to ensure that projects match FEMA technical requirements and other applicable standards. We expect that a typical review will guide the development of a two-year capital plan with a five-year outlook. This will be a repeatable process.

LUMA's approach will be to develop a single engineering organization, known as Asset Management and Planning (AMP), that we intend to be part of the Utility Transformation department. This will foster collaboration and ensure that projects to address system capacity, reliability, asset management, mandatory government and regulatory requirements and grid modernization are integrated in a holistic plan that also incorporates inputs from all stakeholders.

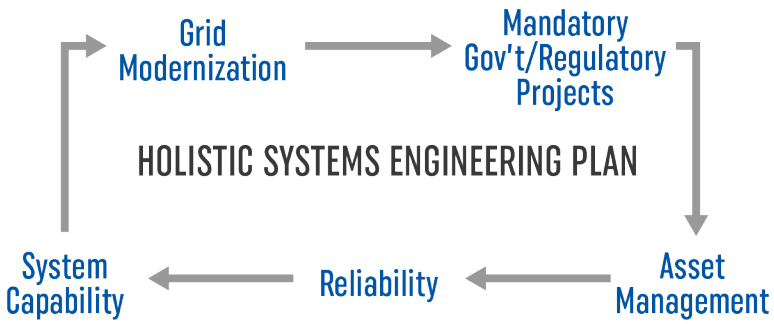


Figure 24: Systems engineering/asset management approach

AMP's engineering functions will include T&D system planning, developing projects to address reliability, performing distributed energy resources (DER) studies and developing grid modernization and asset replacement strategies. AMP will use existing full-time engineering employees, who will require training to perform functions that are not mature or do not currently exist within PREPA. It may also be necessary to retain external engineering resources to supplement existing teams.

AMP will be responsible for ensuring that the T&D system and facilities are safe for employees and the public. LUMA will plan for a safe, efficient, cost-effective, reliable and resilient T&D system that effectively integrates as many distributed energy resources as possible (e.g., solar photovoltaic, wind and energy storage). We will also implement industry best practice standards and guidelines for interconnecting DERs to the T&D system. To address third-party attachments to T&D poles and structures, the team will design and implement a pole attachments audit, create design guidelines and establish a process for installing, billing and tracking attachments.

AMP will create maintenance programs for distribution and transmission lines (overhead and underground) and substations; design structured inspection programs of substation equipment and corrective actions with data collection and tracking/scheduling; and develop five-year inspection plans for T&D overhead and underground lines where 20 percent of the assets are inspected annually, and every asset inspected every five years. This plan will include data collection and tracking/scheduling inspection and corrective actions.

AMP will ensure the efficient, effective development and delivery of capital projects, which will include creating engineering and construction standards to meet code. AMP will develop and deploy a distribution automation platform and resiliency strategies for the T&D system, in addition to overseeing the transformation of the T&D system from unidirectional to bidirectional.

Beyond these overall strategies, implementing our asset management program will improve Operator SAIDI, SAIFI and CAIDI reliability indices. Our program will also include developing and deploying asset condition strategies for transformers, circuit breakers, electromechanical relays, poles and structures.

2.3 Asset Management

Leveraging the Consortium's experience in asset management, LUMA will undertake the following key steps to create an effective asset management program that is based on ISO 55000.

Create an Asset Management Policy

This document will serve as a statement of commitment and outline the objectives and role of the asset management program in meeting those objectives.

Develop a Strategic Asset Management Plan (SAMP)

The objectives of the SAMP will be disseminated across the organization through the individual asset management plans. When implemented correctly, the SAMP determines the activities undertaken in the workplace and enables the asset management and broader organizational goals to be achieved.

Identify Asset Families

We will determine the information requirements to support asset management in accordance with ISO 55000. Typical groupings include similar physical assets that perform the same function or have similar components. To understand the contribution to overall cost, risk management and performance objectives, we will identify the organizational accountability for each asset family.

Perform Risk Management Analysis

LUMA will identify key risks, establish risk tolerance and analyze risk drivers and consequences for safety, reliability, regulatory/statutory, financial and environmental matters. Once this analysis has been performed, we will apply controls and mitigation to reduce the risk.

Acquire Asset Information

LUMA will work to understand attributes such as age, performance, industry experience, manufacturer information and environment — using asset databases as a register for the assets and associated information.

Assess & Refine the Existing Requirements & Procedures

LUMA will allow standards and procedures to evolve over time and with consideration for the total lifecycle. We will continuously measure adherence to standards and quality management procedures to assess effectiveness and, as standards and procedures evolve and develop, will prioritize change management to ensure that information is properly disseminated.

Collect Data

We will employ tools, datasets and system integration databases that allow data to be collected and analytics performed, and which provide traceable, verifiable and accurate data necessary for continuous improvement. LUMA will establish data structure, quality and governance of data.

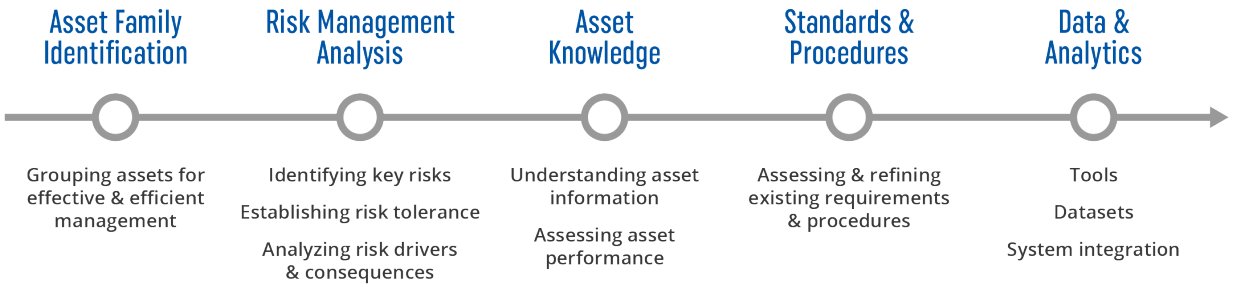


Figure 25: Our approach to developing an effective asset management program

Once an effective asset management program has been developed, LUMA can employ the Plan-Do-Check-Act model when devising an approach to:

- Meeting the key objectives of the transformation process;
- Providing affordable and reliable power;
- Developing infrastructure that is reliable and resilient;
- Deploying new technology;
- Making appropriate capital investments; and
- Providing operational excellence.

The goal in following this cycle is to develop an asset management culture in which the entire organization understands the processes and roles.

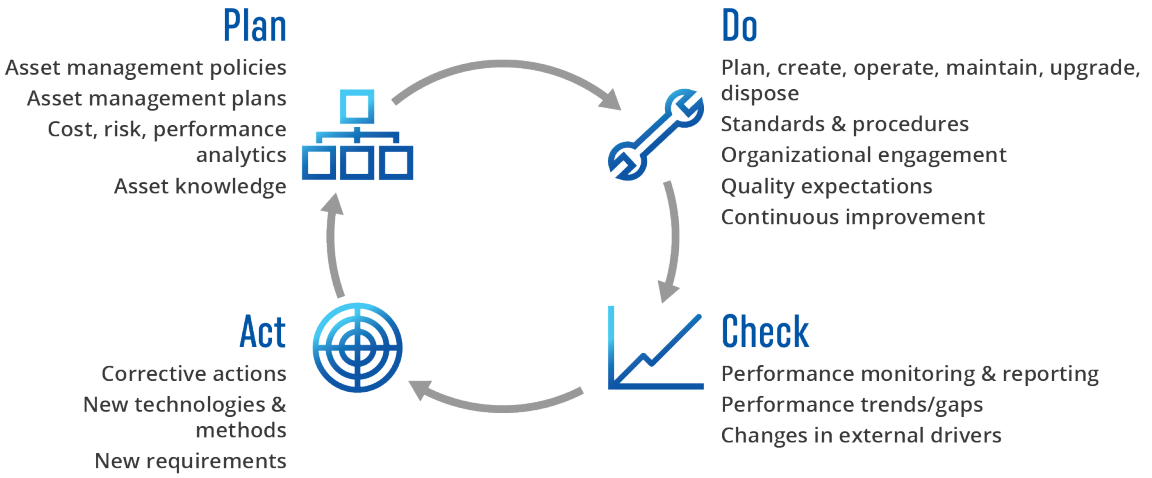


Figure 26: Key asset management steps

2.4 Systems Planning

LUMA's systems planning will include an in-depth review of reliability performance (SAIDI, SAIFI and CAIDI) from 2012 to the present. We will develop a predictive reliability model of the PREPA distribution system using distribution analysis software. This will enable more optimal deployment of capital at accurately targeted locations to achieve maximum reliability benefits at the lowest cost.

We will use spatial load forecasting techniques and tools, and model and validate historical and planned future T&D system configurations and related components. LUMA's asset management team will, conduct a simulation and analysis of forecast T&D system states under normal and contingency conditions. This work will feed into:

- Developing, documenting and implementing comprehensive T&D system planning criteria, guidelines and processes, and moving toward industry best practice;
- Developing cost-effective, reliable and resilient solutions to voltage violations, as well as initaiting, justifying and sponsoring projects to implement those solutions;
- Developing a screening process for potential microgrid locations (including measuring customer engagement);
- Developing and executing a plan to create and maintain DER hosting capacity maps at the distribution feeder level; and
- Developing a strategy to plan and execute programs and manage assets that are FEMA-funded as opposed to non-FEMA-funded.

2.5 Collaboration

The AMP team will develop collaborative programs to interact with all other work groups. The goal of these joint work processes will be to eliminate bottlenecks and increase interdepartmental communications to improve customer service delivery. Developing integrated work management systems will formalize planned work, support requirements and provide continuous feedback on workforce effectiveness, thereby increasing opportunities to exchange knowledge and collaborate.

We will establish collaboration between work groups through practices such as a daily operational call to discuss the previous day's operating experience — especially abnormal events such as large unplanned outages, outages to key customers and mis-operations — to reinforce appropriate accountability between AMP and T&D Operations. These meetings will include reporting resolution of abnormal events and preparing for the upcoming operational day and several days forward.

3.0 PREPARING FOR THE FUTURE

3.1 New Technology & Innovation

Within Systems Engineering, we will establish an Innovation Group to address gaps existing in technology as LUMA modernizes the Systems Engineering function to include innovative grid forecasting, modeling and analytical tools and techniques. We will also incorporate new technologies to solve predicted future operating violations and improve reliability, resiliency and power system efficiency — all of which will contribute to a reliable utility aimed at serving customer needs.

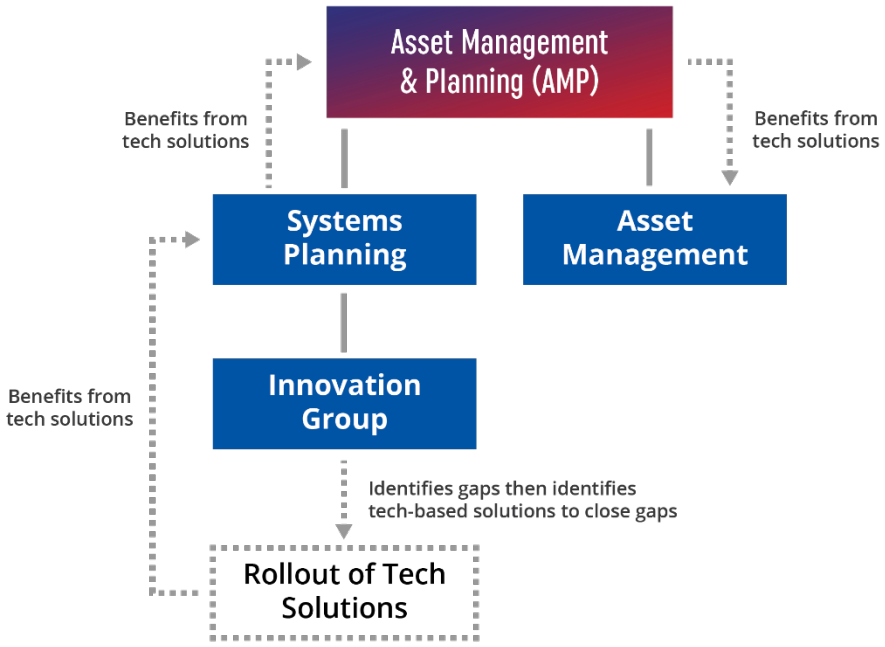


Figure 27: The innovation process for addressing gaps existing in technology

Innovation and intelligent planning of new technologies based on data collection and analysis will enable LUMA to modernize infrastructure, enhance reliability, optimize assets and interconnect DERs, as required in the IRP and outlined in the GridMod Plan.

The newly established Innovation group will support new technology strategy development in alignment with corporate strategy; promote, evaluate and test new grid technologies; and train staff to adopt these new tools (borrowing resources from other areas of the organization as needed for testing and training). Some of these innovations and technologies include:

- Energized services (patents and specialized equipment);
- Microgrid deployment (e.g., design, control and testing);
- PV/storage integration experience (and other renewables);
- Smart grid and AMI and advanced functionality;
- Distribution automation/FLISR, including smart sensors;
- Infrared, LiDAR, drones and data analytics;
- Communication-enabled mobile asset management tools (e.g., iPads in the field);
- Distribution system DER hosting capacity;
- Electrical vehicle charging; and
- Energy efficiency

The Innovation group will allow LUMA to maximize the integration of renewable DER, including solar PV, wind, energy storage and demand response, and to modernize the Puerto Rican grid. To accomplish this, we will:

- Establish organizational design roles and responsibilities;

- Perform informal benchmarking with other U.S. utilities (e.g., Pepco, ComEd, JEA, Dominion);
- Perform gap analysis of the existing functions, skill levels and tools;
- Create an Innovation Center to demonstrate innovations and new technologies to various stakeholders; and
- Develop a high-level design of the project portfolio, with timelines and budgets for the creation of the Innovation Center, which will initially focus on on microgrids.

The Innovation group will draw from the Consortium's experience, including the transformative work done by Quanta Technology, a Quanta subsidiary focused on utility technology consulting. Over the last ten years, Quanta Technology has led the industry in studying and evaluating strategies for storm restoration, maintenance practices and infrastructure reinforcement to reduce damage from severe weather and shorten the restoration time following weather damage. Quanta Technology's innovative approaches in this space have been widely documented.

In the past, it was not deemed economical to design T&D systems to withstand major weather events such as hurricanes, linear windstorms and ice storms. The expectation was that utilities would be prepared for timely customer restorations and repairs. Today, expectations have changed, and utilities are increasingly being expected to "harden" their system so that less damage occurs during such events. Efforts to harden the electricity grid must focus on two complementary and balancing elements: adaptation and survivability.

System Adaptation

Preventing future damage due to extreme weather may require changes in assumptions, design standards, equipment specification, construction guidelines, maintenance and inspection procedures and flood proofing critical facilities.

System Survivability

Survivability during and after an extreme weather event entails the ability to maintain some basic level of electrical power functionality to the communities. This necessitates some level of resiliency in the supply, including protection, switching, vegetation management and other measures. It will also include requirements associated with timely and accurate communications to customers.

M. SAFETY MANAGEMENT

Our core philosophy is that safety takes precedence over all business pursuits and work practices. Our goal is to complete every task without incident or injury. Our management teams create a culture in which all employees take ownership for their safety and the safety of their coworkers. We've always held the belief that our most valuable asset — what truly sets us apart — is our employees. At the end of the day, there's nothing more important than our employees going home safely.

We will draw from our experience developing safety and health programs, and infusing a safety focus throughout our organizations, to evolve PREPA's workforce safety and health and public safety programs to realize improved results.

The Consortium takes an innovative approach to safety — the Safety, Health, Environment and Quality (SHEQ) Integrated Management System (IMS). The SHEQ IMS is an integrated approach, acknowledging that critical platforms should be managed by a single management system, which is currently used at Quanta. The Consortium has dedicated our efforts to ensure these consolidated platforms deliver a mindset of building capacity across all business processes and relationships. Integrating quality with safety, health and environment gains a significant competitive advantage as it allows for similar processes to be seamlessly managed and executed without duplication while achieving a reduction in operating costs.

The Consortium has a strong approach to integrating quality assurance with safety, health and environment that sets us above our peers. This comprehensive approach ensures continuous improvements across all our teams, which has allowed us to be top-quartile safety performers.

1.0 WHAT WE FOUND

1.1 Safety & Health

Workforce Safety

In 2014, DuPont Sustainable Solutions reviewed PREPA's safety practices. DuPont noted significant deficiencies. The report recommended that a "robust plan of action must be implemented in order to correct these deficiencies."

While improvements have been made over the past five years, PREPA's safety performance lags behind industry standards. PREPA's OSHA Recordable Incident Rate was 10.72 for 2018 while the average for select utility peers was 1.56. PREPA's safety deficiencies directly cost the company millions of dollars each year and could have impacts several times higher when including indirect costs to the system.

These systemic issues are not the result of one team, or of a lack of effort to meet customer needs. They are due to the absence of an integrated system that fosters communication and collaboration across functional teams.

Public Safety

PREPA serves approximately 1.5 million customers. This volume of customers drives the need for more robust safety education and outreach to local communities than is currently available. In addition, low levels of investment to fund T&D maintenance and improvements have led to an extremely fragile system that does not meet industry standards or codes, which can create hazards to members of the public.

1.2 Environment

Non-compliance has broad impacts and negatively affects PREPA's ability to provide reliable, affordable service.

Multiple regulations and numerous consent decrees, notices of violation, consent agreements with the U.S. Environmental Protection Agency (EPA) and Puerto Rico regulatory agencies and continued regulatory agency inspection have all affected PREPA's ability to operate and had an impact on the cost of services to ratepayers.

The absence of documented environmental management procedures and insufficient coordination between the Environment and Operations departments on wastes and regulatory requirements has had a significant monetary impact, including $2.5 million in environmental fines in the last fiscal year. Policies, procedures and programs will reduce the potential of future finable non-compliances.

PREPA's current, office-based Environment team works hard to process permits and respond to regulatory agencies but spends very little time in the field. The lack of input, oversight or auditing of actual operations makes compliance with laws and industry standards throughout the T&D system challenging.

1.3 Quality

PREPA has made significant improvements following Maria and Irma. Their efforts have strengthened the T&D system, improved response operations and increased reliability and redundancies in designs. Despite these initiatives, there remains evidence of weak processes and equipment deficiencies, which raise rework costs, duplicate efforts in documentation, reduce available resources and hinder change initiatives. Operating procedures and documentation also lack quality control standards to ensure compliance. Combined, these drive higher operational costs ultimately borne by PREPA's customers.

As teams execute their work, it is imperative to capture performance through monitoring and reporting — instilling a culture of transparency and adaptiveness to change. The absence of adequate data impedes leadership's ability to accurately assess past performance and develop future projections. It also limits the ability of project teams to benefit from lessons learned and proactively manage safety, health, environmental, quality control and technical risks.

2.0 WHAT WE PROPOSE

We observed safety, health, environment and quality managed separately at PREPA, with little integration between these functions. We propose a new integrated approach to safety management that is essentially a version of proven SHEQ IMS, tailored for Puerto Rico.

Our commitment to excellence in safety and quality is not accomplished as a program, but as a core value that is enforced daily. Safety best practices and standards become our avenues for fostering and measuring safety improvements across the organization.

SHEQ has the unique capability to train and mobilize highly craft-skilled workforce while:

- Driving a powerful culture of caring and keeping safety at the heart of all our actions;
- Fostering transparency with clear reporting and a commitment to the safety of our crews;
- Disseminating lessons learned as effective training opportunities;
- Driving a culture of quality excellence and continuous improvement; and
- Living and practicing a set of values based on crew empowerment, integrity and a strong commitment to preserving the lives and health of our people and the environment.

LUMA will strengthen the safety and health activities for all day-to-day T&D operations in addition to coordinating public safety initiatives. This includes identifying and helping to support the actions required to bring the T&D organization into compliance with all applicable Commonwealth and federal Occupational Safety and Health Acts. We will initiate and drive proactive safety initiatives that will help improve performance and bring PREPA closer to their utility peers in the U.S.

On the environment, our team's overall approach is to drive down environmental fines by creating a culture of environmental awareness and respect. From administrative staff to senior management to field operations, we will instill a commitment to environmental compliance and sustainability that preserves the health of Puerto Rico long into the future. Training, oversight, process improvement, systems improvement and community involvement will be central to our approach.

We will provide day-to-day environmental support for T&D operations and maintenance, interfacing with regulators and working closely with Operations, with FEMA on project support and with generation prior to the GenCo delineation to determine stakeholder needs.

This best-in-class environmental program will center on:

- A strong management system that drives a continuous improvement process;
- Organization-wide training that empowers the people to understand the implications of their decisions with respect to environmental management and compliance;
- Processes that fully integrate SHEQ and Operations — to avoid redundancies and promote clear communication — that adequately capture each group's job requirements;
- Compliance tracking systems and operational compliance; and
- Community inclusion and incorporating local knowledge and wishes.

3.0 HOW WE WILL DELIVER

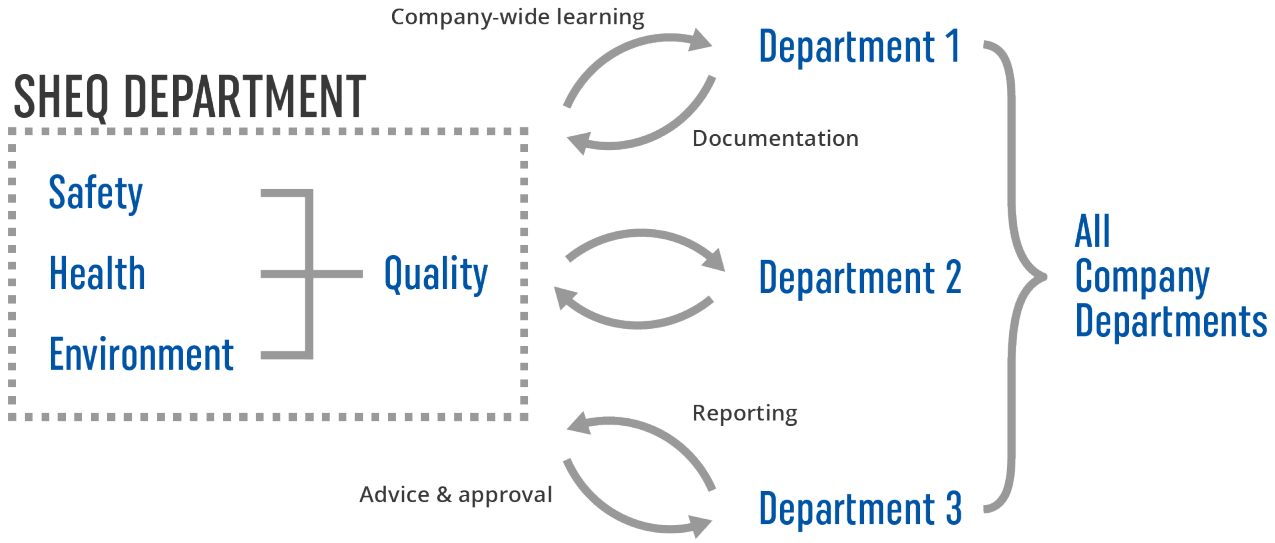


Figure 28: Learning in one department shared across the whole company through SHEQ — allowing for continuous improvements. The SHEQ process is embedded in all departments.

Our end goal is a shift across the whole organization, top-down and bottom-up, to a culture that places safety and continuous improvement above all else. We will achieve this by putting implementing a SHEQ IMS specific to Puerto Rico. We will establish processes and procedures and instill in all employees the importance of being linked across the organization, so that learning can be continuous and shared by and with everyone. The SHEQ IMS is a key differentiator that will drive a proactive approach with input and involvement from all departments and levels of leadership across the organization. The Consortium team has experience implementing quality and continuous improvement among a diverse range of clients for whom quality is a core and challenging need; these clients include NASA, Shell, Exxon and the U.S. Navy.

The Consortium's transformation strategy focuses on several primary areas.

Regulatory & Internal Policy & Procedure Compliance

To achieve a zero-harm environment for our employees, we must first establish the foundational systems and processes that will allow us to comply with basic regulatory requirements. This includes establishing and implementing:

- An incident management procedure that includes notification procedures, injury management protocol and incident investigation training requirements;
- Formalized reporting, incident investigation and tracking procedures across the organization;
- A Safety and Health Policies and Procedures Manual that aligns with regulatory requirements;
- A DOT Driver's Compliance Program that includes items such as a drug and alcohol testing policy, medical requirements and hours of service; and
- A Contractor Safety Program that includes the qualification and oversight of all contractors working on the Owner's property.

Proactive Safety & Health Initiatives

For LUMA to reach safety and health performance levels on par with their U.S. utility peers, we must implement multiple proactive initiatives to create a culture that allows for sustainable success. Some of these initiatives will include establishing and implementing:

- A formalized process for evaluating and managing high-hazard risks during the job planning process;
- The Human Performance System and associated components across the organization;
- A comprehensive jobsite observation program that will expand beyond the leadership team and safety organization;
- Various safety committees, task teams and other leadership-sponsored safety initiatives to increase frontline employee engagement;
- A system-wide safe-driving campaign; and
- A system-side program to include an Automated External Defibrillator (AED) on each job site, as Quanta has done across North America. This exceeds industry standards. Quanta has deployed more than 9,000 units and has saved 26 employee and civilian lives to date.

Establishing Safety & Health Performance Metrics & Leadership Accountability

What gets measured is what people focus on and improve. To help address these concerns, we will implement the following measures.

- Measure and communicate all safety and health performance metrics;
- Establish and implement new SHEQ performance metrics in individual performance plans for the entire leadership team; and
- Implement a near miss/good catch reporting incentive program.

Public Safety Outreach Initiatives

To help minimize the number of public safety incidents and promote a positive reputation for LUMA in the communities we serve, an aggressive public safety campaign with have to be implemented across Puerto Rico. Examples of these initiatives include:

- Distributing various videos and reference materials to promote public safety;
- Promoting the awareness and use of “Call Before You Dig”;
- Using social media to provide the public with safety information;
- Hosting electrical safety awareness events with groups such as first responders, construction trade associations, agricultural associations, tree trimmers, landscapers and others; and
- Facilitating electrical safety awareness programs in schools.

Environmental Training

All employees will receive environmental awareness training, and certain employees will receive additional training specific to their job duties — mainly associated with stormwater management, spill containment, waste storage and waste handling. Awareness training for all employees will eventually

be an annual requirement, with specific environmental training for all contractors that work on the system.

Figure 29: An ATCO lineman who responded to a call from a family in distress after their cat climbed a power pole and couldn't get back down. Our lineman soothed the cat and carefully put him in his coat for the descent. The customer's daughter was relieved to have her pet home safe and sound.

Quality Plans

LUMA will implement a quality control process (quality assurance plan) built on integrity and able to report on strengths and weaknesses from the field to both T&D Operations and the Customer Service team. This reporting will allow for trend and root-cause analysis and will highlight performance results on a balanced scorecard.

Our team will develop a customer service-specific quality control plan that is highly focused on efforts to reduce tampering and theft of commercial and residential meters. The plan will establish controls for meter reading, inspections and asset management. These controls will set the foundation of a cultural shift that integrates a focus on quality, customer service and relationships with processes across the organization.

We will analyze risks based on reliability data, the frequency of field visits, meter type and exposure to tampering and theft. The analysis will help us implement a strategic plan that incorporates procurement, replacement, asset management, traceability/serialization and system upgrades for products, and that aligns with T&D Operations and Warehouse Management strategic plans.

Fostering a quality culture that promotes trust and transparency, and highlighting the value of feedback from the field and in sharing lessons learned, will improve ownership/accountability across all levels of the organization, empower crews in the field, streamline core processes for easier and faster reporting methods and help employees embrace a culture centered on positive change. Training that is integrated with SHEQ's initiatives from the start will help elevate morale and build trust among employees and leadership.

Customer Satisfaction Survey

The Quality team will be actively involved in planning and releasing a customer satisfaction survey to capture the concerns of our customers — both external customers and those internal to the organization. This survey will be a cornerstone of the strategic plan that drives improvement cycles.

4.0 PREPARING FOR THE FUTURE

The SHEQ IMS is as an integrated approach that will allow LUMA to manage critical platforms within a single management system. The Quality team will dedicate its efforts to ensuring that these platforms are consolidated to deliver a mindset of capacity building across all business processes and relationships. The integration has a key advantage: it enables similar processes to be managed seamlessly and executed without duplication while reflecting a reduction in operating costs. This integration focuses on increasing productivity, empowerment, job satisfaction and reducing errors and accidents.

A proactive culture built on continuous improvement opens communication channels to drive compliance requirements and improvement efforts. The workforce will be empowered to speak up and collaborate on process revisions, increasing accountability at all levels of the organization. Ultimately, it leads to a SHEQ organization that is involved in all stages of project planning and benefits from collaborative thinking.

N. ADMINISTRATION OF SYSTEM CONTRACTS

The Consortium's industry best practices for administering system contracts leverage our experience developed over several decades as a T&D system owner and operator. We prioritize extracting expected value, good governance and compliance to support the efficient operation and maintenance of the T&D system.

At the end of the transition period, we understand that PREPA will be divided into GridCo and GenCo. This unbundling is new for Puerto Rico. As Operator we will take signals from the Owner and the Administrator, and the reorganization of PREPA mandated by the Title III court, to effectively manage the assumption of System Contracts.

Change management will be key to success in this area, as it will be new territory for much of LUMA workforce. We will guide ourselves based on the procurement manuals that will be created during the Front-End Transition Period.

We will use our expertise to establish a legally robust and operationally workable framework that will govern how these entities will safely and legally contract with vendors and each other. Our compliance framework will use best practices from other successful P3 processes in Puerto Rico that our local advisors have been supporting. We will also draw on IEM's substantial background in this area.

Through the System Contract Administration Process, we will administer and perform Owner's rights and obligations, while respecting existing liabilities. Requests to amend, renew or expand existing system contracts will be completed as required based on the demands to provide O&M services, but in accordance with the procurement manuals, our delegation of authority and other limits and checks that will be put in place during the Front-End Transition Period.

Any request to amend, renew or expand existing system contracts and all supporting materials will comply with the Federal Funding Procurement Manual to the extent that the system contract involves federal funding. In such cases where the Operator legally cannot act on behalf of the Owner, the Operator will advise the Owner on how to administer and perform the relevant functions.

The standardization and continuous improvement of contracting and procurement processes will be reflected in periodic updates of the aforementioned Procurement Manuals in accordance with requirements and local law.

O. ENVIRONMENTAL MANAGEMENT

The Consortium currently performs work in complex regulatory frameworks and environmentally sensitive areas around the world. We have a wealth of experience with routing, siting and permitting large utility projects, as well as implementing environmental controls and mitigations from planning and execution through to reclamation and remediation.

Our Fort McMurray West 500 kV Transmission Line traversed environmentally sensitive forest and marshland areas; and Quanta constructed a transmission project through the Florida Everglades, the most protected wetland complex in the U.S. Both projects were executed successfully while adhering to all applicable environmental regulations and permits.

Our more than 50 environmental specialists, together with our global corps of expert environmental consultants, have successfully completed billions of dollars of projects with minimal environmental incident. These specialists provide:

- Regulatory compliance advice;
- Monitoring and reporting;
- Regulatory relationship management;
- Communication;
- Maintenance and auditing services;
- Business development support;
- Environmental data management;
- Corporate sustainability reporting; and
- Environmental partnerships (research, community investment programs).

The Consortium maintains environmental management systems and compliance tracking systems for our daily operations. These systems align with ISO 14001 and are therefore scalable for use to support operations in Puerto Rico. We will help transform LUMA into a utility that better ensures and promotes the long-term health of Puerto Rico and saves ratepayer dollars by avoiding regulatory fines. Our goal is to deliver reliable power with minimal impacts on Puerto Rico's unique biodiversity and plant life and to build its reputation as a world-class destination that champions sustainability for residents and guests.

CASE STUDY: CONSTRUCTING IN THE FLORIDA EVERGLADES

Quanta recently constructed a 68-mile line in the Florida Everglades, a project that involved significant effort to maintain compliance with permit requirements. Our superintendents worked with and monitored subcontractors closely during the access installation, which made heavy use of floating silt fences and road construction fabric.

A fifteen-mile portion of the project was in grid-patterned canals, which presented the biggest challenge of the job. Our construction superintendents and foundation subcontractors formulated processes for material and equipment delivery for the 60+ structure sites in this canal segment using barges and specialty pontoon equipment to minimize impacts. Once our crews became familiar with them, these procedures allowed us to make better progress than with some of our land-based construction methods.

1.0 WHAT WE FOUND

We recognize that PREPA's employees work hard to deliver electricity to the people of Puerto Rico and may see environmental regulations as an impediment to meeting project timelines and budgets. However, numerous consent decrees, notices of violation, consent agreements with the U.S. Environmental Protection Agency (EPA) and Puerto Rico regulatory agencies and continued regulatory agency inspection have all affected PREPA's ability to operate and had an impact on the cost of services to ratepayers.

The absence of documented environmental management procedures and insufficient coordination between the Environment and Operations departments on wastes and regulatory requirements has had a significant monetary impact, including $2.5 million in environmental fines in the last fiscal year. Policies, procedures and programs will reduce the potential of future finable non-compliances.

PREPA's current, office-based Environment team works hard to process permits and respond to regulatory agencies but spends very little time in the field. The lack of input, oversight or auditing of

actual operations makes compliance with laws and industry standards throughout the T&D system challenging.

2.0 WHAT WE PROPOSE

Our team's overall approach is to drive down environmental fines by creating a culture of environmental awareness and respect while ensuring that environmental staff fully understand project execution. This will allow them to design environmental solutions that can be practically implemented. From administrative staff to senior management to field operations, we will instill a commitment to environmental compliance and sustainability that preserves the health of Puerto Rico long into the future. Training, oversight, process improvement, systems improvement and community involvement will be central to our approach.

The environmental team will provide day-to-day environmental support for T&D operations and maintenance, interfacing with regulators and working closely with Operations and the Capital Projects team on project support. We will leverage our pre-existing relationships with leading global environmental consulting firms, like Environmental Resources Management (ERM), by expanding their already well-established Puerto Rico operations and strong relationship with environmental agencies as well as the Consortium. Leveraging a multinational consultant with an on-island presence will help smooth and expedite the transition to a best-in-class environmental program.

This best-in-class environmental program will center on:

- A strong management system that drives a continuous improvement process;
- Organization-wide training that empowers the people to understand the implications of their decisions with respect to environmental management and compliance;
- Processes that fully integrate SHEQ and Operations to avoid redundancies and promote clear communication that adequately capture each group's job requirements;
- Compliance tracking systems and operational compliance; and
- Community inclusion and leveraging local knowledge and wishes.

3.0 HOW WE WILL DELIVER

A strong field presence with permitting support will be critical to improving Operator compliance and attention to environmental process. Our transformation strategy focuses on five primary areas to achieve this.

Environmental Training

All employees will receive environmental awareness training, and certain employees will receive additional training specific to their job duties — mainly associated with stormwater management, spill containment, waste storage and waste handling. Awareness training for all employees will eventually be an annual requirement, with specific environmental training for all contractors that work on the system.

Regulatory Permitting Compliance

Many processes for managing permits will need to be streamlined into a compliance management system to free up man hours for compliance officers to provide more support in the field. Field-based support staff must be internal to the organization to allow trust to be built between operations and environmental teams, and to ensure continuity in the knowledge of environmental regulations that affect environmental process.

Field-Based Compliance

Environmental compliance begins at the field level. A key component of increasing field-based compliance is training. When employees understand the reasons for a certain process or requirement, they make more informed decisions. From project planning to waste storage and final restoration, training and communication are key to the achieving the field-based compliance portion of the transformation.

Environmental Involvement in Planning Stages

Attention to environmental requirements will be included at the start of all project discussions to ensure the design's constructability and permit applicability. Systems and processes for data collection will be developed in a way that allows for sustainability reporting in the long term. The quantitative analysis of the data will also drive continuous improvements. Each of these measures will reduce compliance issues and associated penalties.

Management System/Seamless Integration with Operations

We will implement a practical environmental management system (EMS) that supports the process of continuous improvement and garners senior leadership support. We will undertake this process following the methodology that the Consortium uses through training and by integrating environmental aspects into operations. ATCO developed a new EMS in 2015, and Quanta continuously improves and develops its EMS with each new acquisition. This experience will be brought to bear in developing an EMS that is right for LUMA.

We use an integrated program for safety, health, environment and quality (SHEQ) that is woven into operations, as described in our approach to safety management, and which presents an opportunity to evolve the employee culture quickly, increasing coordination and information transfer. This change will also drive continuous improvement within the organization, which will ultimately improve customer satisfaction.

Implementing an environmental management system will assist T&D Operations with seamlessly integrating environmental processes into work steps; doing so will drive proper waste handling and storage the other actions required for environmental compliance. Our team will deliver training to ensure that all waste streams are properly segregated, handled and disposed of at permitted disposal facilities, and encourage recycling and reuse for non-hazardous items. Disposal facility audits will help avoid future Superfund site involvement and ensure that materials are handled as required by law.

Community Inclusion

A key component of our overall approach to O&M services is community integration. Involving the community is one way to ensure that our work leaves lasting benefits and will improve the confidence Puerto Ricans have in their energy provider. This extends to environmental management, with potential initiatives that may include sponsored university environmental studies, household hazardous waste recycling and innovative vegetation management programs that benefit the local community.

4.0 PREPARING FOR THE FUTURE

The Consortium is well practiced in Lean and Six Sigma quality methodology, which will inform the continuous improvement process governing our environmental management system.

We will implement a quality control and continuous improvement process built on integrity and able to report strengths and weaknesses from the field to both T&D Operations and the Environment department. Monitoring and reporting will allow for analysis of trends and causal effects and, highlighting performance results with the balanced scorecard, will feed into controls and performance measures.

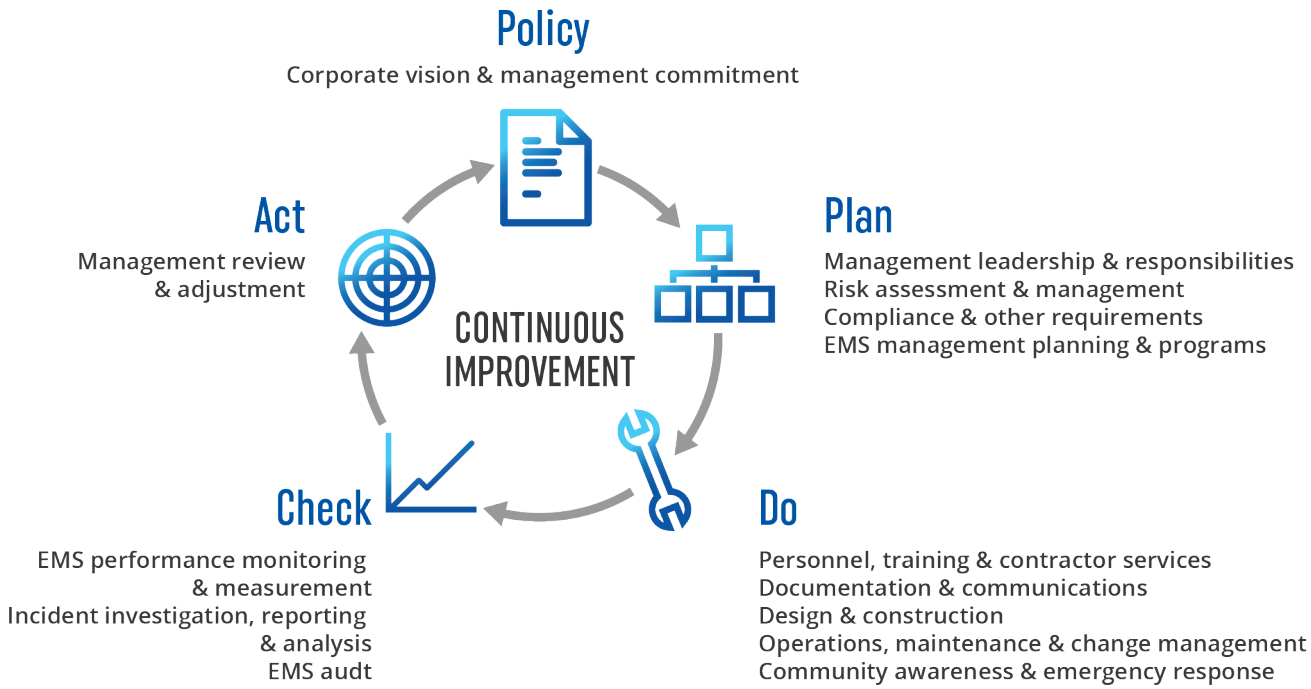


Figure 30: Continuous improvement in environmental management

P. GENERATION & SHARED SERVICES

It is our understanding that, prior to the Service Commencement Date, PREPA will be reorganized so that GenCo owns the legacy generation assets and GridCo remains as Owner of the T&D System. GenCo will generate energy and capacity and sell to GridCo under the GridCo-GenCo PPOA. This PPOA will be finalized during the Front-End Transition Period. PREPA will also continue to purchase energy and capacity from IPPs under their PPOAs. The O&M Agreement refers to these PPOAs between GridCo and IPPs as Generation Supply Contracts. Operator will act as agent of GridCo in managing our obligations with regard to the GridCo-GenCo PPOA and any other PPOAs.

The Consortium's approach for how LUMA will interface with Puerto Rico's power generation facilities will achieve several objectives and will require new procedures and organizational structures. To do this, we will need to accomplish the following tasks;

- Formalizing the procedures and organization of a power supply dispatch function, including all necessary power-supply information;
- Developing the System Operation Principles document, which will be used to manage the interface between system dispatch and the generation fleet;
- Providing the analytical support to define and administer resource adequacy requirements for generation capacity;
- Organizing a Shared Services group at LUMA to provide administrative services such as accounting, human resources and others to Genco in a similar manner to how PREPA staff currently provide these services; and
- Working with PREPA and the Administrator to support the completion of the GridCo-GenCo Power Purchase Operating Agreement (PPOA) during transition.

1.0 GENERAL

There are still several undefined elements of the regulatory transition to a fully unbundled generation sector in Puerto Rico. We will work closely with PREB, the Administrator and other government stakeholders to fully understand and incorporate their vision for the unbundling priorities and timelines. We are confident in our ability to support these priorities once they have been vetted and defined among all stakeholders.

The following key considerations will inform our discussions with PREB and government stakeholders:

- The timeline for unbundling and key milestone events;
- The preferred path to ring-fence generation assets and related business;
- The status of existing PPOAs that have not been renegotiated, including if any justifiable reasons exist for not proceeding with a new RFP solicitation to obtain more recent prices that reflect photovoltaic (PV) price declines over the past decade; and
- Pricing and penalty provisions for scheduling and dispatching legacy plants under the new GridCo-GenCo PPOA.

Once these priorities and timelines are defined, the other more detailed activities can be mapped out and planned. A conceptual timeline of the key milestones to unbundling is shown below as a reference.

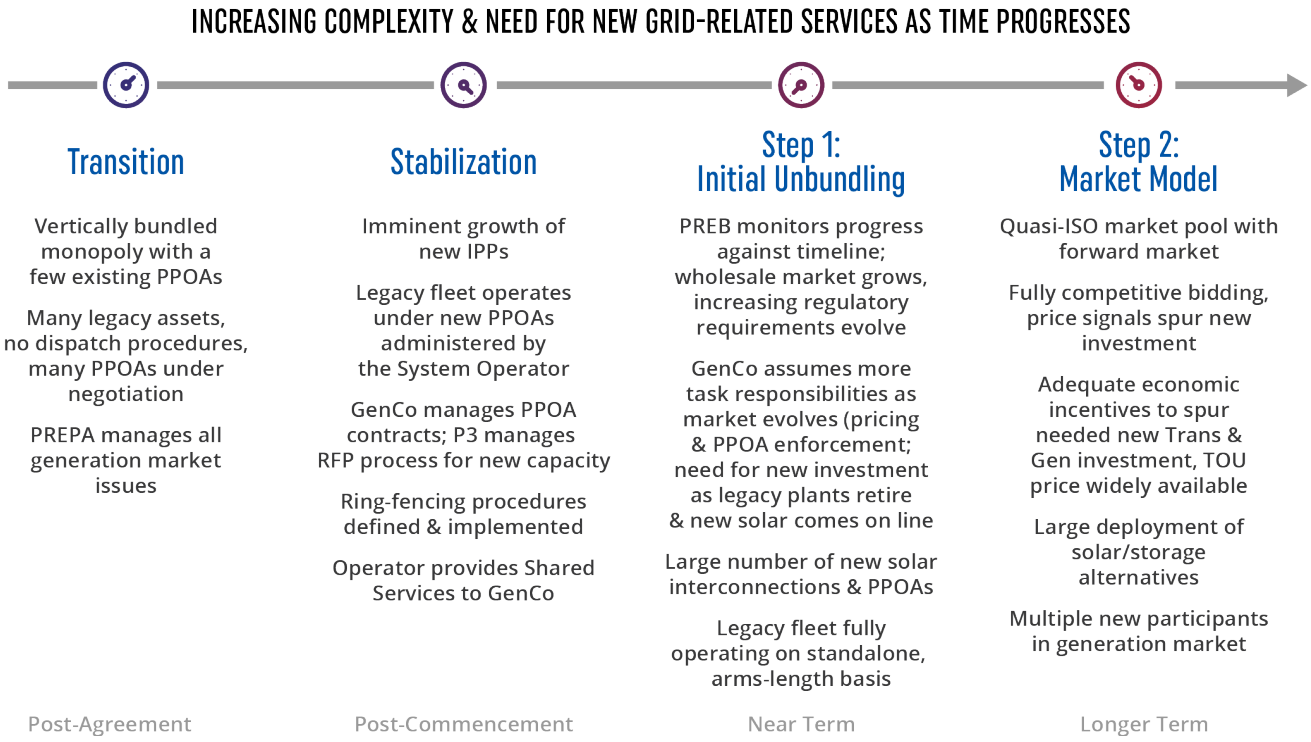


Figure 31: Conceptual timeline of the key milestones to unbundling

This is not a definitive roadmap to an unbundled energy marketplace, but it does illustrate that the generation sector must move through several distinct phases to become unbundled. The transition to each successive phase will be progressively more complex, and each new phase has the potential to require considerable time depending on the regulatory timeline and actions of market participants to support the timeline. We intend to play a constructive role appropriate to our obligations under the O&M Agreement including responsibilities as the System Operator to achieve the policy objectives and timeline set by GOPR and PREB.

2.0 POWER SUPPLY DISPATCH

Please note that this section repeats our plan as defined in Section 1.A, T&D Operations.

The Operator will be responsible for planning and scheduling the dispatch of electric energy, capacity and ancillary services products. Initially, this will involve a simple transfer of activities previously performed by PREPA. Within a year or two however, this function will have to adapt to a new operating environment, particularly as new solar generation is added to the system.

The future operating environment will require a dynamic, flexible dispatch model that incorporates the growing role of short-term weather fluctuations and variable solar production, as well as real-time load conditions and pricing signals that may change within a single hour. The system operator will need to

coordinate and reconcile different forecasts and models to deliver the least-cost power supply to end-use customers and to efficiently manage the dispatch of existing baseload thermal generation assets.

One of the first, most important priorities will be to review dispatch protocols and incorporate recommendations from subject-matter experts to define formalized, written dispatch procedures. These procedures will need to address steady-state operating conditions and storm planning and execution events, while recognizing the increased complexity and importance of real-time decision making.

Our team will review fuel and plant production trends for individual plants and the total fleet during the GridCo-GenCo PPOA negotiation process in order to identify key bottlenecks or operational limits that increase cost or limit total production. Analysis presented in the fiscal plan suggests that improved system dispatch could save $24 million annually. LUMA will work to validate these savings so that they can be passed on to ratepayers.

The dispatch center will have to develop contingency plans for scenarios of high solar penetration and potential curtailment procedures. Termed the “duck curve,” this is an increasing concern for most independent system operators as variable penetration increases. Given Puerto Rico’s general lack of resource diversity and inability to share resources with other systems, issues related to over-generation or curtailments could eventually become a significant issue.

3.0 INTERCONNECTION PROGRAM

LUMA will also be responsible for designing and administering an Interconnection Program in a manner that increases customer satisfaction and achieves regulatory objectives. The interconnection policy will be effective and transparent. It will ensure timely processing and that a potentially large number of interconnection requests is completed. One critical element of ensuring public support will be a queue management and status reporting capability that integrates website, social media and regulatory reporting requirements. Customers will be able to check the status and progress of their requests and regulators will be able to see the overall interconnection program status by accessing accurate and timely status reports. The overall program will use information portals that are used in California and Hawaii as models, and include a large amount of annual, monthly and near real-time reporting information.

LUMA will first work with PREB to learn their priorities and timelines for the interconnection procedures. We will develop separate interconnection policies for rooftop and utility-scale solar customers, which will involve public meetings to solicit input from customers and developers, as well as communicating our policy goals and requirements to these stakeholder groups.

LUMA will also establish a fair and transparent cost policy that charges a reasonable amount to interconnect to the system and in a reasonable timeframe. The interconnection program will identify all cost components and describe how costs are charged to developers. We will also define a cost-tracking and audit process to periodically audit cost trends and, with PREB approval, make adjustments if the cost to customers is trending too high or low. The results of this cost-tracking and

audit process will be released to the public to build credibility and assurance that costs are applied in a fair and reasonable way.

As described earlier, we expect that status and performance trends related to interconnection requests will be of high interest to developers and customer communities. Status reporting of the PPOA queue for utility-scale developments will be provided through a web application so interested stakeholders can immediately assess the status and performance trends of the interconnection process.

4.0 SYSTEM OPERATION PRINCIPLES

A team staffed by Operator and Administrator personnel will create the initial System Operations Principles document (SOP) during the Front-End Transition. As there appears to be nothing comparable to the SOP in existing, written form, it must be created entirely from scratch.

The SOP will prescribe how the electric supply system will be operated in a safe, reliable and economical manner. It will define how the Operator will conduct:

- Short– and long-term supply and demand forecasting;
- Reliability planning studies;
- Economic and technical assessment of new projects;
- Deactivation studies and other studies and evaluations; and
- Managemnet of the interconnection process.

The SOP will contain formal, written procedures that reflect the design and interconnection of each generation facility. They will include topics such as:

- Communications;
- Clearances and switching practices;
- Outage scheduling;
- Economic dispatch;
- Information and documentation requirements;
- Reactive power; and
- Voltage scheduling and emergency procedures.

In the past, PREPA has not used written dispatch procedures but, with the expected growth of variable solar generation, formal procedures are mandatory to ensure efficient operations and to monitor compliance with the GridCo-GenCo PPOA.

The SOP will also define coordination of unit dispatching, including annual, monthly and hourly scheduling. Scheduled and non-scheduled outages will be coordinated to meet the hourly demand for electricity. It will also specify the operation of ancillary services to maintain reactive power and/or voltage levels, as well as reserve operations, including both synchronized and non-synchronized spinning reserves.

Our plan for System Operations will include key processes and documentation we expect Operator to produce and maintain after commencement. Key items are described below. Table 3 below summarizes the specific planning horizon, sources and primary purpose for these documents, which we intend to use as tools of the System Operator function.

Table 3: Scheduling of electric energy & capacity

	PLANNING HORIZON	INFORMATION SOURCE	PRIMARY PURPOSE
Long-Term Generation Plan (LTGP)	10 years	▪ System studies ▪ T&D improvement status ▪ Market updates (economic, world oil prices) ▪ Contractual performance (PPOAs, natural gas) ▪ Regulatory progress on unbundling	▪ Maintain an up-to-date reflection of long-term plan
Annual Loads & Resources Report (L&R Report)	1 year	▪ The System Planning group will compile projected loads and resources, which will reflect the contractual obligations of all existing PPOAs and PREPA's legacy fleet ▪ Planned outage schedules for all generation will be provided by each generator consistent with their PPOA	▪ Near-term planning tool to ensure that loads & resources are balanced ▪ Fuel planning
Generation Supply & Demand Report (GS&D Report)	1 month (or seasonal)	▪ Operator ▪ PREPA legacy generation fleet ▪ PPOA portfolio	▪ Near-term outage and contingency scheduling ▪ Fuel planning
Two-Day Forecast	48 hours	▪ Operator ▪ PREPA legacy generation fleet ▪ PPOA portfolio ▪ T&D availability reporting	▪ Manage immediate terms adjustments related to unavailable capacity (generation or T&D)

Long-Term Generation Plan (LTGP)

The Operator will maintain an LTGP, which will be an up-to-date reflection of the long-term plan. The LTGP will be provided each year to PREB and reflect the most recently approved IRP, which captures real market conditions. This report will be prepared each year and have a ten-year planning horizon.

Annual Loads & Resources Report (L&R Report)

By the fourth quarter of each year, LUMA's System Planning group will prepare an L&R Report that incorporates the expected energy demand (loads) for the next 12-month period, as well as the expected generation from all known generation facilities (energy supply). This will serve as the basis for the next 12 months' outlook.

The expected loads will be prepared net of energy efficiency program impacts. The System Planning group will prepare and maintain these expected loads in a manner consistent with the demand forecast used in the IRP and any other system planning-related activities.

We expect that the energy-supply resources will reflect the contractual obligations of all existing thermal projects, as well as the expected output from all renewable projects. The renewable projects will be designated “must run” facilities since they have zero marginal costs and will be the lowest variable-cost units on the system.

The energy supply will also reflect the forecast output from PREPA’s legacy fleet, which will soon be managed under the GridCo-GenCo PPOA. Planned outage schedules for all generation will be prepared and reflected in the L&R report.

Generation Supply & Demand Report (GS&D Report)

We will prepare a GS&D Report each week with a three-month rolling-time horizon. The forecast will reflect the updated perspective from the L&R Report and incorporate known changes or conditions that could affect the balance of supply and demand.

The GS&D Report will be used as a primary input for GenCo’s Fuel Procurement group, as it will be the company’s best estimate of fuel requirements for the coming week. It will also be the source of the week-ahead generation requirements forecast.

Two-Day Forecasts

To provide a more near-term perspective to balance demand and supply, we will also maintain a two-day forecast of planned loads and resources. The two-day forecast will eventually become the primary energy product contracted and managed through the PPOA process.

5.0 PROCUREMENT OF GENERATION PROJECTS & CONTRACTS

Based on our interviews during the field assessment, there appear to be no written protocols defining generation procurement projects and contracts. These procedures will have to be developed from scratch.

In accordance with the IRP, the Operator will define resource adequacy levels that may require new generation procurement. We will define resource procurement priorities, perform long– and short-term system planning studies to determine the need for new resources, meet with PREB annually to determine whether additional power supply resources are needed and coordinate any startup-related services connected with new electric supply.

We will periodically develop a Long-Term Capacity Expansion plan (LTCE) for submission to PREB. The LTCE will project the expected capacity for the system. It will also evaluate all potential means to meet system adequacy limits, including wires, non-wires and all generation alternatives. These analyses and system plan assumptions must also be coordinated and integrated into future IRP updates.

We will coordinate the T&D Planning Analysis & Forecasts used to model future loads and resource adequacy limits. We will determine the amount of energy and capacity needed, in addition to specifying where on the system it is needed and when. This forecast will be updated at least twice per

year for the next three to five years, at a minimum, due to the magnitude of new capacity, new mini-grids and other changes on the system.

We will manage periodic updates to the approved IRP, which will be completed at least every three years. We will coordinate the development of planning assumptions and criteria and review the applicability of existing law or future revisions to the law. To solicit greater public involvement and consensus for the IRP report, we will conduct open public meetings.

After LUMA determines the need for new resources, we will communicate these needs in a formal request to GenCo and Administrator. At that point, the Administrator will be responsible for procuring these new resources. We understand that the Administrator will manage the competitive solicitation process, select finalists and eventual winners of the RFP process and negotiate and administer the new PPOA associated with the new source of supply.

6.0 GENCO SHARED SERVICES

Individual personnel inside PREPA who currently provide services to generation-related activities will be identified and organized into a Shared Services group. These services may include:

- Administrative/Human Resources;
- Regulatory & Public Affairs (generation-related only);
- Finance & Accounting;
- Information Technology;
- Legal;
- Bookkeeping;
- Environmental;
- Procurement & Supply Chain;
- Outage Support;
- Fleet;
- Capital Improvements Analysis & Determination;
- Real Estate;
- Facilities; and
- Physical Security.

The identified employee groups will operate under the GenCo Shared Services Agreement (SSA), which will be signed between Operator and GridCo prior to commencement. Pursuant to the SSA, the Operator will provide identified shared services to GenCo in the manner, amount and quality consistent with what is currently provided by PREPA. Employees providing services under the SSA will also be eligible to provide other services to LUMA as appropriate, but they will track and report specific services provided under the SSA by separate charge numbers to be defined during the transition phase.

7.0 SERVICES TO SUPPORT GRIDCO-GENCO PPOA NEGOTIATION

Interactions between GridCo and GenCo will be governed by a PPOA that will be negotiated during the transition period. The PPOA will define topics such as pricing, budgets and payments, fuel and generation charges, working capital and invoices. It will also prescribe operating provisions and commercial terms.

Based on information provided during field work, it is our understanding that any future PPOAs that PREPA executes for purchase of energy will be signed by GenCo as purchaser and the IPP that owns the new facility as seller. We plan to provide information and support to GenCo and the Administrator for the procurement of new PPOAs consistent with our long-term planning responsibility and our role as System Operator.

Q. REGULATORY

LUMA has a deep history of working collaboratively with regulators throughout North and Latin America. Our leadership team has a deep understanding of the role of regulators and appreciates the vital role that they perform in ensuring that utility services are carried out in the public interest.

Puerto Rico has a mix of legal and regulatory processes with elements from civil law systems used in Latin America and common law practices from the U.S. legal system. Through our operations in Latin America and the U.S., our Consortium brings functional expertise in both systems.

In addition, LUMA has a unique blend of regulatory experience ranging from operating under performance-based regulation (ATCO Distribution) to cost-of-service regulation (ATCO Transmission) — all within a framework with competitive generation and retail markets.

1.0 WHAT WE FOUND

LUMA's regulatory due diligence included a review of the legislative framework, a review of PREB decisions and information available on the record of proceedings.

Our assessment of the legislative framework and regulatory structure currently in place is positive. Considering PREB has only been assembled for a short period of time (since 2014), our assessment is that PREB has done significant work to build a strong and supportive regulatory environment. It has used qualified experts to establish regulations drawing from modern state regulatory frameworks.

PREB decisions adhere to well-established regulatory principles used in other North American jurisdictions (including cost causation, just and reasonable rates, efficiency, prospectively and affiliate code of conduct). LUMA is very familiar and has significant experience with these regulatory principles.

PREB's responsibilities are not limited to establishing rates. It must also establish rules and carry out oversight duties to ensure that PREPA's operational performance satisfies customers' needs and achieves financial sustainability.

To carry out its duties, PREB has the ability to issue regulations and establish standards required of entities and companies that provide electricity services. PREB may issue decisions on cases related to the energy sector, including reviewing electricity bills, addressing complaints related to failure of compliance with public policy, resolving disputes with respect to wheeling and interconnection contracts.

LUMA also acknowledges that policymakers and regulators have set a vision to deploy multiple, relatively new technologies (e.g., DER, microgrids) for customers to have more tools to manage their energy use and evolve into prosumers.

2.0 WHAT WE PROPOSE

Our approach will be one of collaboration, as appropriate, with PREB in order to fully understand the needs and goals of the regulator. Our regulatory filings (e.g., rate applications, IRP applications, etc.) will be data-driven and comprehensive to enable PREB to make fully informed decisions.

LUMA's regulatory group will have several key focus areas. The team will be responsible for rate case proceedings before PREB and will participate in the annual budget approval process. The team will prepare and present rate adjustment requests when necessary, as per the O&M Agreement.

The team will also be responsible to ensure adherence to all Puerto Rican government policy goals and regulations including the implementation of the IRP. Examples of priorities identified during our due diligence that will be incorporated into our work include:

- Establishing a transparent and efficient interconnection process for large and small generators, including customers installing their own generation source;
- Implementing energy efficiency programs targeting reductions in overall demand per year; and
- Instituting demand-side management techniques to assist with managing peak load and adding resiliency to the system.

To achieve success, our approach within LUMA will involve a regulatory team that works closely with the operating team to be as effective as possible in developing regulatory submissions. The team's responsibilities will include ensuring that LUMA remains current on legislative changes affecting applicable regulations be they related to energy or to related topics (e.g., environmental, land rights, etc.).

LUMA will also establish relationships with known entities that may act as interveners, more specifically, the Independent Consumer Protection Office and the Commonwealth Energy Public Policy Office.

3.0 HOW WE WILL DELIVER

Rate applications before PREB (including rate adjustment filings) will be a key focus of LUMA's regulatory department. As described in Form 1.5, we will start during the Front-End Transition period with a more comprehensive review with the PREPA team of the rate application that led to PREB's January 17, 2017 Final Resolution and Order (Case No. CEPR-AP-2015-0001). The intent of the review will be to fully understand the initial application that led to the PREB decision with an aim to identify areas of improvement in the development of the future rate applications. This will include working with the PREPA team to understand any shortcomings in data gathering and establish an understanding of the required information necessary to form comprehensive regulatory applications that are in conformance with the expectations of PREB.

We will also work with PREB and relevant stakeholders to identify lessons from the recent IRP process. We will incorporate these into our plan for the development of the next IRP and the subsequent PREB approval proceedings.

For general compliance matters, the regulatory team will be in charge of tracking compliance issues for LUMA, communicating appropriate follow-up actions, and documenting that the follow-up actions are taken. The regulatory team will also work to update internal policy and processes to ensure on-going compliance.

With regards to the tracking of performance metrics and presentation of results, we will use the data standards, reports and other processes established during the Front-End Transition Period. The resulting reports will be used within LUMA to celebrate successes and as a tool to continuously improve our operations and reduce costs to our customers.

To accomplish all the above, we will draw on our SMEs to build internal competency, while continuing to work with qualified external advisors to fill gaps. We plan over time is to rely less on external advisors and draw more heavily from in-house expertise.

3.1 Interconnection

We recognize the importance of increasing renewable energy penetration in Puerto Rico, particularly small-scale solar, and of providing customers the opportunity to receive information on the status and timelines for interconnection.

In accordance with the laws and regulations of Puerto Rico, we will improve and administer an Interconnection Program that increases customer satisfaction and achieves its regulatory objectives. The interconnection policy will be effective and transparent. It will ensure timely processing and that a potentially large number of interconnection requests is completed.

One critical element of ensuring public support will be a queue management and status reporting capability that integrates website, social media and regulatory reporting requirements. Customers will be able to check the status and progress of their requests and regulators will be able to see the overall interconnection program status by accessing accurate and timely status reports.

Our plan for improved interconnection process is described in Sections 1.P and 1.Q. Generation and Shared Services, 3.0 Interconnection Program.

3.2 Distributed Generation

A detailed program will be defined to maximize the pace and magnitude of increased solar generation. While the largest source of new solar generation in Puerto Rico will be utility-scale PPOAs, we will seek distributed solar opportunities that could be constructed within 18 – 24 months of commencement. Based on our observations, this could add up to as much as 100 MW.

There are a number of different load segments that will represent the most attractive solar opportunities. These are illustrated in Figure 30 and described below.

In-House Load

In-house load includes GenCo generation sites, Owner facilities and car parking lots.

Eco-Center Community Solar

We will develop at least one prototype Eco-Center, preferably near a low-income housing area, school or other site. It will feature a community solar resource and enhanced energy-efficiency deployments (e.g., LED bulb changeouts, high-efficiency appliances for demand response).

Municipal Outreach

We will target municipalities with desired attributes for solar resources, such as land availability. These DER could be helpful for some municipalities to reduce their excess CILT payment balance. The capital investment may be sourced from federal or other low-cost sources.

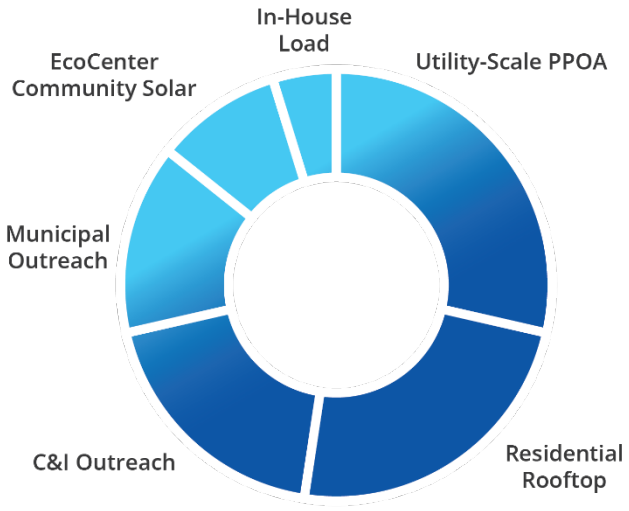


Figure 32: Load segments for solar opportunities

Corporate & Industrial (C&I) Outreach

There are solar facilities in place at the Puerto Rico Convention Center in San Juan. We will target highly visible locations such as these, including convention centers, airports and city car parks for further installations.

Residential Rooftop

LUMA will define the program for a standard solar option to appeal to small residentials, which could include financing support, integration with energy efficiency and DR programs and potentially a new tariff for standard solar customers. Legislative could require outside developers to participate in the program.

Utility-Scale PPOA

This will eventually provide most solar energy production. It will take time to define the solicitation and selection process and interconnection program, and for developers to be able to access credit markets to bring prices down closer to the low price levels seen in other markets.

We will work closely with identified, high-profile stakeholders to increase their use and the benefit of solar generation. This will include identifying the most attractive locations for solar deployment. There could be financing or legal constraints to resolve, such as solar generation ownership and tax obstacles, but we anticipate that these will be manageable. We are committed to making this a reality.

3.3 Energy Storage

The IRP identifies a significant requirement for new battery storage capacity, totaling approximately 900 MW over the next five years. Achieving this will require the development of technical capability at

LUMA, as well as considerable effort to support the regulatory requirements of such a rapid deployment.

Commercial-scale battery storage offers the greatest opportunity to deploy the large number of required MWs to meet the IRP targets and will be LUMA's primary focus when considering long-term capacity plans and competitive solicitation cycles. These solicitations must be coordinated with timelines for the development of minigrids across Puerto Rico, as a primary purpose of the storage is to support the minigrids in the event of an extended storm-related outage.

Storage capacity additions will be closely linked to the development of utility-scale solar, and future solar bids should be solicited with a storage option. We expect that early utility-scale solar/storage projects might be built with solar capacity developed first, and storage added on as a later-stage option — as the minigrids are able to integrate storage and the price of storage continues to decline. Ideally, the first RFPs related to utility-scale solar and storage should be released before the end of the first year after commencement.

The deployment of large-scale battery storage will also require considerable regulatory research and policy development, since many of these regulatory interpretations are not fully defined in utility practice. These policies will have an impact on utility-scale projects and capacity additions; LUMA will therefore work closely with PREB to define these requirements.

3.4 Minigrids & Microgrids

On May 16, 2018, PREB issued its first microgrid regulation, and microgrids are also deemed essential in Act 17. Since then, microgrids have been the topic of much additional discussion and rulemaking. Several issues continue to evolve, but the role of microgrids has become more prominent in T&D planning and was a key element of the IRP. LUMA will define the schedule for transmission system expansion in the System Remediation Plan — which will be a key factor in prioritizing which minigrids are developed first. LUMA must work closely with PREB to resolve questions of who will pay for costs related to the minigrid, how these costs might be allocated in rates and what are the policies and procedures for matching generation to support each minigrid.

The large-scale deployment of storage resources will also have to be coordinated and administered between the Operator and GenCo. The method for pricing and financing these storage facilities must be defined in greater detail. There are potential opportunities for LUMA to assist in these decisions, but PREB must determine how to address issues of ratepayer equity, cross-subsidization and cost allocations. We expect that many of these questions should be addressed by the PREB study that are due to be completed by the end of 2019, as required by Act 17.

3.5 Energy Efficiency

Energy efficiency and demand-side management (EE-DSM) programs can significantly reduce customer costs. The latest IRP identified approximately $100 million in spending, beginning in 2020, for six major EE programs that passed the Total Resource Test (TRC). The largest of these programs is the commercial lighting rebate for high-efficiency LEDs.

The IRP has an aggressive commitment to energy efficiency investment, targeting a decrease in energy consumption of 2% each year over a 20-year time horizon. We intend to will focus in the near term on traditional EE programs (e.g., high-efficiency commercial LED replacements). However, within a few years, we will need to think more creatively to consider opportunities such as more efficient building standards, deploying DER to modify load shapes and procurement efficiencies to reduce waste, as in government energy programs and services.

As the smart grid continues to evolve, more market-based transactions between energy consumers and producers, as well as new processes and analytical tools, will be needed. These programs will require strong regulatory support and approval.

EE-DSM programs represent an important customer touchpoint with great potential to send a well-crafted message to customers contacted and increase customer satisfaction for those adopting one of the EE-DSM programs. EE-DSM programs will also broadly support the government's agenda of a green, progressive utility becoming more innovative and reducing its carbon footprint.

LUMA will conduct a detailed assessment of existing EE program status, effectiveness and timelines, and will validate or improve existing programs and propose revised targets or timelines if appropriate. We expect that, unless significant issues are identified during the transition period, we will continue strongly supporting existing EE program deployment.

KPI metrics used to monitor the EE program are expected to be total estimated energy savings and total dollar expenditures for EE programs. We will design and implement a strong measurement and verification (M&V) program to ensure that ratepayers receive the appropriate benefits as designed.

3.6 Net Metering

LUMA will ensure that the proper meter is installed and functioning at each net-metering customer location, and that the meter accurately measures energy delivered to the customer and energy provided to the grid. The energy sold back will be tracked and accounted for as Net Energy Generation credits (NEGs), and will capture monthly consumption and credits carried over and trued up at the end of each fiscal year. LUMA will oversee this process to make sure it achieves the goals of the legislation — which is to increase solar penetration, promote DER and ensure that those customers will not be forced to incur unreasonable costs to support these initiatives.

The energy produced by a customer's rooftop solar array (RSA) must also be tracked separately and accounted for, as the amount of energy generated on site will also incur the debt transition charge required under the RSA. This must be evaluated more fully in developing an estimated interconnection fee, which will require PREB approval. For customers who are already generating energy from their roofs, additional costs to properly meter them may be required. This will be a complex process that will have to be presented to PREB.

3.7 Renewable Portfolio Standard (RPS) Compliance

Puerto Rico has established renewable energy targets that will require significant new solar PV generation in terms of total MW and the number of new solar facilities to be contracted and monitored

under new PPOAs. The Operator will be responsible for monitoring and reporting on renewable production for compliance reporting purposes.

In addition to reporting renewable energy production, LUMA will also calculate and report emissions avoided from renewable production and the carbon intensity of total electric generation. Though legislation currently requires only the percentage of energy generated from renewables, it is conceivable that these other metrics might also be important in a decarbonized generation future.

Finally, LUMA will also coordinate information tracked and reported from energy efficiency program implementations. In many other parts of the U.S., kWh savings from energy efficiency programs can be used to offset RPS requirements on a kWh-for-kWh basis. This is not currently the case in Puerto Rico but is likely to become a topic that attracts future discussion when considering the large investment that ratepayers are making in energy efficiency and the significant RPS requirements imposed by legislation.

3.8 Retail Wheeling

Puerto Rico statutory law (Acts 57-2014 and 73-2008) provides for "wheeling" — i.e., delivering electricity over the T&D system where the electricity is sold by a qualified producer who uses renewable energy resources. In August 2018, PREB issued a rule to create a wheeling regulation with broader interpretation, such as allowing all potential suppliers to sell electricity at retail to PREPA's customers (which we understand is not provided for under existing Puerto Rico law). Comments have been filed and this docket is still open. In addition, retail wheeling was addressed in Law 17-2019. LUMA will closely monitor retail wheeling discussions due to the potential impact on cost structure and end-user customer rates.

3.9 Electric Vehicles

Electric vehicles represent a significant opportunity and are particularly attractive for Puerto Rico and LUMA. The island's size means that very few vehicle roundtrips will be greater than 200 miles, so trips can be completed without any need to recharge batteries. This removes a significant impediment to EV adoption. Additionally, Puerto Rico lacks the cold winters that reduce the effective range and expected life of an EV battery. EVs also offer an opportunity to reduce vehicle emissions, significantly cutting urban smog and CO_2 production.

We will implement a series of proposed initiatives to support the greening of the fleet through deployment of electric vehicles in Puerto Rico. Ultimately, the pace of EV adoption is up to consumer preference and the cost of replacing existing vehicles. However, it is the utility's responsibility to support this transition by installing the necessary EV charging infrastructure and pricing programs when doing so is in the best interest of the rate payers. We are committed to this transition for Puerto Rico and have executive with the unique expertise and experience to execute on this plan.

Current analytics report over 50 EV charging stations already in Puerto Rico, but this number will increase dramatically in coming years. We will meet with interested stakeholder groups in San Juan and other communities to develop a more detailed, specific plan to increase the deployment of electric vehicles.

R. LAND ACCESS & PERMITTING

Land requirements in Puerto Rico are a key element of operating the T&D system. As Operator we will manage the Owner's property rights necessary for T&D operations. Understanding rights and obligations of PREPA and property owners is an indispensable part of the process. This includes regulations on land rights and acquisition, construction permitting, new construction and maintenance, easements, emergency repair, crossings, liabilities and public encroachment on rights of way.

The Consortium has extensive experience managing land issues and utility operations in multiple jurisdictions in North America and elsewhere. We are well positioned to navigate land access and permitting in Puerto Rico. We have extensive experience in managing easement data and records, applying for and obtaining permits required at federal and local levels and conducting consultations with the public.

1.0 WHAT WE FOUND

Our observations of PREPA's current approach to land access and permitting relate to the lack of documentation and opaque requirements. Land access is a key element of performing work, and the Operator will have responsibility for managing and supporting the acquisition of property rights. We will identify any gaps in the approach to land use and permitting — particularly those related to:

- Missing land rights;
- Vegetation clearing limitations;
- Reclamation/decommission liabilities;
- Liabilities and indemnification from third parties crossing powerline assets;
- Public engagement;
- Stop-work orders;
- Damage to third-party infrastructure easements; and
- Any unknown costs related to these areas of risk.

2.0 WHAT WE PROPOSE

By using local talent and implementing methodology the Consortium has used successfully in many jurisdictions, including Spanish-speaking ones, we believe we can quickly close the gaps in the current system and develop standards and practices for a consistent approach to land access and permitting. Key components of this approach are defined below.

Local Workforce

LUMA will implement a focused department to provide professional services for land administration and acquisition. This department will be responsible for conducting land administration, survey, appraisals and consultation/negotiation activities. To supplement knowledge gaps in existing staff, we will engage local consultants experienced in obtaining land agreements and permits and in developing necessary administrative materials. These consultants will help fill any gaps in the existing team and build expertise within the group.

Database Development

Existing documentation will be collected and compiled into a database to identify gaps and assign actions. The local consultants we engage will direct Land group employees on the missing data, how to obtain it and why it is necessary. This database will be used for future reporting and will provide all necessary information, including surveys.

Awareness

Working with local experts, we will also identify and define all permitting or agreements required in Puerto Rico for LUMA to successfully complete all land, construction and maintenance activities. This includes defining the requirements for any crossing activities (e.g., railway, water, undergrounds) and road-use agreements. Not only will this work provide context for Land team employees, but it will also be used to educate construction and maintenance crews on the use of permits, the process and length of time to needed obtain them and the need to adhere to requirements outlined in agreements.

Results

By putting in place a focused land team, we expect to see the following:

- Local consultants sharing their subject-matter expertise with engaged employees to reduce overall reliance on external support and create a sustainable internal workforce;
- A better knowledge base of land rights to reduce risk associated with acquisition and maintenance of property rights;
- Improved turnaround times for property acquisition; and
- An improved understanding of the timing and requirements associated with obtaining permits and approvals, areas that can affect schedules and costs if misunderstood.

3.0 HOW WE WILL DELIVER

As we move forward in securing new land acquisitions for capital programs, it will be imperative for the group to conduct public consultations and file applications seeking approval. Leveraging the Consortium's experience, employees will learn how to complete the consultation process — notifying stakeholders, conducting open houses, updating stakeholders on any changes, filing the application and awaiting approval.

Our successes in obtaining application approval is due to our effective public interactions. We use the following as tools to communicate with customers and provide them with channels for feedback.

Online Project Profiles

These describe the project and identify current approval status. The public can see all information related to the project: schedule, updates, maps showing planned land use and any additional resources.

Notification Letters

Personalized notification letters communicate to the public regarding the upcoming project and identify the areas required for planned activities. This letter includes a reply form where landowners can voice their comments and concerns.

Additional Resources

Informational guides for the public will be available to download and read. These provide educational material on energy infrastructure. We will ensure that these are clear and readily available.

Open Houses

These face-to-face interactions with the public inform them of the project and create a forum to openly discuss concerns. They allow for feedback collection and can identify any potential opposing views, which we can work to proactively mitigate in our designs and construction processes.

Engaging the public on future land acquisition reflects the organization's involvement in the community and affords an opportunity for customer engagement, and to involve Puerto Ricans in how their energy needs are addressed. It will also allow LUMA to identify potential intervention.

By understanding concerns and mitigating issues prior to application submittal, we can expedite turnaround for approval to avoid delays from stakeholder objections. We intend to implement this methodology in the land department to expand employee capabilities, as consultation expertise will be integral for future infrastructure developments.

S. ENERGY LOSS REDUCTION

The combined technical (energy lost during transmission) and non-technical energy loss (energy lost from theft or fraud) for the Consortium and for premier utilities is below 4.5%. Maintaining energy losses at these levels requires continuous work to identify the source of losses. It also requires investment plans for improving technical energy losses and well-documented processes, inspections and technology to eliminate non-technical losses.

For LUMA to achieve a premier utility energy-loss program and maintain low loss levels, PREPA's current program, investment and structure have to be completely revamped to accelerate loss reduction. The Consortium's leadership has developed and implemented programs that have reduced non-technical energy losses at utilities which had energy losses equal to or greater than those currently found at PREPA.

1.0 WHAT WE FOUND

Siemens calculated PREPA's energy losses to be approximately 12.3%, with the breakdown of losses between technical and non-technical losses to be 7.8% and 4.5%, respectively. Based on interviews with PREPA staff, technical energy loss reduction has not been a priority. Although PREPA has had a focus on non-technical loss reduction, the program has not been very effective. PREPA's fraud program leaders attribute this to broken or missing meters and a lack of personnel for meter inspections. While we agree that these are contributing factors, we believe a more comprehensive non-technical energy loss reduction strategy is needed. This is required to reduce and maintain losses at the level of a premier utility. The consortium proven approach to reduce energy losses from the current high level to those of a premier utility levels is described below. Also, described below is the approach to maintain the non-technical energy losses at the reduced levels. Maintaining non-technical losses

2.0 WHAT WE PROPOSE

We propose reducing technical energy losses from today's 7 – 8% range to 4% by year 5. The non-technical energy loss program and targets will jointly be set in the System Remediation Plan.

Our approach consists of developing a Loss Reduction Program that incorporates plans to reduce technical and non-technical energy losses. It will include a plan and process for sustaining the lower level of energy losses once they are reduced.

The graphic below sets out initiatives that will be the starting point for the Loss Reduction Program. They may be amended during the transition period in the System Reduction Plan.

3.0 HOW WE WILL DELIVER

3.1 Boundary Metering

We will begin by accurately identifying overall system losses. A high priority will be to install boundary meters between all generation sources and the T&D system. Once the boundary meters are installed,

coordinated meter reads with electronic meters must be conducted as often as possible (but no less than once per month) to totalize consumption. The current residential population has meters that are not electronically read. Therefore, energy consumption from these manually read meters must be estimated to align with the coordinated meter read. Based on PREPA interviews, the meters used for large accounts are capable of electronic reads every 15 minutes, so coordinating these meter reads is possible. The coordinated electronic meter reads — with some analytical estimation for manual meter reads — will yield a more accurate account of energy loss for the T&D system, and a better understanding of this issue in Puerto Rico.

3.2 Technical Energy Loss Reduction

Siemens calculated PREPA's technical energy loss allocation between the T&D systems to be 2.8% and 5% respectively.

We will focus the Loss Reduction Program on the distribution system. As we mention previously, our goal is to reduce technical energy losses from today's 7 – 8% range to 4% over five years. We will continue to use the Siemens report's energy loss calculation formulas, but we will further calculate losses by distribution circuit and then, further, by circuit segments to determine which circuits and circuit segments to prioritize for investment.

The technical losses driven by the various distribution voltages below 13 kV; more extensive secondary network; and need for power factor (PF) improvement. Our technical solution will be as follows.

Convert & Standardize Various Lower Primary Distribution Levels

We will convert and standardize the various lower voltage primary distribution levels (i.e., 4 – 13 kV). The primary voltage conversions will be prioritized by segments with the highest energy losses. In addition, we will coordinate projects to simultaneously capture multiple improvement initiatives on circuits and/or circuit segments. For example, projects will be combined on circuit segments that have high energy losses as well as the worst reliability indices.

Install PF Correction

We will install PF correction (capacitor banks) with automated controls along the distribution circuits or at substations. The locations that see the greatest benefits will be prioritized.

LUMA will develop a business case template to decide if standalone energy loss reduction projects can be prudent. If they are not, the project will be assessed with other improvement initiatives for that particular circuit segment, evaluating the overall business case at that time.

3.3 Non-Technical Energy Loss Reduction

The Consortium has had significant success in substantially reducing non-technical energy losses in underperforming operations, while most North American utilities have not had the opportunity to gain the knowledge or practice to do so. Our current strategy to reduce non-technical losses is as follows.

- Communicate the dangers of fraudulent tampering with meters and service drops to customers. This communication will focus on the safety aspect of tampering with electrical equipment.
- Replace current meters with smart meters. We will start with replacing commercial and industrial meters because these customers account for approximately 60% of PREPA's overall revenue.
- Use energy balance segmentation to isolate energy losses by geographic region and circuit segments to prioritize energy-loss recovery work, and install smart meters in residential areas.
- Use the latest version of smart meters with approved meter-tampering detection.
- Implement a Meter Data Management (MDM) System with analytics to improve the success rate of identifying potential meter tampering.

4.0 PREPARING FOR THE FUTURE

Continuous improvement will occur as we mature the energy loss (fraud/theft) detection system and analytics. In the first three years, we will focus on analyzing the meter readings with the analytics engine of the MDM. Subsequently, analytics will use information from the MDM and from multiple sources such as GIS, asset management and third-party information sources. Enhancing the analytics engine will allow LUMA to quickly and more effectively identify energy theft.

T. RISK & INSURANCE

The Consortium runs highly complex and mature insurance and risk programs. Our experience in the marketplace is global in scope and size, and we work with nearly every applicable property underwriter in the world capable of insuring the utility assets and services in Puerto Rico. We also have to expertise to conduct a gap analysis of policy coverages and complete benchmarking exercises in addition to integrating an enterprise risk management approach across all business units.

Our well-staffed and experienced Risk departments fully understand the concepts of risk management dealing with identification, assessment, control, financing and administration. Our brokerage teams are bilingual, and we currently have thousands of Spanish-speaking employees in Latin American locations where we do business.

We believe a best-in-class Risk & Insurance program will address management, prevention and mitigation through appropriate training, programming and the efficient use of existing tools.

1.0 WHAT WE FOUND

PREPA has a system in place for collecting and tracking exposure data. While the data is mostly current, some insurance policies have expired, and a complete and current record of policies is needed to accurately represent the risk transfer tools in place. PREPA is putting an Enterprise Risk Management (ERM) system into place, which will be instrumental in collecting risks from across the company, and an important part of the ongoing improvement of risk identification.

2.0 WHAT WE PROPOSE

The ERM system will identify unique exposures on all facets of the business model, furthering our ability to minimize risk.

A comprehensive risk management program is necessary to protect assets from exposures that can create financial or other harm during the course of operations. Injury prevention and loss control that incorporates medical case management and return-to-work programs are vital to providing a full-service solution to risk management. We will implement controls to monitor tools and inventory that linemen take from facilities for their work, and to address the concentration of risk exposure in warehousing and asset management.

It will also be critical to manage risk associated with Puerto Rico's climate events. Regular crisis management drills for extreme weather events will be implemented to improve recovery time, ensuring that systems can quickly return to regular operation.

3.0 HOW WE WILL DELIVER

Our approach to Risk & Insurance for the Operator will include the adoption and enhancement of the current ERM system at PREPA. The ERM will be integral to an on-going risk assessment, management, monitoring and disclosure processes. Key components will be an assessment of the spectrum of risks, executive oversight, internal audit and Board Oversight.

The adequacy of processes and controls to manage business risk identified in the ERM will be to follow a standardized, disciplined approach to help management evaluate and improve the effectiveness of risk management, control and governance processes.

To ensure the ERM is functioning properly, our Internal Auditing program will annually design a plan—in conjunction with business leaders—that focuses audit attention on high-risk areas. Through its work, Internal Audit will assess, monitor and report on the adequacy of internal controls in areas such as information technology, energy delivery, customer service and capital projects. The Board of Directors for LUMA will receive periodic reports on audits conducted and progress in implementing the annual audit plan and on changes made to the audit plan.

2. EXPERIENCE & CREDENTIALS OF MANAGEMENT TEAM

Below is a summary of key management team personnel who will lead the different functional areas, as well as their supporting experience and credentials.

The Board of Directors will provide management oversight, strategic guidance, compliance and oversight. The board will include Richard Urwin and Pat Wood, whose qualifications are described below. Other board members will include executives from ATCO and Quanta.

Roger J. Urwin, PhD, C. B. E
Director

Dr. Urwin is a Director of ATCO Ltd. and the Chair of ATCO Australia Pty Ltd. He has worked in gas, electric and telecom utilities throughout his career, retiring at the end of 2006 as Group Chief Executive of National Grid PLC. He played a key role in establishing National Grid's international strategy and its successful expansion into the U.S., creating one of the largest investor-owned utility companies in the world.

Dr. Urwin was Managing Director and Chief Executive of London Electricity from 1990 to 1995. He was non-executive Chairman of Utilico Investments Limited until October 2015 and has been a special advisor to Global Infrastructure Partners, an international infrastructure investment fund. He was Chair of Alfred McAlpine plc from 2006 to 2008.

Dr. Urwin is a Commander of the Order of the British Empire. He has a Physics degree and a Doctorate from the University of Southampton, U.K.

Pat Wood, III
Director

Pat Wood is an energy infrastructure developer and has had a long career in the energy industry. He is the past Chairman of the Federal Energy Regulatory Commission and the Public Utility Commission of Texas. In his regulatory career in the natural gas, transportation, telecommunications and electric power industries, Mr. Wood was a forceful advocate for competitive, well-monitored markets and robust infrastructure investment. He is best-known for his role in building the Texas competitive power industry and expanding organized wholesale power and natural gas markets across the U.S.

Mr. Wood's development focus is on new power system infrastructure. He is President of Hunt BEE Network, an energy storage business. Mr. Wood is also the Lead Independent Director of integrated solar company, SunPower, and a Director of utility construction firm Quanta Services, Inc.

Mr. Wood holds a Bachelor of Science degree from Texas A&M University and a Juris Doctor degree from Harvard Law School. He serves on the Executive Board of Big Brothers Big Sisters Lone Star, the National Petroleum Council, the National Renewable Energy Laboratory External Advisory Council and the Texas A&M Smart Grid Council.

We are relocating a world-class management team to Puerto Rico. The combined experience of our senior leaders amounts to hundreds of years of successfully leading utility operations teams, building major energy infrastructure on time and on budget and navigating the unique challenges of moving

utilities from public to private operation. We also specialize in bringing financial accountability, information technology enhancement and transparency to organizations. We are proud to have Spanish-speaking bilingual executives who have led the turnaround of electric service in Latin America and the Caribbean.

Our team's top professionals have trained utility employees to work safely and at higher competency levels. As we detail in our bid proposal, we are committed to establishing a new NLC campus to train the next generation of Puerto Rico's craft-skilled workforce. This will be a key investment in the successful modernization of the grid and economic growth in Puerto Rico. Additionally, we are accustomed to working with local businesses, and plan to subcontract with qualified local service providers. We believe this practice will maximize economic activity in communities across Puerto Rico.

Wayne Stensby
CEO & President

Wayne Stensby brings over 30 years of experience in the energy and electricity industry. He is the Executive Vice President of Corporate Development for Canadian Utilities Limited (an ATCO Company) and is currently responsible for the leadership, strategy and direction of Canadian Utilities global corporate development, including its Canadian midstream business and its LATAM operations.

Most recently, Wayne held the role of Managing Director, Electricity Global Business Unit for Canadian Utilities Limited, where Wayne was responsible for the operations, strategy and development of Canadian Utilities electricity related businesses.

Prior to leading the electricity businesses, Wayne was Managing Director and Chief Operating Officer for ATCO Australia where he led ATCO's Australian operations.

Wayne joined ATCO in 1988 and has held a wide variety of increasingly senior operational, commercial and engineering leadership positions, including multiple assignments in Australia, Canada, and the U.K.

Wayne holds a Bachelor of Science in Electrical Engineering from the University of Alberta and is registered as a Professional Engineer.

Derek Carson
Health, Safety, Environmental & Quality

Derek Carson has more than 20 years of experience in safety, health, environmental and quality leadership roles within the electric utilities industry. In his current role at Quanta Services, Derek provides support to all of Quanta's operating units in the areas of industrial hygiene, environment, quality and overall injury prevention. His experience includes expertise implementing safety and environmental management systems, developing behavior-based safety programs that reinforce good safety behaviors and drive down the number of safety incidents, implementing vehicle accident reduction initiatives, conducting incident investigations, developing risk assessments and using root-cause analysis methodologies to drive permanent change.

In addition to the years spent at multiple utility companies, Derek worked for the U.S. Department of Labor in the OSHA division and brings with him a strong background in regulatory compliance.

Derek holds a Bachelor of Science in Industrial Hygiene from Ohio University and has Certified Safety Professional (CSP) and Certified Professional Environmental Auditor (CPEA) designations.

Donato (Don) Cortez
Utility Transformation

An experienced utility operations executive and business development professional, Don Cortez has a proven track record in creating and implementing strategic plans to improve business. Currently, Don is responsible for developing electric and gas utility business opportunities for Quanta Services. He brings with him significant amount experience in utility operations step-change management, both nationally and internationally, with positive results, increasing shareholder value and customer satisfaction. Specifically, Don has experience leading the operations and maintenance of utilities in multiple Latin American countries.

While at IBM, Don developed large business deals in the global utilities market, collaborating with executives in China, Taiwan, Oman, Australia, Brazil, Chile, South Africa, Mexico, Korea and the U.S.

At CenterPoint Energy, Cortez oversaw the electric and gas business technology strategy including the smart grid program, which encompassed the major equipment selection, overall architecture direction, contract negotiations and Public Utility Commission of Texas smart meter deployment agreements. He managed and coordinated with personnel to oversee process improvement in gas and electric utilities, telecom services, fleet services, land and field services, geographical information systems (GIS), central shop services, contractor services, distribution engineering, central metering and safety and environmental services.

Lastly, Don led and managed emergency response planning within electric utilities, including developing a utility asset damage prediction model used to estimate labor resources for power restoration, storm restoration duration, power system actual storm damage assessment processes and procedures and emergency operating plans to minimize the power system outage time.

Don holds a Bachelor of Science in Electrical Engineering from Texas A&M University. He is fully English-Spanish bilingual and thrives in leading diverse individuals and teams.

Cam DaFoe
IT/OT Planning

As an IT executive for ATCO, Cam DaFoe applies his extensive background in relationship management, influencing, negotiating, problem-solving, oral and written communications, executive selling, planning and strategizing within the IT function. Cam has built and led a team of trusted advisors for his client organization. He works with multiple functional areas in organizations, including customer information systems, workforce management, asset management, meter management, customer care, dispatch, geographic information and land management. Cam's IT experience extends across IT portfolio management, project accounting, lifecycle upgrades, Windows 10, Oracle

Financials, Oracle Cloud, IBM Maximo, application outsourcing (Wipro) and migration to cloud computing.

Formal training and on-the-job experience have given Cam exposure to — and a broad perspective on — numerous aspects of utility operations including business functions, regulatory environment, application systems, capitalization and revenue generation.

Prior to his work at ATCO, Cam spent over 30 years with IBM Canada Ltd. where he worked with business clients on managing business priorities, scheduling, dependencies and resources over complex project portfolios to build and execute governance programs in support of proper IT management.

Cam earned a Bachelor of Science in Psychology from University of Alberta and completed a number of executive programs through Harvard Business School (IBM Certification Program), the University of Michigan (Stone and Webster Utilities Executive Program) and Queen's School of Business (Public Executive Forum). Cam is certified as a Certified Client Executive from IBM and as a Business Relationship Manager from the Business Relationship Management Institute.

Kari Findley
Legal

Kari Findley currently serves as Senior Legal Counsel Lead for strategic transactions at Quanta Services. In this role, she has immense experience in structuring corporate operations, bidding on concessions, devising tax structure and preparing agreements between publicly traded companies for limited partnerships in both the utility and telecommunications space.

Kari has over 25 years of experience in mergers and acquisitions, drafting and negotiating documents and working closely with executive leadership to close strategic corporate acquisitions. Kari has an extensive history working with foreign and domestic corporations and joint ventures.

Kari has a Bachelor of Arts in Economics, Managerial Studies and Political Science from Rice University and earned her Doctor of Jurisprudence from the University of Texas School of Law.

Paul Goguen
Capital Projects

Paul Goguen has more than 32 years of utility experience in progressively responsible engineering, project management and executive roles. He is skilled with executive management and oversight of major electricity transmission and distribution projects and programs, and with managing and coordinating planning, operations and maintenance activities of transmission, distribution and telecommunications systems.

In his current role as Senior Vice President, Project Development, Paul's has overall responsibility for providing integrated direction, management and leadership in the business planning efforts of major projects for ATCO. His strengths include identifying, evaluating and implementing projects to grow ATCO in existing and new strategic markets. Paul provided regulatory oversight on the deferral

application for the $1.35 billion Eastern Alberta Transmission Line (EATL) project and served as the Director responsible for the operations and divestiture of the West Fort McMurray 500 kV Transmission Line — Alberta Power Line project.

Previously, Paul was the Senior Vice President and General Manager for Transmission and Distribution at ATCO. His overall responsibility comprised of ATCO's transmission and distribution business, including; system operations, maintenance, asset and work management, quality management, risk management, project and construction management, engineering, procurement, commercial, finance and accounting, regulatory, health & safety, environment, customer care and billing and metering and meter data management functions.

Paul holds a Bachelor of Science (Hons) in Mechanical Engineering from Queen's University and a Master of Business Administration from the University of Alberta. In addition, Paul is a Professional Engineer, earning and maintaining his designation since 1986.

Mario Hurtado
Regulatory

Mario Hurtado has over 25 years of experience in the electric utility, renewable energy and natural gas sectors. As a Co-Founder and Executive Vice President of Clean Line Energy Partners, Mario led the development of a $2.5 billion transmission line to connect 4,000 MW of renewable energy produced in the Oklahoma Panhandle to utilities in the Southeast U.S. In this role, Mario managed teams that received public utility commission and environmental approvals in Oklahoma and Tennessee and created and managed a public-private partnership with the U.S. Department of Energy. His team obtained permits and hundreds of miles of easements necessary to construct this 720-mile project.

Hurtado also managed operations for and new project development at a regional power generation business in Central America and the Caribbean. He has negotiated and executed large utility acquisitions and led transitions for several former public electric utilities in Brazil and Colombia. He is fully English-Spanish bilingual, is fluent in Portuguese and proficient in French, and has led diverse teams across multiple countries.

Mario received his Bachelor of Arts in Political Science from Columbia University. He pursued his Master of Arts in International Relations with concentrations in International Economics and Latin American Studies at the Nitze School of Advanced International Studies, Johns Hopkins University.

Jessica Laird
Customer Service

Jessica Laird brings over 15 years of specialized experience in customer service, billing and retail. In her various roles at ATCO, Jessica has led and implemented change for the ATCO retail business, ATCO Energy Ltd., as well as ATCO Electric. She focuses on the ongoing development of the customer experience using Lean Six Sigma methodologies.

In her career, Jessica has set up new billing systems from the ground up; developed and documented all customer service policies, processes, procedures and training modules for staff; created customer satisfaction surveys; and implemented process improvements based on these results.

To enhance the customer experience, Jessica focuses on driving key metrics across customer service teams, decreasing customer call times and increasing customer satisfaction by implementing a wide variety of innovative programs.

Jessica holds a Bachelor of Commerce in Organizational Analysis & Marketing from the University of Alberta.

Todd McLaren
Operations

Todd McLaren has over 25 years of utility experience in varying roles and over 11 years in an executive capacity on transmission, large distribution and substation construction projects. In his current role as Vice President, Engineering and Construction, Todd is responsible for the overall operations and maintenance of ATCO's transmission, distribution and telecommunication system, as well as project management, supply chain, project construction, commissioning, asset management, land and property functions.

Todd has successfully executed and managed challenging, multidisciplinary projects to completion. He is skilled in providing management and oversight through the full lifecycle of significant large-scale utility projects, including major storm and wildfire response.

Most notably, Todd was responsible for the construction planning, tender development and award, contractor management and regulatory matters for ATCO's $1.8 billion Eastern Alberta Transmission Line.

Todd majored in Finance at Olds College and minored in Law at Texas State University.

Darren Miller
Financial Management

With more than 30 years of experience as a financial and accounting leader, Darren Miller most recently served as the Chief Financial Officer of Quanta Marine Services, LLC. Darren is a proven financial executive with multi-faceted experience in fast-paced entrepreneurial environments. He specializes in areas of financial analysis and management, operational accounting, administrative services, mergers and acquisitions, risk assessment and management, internal controls and auditing, and process improvement.

Darren has successfully led change implementations in energy, marine, industrial service and construction companies, both nationally and internationally. Most recently, Miller managed the setup of a permanent establishment in Mexico, enabling Quanta Marine Services to be a key contractor for the Sur de Tejas offshore pipeline from Texas to Mexico.

Darren holds a Bachelor of Business Administration in Accounting from Lamar University and is a Certified Public Accountant.

Quyen Nguyen
Capital Projects

An electrical industry executive, Quyen Nguyen has over 25 years of experience in project development and execution. In his current role as Vice President, Projects and Construction, at ATCO, he manages and oversees all aspects of major transmission and worker accommodation projects and programs. He has expertise in managing and coordinating all maintenance activities of both transmission and telecommunication systems, as well as completing engineering design for all aspects of transmission line, substation and telecommunication facilities.

Most recently, Quyen was responsible for the engineering, construction, procurement project control and overall execution of the $1.6 billion Fort McMurray West 500 kV Transmission Line project and the $1.8 billion, 500 kV Eastern Alberta Transmission Line (EATL) project. In addition, Quyen led the Site C Worker Accommodation project, a $580 million 1,800-person lodge. His vast experience and record of delivering projects on schedule and on budget were key to meeting the compressed schedules of these projects.

Quyen holds a Bachelor of Science in Electrical Engineering from the University of Alberta and is a licensed Professional Engineer.

Kim Riddle
Human Resources

Kim Riddle currently serves as the Vice President of Human Resources (HR) for Quanta Services. In this role, she leads all HR functions, including full accountability for $130 million in consolidated benefits, retirement plans, HR compliance, diversity and inclusion, organizational performance, employee retention and other critical areas. Kim collaborates closely with the CEO, Board of Directors and senior management, assessing business objectives and designing global HR strategies and initiatives. She coordinates a full range of support tasks for 46,000 employees globally, including workforce planning, internal training, workforce development, employee relations, executive/staff compensation, auditing and onboarding processes. Kim is responsible for the enhancement of company culture and influence in the community, a mission that she cares deeply about.

Kim has headed due diligence for over 20 acquisitions at Quanta and has facilitated rapid integration into the Quanta organization. Prior to joining Quanta, Kim held various HR leadership positions, including Vice President of Human Resources for Hercules Offshore. Over her 25 years in the HR field, she has specialized in energy–, utility– and healthcare-related industries. In these fields, Kim has driven strategies that maximize organizational performance and accelerated growth. She excels at creating employee motivational programs that start from the top down, helping managers embrace styles that are proactive in employee retention.

Kim earned her Bachelor of Arts in Journalism from the University of Houston and possesses both Senior Professional in Human Resources (SPHR) and SHRM Senior Certified Professional (SHRM-SCP) designations.

Brian has a Master of Business Administration from the University of Michigan and a Bachelor of Science in Civil Engineering from Northeastern University.

Craig Schutt
Transition Program Manager

Craig Shutt has over 30 years of experience in project management leading large scale EPC projects. In his various project management roles with ATCO, Craig has been responsible for leading and directing the design build, the direction of EPC and routing/regulatory contractors, overall project management and project controls. He has prior knowledge and experience with managing the requirements of P3 projects and successful completions. Specifically, the West Fort McMurray 500 kV Transmission Project was energized 90 days in advance of the Target Energization Date.

In addition, Craig was responsible for the North East Transmission Development Project (NETD), a $600 million project to increase the transmission system capability around Fort McMurray, Alberta. In this role, he provided leadership and direction to project teams for NETD. He has a large amount of experience in developing and implementing project processes and management tools required for any project, including master contract management systems, inter-project material appropriation systems, resource planning, progress reporting requirements and integration with the project management offices.

Craig has a Bachelor of Science in Engineering from the University of Alberta and achieved his Project Management Professional (PMP) certification from the Project Management Institute.

Brian Walshe
Wholesale Generation

Brian Walshe has over 25 years of experience across a wide range of areas within the energy and utility industries. He has primarily focused on power plant and transmission and distribution operations, renewable energy strategies, generation wholesale markets and business integration planning. Brian has provided services to over 300 electric power generation plants of all technologies around the world. These services include leading or supporting technical or commercial due diligence on scores of thermal and renewable projects and providing expert witness testimony in utility regulatory proceedings.

For over 12 years of his career, Brian has lived and worked outside of North America and is English-Spanish bilingual. Prior to forming ION Consulting, Brian was employed with McKinsey & Company, Navigant/Metzler & Associates and Stone & Webster Inc. In all of these positions, he focused exclusively on the energy and utility industries and provided consulting services to over 80 utility and regulatory clients on four continents.

3. FEDERAL FUNDING EXPERIENCE & PLAN

A. FEDERAL FUNDING EXPERIENCE

The Consortium understands that the complete recovery of the Puerto Rican grid — and the ability to build it back better — will require a fully integrated team that leverages holistic electrical industry knowledge and deep insight and experience with acquiring and retaining federal financial assistance. Consortium team member IEM brings extensive federal financial assistance and disaster recovery insight and experience. As part of an integrated approach to capital spending programs and executing the System Remediation Plan, IEM executives will lead the federal funds management effort to develop quality staff, exercise leadership and execute technically sound processes and procedures.

1.0 OVERVIEW

For over three decades, IEM has been one of few contractors to maintain disaster management as its core business. IEM brings broad federal funds management insights, understanding and innovations.

Throughout our history, IEM has been on the leading edge of disaster management, providing the full spectrum of services before, during and after disasters. This includes disaster planning; helping state, local and federal agencies prepare for both man-made and natural disasters; putting boots on the ground during disaster response; and the complex operations required for disaster recovery. Most importantly, IEM has been on the ground helping both recipients and sub-recipients of federal financial assistance prioritize, manage and retain federal resources related to disaster recovery.

FEMA's Section 428 program was enacted to reduce disaster costs, streamline delivery and expedite recovery funds, while providing grantees with greater flexibility on how disaster recovery funds are applied for certain types of work. To date, of the nearly $16 billion in Public Assistance (PA) project funds identified by the State of New York for Hurricane Sandy, over 60% (nearly $10 billion) has been approved under Section 428 procedures. Since its authorization, IEM has implemented Section 428 projects in New York and New Jersey. IEM staff, working with the State of New York Disaster Assistance Representatives and other staff, have ensured:

- That project worksheets were clearly and effectively defined in terms of the scope of work and consistent with eligible, reimbursable costs;
- Timely follow-up and resolution of gaps and deficiencies with the FEMA Consolidated Resource Center (CRC) to support project approval or amendments; and
- Detailed review, reconciliation and approval (or denial) of all applicant reimbursement requests, including ensuring that auditing and financial review standards were fully met through a "rolling close-out" process.

In addition, for the last five years and on behalf of the State of New York, IEM has been working daily with sub-recipients throughout the state to rectify errors and omissions in their reimbursement requests and ensure timely payments. Through these engagements IEM has provided training to minimize issues with future submissions.

IEM Understands CDBG-DR Requirements

Housing and Urban Development (HUD) is providing Community Development Block Grant-Disaster Recovery (CDBG-DR) funds to the Government of Puerto Rico to address recovery needs from the 2017 Hurricanes and the Puerto Rico Department of Housing (PRDOH). The FEMA Coordination Program enables this and will provide reimbursement for the Puerto Rican government's cost share or local match for the portion of a project that qualifies for a HUD-eligible activity under CDBG-DR.

For CDBG-DR funds to be used on a project, the project must demonstrate certain factors, such as how the funding will benefit low– to moderate-income populations. The PRDOH FEMA Coordination PA Match is a reimbursement-based program that provides the non-federal share of the actual costs of completed eligible FEMA PA work to applicants/sub-recipients. IEM understands CDBG-DR requirements and will leverage this knowledge and experience to obtain the maximum funds possible to rebuild PREPA infrastructure.

IEM approaches disaster preparedness, response, recovery and mitigation comprehensively as an emergency management company. Therefore, IEM must be experts in all programs, including FEMA– and HUD-supported recovery programs. For example, IEM has been at the forefront of some of the largest CDBG-DR recoveries in recent history, and IEM understands CDBG-DR requirements even when executing on a recovery largely paid for with FEMA dollars. After Hurricane Katrina, it was IEM that wrote the Global Match concept for Louisiana, which not only accounted for using CDBG-DR funding as cost share, but also calculated the funding local governments had to expend on other non-federally supported projects so they could demonstrate total cost share compliance.

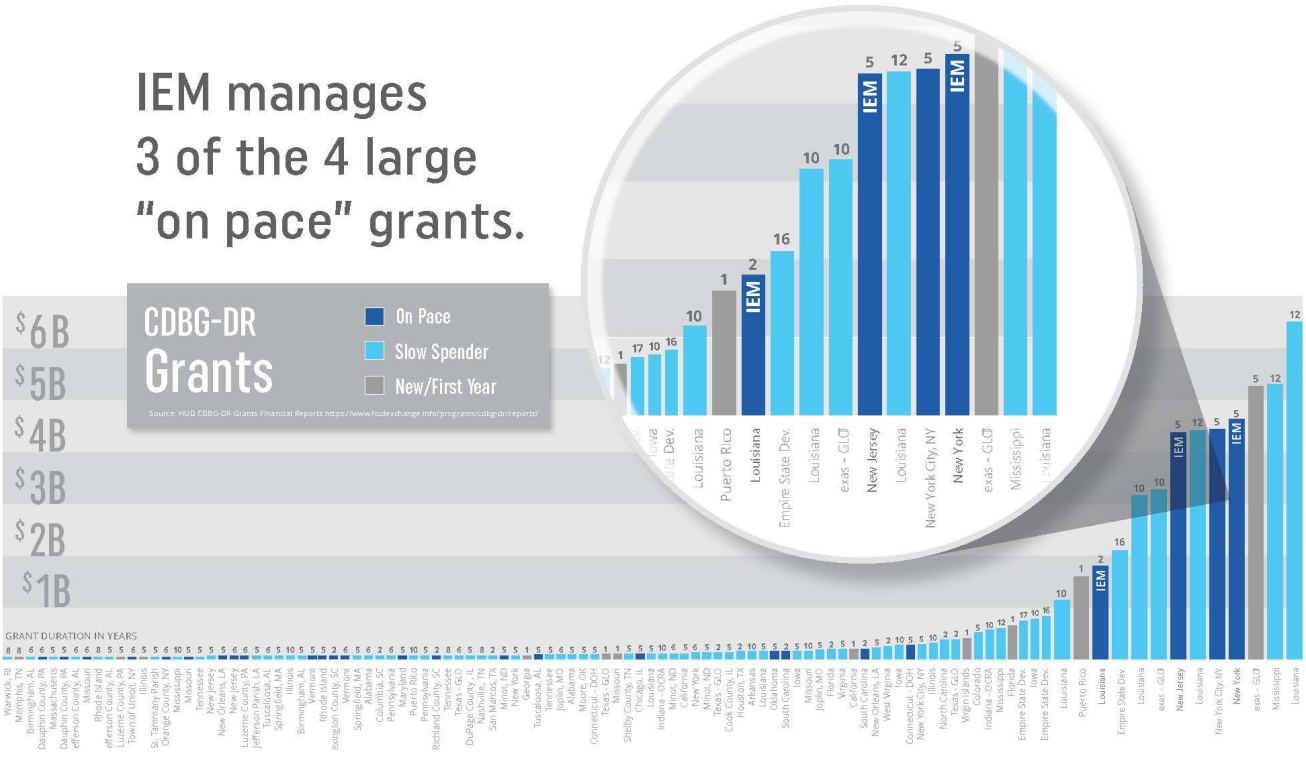


Figure 33: IEM's managed "on page" grants

Over the last ten years, IEM has managed some of the largest disaster recovery grants in the nation. Figure 34 illustrates our experience since 2005.

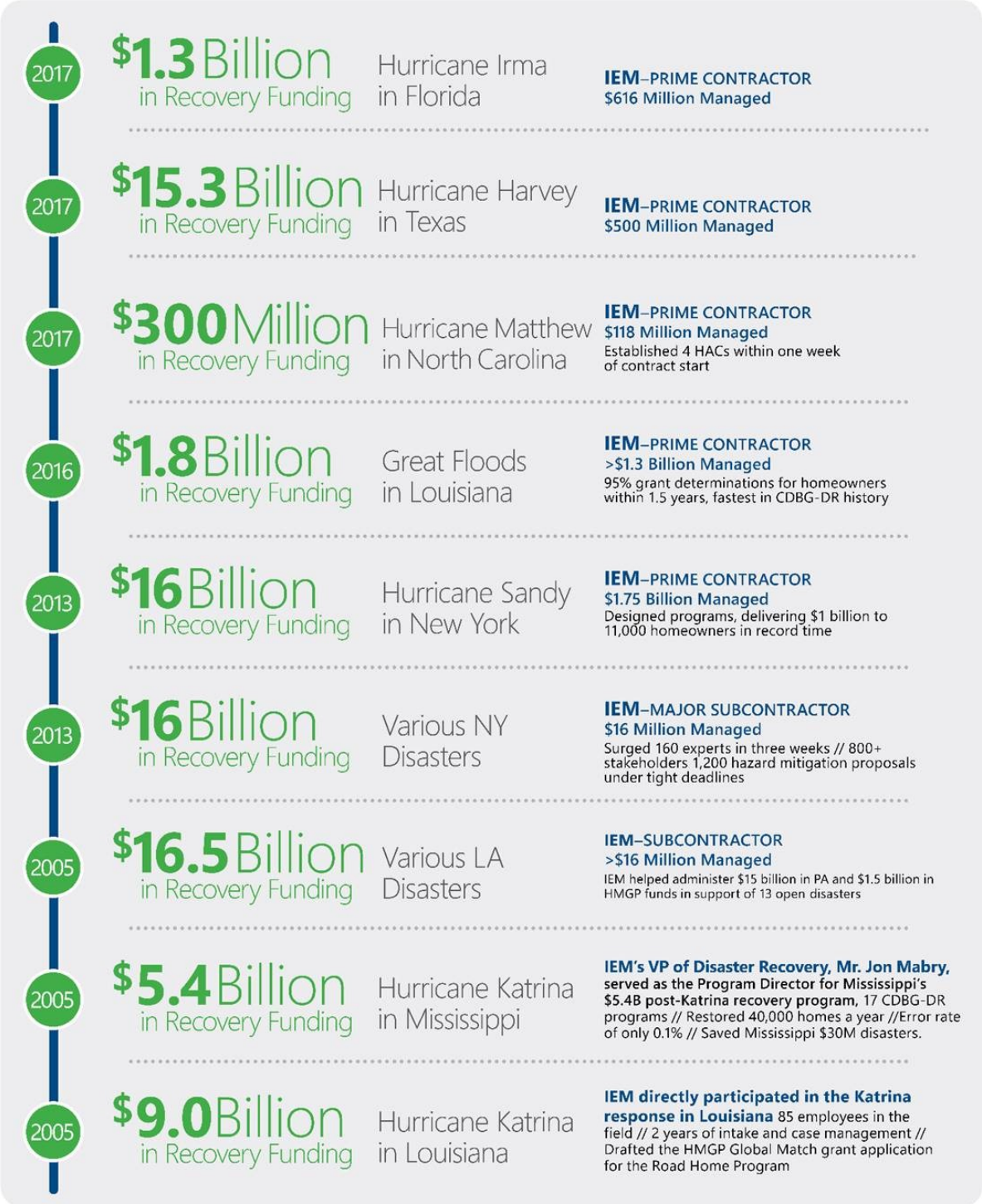


Figure 34: IEM's major disaster-recovery grant management experience

IEM Staff Receives the Best Training

Essential for IEM success in approaching our projects is deploying only the most highly trained and reliable staff for disaster recovery. IEM embraces a strategy that builds a deployable workforce where employees can grow and train to become the best. Our program specialists continually engage in training and, where applicable, maintain professional designations and certifications such as the Certified Flood Plain Manager (CFPM), Certified Emergency Manager (CEM), Project Management Professional (PMP), Certified Fraud Examiner (CFE), Certified Public Accountant (CPA), Professional Engineer (P.E.) and Certified Grants Management Professional (CGMP). All IEM employees are required to receive at least 40 hours of technical update training annually. All training is approved by IEM management, who take an active role in encouraging professional development, helping employees set career goals and identifying quality training that can be dispersed throughout the organization. This ensures that IEM has a continuously improving workforce that is better able to serve clients. Common courses IEM project personnel complete include:

- 632 Introduction to Debris Operations;
- IS-1000 Public Assistance Programs and Eligibility;
- IS-1002 FEMA Grants Portal;
- IS-1003 Exploratory Call, Damage Assessment, and the Recovery Scoping Meeting;
- IS-1005 Public Assistance Alternative Procedures (PAAP);
- IS-1008 Scope of Work and Costing;
- IS-1010 Emergency Protective Measures;
- IS-1012 PA Management Costs;
- IS-1017 Scope Change Requests, Time Extension, Improved/Alternate Project Requests;
- IS-1018 Determination Memorandums and Appeals;
- IS-1112 Introduction to Flood Claims;
- IS-1160 Damage Assessment Operations Training;
- IS-2900 National Disaster Recovery Framework;
- IS-393 Introduction to Hazard Mitigation;
- IS- 2700 Introduction to the National Mitigation Framework;
- IS-277 Introduction to Benefit Cost Analysis (BCA);
- IS-403 Introduction to Individual Assistance;
- IS-1117 Severe Repetitive Loss for Agents;
- IS-1106a FEMA Mapping Changes;
- IS-921a Implementing Critical Infrastructure Security and Resilience;
- IS-329 State Hazard Mitigation Planning;
- IS-325 Earthquake Basics: Science, Risk and Mitigation; and
- IS-321 Hurricane Mitigation for Mitigation Staff.

IEM Specializes in Advanced Project Management

IEM builds quality into every product and service we provide through our proven corporate Task Management Process (TMP), which is based on Project Management Institute (PMI) principles (see Figure 35 below). Our TMP has been honed through more than 29 years of successfully completing

projects through cycles of use, feedback and process improvement to where quality control is inherent in all tasks. The TMP includes built-in mechanisms to help avoid and resolve all potential problems. The core tenets of the TMP reflect an ongoing engagement to provide project feedback and incorporate our own internal management's review and expertise into the larger project. Regular feedback reduces risks associated with deliverable development.

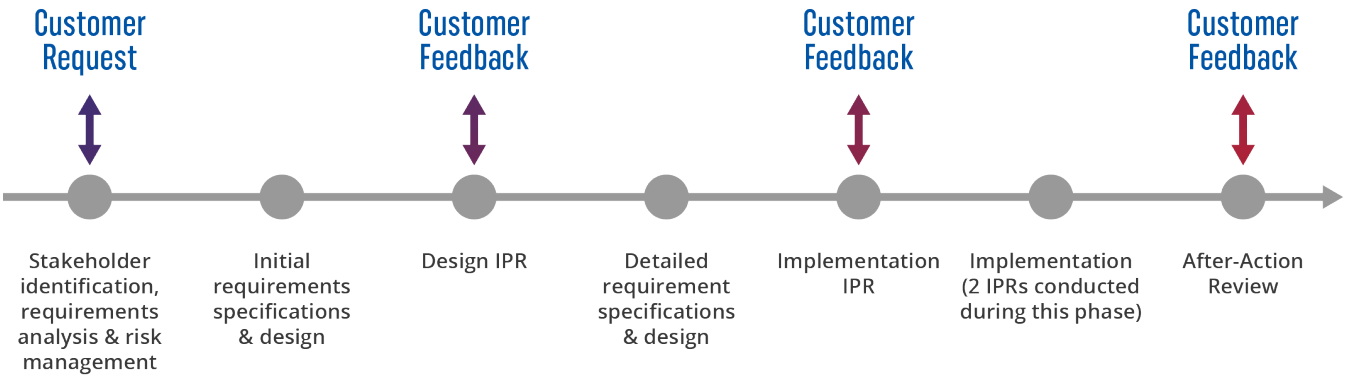


Figure 35: IEM's TMP ensures quality control through proactive customer engagement

Our TMP has been a driver of our success in hundreds of projects — ranging in scope from small projects to multi-year, multimillion-dollar contracts for federal agencies. The TMP is founded on:

- Careful analysis of all stakeholder requirements and concerns;
- Focused planning that includes "outside-the-box" thinking; and
- Attention to risk management from day one of task implementation, including detailed reviews by the responsible managers.

2.0 RECENT PROJECT EXAMPLES

IEM has extensive disaster recovery experience and has provided fully integrated program design, delivery and management from preparedness, protection and planning to disaster response and recovery in all 50 states, as well as several U.S. territories.

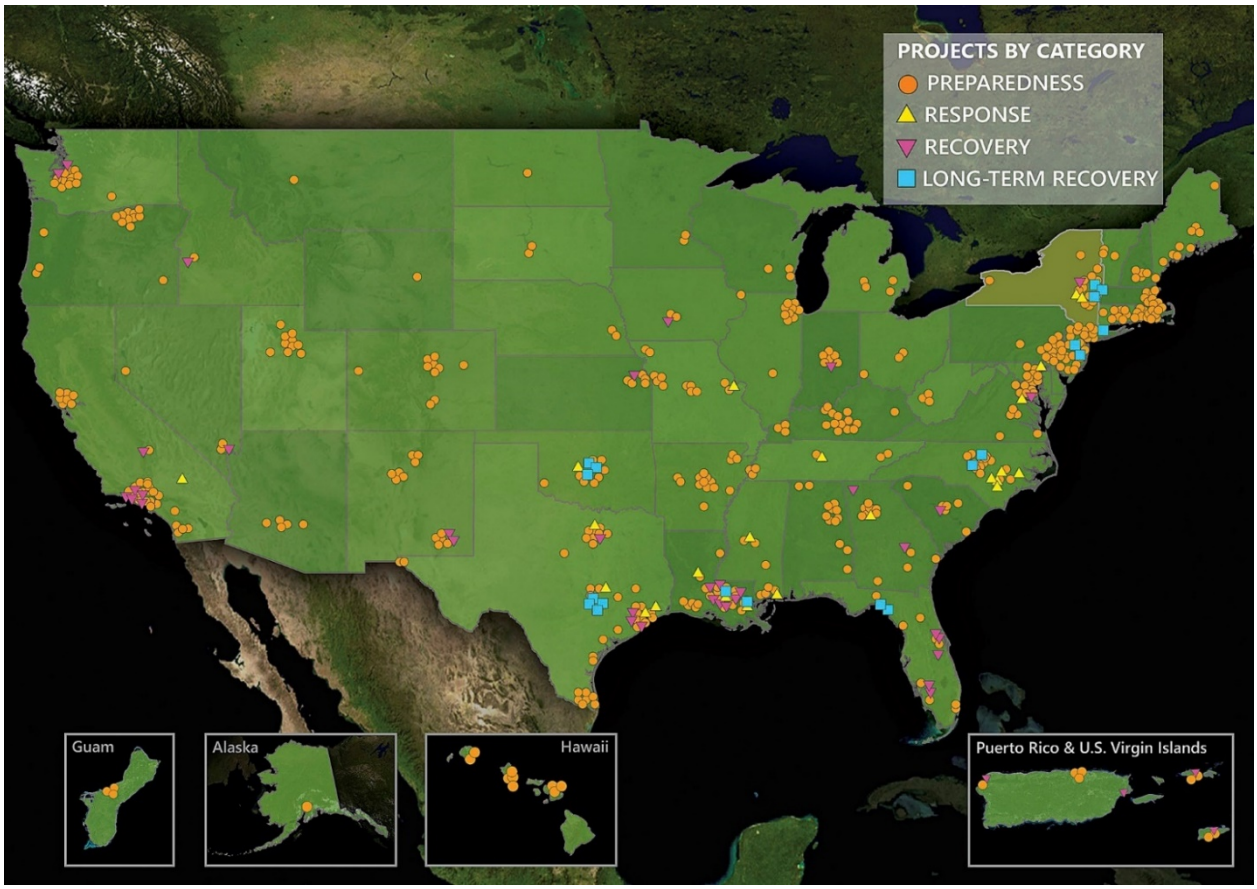


Figure 36: IEM's disaster recovery projects by category

The recent example provided below is just one of the 37 response and recovery projects IEM has undertaken in the last five years. We have provided details on additional representative projects in Appendix 3.

2.1 Hurricane Harvey Disaster Recovery Consulting Services
City of Houston

PERFORMANCE PERIOD

August 2017 – present

PROGRAM VALUE

$5 billion

IEM has been working with the City of Houston on the Hurricane Harvey Disaster Recovery Consulting Services project. In late August 2017, Hurricane Harvey struck the Gulf Coast, dumping more than 27 trillion gallons of water on the Houston metropolitan area and making it the wettest hurricane on record. The resulting catastrophic flooding damaged homes, businesses and municipal infrastructure — including city buildings, water/wastewater facilities, roads and bridges. Harvey has become the costliest hurricane in history, with damages estimated to be as high as $61 billion. IEM and its teaming partner have submitted fully scoped and properly estimated project worksheets for the City to sign, which is well over $1 billion in permanent work in multiple categories.

Over the subsequent months, the City assembled a Recovery Leadership Team (RLT) focused on recovering from and mitigating against future disasters. IEM and its teaming partner worked closely with the chief recovery officer, chief resilience officer and floodplain-management staff to identify housing– and infrastructure-related mitigation projects for both the FEMA 404 HMGP and Flood Mitigation Assistance (FMA) programs.

In October 2019, the City received the initial approval for its top three infrastructure projects, including the Lake Houston Dam Gate Expansion Project, Inwood Forest Flood Detention Project and North Canal Bypass Channel from the State's $1.2 billion allocation of 404 HMGP funds. Each of these is a unique infrastructure project that required consultation with FEMA mitigation staff, development of benefit-cost analyses and coordination with State leadership. This news came on the heels of the City's notification of approval for home-elevation grants totaling $18 million in FEMA funding from the 2019 grant cycle.

B. FEDERAL FUNDING PLAN

1.0 WHAT WE FOUND

The Consortium met with PREPA staff handling federal grant funding and gained an understanding of how they are being supported by vendors, the strategy to submit Section 428 projects by district and staff capacity. We observed the lack of a robust internal electronic sharing system to allow for closer disaster-recovery collaboration, and the absence of a grant compliance framework similar to COR^3's. We also observed that disaster incident-period activity before and just following Hurricanes Irma and Maria occurred in an EOC with insufficient space and technology. This can hinder adequate recordkeeping and make it difficult to meet FEMA reimbursements related to the incident period.

IEM has a number of projects using federal funding and may have another project in Puerto Rico as COR^3's vendor provider for Hazard Mitigation Assistance (HMA). As of the date of this proposal, IEM and COR^3 have not entered into a contract to perform these services that could create a perceived or real organizational conflict of interest (OCI). If IEM enters into a contract with COR^3 to provide HMA assistance, consistent with communication and commitment between the Administrator and IEM, no IEM staff will serve on this project that also serve on COR^3's HMA contract — among other OCI strategies addressed in IEM's July 30, 2019, letter to the Administrator's Chief Legal Counsel, Mr. Fermín E. Fontanes Goméz.

2.0 WHAT WE PROPOSE

We are familiar with COR^3's management of recovery activities involving FEMA funding related to Hurricanes Irma and Maria. IEM also has collegial relationships with other vendor staff serving COR^3 from companies like Deloitte and ICF. Further, the team includes Dora Pleasant, who facilitated COR^3's Disaster Recovery Federal Funds Management Guide when she worked for Deloitte and COR^3 was her client. In 2010 and 2019, IEM conducted airfield assessments and wrote emergency operations plans for Ceiba and Aguadilla, Puerto Rico. In 2017 and 2018, IEM deployed disaster response personnel to five airports in Puerto Rico and various warehouses. For eight months following Hurricanes Irma and Maria, we coordinated disaster response activities between the airports and FEMA Joint Field Office (JFO), conducted passenger manifesting, tracked and moved relief supplies, assisted with a limited general population evacuation of sick and elderly patients for a clinic, and supported U.S. Congressional delegations helicopter flights.

IEM is well-versed in COR^3's Federal Funds Management Guide, which includes important workflow mapping that will help our team set up a grants management function that completely aligns with COR^3. Integral to our success will be a procurement guide that is reliable and compliant with federal and territorial requirements. We will leverage this knowledge of Chapter 3: Procurement in the Federal Funds Management Guide as the basis for our procurement policy. However, we will enhance it to include procedural guidance — the "how to" conduct procurements — given that these procedural steps are specific to each sub-recipient. This will ensure a consistent application of policies and compliance with federal, FEMA and COR^3 rules and regulations. In addition, we will leverage COR^3's

Chapter 11: Sub-recipient Management and Monitoring to create LUMA's policies and procedures for contractor management and monitoring policies and procedures.

3.0 HOW WE WILL DELIVER

Our Federal Funds Management strategy depends on the reliable handoff of projects from various partners currently working for PREPA as we describe in our transition plan. Once this handoff has been achieved, our long-term strategy is to engage in project-level activities that result in a speedy but compliant recovery for the T&D system and achieves all priorities identified in the recovery strategy that will be part of the System Remediation Plan. We will activate the Disaster Recovery Team (DRT) to handle the wide-ranging tasks of grants management, such as:

- Handling FEMA Requests for Information on project worksheets;
- Answering inquiries from COR[3] regarding HMGP applications;
- Grant accounting;
- Reporting; and
- Federally funded project oversight and accountability.

3.1 Our Disaster Recovery Team

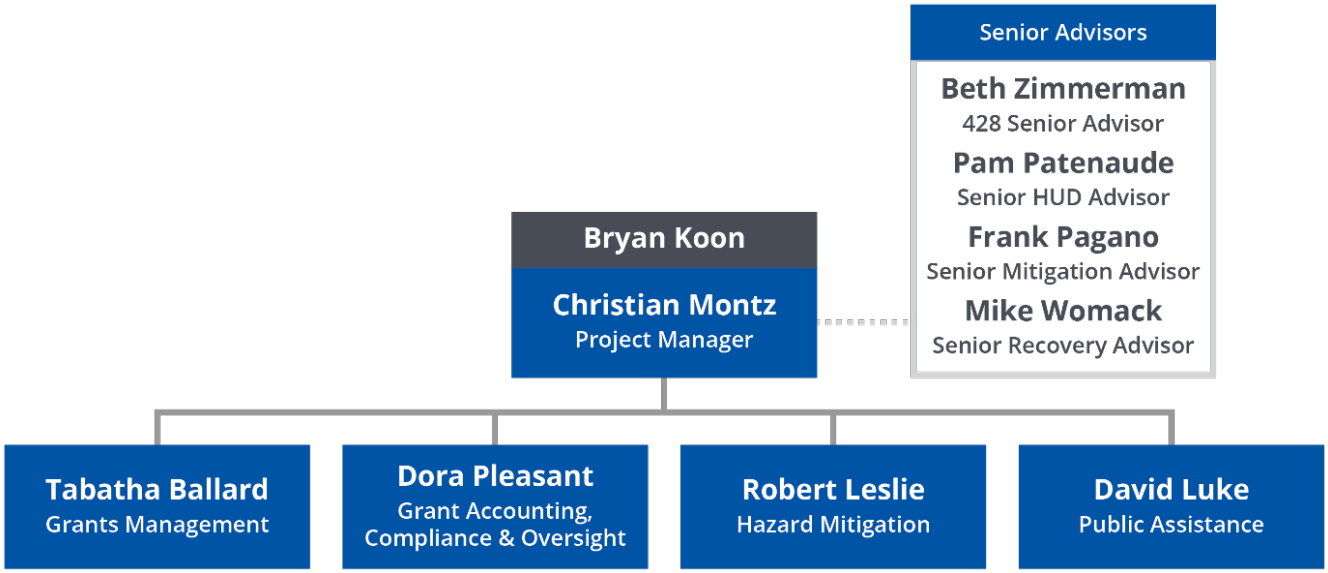


Figure 37: IEM organization chart

Bryan Koon

IEM VP of Homeland Security & Emergency Engagment

Mr. Koon has 20 years of experience in emergency operations, planning, management and response. He served for six years as the Director of the Florida Department of Emergency Management Division (FDEM), providing executive direction to ensure that Floridians were prepared for emergencies, recovered from them and mitigated against their impacts. Mr. Koon currently serves as the Chair of the Multihazard Mitigation Council (MMC), an independent, non-governmental entity of leading experts in mitigation that helps inform policy and advocates for smart mitigation practices nationwide.

Christian Montz
Disaster Recovery Team Program Manager

Mr. Montz is a certified fraud examiner with experience in federal grants management and oversight. He has nine years of experience in disaster recovery and 18 of federal grant experience. He served as regional division director for FEMA Region VI, overseeing HMA and PA grant activities. During his tenure at FEMA, he provided technical expertise on such topics as FEMA 428 Alternative Procedures and others, such as indirect cost plans, audit resilience and records retention. Mr. Montz is a former GAO auditor with an emphasis on disaster recovery programs.

Beth Zimmerman
428 Senior Advisor

Ms. Zimmerman is a seasoned recovery program advisor with 33 years of experience in disaster recovery operations. She has led response and recovery operations of over 400 major disaster declarations and 70 emergency declarations at the state and federal government levels. Ms. Zimmerman directed, coordinated and synchronized the programs and operations of FEMA's Response, Recovery, Logistics and Field Operations Directorates during steady-state and major disaster and emergency activations. She is a nationally recognized leader in emergency management.

Pam Patenaude
HUD Senior Advisor

Ms. Patenaude has more than 35 years of experience in housing, community economic development, real estate and public policy. She serves as senior community liaison at IEM, and served as the chief operating officer for the U.S. Department of Housing and Urban Development (HUD), where she oversaw a $52 billion budget and 7,000 employees. Ms. Patenaude served as director of Housing Policy at the Bipartisan Policy Center and executive vice president and founding executive director of the J. Ronald Terwilliger Center for Workforce Housing at the Urban Land Institute. She was nominated by President George W. Bush and confirmed by the U.S. Senate to serve as assistant secretary for Community Planning and Development.

Thomas Mike Womack
Recovery Senior Advisor

Mr. Womack is a seasoned technical advisor with 17 years of experience in emergency management, specializing in public-assistance and hazard-mitigation programs. He served as executive director of FEMA's Louisiana Recovery Office for five years unitl 2018, managing all PA and HMGP activity for Hurricanes Katrina and Rita. As a leader on the FEMA Region VI HQ Disaster Closeout Team, Mr. Womack assisted the Region VI Administrator and Louisiana Recovery Office staff in establishing PA project closeout goals and procedures resulting in a 300% increase in the pace of closeout of large projects during the last half of 2012.

Frank Pagano
406 Mitigation Senior Advisor

Mr. Pagano has 40 years of experience with disaster preparedness, recovery, emergency management, long-term recovery and community resilience. He has provided expert advice to support grants and studies that assist public safety/emergency management with critical infrastructure protection to foster disaster resilience outcomes. His experience includes managing over $2.0 billion of regional HMGP grants in FEMA Region VI, with the majority of grants located in Texas and Louisiana. Recent experience includes helping FEMA assist applicants with integrating Section 406 mitigation related to Hurricane Harvey.

Dora Pleasant
Governance, Compliance & Oversight Workstream Lead

Ms. Pleasant has extensive experience administering and overseeing grant funding and program implementation at the federal, state and local levels, with an emphasis on emergency management, preparedness and disaster recovery grant programs, such as CDBG-DR and FEMA grants. She has tested thousands of federal grant expenditures and has extensive FEMA PA grant accounting experience. She has intimate knowledge of the Grants Management Body of Knowledge (GMBoK) and is technically proficient with grant-related requirements found in selected titles such as 2, 24, and 44 of the Code of Federal Regulations (CFR).

David Luke
Public Assistance Workstream Lead

Mr. Luke brings 17 years of extensive of FEMA policy, rule and regulation experience, including Title 44 of the CFR, FEMA's PAPPG, Hurricanes Katrina/Rita-specific policies (disaster-specific guidelines, information sheets), Coastal Barrier Resources Act (CBRA) and Coastal Wetlands Planning, Protection and Restoration Act. He served as a policy advisor to the New York State Executive Liaison to the Chief of PA, providing policy guidance and insight. Mr. Luke was instrumental in getting millions in PA projects approved using Section 428 Alternative Procedures, incldluing for the Long Island Power Authority (LIPA). Mr. Luke is a civil engineer.

Tabatha Ballard
Grants Management Workstream Lead

Ms. Ballard is a seasoned grants manager with 15 years of experience in progressively responsible roles. She was selected by the Lieutenant Governor's Office to assist in organizing recovery and volunteer efforts across the State of Louisiana. As deputy program manager, Ms. Ballard assisted with staffing and successfully implementing the Shelter at Home (SAH) program for Louisiana residents. She led four managers and 68 employees assigned to several departments, including the call center, scheduling, QA/QC and senior site inspection teams.

Robert Leslie
HMA Status Analysis

Mr. Leslie has managed environmental site investigation and remediation projects, regulatory agency coordination and design/construction management of environmental restoration projects in excess of $20 million. He has carried out dozens of BCAs for FEMA for HMA projects over $100 million. Mr. Leslie is adept at finding and using data from across a wide spectrum to justify investments in mitigation. He is a licensed civil engineer and a certified flood plain manager.

The DRT will be divided into four major workstreams — grant management, grant accounting & compliance oversight, hazard mitigation and public assistance — and each workstream lead will report directly to Christian Montz, the Disaster Recovery Team's program manager.

Bryan Koon will support Mr. Montz, with the latter elevating issues that require corporate attention. Advisors to Mr. Montz will include Elizabeth Zimmerman for PA 428 issues and Frank Pagano for all issues related to hazard mitigation, whether HMGP, PA 406, FMA, PDM or any other mitigation grant program FEMA implements. Pam Patenaude will support with issues related to CDBG-DR funding, which will be used as match funding. Lastly, Mike Womack, whose experience managing Hurricane Katrina and Rita issues will be important, will assist the team as necessary with ongoing recovery strategic issues.

Table 4: Overview of each workstream's activities

WORKSTREAM	ACTIVITIES
Grants Management	▪ On behalf of the Owner, submit sub-grant applications for programs such as HMGP, PDM, EMPG, SHSGP and other relevant federal grant programs for which PREPA may be eligible ▪ Manage a routinized search for federal grants on Grants.gov and craft federal grant applications (e.g., U.S. Department of Energy, Transportation, Labor and any other future grant funding) ▪ Report sub-grant activity to COR^3, FEMA and other relevant granting agencies related to financial expenditures, progress and other required reporting ▪ Manage grant tasks in any federal granting agency system when the Owner is the Recipient ▪ In coordination with Operator's Procurement Office, manage certain aspects of the procurement lifecycle for procurements that will be reimbursed with federal funding ▪ Review contractor invoices received prior to payment to ensure that costs are allowable, supportable, allocable and necessary ▪ Work with the DRT Grant Accounting, Compliance and Oversight team leader to request reimbursements from COR^3 ▪ Perform grant and sub-grant closeout procedures, including FEMA's Final Inspection Report and, in cases when the Owner is the recipient, final SF-425s and progress reports ▪ Prepare an annual report to COR^3 on the status of the Owner's recovery across Puerto Rico, coordinated through the DRT and the Operator
Grant Accounting, Compliance & Oversight	▪ Create, assign and track accounting codes to avoid comingling of funding ▪ Submit, track and monitor requests for reimbursement from COR^3 ▪ Execute federal drawdowns in instances where the Owner is a recipient of grant funds from other federal granting agencies

WORKSTREAM	ACTIVITIES
	▪ Issue approval recommendations to the Operator's Office of Finance for the payment of contractor invoices upon receiving the respective workstream's review of the contractor invoices ▪ On behalf of the Owner, manage the Owner's response to external audits and monitoring visits related to federal funds received (e.g., FEMA, DHS or HUD Office of Inspector General, COR^3, Single Auditor) ▪ Work with COR^3 to resolve any Owner-related Single Audit and OIG audit findings or questions ▪ Maintain the Operator's Disaster Recovery Federal Funds Management Guide (DRFFMG) ▪ Take certain grant actions in the Puerto Rico Disaster Recovery Solution (PRDRS) as necessary ▪ Conduct periodic internal controls assessment on the Operator's operations and internal project monitoring (including contractors), and make findings available to COR^3 ▪ Provide technical assistance related to grant accounting, grant compliance and oversight as needed to the Operator, its contractors and DRT
Hazard Mitigation	▪ Identify ways in which the Operator or its resources can be protected against future damages and service interruption through water control efforts, wind impact mitigation and other strategies ▪ Apply for and manage HMGP projects ▪ Conduct benefit-cost analysis (BCA) consistent with FEMA requirements ▪ With assistance from the Grants Management Workstream, identify and apply for other federal mitigation funding streams like PDM, FMA and FEMA's future mitigation program among others ▪ Create scopes of work for architectural and engineering (A/E) services as well as construction projects related to mitigation project requests for proposals ▪ Work with the Grants Management workstream and the Operator Procurement Office to publish public solicitations for vendor services (e.g., A/E, environmental, construction) ▪ Assist with selecting the most responsive and responsible bidders ▪ Serve as the technical representative on contracts involving mitigation projects ▪ Elevate, from a technical perspective, contractor performance issues ▪ Provide substantive information regarding mitigation projects to Grants Management for reliable sub-recipient progress reporting to COR^3 ▪ Conduct review of vendor invoices ▪ Produce periodic program monitoring of mitigation projects and make them available to COR^3
Public Assistance	▪ Prioritize sequence of recovery projects with coordination across the Recovery Team and the Operator ▪ Create scopes of work for A/E services, construction and equipment acquisition for recovery enhancement projects related to the T&D system's recovery ▪ Work with Grants Management and the Operator Procurement Office to publish public solicitations for vendor services (e.g., A/E, environmental, construction) and assist with selecting the most responsive and responsible bidders ▪ Liaise with COR^3 ▪ Respond to FEMA and COR^3 requests for information ▪ Act as technical representative on A/E, equipment acquisition and recovery construction project contracts, and elevate performance issues ▪ Review invoices for vendor services

WORKSTREAM	ACTIVITIES
	▪ Conduct routine site visits to monitor recovery projects and make reports available to COR3 ▪ Provide to Grants Management project details to ensure reliable sub-recipient progress reporting to COR3

Of the four major workstreams identified above, most of our resources will focus on public assistance and hazard mitigation.

3.2 Public Assistance

We know that most of the federal funding used to support recovery will come from FEMA's Public Assistance (PA) program. We have substantial experience with PA and how the program is being managed in Puerto Rico. The following are key actions the DRT will take to ensure full obligation of capped project worksheets, effective and compliant procurement and day-to-day management of communication with COR3 and FEMA's CRC:

- Accurate damage description and dimensions (DDDs) and scoping;
- Comprehensive and reliable cost estimations with appropriate technical specifications;
- Management, tracking and tasking of COR3 or CRC requests for information;
- Review insurance requirements and settlements;
- An environmental and historic preservation (EHP) review;
- 406 mitigation consistent with FEMA requirements;
- RFPs that comply with 2 CFR 200, COR3 requirements and the Operator's DRFFM guide;
- Contracts awarded that incentivize performance;
- Construction contractor monitoring; and
- Work closely with Grants Management staff to complete FEMA's Final Inspection Report.

The DRT will work with LUMA's Procurement Office to publish solicitations for A/E and environmental services, which are typically first steps in capital infrastructure projects. Performing an EHP review as quickly as possible will afford the time to address any EHP issues before work begins. The DRT's goal is for PREPA to be removed from the COR3 high-risk list by designing and implementing best-in-class federal grant internal controls and a 12-month track record of monitored and reliable management of federal funding.

The DRT will work closely with all vendors as they commence large and small infrastructure projects for LUMA. Because we are dealing with capped projects, it will be critical that we provide construction contractor oversight. We will ensure that large capital projects are closely managed according to Integrated Master Schedules (IMS). We will oversee aspects of project design, coordinate the multiple construction schedules for these projects or, in some cases, have A/E firms track schedules consistently.

In the unlikely event that the DRT needs to submit an appeal to FEMA for PA or HMGP activities, IEM staff has considerable experience with this. However, we have historically been able to resolve issues successfully through effective communication. Some disaster-recovery firms may tout their ability to

"fight with FEMA." We take a different approach. We use our regional and headquarters relationships and our knowledge of FEMA to avoid costly appeals. Our project influencing has been effective, and we will do the same for LUMA. But, when all else fails, we are capable of vigorously launching a well-argued appeal on behalf of the Owner.

The DRT will examine vendor invoices, conduct site visits, provide technical assistance and oversight of project delivery and request reimbursements from COR^3 based on the 428 schedule so we can make timely payments to vendors. The DRT will also begin to search for additional funding streams on Grants.gov to help obtain additional funding if needed. Critical tasks for grants management include:

- Managing tasks in the PRDRS;
- Submitting routine reporting to COR^3;
- Reviewing invoices;
- Assisting the Grant Accounting, Compliance and Oversight workstream with cost-share tracking;
- Ensuring fidelity with FEMA grant compliance, including HUD CDBG-DR compliance with respect to cost-share usage; and
- Maintaining DRT awareness by tracking a number of key project milestones overlaid with grant lifecycle deadlines in an IMS. This is a must for IEM to effectively manage a recovery (see Figure 38 below)

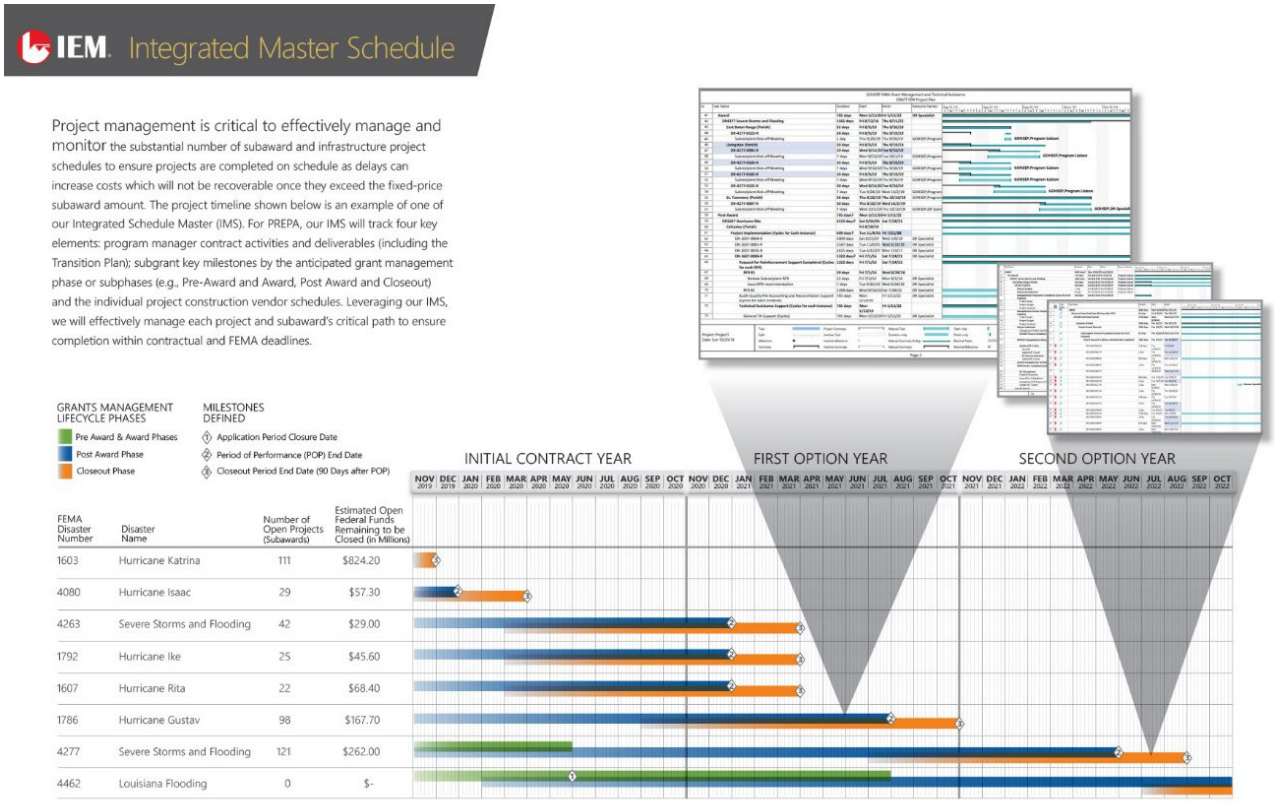


Figure 38: IEM integrated master schedule

Project management is critical to effectively managing and monitoring the substantial number of subaward and infrastructure project schedules and ensure that projects are completed on schedule, as delays can increase costs that will not be recoverable once they exceed the fixed-price subaward amount. For LUMA, our IMS will track three key elements: program manager contract activities and deliverables (including the Transition Plan); subgrant key milestones by the anticipated grant management phase or subphases (e.g., pre-award and award, post-award and closeout); and the individual project construction vendor schedules. Leveraging our IMS, we will effectively manage each project and subaward's critical path to ensure completion within contractual and FEMA deadlines.

We think it is critical to help COR^3 tell its recovery story related to power in Puerto Rico to maintain transparency. In addition to compliance with the required reporing on progress and expenditures, it is important that we and all key stakeholders have a clear and common operating picture. We will manage a GIS-enabled dashboard, in close coordination with COR^3, to show the progress of the recovery of Puerto Rico's grid. This will allow us to report more on the recovery and function of the electric grid while ensuring that we comply with requirements for sensitivities around providing public crticial infrastructure data. Figure 39 is an illustration of the concept we would implement for LUMA. We have used interactive dashboards for some of our recovery clients to elevate transprency for them and their stakeholders.

Geographic Information Systems (GIS), Data Analytics and Dashboards

IEM's Geographic Information Systems (GIS) team uses advanced mapping and modeling tools, such as ArcGIS, integrating data from a variety of sources to complement our recovery grant and subgrant data. ArcGIS provides data such as state and county boundaries, streets, hydrology, etc., U.S. Census Bureau Community Survey Data (ACS), FEMA National Flood Insurance Data, Homeland Infrastructure Foundation-Level Data, USGS data, Small Business Administration data, FEMA Verified Loss Data, threat or hazard overlays for specific events, as well as commercially available data such as Google Earth. **We have access to building outline data for the entire United States, including Puerto Rico.**

Figure 39: IEM GIS Assistance Dashboard

3.3 Hazard Mitigation Assistance

Because the FEMA HMA process for developing HMGP applications is already underway, the DRT HMA team will review and enhance HMGP applications that have not yet been submitted to COR[3]. We will simultaneously look for additional opportunities to create and submit applications that can mitigate future disasters using a solid benefit-cost analysis (BCA). Our HMA Specialists are licensed engineers with broad experience, especially around hazards that involve the damages associated with flooding and high winds, like those experienced in Puerto Rico. They have the expertise to mitigate these hazards.

BENEFIT-COST ANALYSIS

BCA is the FEMA-required method by which the future benefits of a hazard mitigation project are determined and compared to its costs. The end result is a benefit-cost ratio (BCR) calculated by dividing a project's total benefits by its total costs. The BCR is a numerical expression of a project's cost effectiveness. A project is considered cost effective when the BCR is 1.0 or greater, indicating that benefits of a prospective hazard mitigation project are sufficient to justify the costs.

A reliable BCA, either reviewed, enhanced or written by our HMA specialists, is more than just a statement of work, costs and a schedule. It is also a narrative this contextualizes the numbers, describing a vision of a resilient community. Arriving at this vision is a whole-community effort that includes residents, elected officials, local and state/Commonwealth emergency managers and the engineers and scientists who will implement each of the technologies involved. Each of these parties has its own unique perspective of the benefits to be realized. A good mitigation project prevents future loss of life and property and can transform a community. In addition to the local jobs it creates, it can provide new amenities such as open spaces for recreation. It can also be an expression of the community's spirit and a realization of the motto, "build back better."

Having worked with FEMA over many decades, IEM's DRT has a deep understanding of what FEMA officials will and will not support. Our approach is to start with what our client needs, determine the mitigation benefits of the desired project and make the case to FEMA with supporting BCAs that are carefully attentive to applicable regulations. This includes reasonable methodologies and assumptions and past damages/losses for numerous traditional — and, most importantly, non-traditional — projects, which provide a precedent for requests on behalf of our clients.

Another way our approach results with a positive BCA is by aggregating information for an entire area that can benefit from multiple projects. We can clearly explain and justify an overall mitigation benefit that is greater than the sum of its parts.

Another approach we use to develop successful BCAs is encouraging our clients to fully consider all the risks that can be potentially mitigated when developing a project scope. Risk in this context depends on the frequency and severity of hazards and the vulnerability of the built environment. The highest-risk situations have a combination of high hazard, high vulnerability and high value of inventory exposed to the hazard. We employ a data-driven strategy. We gather and analyze historic data on the vulnerability to be mitigated, enlist the input of subject-matter experts on the proposed

solution and identify and quantify the current vulnerabilities using the most current technology. This concept of risk is summarized in Figure 38.

Our process rigorously adheres to FEMA's best practices for justifying a mitigation project and demonstrates its conformance to the intent of Section 404 of the Stafford Act. We use the FEMA-recommended BCA checklists and tools such as the FEMA BCA Toolkit to demonstrate:

Figure 40: IEM's hazard & risk value

- That BCA components are credible and well documented;
- That the BCA was prepared in accordance with FEMA BCA practices; and
- That the proposed project is cost-effective, showing at a minimum that every dollar spent will result in savings of at least one dollar (1:1 ratio).

Our philosophy, which we have demonstrated consistently over the years, is that if there has been damage, we can find a way to develop a successful BCA to earn FEMA approval and funding to build in resiliency.

3.4 Sub-Grant Monitoring & Oversight

The DRT may liaise with COR^3 and FEMA for desk and onsite monitoring activities, resolving Single Audit issues (should they arise from annual financial audits relative to federal funds management) and resolving any other oversight matters. Most importantly, resolving Single Audit issues will involve project preparation for closeout.

We will help LUMA accept work of vendors and report the completion of projects to COR^3. This will settle any remaining funding associated with Section 428 projects and provide a financial reconciliation to COR^3 to demonstrate that any excess funding was used for Stafford Act-approved activities.

Further, relying on our audit experience, the program manager and the workstream leader for Grants Compliance will periodically test expenditures, practices and the effectiveness of internal controls. This process will operate very similarly to an internal audit function to safeguard against problems that could grow exponentially if not addressed in a timely way.

4. CORPORATE CULTURE & ALIGNMENT

C. OUR CULTURE

The Consortium is firmly rooted in family and family values, and this mindset is key to our growth and success. As a result, people are at the forefront of everything we do.

ATCO's Commitment to Excellence

Since ATCO's founding by R.D. Southern and his father S.D. in 1947, ATCO's core vision has been to improve the lives of our customers by providing sustainable, innovative and comprehensive solutions. Driven by a pioneering spirit, ATCO has grown from humble beginnings of just 15 small utility trailers to now serving more than two million customers worldwide. The team is committed to operational excellence in all areas, and to strengthening the communities where we work and live.

The values that form the basis of ATCO's corporate culture guide the conduct of every employee, officer and director — and ATCO seeks out business partners who share them as well. This begins with the ATCO "Heart and Mind," the company's foundational commitment to excellence:

> "Going far beyond the call of duty. Doing more than others expect. This is what **excellence** is all about. It comes from striving, maintaining the **highest standards**, looking after the smallest detail and going the extra mile. Excellence means caring. It means making a **special effort to do more**."
>
> — R.D. Southern, Founder, ATCO

Supporting the "Heart and Mind" are ATCO's values of:

- **Integrity:** we never break a promise, we do the right thing, we are transparent and respectful, we are ethical and we hold ourselves and each other accountable;
- **Caring**: we seek to understand, we care enough to challenge each other, we celebrate our successes, we care about communities and we care about each other;
- **Agility:** we stay relevant, we pivot, we innovate, we challenge status quo and we reward action and learn from failure; and
- **Collaboration:** we are one ATCO, we communicate openly, we share our ideas, we learn from our failures and celebrate successes, we value and encourage diversity and different perspectives and we work together to build bridges and strong networks across ATCO.

These values guide how our 6,000 people engage with our customers, communities, investors and partners.

Quanta's Family Purpose

Quanta is a family with purpose. The company's 20-year history is built on a heritage that goes back much further. Many of Quanta's operating companies have served their markets for more than 50 years.

> "It's a people business. You can't process this business. It won't work. That's the very key here – the quality of the people."
>
> — Earl C. "Duke" Austin, Jr., President and CEO, Quanta Services

Quanta has grown by bringing teams together to collaborate with customers to meet their critical needs, becoming the leader in the specialty infrastructure services industry through innovative thinking and safe execution, which has woven the company into the very fabric of the utility space.

> "We find people who are just **genuine** and who approach it as though this is the work they want to do and this is the place they want to be, and they enjoy the people that they're around."
>
> — Derrick A. Jensen, CFO, Quanta Services

Today, the people of Quanta are a workforce of more than 46,000. The vast majority of these employees are an industry-leading craft labor force, who bring the skills required to safely deliver execution excellence.

> "It is a family, a huge family now, but it's always been treated that way, thought of that way, and they need to be taken care of and make sure they have the very best training they can possibly have."
>
> — John Colson, Founder, Quanta Services

In addition to the foundational values of our respective companies, the Consortium is also committed to conducting business ethically while promoting a work environment that fosters **mutual respect**, **open communication** and **integrity**. A critical aspect is that we consider the broader implications of our actions, complying with not only the letter of the law but also the spirit in which it was intended, and taking into account what our family, friends and co-workers would think of our actions.

1.0 ALIGNMENT WITH CORE PRINCIPLES

Our culture is key to the successful implementation of the six core principles. Our culture informs every action we take and every decision we make. The following core principles, which are embedded in our culture of excellence, will drive LUMA's success.

Table 5: Our Core Values

VALUE	STRATEGY
Safety 	Safety is critical. It is the cornerstone to ensuring that our most important assets — our employees and our customers — are protected. Safety is the first consideration in everything we do. Providing a safe environment for our people and the public is ingrained in our culture.
Customer Centricity 	We always put our customers first. We collaborate with them to develop solutions that meet their needs. We understand that caring is not only good for people, it's good for business. When our customers are successful, we are successful.
Affordability 	We are not satisfied with the status quo and take the initiative to go above and beyond. It is important for us that electric service becomes more economically accessible for all our customers.
Reliability 	We believe in using proven, industry-leading practices that increase service reliability to improve customer well-being and foster economic development. We are focused on operating our business for the long term and expect to continue to distinguish ourselves through safe execution and best-in-class field leadership. We stay relevant, are agile and innovative.
Resilience 	We are committed to doing everything we can to make sure that our customers will have reliable service in the face of the most extreme conditions. The components of a resilient system are physical strength and hardened infrastructure, as well as the ability to recover and restore services to customers after major events. We push ourselves to think differently to move beyond what industry standards require.
Sustainability 	We invest significant resources to establish a transparent regulatory framework, environmental leadership and a trained and engaged workforce with a strong safety culture to realize improvements across the business. From everyday actions to major capital investments, we prioritize the environment around us as we make decisions. We strictly adhere to environmental rules and regulations while safely providing our services. And, to support sustainable communities, we will invest in community programs by promoting volunteerism with our employees.

5. ROLES & RESPONSIBILITIES OF EACH MEMBER OF CONSORTIUM

Our Consortium combines superior electric utility services and project execution from Quanta Services, operational excellence and superior customer service as a utility from ATCO and the experience of IEM in federal funds management. All the Consortium organizations have deep and relevant experience in emergency response and management.

The Consortium will be a jointly owned, in equal shares by Quanta and ATCO. We have worked in this structure successfully before — as, for example, with the Fort McMurray West 500 kV Transmission Project, a major public private partnership project. Our companies share our values and have excellent communication at all levels of the organizations. Our process helped achieve safe and successful results on time and below budget for the Fort McMurray project. We will deploy similar processes for communicating, maintaining alignment on goals and managing execution.

IEM will be a prime contractor to ServCo. Their role is clearly defined by the scope of involvement in federal funds management and emergency response. IEM has executed these functions for clients in many projects and managed billions of dollars as a prime contractor.

We plan for ServCo to act as a robust, standalone entity with a management team empowered to make decisions and actively operate in accordance with the O&M Contract. The management team will receive strategic direction and broad policy from the Board of Directors of ManagementCo. Both organizations are heavily invested in the success of this endeavor. The Board will hold the management team accountable for the success of ServCo.

Initially, to drive quick results, we expect the ServCo management team to be drawn from highly qualified and experienced executives from Quanta and ATCO. In select posts, we will focus on having managers or leaders from the current PREPA organization. In situations where the job requirements cannot be met with current PREPA managers or leaders, we will seek an individual from Puerto Rico who brings the specific competencies and skills needed. For example, the communications function will be headed by an experienced manager or company with experience in this area in Puerto Rico. We will also draw on specific expertise and support to carry out the improvements and key initiatives outlined in this proposal. The management team at ServCo will work as a single unit. The management team will engage key personnel that are best suited for specific tasks and process improvements to work collaboratively to improve operations.

Figure 41 below describes the Consortium structure in relation to the Owner, Administrator and PREB.

6. ORGANIZATIONAL STRUCTURE OF MANAGEMENTCO & SERVCO

CU and Quanta will establish two entities in Puerto Rico as described and shown below (Figure 41):

- A Puerto Rico limited liability company (LLC) (ManagementCo) with 50:50 ownership; and
- ServCo, a Puerto Rico single member limited liability company 100% owned by ManagementCo. ServCo is the entity employing the employees performing the O&M Services.

Combined they are and will perform under the name of LUMA. LUMA will be governed by a Board of Directors comprised of an even number of Directors, half of which will be appointed by CU and the other half by Quanta.

IEM will be engaged as a subcontractor to LUMA to provide federal fund management expertise.

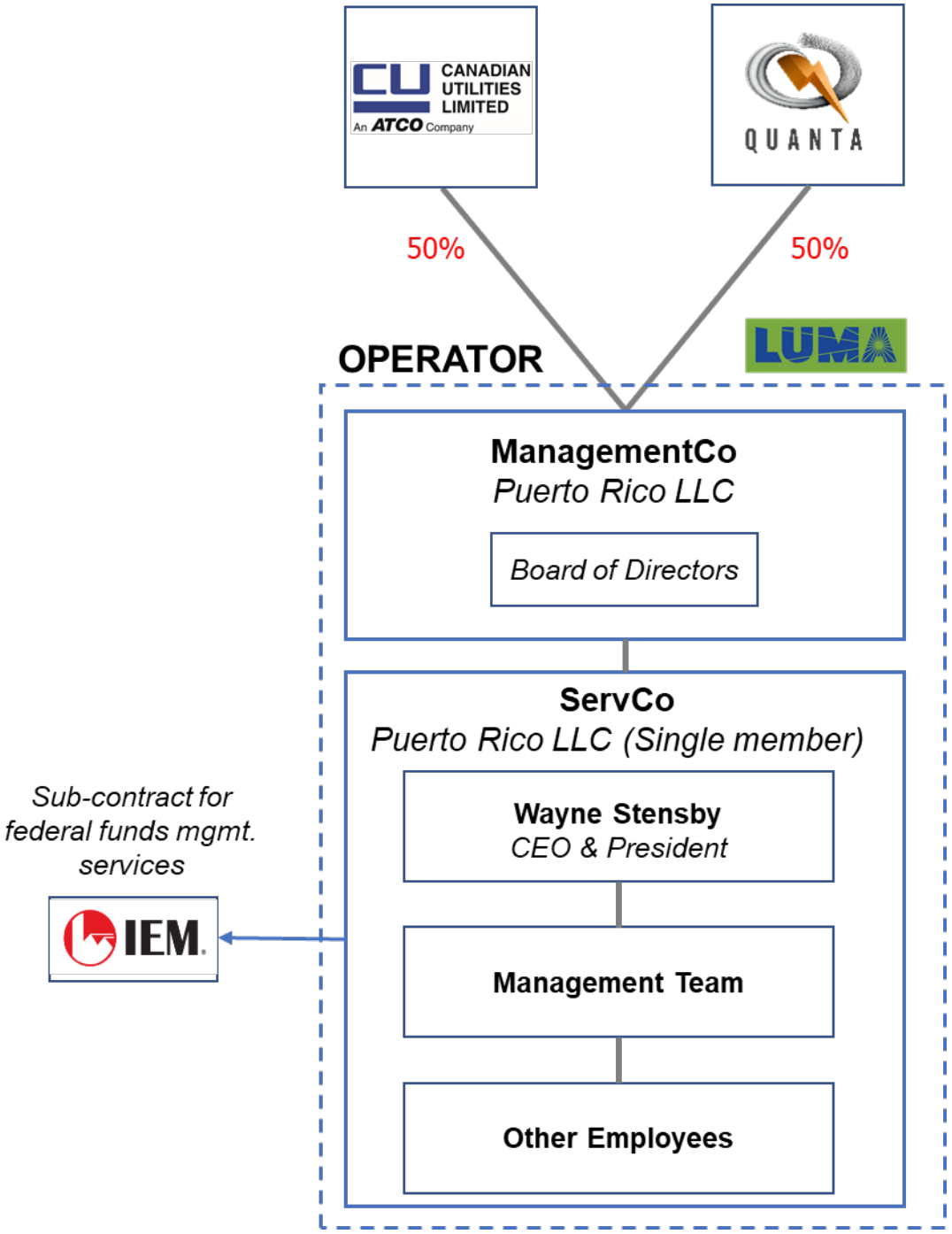


Figure 41: Quanta/ATCO JV Overall Structure

7. COMMITMENT TO SOCIAL WELFARE

D. A HISTORY OF CARING

The Consortium has the great privilege of serving customers in many communities in North America, Latin America, the Caribbean and Australia. We have a foundational commitment to the social welfare of the communities where we work. This is evident in our combined values.

As a provider of essential services (e.g., modular housing, disaster response, logistical support and transportation) and energy infrastructure products and services, ATCO plays a central role in delivering long-term, sustainable solutions. This provides a unique opportunity to engage and find ways to make life easier for our customers and neighbors.

As a leading infrastructure solutions provider, Quanta Technologies supports the safe and reliable delivery of electric power, energy and communications services to hundreds of millions of people. A commitment to benefiting our employees, customers and with the communities we serve is paramount.

Integrity & Value

We take pride in what we do. We understand that what we do and how we do it affect the reputation of our teams and our companies. Transparency, respect and ethical conduct require an organization that holds itself accountable. This behavior drives our business today and in the long term, as we continue to distinguish ourselves through safe execution and best-in-class field leadership. Together, our scope, scale and commitment to safety and integrity will continue to generate long-term value for our customers and for our communities.

Providing reliable, resilient and sustainable energy in Puerto Rico is not just a business initiative. It is a human one. And that aligns with the visions of each member of the Consortium.

Caring & Diversity

We are family companies. The Consortium is committed to bringing our people home safely every night, which requires dedication to world-class training and safety initiatives. Likewise, we approach the world we live and work in with the same sense of duty. From everyday actions to major capital investments, we prioritize the environment around us as we make decisions and strictly adhere to environmental rules and regulations while safely providing our services.

Our culture supports an environment where employees from all walks of life can find purpose, flourish in their work and have an equal opportunity to succeed. We encourage and support ideas, innovation and advancement to attract and retain the best workforce in the industry.

We are excited to bring Puerto Ricans employed in the energy sector into our family to feel valued, supported and safe.

Agility & Collaboration

The Consortium is not satisfied with the status quo and takes the initiative to go above and beyond. Our ability to adapt has been an important part of our past and will be an important part of our future.

To remain nimble, Quanta invests significant resources in industry-leading training initiatives to help its employees grow and advance in their careers. The Lazy Q Ranch, a state-of-the-art training facility, provides hands-on instruction from master trainers in a controlled environment. In 2018 alone, Quanta trained more than 5,000 employees. Between Lazy Q and NLC training facilities, we have trained more than 50,000 employees, and this number continues to increase year after year.

Likewise, ATCO uses its many projects to increase the work capacity of the communities we serve. This is particularly important in remote communities like Fort Chipewyan, where local workers are trained to operate solar microgrids, allowing the community to be self-sufficient and retain a portion of the project's ownership.

The Consortium sees significant opportunity to collaborate with local educational institutions to create training programs for Puerto Ricans working in the energy sector, sharing our award-winning methods to create a workforce capable of carrying the same commitment to safety and quality into the next generation.

1.0 SOCIAL WELFARE THROUGH IMPROVED SERVICE DELIVERY

Reliable power is the bedrock of maintaining a good standard of living in the modern world. We take our responsibility to provide safe, reliable, affordable power extremely seriously, because we know how central it is to our customers' welfare. The initiatives below are aspects of our function as a utility that are specifically designed to contribute to and enhance the welfare of the people of Puerto Rico — who we will be proud to serve.

Identifying & Restoring Critical Infrastructure & Equipment

Improving system reliability and limiting the outage durations experienced during emergency events is imperative. This is especially important for critical infrastructure in Puerto Rico — i.e., hospitals, airports and schools, as well as residents who require the support of life-saving equipment such as respirators and dialysis machines. LUMA will identify key infrastructure and residential impacts during emergency response efforts, so those critical circuits are prioritized for restoration. Ongoing asset management programs will also ensure that T&D systems are adequately hardened to limit exposure to potential failures.

Improving Metering Accuracy

Data reflects a lack of maintenance in customer meters and that the technology currently in use is limited. This creates the potential for inaccurate meter reading for customers who already face the challenges of large bills. By implementing regular meter maintenance programs and replacing dated systems with smart tamper-proof technology, customers can be assured that they will only be charged for what they use.

Awareness & Support

We believe in promoting electrical awareness and several avenues for customer contact for support (e.g., online chats, telephone, social media platforms, face-to-face). By educating communities on topics such as how the electrical system works, safety education, who to contact in case of an emergency and how to read your bill, customers will have forums to quickly find responses to their concerns. This is provided as part of an overall marketing and communications plan for the public.

Billing Support

We fully understand that some customers require assistance with utility billing payments. Electricity is a necessity and we want to ensure that unfortunate financial circumstances do not affect service. We will implement programs to identify those who require support and provide payment plans or options for those customers, addressing the issue to avoid the potential disconnection of service.

Safety

To help reduce the number of public safety incidents and promote a positive reputation for LUMA in the communities we serve, we will undertake an intensive public safety campaign across Puerto Rico. Examples of these initiatives include:

- Distributing various videos and reference materials to promote public safety;
- Promoting the awareness and use of “Call Before You Dig”;
- Using social media to provide the public with safety information;
- Hosting electrical safety awareness events with groups such as first responders, construction trade associations, agricultural associations, tree trimmers, landscapers and others; and
- Facilitating electrical safety awareness programs in schools.

Consumer to Prosumer

We will take all steps necessary to transform Puerto Rico consumers into prosumers: informed, empowered and active “producing consumers” who consume and produce energy through sustainability programs.

The following graphic shows what early transformational steps might include. Over time, a broader array of new technologies will find their way into the power grid as utility offerings, eventually resulting in a Smart City to offset issues with urbanization. A Smart City optimizes the efficient use of physical infrastructure through artificial intelligence and data analytics to support a strong and healthy economic, social and cultural environment.

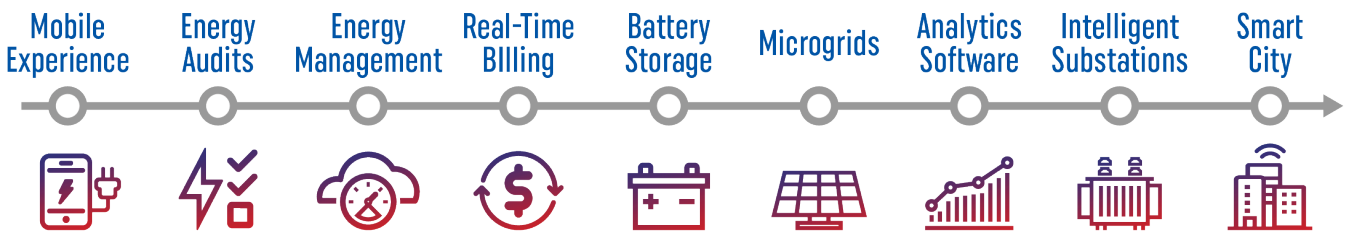


Figure 42: The path to a Smart City

2.0 COMMUNITY INVESTMENT

We are more than just a partnership offering exceptional service and innovative infrastructure solutions. We will also be a good neighbor and an active member of the community. Throughout our global operations, we provide volunteers, expertise, gifts-in-kind and financial support to the organizations that help Puerto Rican communities thrive.

Our mandate is to deliver inspired solutions to make the world better. Our approach is to build relationships based on respect, trust, transparency and understanding of local interests. This same approach will be invaluable when working with communities in Puerto Rico, and our combined history speaks to our commitment to engaging them.

A Duty of Care

Our employees are at the heart of our success and, in their times of greatest need, we are there for them.

A fund was established in the wake of Hurricane Harvey, in 2017, to help employees devastated by the storm. Through employee donations, matched by the company, we initially raised $1.3 million. The fund has continued to grow and benefit employees affected by natural tragedies around the country. It provides confidential, timely short-term crisis relief for employees needing assistance with living expenses and the essentials of life, such as food, clothing, utilities, temporary housing, property repairs and other necessities.

We strive to treat all employees, wherever they are located, as family — and employees in Puerto Rico will be no different. This is at the very core of our culture and will be woven through every aspect of the Operator's activity in Puerto Rico.

8. USE OF LOCAL RESOURCES

A. USE OF LOCAL RESOURCES

1.0 OUR COMMITMENT TO PUERTO RICO

The Consortium is committed to successfully operating Puerto Rico's T&D system and would consider it an honor to do so. We believe that this Consortium is exactly what Puerto Rico needs, at this time, to move toward world-class electric utility service that drives economic growth, development and opportunity for all Puerto Ricans. We understand that our team must work in a manner that is respectful of local culture, supports the Puerto Rican community and creates a positive legacy through programs that encourage mentorship, education and employment. Quanta and ATCO do this today in every community we serve.

1.1 Investing in Puerto Rico

The Consortium will prioritize investment in LUMA's people and will develop a new lineworker training center in Puerto Rico, which will be a center of excellence for Puerto Ricans — as well as workers from other Caribbean islands. Puerto Ricans trained at this campus will be equipped to work safety to operate and maintain the grid for LUMA, and for the local contractors who will be busy modernizing the energy system. This commitment to further the skills to Puerto Rico´s workforce will help retain key workers on the island.

Our emphasis on safety will also help the communities in which Operator's people work and live. The spirit of a safety-first philosophy contagious — and we will follow up on the residents' desire to create safer neighborhoods and workplaces with community outreach focused on being safe around utility infrastructure, storm preparedness and other programs. We believe that engagement with the community will increase stakeholder support for utility activities, build stronger ties to customers and provide value to Puerto Rico.

An example of our commitment to investing in communities is ATCO's Fort Chipewyan solar project in a northern Alberta community that is accessible only by air and a winter ice road. ATCO worked with the community to install a 608 kW solar array and battery storage system that will provide additional reliability to the electrical grid — which is particularly critical for a small isolated system with minimal sunlight during the winter months. As part of the project, ATCO worked with the local community to create skill-development opportunities and build local capacity for installation, operations and maintenance.

1.2 Listening to Puerto Ricans

Since Hurricanes Irma and Maria devastated Puerto Rico, numerous non-governmental organizations, education institutions, charities and others have made a lasting impact. Organizations such as the Rocky Mountain Institute and Resilience Power Puerto Rico are critical to our future success. We plan to communicate with local grass-roots organizations and advocacy groups, and to work with them on a collaborative basis.

LUMA will hold open-forum meetings throughout Puerto Rico to hear from the people. We will compile feedback and put together initiatives to positively affect Puerto Rican residents. We will look to build successful communication as part of our long-term effort. We will begin this process by listening.

Mayors and other elected officials are an important constituency, and we will reach out to them. We must understand, at a local level, what is important in their communities.

We will also engage the solar and battery storage companies promoting the prosumer environment in Puerto Rico, as well as local manufacturer and other commercial employers. Doing so will help us understand their priorities for the power system and their employees.

Finally, we must note our commitment to listening to and engaging women-owned businesses, low-income housing organizations, local community health centers, The University of Puerto Rico and other community college-based programs. They have unique insights into the desires of Puerto Rican people and expertise in energy issues. We will engage these groups in an ongoing manner and listen and learn from their experiences.

1.3 Using Puerto Rico Businesses & Labor

A cornerstone of the effort will be a successful transition of former PREPA employees to ServCo. We also look forward to working with local vendors and other professionals who are eager to participate in the system transformation.

Most importantly we will train and re-train local lineworkers to the most up-to-date, industry-standard safety techniques and procedures. As we have stated previously, this is critical to providing a safe environment for workers and those around them.

Quanta has been working with local businesses in Puerto Rico for many years. Quanta's partner in the U.S. Small Business Administration Mentor-Protégé program is a Puerto Rican-based construction and engineering firm, the Bonneville Group based in Caguas, Puerto Rico.

ATCO has been promoting and working alongside local and Indigenous businesses for decades and has a strong commitment to corporate citizenship. After Hurricane Maria, ATCO helped Amgen and their employees by providing critical services.

We know that there are many qualified contractors and other companies in Puerto Rico that we expect will provide vital services to LUMA. We anticipate that there will be strong local firms to support the environmental, vegetation management, fleet services, information technology, engineering system operations, human resources, administrative support, executive management and many other areas.

As an example of local support, Appendix 4 contains letters from the following Puerto Rican firms, each of which supports our proposal to operate the T&D system in Puerto Rico.

Table 6: Local Companies Who Support Our Proposal to Operate the T&D System in Puerto Rico

COMPANY	LOCATION
Bonneville Contracting and Technology Group	Caugas, Puerto Rico
Hydro Ex	Guaynabo, Puerto Rico
Division 16, LLC	Guaynabo, Puerto Rico
Pro Energy Corp	Guaynabo, Puerto Rico
ALPROEM Engineering and Construction Corp	Toa Baja, Puerto Rico
Del Valle Group	Toa Baja, Puerto Rico
Bermudez, Longo, Diaz Masso, LLC	San Juan, Puerto Rico
Venegas Construction Corporation	Ponce, Puerto Rico

Appendix 1: Roadmaps to Puerto Rico's Energy Transformation

A. T&D OPERATIONS

PILLARS	TRANSITION	2020	2021	2022	2023	2024	END STATE 2025
T&D OPERATIONS							
Reliable, Resilient	▪ Develop a plan to implement a distribution automation network in collaboration with System Planning ▪ Prioritize feeders and identify projects for Year 1 ▪ Develop plan to procure midpoint reclosers for installation in Year 1 (i.e., highest-priority feeders)	▪ Install highest-priority midpoint reclosers ▪ Engineer and procure materials for Year 2 ▪ Identify the level of detail of automation/ sectionalizing, including self-healing opportunities	▪ Install Year 2 devices ▪ Engineer and procure materials for Year 3 (could include more sophisticated devices such as TripSavers and IntelliRupters)	▪ Install Year 3 devices ▪ Engineer and procure materials for Year 4	▪ Install Year 4 devices ▪ Engineer and procure materials for Year 5	Install Year 5 devices	Steady state
Resilient	▪ Identify and develop quick-win resiliency projects for implementation in Year 1 (e.g., flood mitigation for the 17 substations per Sargent Lundy Reports) ▪ Identify longer-term resiliency projects and programs in collaboration with Asset Management	▪ Implement quick-win resiliency projects ▪ Identify Year 2 resiliency programs and projects	▪ Execute Year 2 project ▪ Engineer and procure Year 3 projects	▪ Execute Year 3 projects ▪ Engineer and procure Year 4 projects	▪ Execute Year 4 projects ▪ Engineer and procure Year 5 projects	Execute Year 5 projects	Steady state
Sustainable	▪ Assess existing tools used for scheduling and resource planning ▪ Identify gaps in tools and recommend changes if required ▪ Develop a plan for resource planning and scheduling, including contractor strategy	▪ Execute resource and scheduling plan ▪ Execute contracting strategy	Execute resource and scheduling plan	Steady state	Steady state	Steady state	Steady state
Reliable, Resilient	Assess the telecommunications system, and assess PREPA's telecommunications plan	▪ Develop a plan to address gaps identified in transition ▪ Develop a telecom strategy	▪ Implement telecom strategy ▪ Install Year 2 projects	Steady state	Steady state	Steady state	Steady state

PILLARS	TRANSITION	2020	2021	2022	2023	2024	END STATE 2025
Sustainable	▪ Assess operational processes, including work methods, electrical operating standards, equipotential bonding and grounding, lockout/tag-out and tools and equipment ▪ Develop a plan and prioritize Year 1 actions to address gaps	▪ Execute Year 1 plan ▪ Enhance plan as needed for Year 2	▪ Execute Year 2 plan ▪ Enhance plan as needed for Year 3	▪ Execute Year 3 plan ▪ Enhance plan as needed for Year 4	▪ Execute Year 4 plan ▪ Enhance plan as needed for Year 5	Execute Year 5 plan	Steady state
CONTROL CENTERS							
Reliable	▪ Validate and assess all T&D control center grid monitoring and control functionality ▪ Validate and assess inventory of automation and SCADA real-time database ▪ Determine functionality of existing Energy Management System (EMS), including the state estimator ▪ Evaluate functionality of key IT programs, including current level of configuration ▪ Complete gap analysis for bringing above-listed functionality to industry best practices	▪ Develop plan to modernize control centers to optimize deployed, distributed and renewable energy resources; battery storage; smart grid systems; and other technologies that can lower long-term system costs.	Execute the plan to modernize control centers	Execute the plan to modernize control centers	Steady state	Steady state	
VEGETATION MANAGEMENT							
Sustainable	Develop a detailed outline for the Vegetation Management (VM) plan	▪ Create a new VM program ▪ Produce a formal VM plan that defines the strategy, processes, methods, workload estimates, resource requirements, etc.	Continue to refine the program and plan	Continuous improvement based on performance management	Continuous improvement based on performance management	Continuous improvement based on performance management	Continuous improvement based on performance management

PILLARS	TRANSITION	2020	2021	2022	2023	2024	END STATE 2025
Sustainable	Select field-enabled VM work management system (WMS)	Implement VM WMS with special data capability to create maintenance recommendations and compile documentation	Continue to refine the VM WMS	Continuous improvement	Continuous improvement	Continuous improvement	Continuous improvement
Reliable, Resilient	Conduct vegetation condition assessment on critical sites and assets, LiDAR on T-system and direct inspection of D-system	Complete critical risk-based CM work on high-risk sites and assets on the T&D circuits	Steady state	Steady state	Steady state	Steady state	Steady state
Reliable, Resilient	Assess need to widen existing rights of way (ROW); produce preliminary work schedules.	Widen urban 230 kV and 115 kV ROW	Begin widening on rural 38 kV ROW	Steady state	Steady state	Steady state	Steady state
Reliable, Resilient	Assess need for reclamation work on existing ROW; produce preliminary work schedules.	▪ Complete reclamation clearing on rural 230 kV ROW ▪ Begin reclamation on 115 kV ▪ Begin reclamation line clearance VM on 15 kV 3Ø	▪ Continue reclamation clearing on 115 kV and 15 kV 3Ø ▪ Begin reclamation line clearance VM on 15 kV 1Ø taps and 5 kV D-circuits	Complete reclamation phase for all T-lines and D-circuits	Steady state	Steady state	Steady state
Reliable, Resilient	Plan for steady-state preventive vegetation maintenance on T&D system based on principles of integrated vegetation management (IVM)	▪ Begin to reduce line clearance hot spotting ▪ Perform corrective maintenance (CM) on D-system	▪ Implement IVM on 230 kV; follow up herbicide applications ▪ Continue to reduce hot spotting on D-system	▪ Continue IVM on 230 kV ▪ Begin IVM on T&D circuits post-reclamation phase ▪ Continue to reduce level of hot spotting and unplanned line clearance CM on D-system	▪ Fully implemented IVM on T&D ROWs, reliance on proper practices and suite of vegetation maintenance methods ▪ Begin second rotation of preventive line clearance maintenance (prune,	▪ Continue steady-state IVM on T&D-system ROWs ▪ Continue steady-state preventive line clearance maintenance on D-system ▪ Continue to manage reduced level of line	Continue ongoing preventive vegetation maintenance work based on the IVM principles

PILLARS	TRANSITION	2020	2021	2022	2023	2024	END STATE 2025
					removal) on D-system ROWs ▪ Continue efforts to reduce level of line clearance CM on D-system	clearance CM on D-system	
Resilient, Affordable	Conduct assessment of future need for VM support for new capital construction (CapEx) projects	Work with T&D engineering to determine VM requirements and support for new T&D infrastructure projects (CapEx)	Ramp up VM capabilities to support new T&D infrastructure projects (CapEx) as necessary	Continue to support new T&D infrastructure projects (CapEx)	Continue to support new T&D infrastructure projects (CapEx)	Continue to support new T&D infrastructure projects (CapEx)	Continue VM support of CapEx T&D line/ROW projects as needed
Affordable	Develop contracts for specialized IVM services (e.g., mechanized mowing/cutting, herbicide applications); identify capable service providers	Enter into contracts with line clearance service providers; mobilize, monitor and manage contractor performance	Monitor and manage contractor performance	Some specialty VM services will be short-term engagements; plan and manage demobilization	Monitor and manage contractor performance; renegotiate terms & conditions and rates as necessary	Monitor and manage contractor performance; renegotiate terms & conditions and rates as necessary	Continue ongoing contractor management
Sustainable	Create interface documents and service-level agreements (SLAs) with key stakeholder/ support organizations (e.g., engineering, call center, real estate)	Confirm SLAs, measure performance and adjust as necessary	Continue management of relationships with diverse stakeholders; monitor performance indicators	Continue management of relationships with diverse stakeholders; monitor performance indicators	Continue management of relationships with diverse stakeholders; monitor performance indicators	Continue management of relationships with diverse stakeholders; monitor performance indicators	Maintain relationships with stakeholders
Affordable	Conduct herbicide efficacy trials to confirm optimal application methods, formulations and rates	Establish standard herbicide mixes and application specifications	Implement herbicides as part of overarching IVM strategy	Continue to monitor efficacy of herbicide program	Continue to monitor efficacy of herbicide program	Continue to monitor efficacy of herbicide program	Continue to monitor efficacy of herbicide program
Customer Centric	Develop customer-facing public relations/public education plans related to VM activities	▪ Place major emphasis on public education related to VM activities ▪ Develop VM scripts and aids for call center ▪ Create VM internet presence	▪ Continue to enhance customer-facing aspects of VM program ▪ Support “right tree right place” plantings	Continue to enhance customer-facing aspects of VM program	Continue to enhance customer-facing aspects of VM program	Continue to enhance customer-facing aspects of VM program	Continue focus on enhancing customer-facing aspects of the VM program

PILLARS	TRANSITION	2020	2021	2022	2023	2024	END STATE 2025
		▪ Develop customer contact/notification processes ▪ Create customer-centric performance indicators	▪ Participate in community tree planting programs				
METERING							
Sustainable	▪ Assess and identify gaps in meter reading processes, field testing and work procedures ▪ Assess meter shop processes ▪ Benchmark US utilities' meter shop operation following ANSI/NIST/ISO standard	▪ Establish new metering standards and work procedures ▪ Plan new sample testing, meter asset tracking and quality assurance programs	Implement new sample testing, meter asset tracking and quality assurance programs	Continue implementing and reviewing new processes; adjust as required	Steady state	Steady state	Steady state
Customer Centric, Sustainable	Plan for new meter data management (MDM) and meter asset management (MAM) systems	Implement MDM and MAM systems	Operate MDM and MAM systems	Manage lifecycle upgrades	Steady state	Steady state	Steady state
Sustainable	Obtain an update on the progress of the new meter shop	▪ Move to the new meter shop facility ▪ Buy new test boards and equipment	Operate a full-service meter shop and quality assurance programs	Steady state	Steady state	Steady state	Steady state
Customer Centric, Resilient	Assess PREPA's smart meter pilot project	Plan AMI strategy and roadmap	▪ Finalize AMI specification and deployment plan with vendor ▪ Start AMI infrastructure rollout and head-end system implementation	▪ Continue AMI and smart meter installation ▪ Operate AMI data collection	Continue AMI and smart meter installation	Continue AMI and smart meter installation	Steady state
PUBLIC LIGHTING							
Customer Centric, Resilient	▪ Obtain light-out report from T&D operations ▪ Obtain lighting complaints from Customer Service	▪ Implement aggressive strategy to repair streetlights that are damaged or out ▪ Develop inventory of damaged underground	Steady state	Steady state	Steady state	Steady state	Steady state

PILLARS	TRANSITION	2020	2021	2022	2023	2024	END STATE 2025
	▪ Complete a light patrol in highly populated areas and light traffic areas ▪ Develop an internal metric/ guideline for crew timelines to repair customer-reported lights (10 business days)	cable breaks and build a multi-year plan to repair/replace them (depending on O&M funding)					
Resilient, Customer Centric, Affordable	▪ Obtain an inventory of HPS lights and lights that have been converted to LED ▪ Develop inventory list of proposed LEDs to be changed out; prioritize based on population density, traffic volumes and historical areas of customer complaints ▪ Review and understand the existing contractor contracts vs. internal manpower complement	Develop business case for system funding to change 40,000 HPS light heads to LED and execute	Develop business case for system funding to change 40,000 HPS light heads to LED and execute	Develop business case to change 40,000 HPS light heads to LED and execute	Develop business case to change 40,000 HPS light heads to LED and execute	Develop business case to change 40,000 HPS light heads to LED and execute	Develop business case to change 40,000 HPS light heads to LED and execute
Resilient, Affordable, Sustainable	Develop a plan to audit and inspect PREPA's public lighting; identify systems and tools for field personnel to gather field data such as billing information, asset data, unique asset identifiers and mapping data	▪ Purchase required field tools ▪ Complete an audit and inspection on half of PREPA's public lighting ▪ Cross-reference gathered streetlight data with customer billing (CC&B) system	▪ Purchase required field tools ▪ Complete an audit and inspection on half of PREPA's public lighting ▪ Cross-reference gathered streetlight data with CC&B system	Steady state	Steady state	Steady state	Steady state
Affordable, Customer Centric		Investigate and develop a new LED rate; work with the PREB to obtain approvals to make the rate available	Monitor and update all existing public rates as business and customer needs change	Steady state	Steady state	Steady state	Steady state
Customer Centric		Develop a research and development team to investigate and	▪ Implement a customer-facing	▪ Offer solar public lighting	▪ Offer public lighting options to residential	Continue research and development as	Continue research and development as new technologies

PILLARS	TRANSITION	2020	2021	2022	2023	2024	END STATE 2025
		implement solar lighting; smart streetlights; electric vehicle (EV) charging stations; a customer streetlight reporting app; and streetlight structure Wi-Fi meshing	streetlight reporting app ▪ Pilot solar lighting in the nine regions	options to communities ▪ Pilot EV streetlight charging stations to determine viability ▪ Pilot Wi-Fi meshing with selected communities	and commercial customers ▪ Offer EV charging solution to communities ▪ Offer Wi-Fi meshing to the greater community and customer base	new technologies become available and streetlighting needs are understood	become available and streetlighting needs are understood
Reliable, Sustainable		Research existing streetlight preventative maintenance (PM) programs; adjust and deploy. This includes streetlight head/photocell replacement, pole and cable test and treat program, as well as a system CapEx pole and cable replacement program	Continue to deploy annual PM programs	Continue to deploy annual PM programs	Continue to deploy annual PM programs	Continue to deploy annual PM programs	Continue to deploy annual PM programs
FLEET							
Affordable, Sustainable	▪ Assess existing fleet management information system (FMIS) for fleet tracking, identifying any gaps ▪ Develop plan for designing and implementing new FMIS (if required) ▪ Develop plan/process for master fleet data integrity/consistency ▪ Develop Year 1 preventative maintenance program	▪ Implement FMIS and associated technologies; execute continuous preventative maintenance (PM) plan ▪ Collect and populate asset data in FMIS ▪ Provide training and FTE development regarding data input/system use/data integrity for fleet master data	▪ Execute continuous PM plan ▪ Continuous population of master asset data in FMIS ▪ Monitor effectiveness of PM plan ▪ Monitor and audit of data consistency integrity	▪ Develop long-term and replacement plans by asset class ▪ Steady state on fleet master data consistency/integrity	Steady state	Steady state	Steady state
Sustainable	▪ Assess and review current shop operations, including repair	▪ Develop plan for shop operations process changes	▪ Monitor internal maintenance shop	Steady state	Steady state	Steady state	Steady state

PILLARS	TRANSITION	2020	2021	2022	2023	2024	END STATE 2025
	capabilities, downtime durations, etc. ▪ Identify third-party repair facilities to assist in decreasing unit downtime ▪ Identify opportunities to consolidate operations to increase repair productivity and efficiency	▪ Execute on third-party repair facility engagements, including mast service technician (MST), inclusive of shops performing maintenance on chassis and specialty aerial equipment ▪ Execute on shop consolidations identified as opportunities in the transition period	performance on productivity and efficiency ▪ Monitor third-party maintenance facility for productivity and efficiency				
Sustainable	Identify third-party rental opportunities for periods of peak and potential down equipment to maintain field operations	▪ Work with vendors to create a fleet network on the island for rental availability ▪ Identify heavy-use equipment classes that may require immediate availability if equipment is down	Execute on plan identified in Year 1	Continue vendor relations calls to communicate needs and expectations to maintain operational needs	Steady state	Steady state	Steady state
Sustainable	▪ Review and assess the viability of the current telematics systems ▪ Identify gaps/ requirements for GPS/telematics	Create execution plan for GPS/telematics rollout	Implement new GPS/telematics system or identified changes to current system	Fine-tune GPS/telematics system and reporting capabilities, including driver behavior measurement (safety)	Steady state	Steady state	Steady state
Affordable, Sustainable	▪ Confirm location and basic information about all units within fleet; complete high-level health assessment on each piece of equipment, inclusive of aviation operations ▪ Remediate any urgent safety and/or compliance-related	▪ Conduct a detailed fleet health assessment ▪ Develop a fleet standardization model for new additions and replacements ▪ From the health assessment, develop a capital replacement budget for Years 2 and	▪ Continue fleet health analysis ▪ Execute on capital replacement budget identified in Year 1 ▪ Adjust Year 3 replacement capital budget as necessary	▪ Execute Year 3 capital budget replacement program as identified in Year 2 ▪ Adjust five-year capital plan as necessary	▪ Execute Year 4 capital budget replacement program as identified in Year 3 ▪ Adjust five-year capital plan as necessary	▪ Execute Year 5 capital budget replacement program as identified in Year 4 ▪ Adjust five-year capital plan as necessary	Steady state

PILLARS	TRANSITION	2020	2021	2022	2023	2024	END STATE 2025
	deficiencies found during assessments	3, including a comparison to planned FEMA funding ▪ Develop a capital fleet additions budget for the next four years, including a comparison to planned FEMA funding					
Sustainable	Consult with Operations leadership to understand their fleet requirements and future needs (this will drive standards and ensure that the teams have the correct equipment for the work)	Develop a plan to incorporate the identified requirements in the transition period, including fleet standards for securement and fleet operating processes	Review and monitor the standards to ensure that they still meet operational requirements	Steady state	Steady state	Steady state	Steady state
Sustainable		▪ Implement operational excellence by managing the four Ps of the fleet business (petroleum, parts, payments, people) ▪ Develop fleet and team KPIs (managing the four Ps) to ensure operational excellence ▪ In consultation with Supply Chain Management, standardize parts and forecast for buying power; look to partner with parts supplier and better understand warranty claim options on the island	▪ Monitor results of KPI and identify performance opportunities ▪ Execute on parts standardization project with identified suppliers				Steady state
Sustainable	Review fuel procurement, fuel cards and tracking systems	Develop plan for consolidated fuel purchase program	Execute fuel purchase program, including contract engagement, field process and reporting	Monitor fuel spend and identify opportunities for cost savings	Steady state	Steady state	Steady state

PILLARS	TRANSITION	2020	2021	2022	2023	2024	END STATE 2025
Sustainable	Review fleet charge-out practices and potentially set up a fleet pool financial mechanism	Identify roadmap for possible fleet pool financial mechanism	Pilot a consolidated fleet approach and identify opportunities to improve equipment use	Roll out consolidated fleet approach across operations	Continue fleet performance review regarding uptime and availability of fleet resources	Steady state	Steady state

E. CUSTOMER SERVICE

PILLARS	TRANSITION	2020	2021	2022	2023	2024	END STATE 2025
Measure of Completion	*Develop Voice of the Customer Program*	▪ *Excellent first-contact resolution by developing deep organization integrations with customer service* ▪ *Develop highly engaged employees to create a customer-centric organization*	*Rollout additional customer service tools (smart phone app upgrades, self-serve kiosks, employee upskill training)*	*Further engage customers by rolling out proactive communication tools and customer appointment booking capabilities (e.g., outage/restoration notification, billing information/ estimation*	*Continuously improve customer experience through review of Voice of the Customer*		*Best-in-class customer experience*
Reliable, Resilient, Affordable	▪ Develop a Voice of the Customer program to develop an outside-in view of customer service ▪ Assess credit & collection processes and debt recovery	▪ Optimize credit & collection processes and debt recovery ▪ Develop alternative payment options ▪ Implement Voice of the Customer program	Implement pay-as-you-go energy model and other alternative payment options				Enable residents to choose how to best address their energy needs
Sustainable, Reliable	Evaluate and develop plan for digital delivery of customer experience	▪ Develop operating procedures and training for integrating solar-producing customers ▪ Develop solar marketing/customer education plan including simulation and calculation tools ▪ Develop customer prosumer dashboards	Facilitate installations of distributed generation (e.g., plug-and-play)	Pursue alternative rates to encourage additional prosumers			Enable consumers to become prosumers
Customer Centric	▪ Survey customers to increase satisfaction levels ▪ Ensure participation in the initial enterprise-wide employee satisfaction survey ▪ Evaluate call center strategy to balance insource vs.	▪ Add omni-channel functionality to customer portal — i.e., webchat, phone text, visibility to service request status ▪ Implement outbound customer communication & education plan	▪ Enhance smart phone application to provide customers with additional methods of interacting ▪ Implement self-serve pay kiosks in the district offices and alternative retail outlets for cash payments	▪ Pulse Check employee satisfaction survey ▪ Proactively communicate billing information in customers' choice of frequency and format			Increase customer engagement

PILLARS	TRANSITION	2020	2021	2022	2023	2024	END STATE 2025
	outsource customer experience delivery ▪ Develop customer communication plan ▪ Assess current energy efficiency program	▪ Implement proactive planned outage communications ▪ Enhance the underground locate program	▪ Phase 2 employee satisfaction survey				
Affordable	▪ Map the customer journey by customer segment to identify gaps in existing processes ▪ Evaluate existing customer service performance metric data/capabilities ▪ Implement cloud-based call center technology ▪ Upgrade CC&B to Version 2.7 ▪ Develop customer service training program	▪ Integrate distribution operations with customer service to improve service delivery ▪ Reduce customer wait times by implementing contact center workforce management tools ▪ Implement continuous process improvement programs ▪ Implement enterprise-wide customer service training program ▪ Implement customer service performance metric program	▪ Implement annual audit of customer service processes to ensure controls are in place ▪ Establish ongoing refresher training program ▪ Establish an upskilling program for customer service employees to enable succession and/or promotion opportunities ▪ Measure customer service metric program	Implement customer appointment booking	▪ Create more customer self-service options by moving CC&B from Version 2.7 to cloud ▪ Re-evaluate district office and central office operating structure for efficiency gains		Create an exceptional customer experience

F. HUMAN RESOURCES

PILLARS	TRANSITION	2020	2021	2022	2023	2024	END STATE 2025
Communication, Employee Engagement	▪ Establish a communications transition team of stakeholders for an employee communication strategy ▪ Develop comprehensive and robust employee communication strategy with key milestones (all printed communication will be in both English & Spanish) ▪ Operator will deliberately define culture, mission statement and core values and begin to communicate these ▪ Communicate with employees transparently and frequently; involve employees in important decisions ▪ Create a channel for two-way, open communications; schedule and begin conducting town hall meetings, distribute FAQs, memos, newsletters, group sessions, one-on-one meetings, Operator intranet updates ▪ Design employee engagement plan	▪ Create employee value proposition defining ServCo and the reason employees will want to stay or come work with the organization ▪ Implement employee hotline and/or an ombudsman for employees to provide feedback anonymously/without fear of reprisal ▪ Create environment where employees feel able to voice their ideas and leaders value employee contributions ▪ Ensure that frontline supervision/ management aligns with company objectives and help communicate to line employees ▪ Publicize town hall meeting schedule quarterly for state-of-business updates ▪ Implement Pulse Check with employees (allowing them to provide feedback through commencement and frequently moving forward) ▪ Immediately have employee and family picnic with Operator ▪ Coordinate employee appreciation events ▪ Promote change and progress by highlighting projects that are going well and action items that are being delivered on time ▪ Opportunities for employee engagement with employee	▪ Conduct initial employee engagement survey ▪ Create action plan from employee survey and execute on plan ▪ Hold annual meetings moving forward with full financial review, business production/ financial analysis and update short- & long-term goals with frontline supervision/ managers		Conduct employee engagement survey every 2 years to ensure that employees have a bottom-top flow of communication		Multiple avenues for the flow of communication with employees (both top-bottom and bottom-top) Trained, engaged workforce

PILLARS	TRANSITION	2020	2021	2022	2023	2024	END STATE 2025
		events, volunteerism to community ▪ Create environment of feedback without fear of retaliation throughout the entire process					
Labor Relations	▪ Finalize a Labor Relations Strategy & Action Plan ▪ Establish initial communications/relationship with union leadership early to demonstrate desire to negotiate and bargain in good faith ▪ Create Operator's proposals to bring to the negotiating table	▪ Notify unions and employees of Operator's initial Terms & Conditions ▪ Begin negotiations for new, more reasonable collective bargaining agreements (CBAs) ▪ Communicate new CBAs to all Operator employees & leadership ▪ Train line managers and Operator leadership in effective communication, building trust, performance management and leading in a union environment	Maintain constant communication with union leadership, developing a positive employee relations strategy that encourages resolution				Positive relations with the labor unions; reach agreements on Collective Bargaining Agreements that are reasonable for utility to be profitable
Talent Acquisition	▪ Coordinate with each department to develop a department-specific people strategy plan that complements overall business strategy ▪ Determine the number of roles needed in each department ▪ Finalize all job descriptions and pre-hiring assessment tools ▪ Deploy recruiting tool to be used for job postings, applications, and onboarding ▪ Assess current PREPA employees through interviews and evaluations ▪ Create offer letters for "Hired Former Employees	▪ Clean hire all employees and set up for payroll from Operator ▪ Onboard all employees on first day of commencement at multiple locations ▪ Migrate selected "Hired Former Employees of Owner" information to Operator ▪ Hire any necessary external employees to Operator ▪ Create touch points and follow up with all newly hired employees to Operator at 1–, 3– and 6-month increments	▪ Continuously conduct operational workforce planning to identify talent gaps in the short term (present – 18 months) and long term (18 months – 5 years)				Workforce needs meet business requirements. Overtime is minimized because staffing levels are adequate for demand.

PILLARS	TRANSITION	2020	2021	2022	2023	2024	END STATE 2025
	of Owner" & put through pre-screening ▪ Design a comprehensive onboarding program to enhance the employee experience						
Health & Welfare Benefits	▪ Establish relationship with outside broker and consultant for Operator ▪ Perform current-state assessment; including a full data gathering of all plans, vendors, coverages, contracts, SPDs, experience and policies ▪ Benchmark plans for design, cost and contributions ▪ Conduct compliance review ▪ Assess funding arrangements ▪ Assess union contracts/ obligations and bargaining schedules ▪ Assess retiree health care obligations ▪ Evaluate an Employee Assistance Program to determine if it could replace existing onsite resources/ services	▪ Begin negotiations on any benefit plan contracts that are up for renewal ▪ Start benefits open enrollment planning ▪ Conduct full experience review: identify cost drivers, review fee/rates, evaluate prescription drug contract and medical plan design, assess stop loss coverage ▪ Conduct RFP if necessary					Provide great health and welfare benefits to employees at a reasonable cost to the Operator
Pension	▪ Establish a Pension Committee and determine administration (outsourcing) for plan, actuarial and consultant ▪ Sign contract with consultant and actuary and implement the outsourcing program for the plan ▪ Research extensively on viable Sustainable Income Plan design	▪ Announce new pension option to employees ▪ Secure necessary resources to help administer the plan ▪ Meet with employees regarding new pension options showing comparison of legacy vs. new plan ▪ Allow a one-time election into the new plan ▪ Continue communication plan to educate employees					Redesigned, innovative retirement benefits with a Sustainable Income Plan (SIP) for employees

PILLARS	TRANSITION	2020	2021	2022	2023	2024	END STATE 2025
	▪ Communicate with union representatives and gain buy in. ▪ Create online employee retirement portal for retirement estimate calculations and retirement execution ▪ Develop extensive employee communication, including printed materials and in-person sessions	on how to use new retirement tool to estimate and commence pension benefits ▪ Establish quarterly pension committee meetings with actuary and consultant					
Training & Development	▪ Develop a Workforce Development Program for all employees. ▪ Assess employee training policies, standards and practices ▪ Observe training staff/interviews ▪ Determine LMS long-term solution and deploy tool ▪ Assess employees in the field and in functional departments ▪ Complete a skills gap analysis based on assessments ▪ Create a phased plan to comprehensively address findings through learning and development opportunities ▪ Create Go-Forward Training Plans (immediate & long term)	▪ Identify and execute training events (at facilities or mobile training units) that address critical gaps in safety and compliance ▪ Execute Go-Forward Training Plans for each function (all employees), including skilled labor and individual ▪ Ongoing gap assessment and continuous evaluation of training and education effectiveness					Create a sustainable training and development program for all levels of the organization
Compliance	▪ Review compliance with federal and local employee legislation ▪ Establish written policies and procedures	▪ Create quality assurance and ongoing review processes ▪ Promote Operator's commitment to compliance ▪ Establish HR compliance position					Ensure Operator is compliant with federal and local employment laws.

PILLARS	TRANSITION	2020	2021	2022	2023	2024	END STATE 2025
		▪ Ongoing auditing, monitoring and reporting of systems					
Community	▪ Develop a comprehensive community investment plan ▪ Explore opportunities for Operator to have community involvement and volunteer (seek employee input)	▪ Integrate volunteerism and community service into the Operator culture ▪ Develop and implement a strategic marketing campaign aimed at regaining and enhancing public trust, customer confidence and stakeholder partnerships vital to the success of the organization ▪ Select an elementary school in the community to support with school supply drives, campus cleanup ▪ Enhance public image through increased community connections and awareness ▪ Create quarterly opportunities for employees to come together to participate, keeping staff connected					Demonstrate Operator's investment in the lives of Puerto Ricans and communities

G. INFORMATION TECHNOLOGY

PILLARS	TRANSITION	2020	2021	2022	2023	2024	END STATE 2025
INFORMATION TECHNOLOGY							
Measure of Completion for Team	▪ *Systems, resources and processes in place to support PREPA IT transformation* ▪ *System Remediation Plan in place*	▪ *Agile, innovative organization focused on project execution* ▪ *Disaster recovery test complete*	▪ *ITIL processes in place, culture transformation complete* ▪ *New backup data center*	▪ *Business enabled to make data-driven decisions*	▪ *Partnership between business and IT to increase business value*	*Customer-focused digital transformation-enabled organization*	*Pass ITIL Level 3 capability maturity model (CMM) self-assessment*
Transform Corporate Culture	▪ Fill key roles ▪ Develop culture change-management plan ▪ Implement internal customer satisfaction surveys (align with customer service voice of customer)	▪ Establish diversity and inclusion program for IT ▪ Hold regular IT town halls and “all hands” sessions ▪ Establish employee career progression program	▪ Refine continuous improvement methods and practices ▪ Develop “everyone must win” attitude; establish trust between organizations				Cyber culture focused on continuous improvement & project management quality assurance
Adopt a Customer-Centric Philosophy	▪ Develop stakeholder communications and change management plan ▪ Assess established processes; create process improvement plan	▪ Implement incident and change management ITIL processes ▪ Conduct business process reviews and refinement exercises	▪ Implement remaining ITIL processes; especially problem and knowledge management ▪ IT Service Delivery establishes regular business interlock sessions ▪ IT regularly completes projects on time	▪ IT Service Delivery conducts monthly and quarterly business reviews with key stakeholders; established critical lines of communication ▪ Develop executive information systems; KPI dashboarding			Customer service excellence and consistent solution delivery
Affordability	▪ Complete detailed vendor management and contract review; establish preferred vendor lists with procurement ▪ Develop cost management program	▪ Begin budget cycle process early; establish stakeholder needs vs. wants ▪ Establish operations and maintenance budgets	▪ Establish hardware and software replacement cycles and patching and maintenance processes ▪ OpEx efficiencies identified	▪ OpEx efficiencies realized ▪ Continued refinement and execution of the five-year strategy; new years added to the end of the original			

PILLARS	TRANSITION	2020	2021	2022	2023	2024	END STATE 2025
		▪ Develop and gather ideas for OpEx efficiencies					
Reliability	▪ Establish an IT Service Delivery PPMO; enable project execution capabilities ▪ Develop quality management program; establish key quality metrics	▪ Develop a strategic five-year plan with key deliverables	▪ Move secondary data center from Aguirre generation facility	▪ Complete GenCo carve out			Highly available cyber systems that meet all business needs
Resiliency	▪ Partner with Information Security and T&D risk departments to develop risk matrix ▪ Develop risk management program	▪ Greenfield critical infrastructure replacements; create a platform of stability with a strong foundation to build upon ▪ Establish physical security mechanisms for all computing locations ▪ Disaster recovery test executed; lessons learned analyzed	▪ Implement physical computing room transformation plan; rooms must be clean, cool, secure and monitored	▪ Disaster Recovery/Business Continuity Plan is integrated with Enterprise BCP and IRP			Reliable systems that are recoverable and regularly tested
Sustainability	▪ Develop integration management plan/program ▪ Assess all physical computing rooms in offices, field locations and substations for operational effectiveness and develop transformation plan	▪ Enterprise Architecture begins establishing technology standards, develops understanding of business processes, and implements Design Advisory board and Project Enablement Forum	▪ Enterprise Architecture finishes establishing technology standards, heat map, prioritization and alignment with business processes; reuse of project artifacts is in progress	▪ All functional requirements are mapped to business processes and the needs of the business are being met by provided solutions	High-availability architectures established for critical platforms and functions, continuous review and alignment with business process changes/ requirements	High-availability architectures are rolled out to critical systems; heat mapping shows an increased level of maturity and alignment between business and IT	Platforms that are highly available and meet/exceed business requirements

PILLARS	TRANSITION	2020	2021	2022	2023	2024	END STATE 2025
OPERATIONS TECHNOLOGY							
Measure of Completion for Team	▪ *Secure and transfer control of existing OT systems, reliable hand-off*	▪ *Deploying technologies for a strong OT grid, with focus on communications and sensing equipment*	▪ *Achieving significant operational efficiencies through dispatch and theft deterrence*	▪ *Enabling advanced technologies to support Smart City initiatives*	*Driving down costs through the use of the advanced technologies (ADMS, drones, ToU)*	*Evergreening technology to industry best-practice* *Self-sustaining automated environment*	*A resilient grid that can respond to and correct any potential power state issues*
Customer Centric	▪ Review and expand scope of AMI and MDM enhancement projects ▪ System Remediation Plan in place	Secure link developed to stream data from secure OT network to IT systems	Centralized dispatch to field employees for 30% of all work; retail-focused first	Smart Cities technologies rollout (advanced streetlighting, EV charging station)	Time-of-use rates available with real-time power monitoring on APP	Rollout of distributed energy and demand-response options to customers Enablement of prosumer	Information is readily accessible to best meet ever-changing customer needs
Affordable	Assess options for “Truck as an Office” mobile technology	Re-vamp centralized distribution operating desk environment and roles	▪ Theft and meter error detections automated from new MDM ▪ Vehicles outfitted with mobile office technology	▪ Maintenance and capital work all tracked in Enterprise Asset Management system against locations and assets ▪ Timecards are automated	Budgeting and actuals all based on unit rates, baseline and drive efficiencies across organization		Technology enables skilled labor to spend more time on tools and less time finding and collecting information
Reliable	Review and enhance communication network infrastructure plan (including DWDM fiber networking)	▪ Begin deployment of SCADA-enabled recloser deployment ▪ Deployment of select wireless mesh networks	▪ Validation of Electrically Connected Network Model ▪ OPGW network hardened ▪ Continued distribution SCADA deployment	▪ NERC CIP type assessment of OT network complete ▪ >95% of assets are geo-locatable	Battery storage devices begin deployment on network		Marked performance improvements in SAIFI
Resilient	Complete FLISR planning studies for Distribution network	Deployment of network sensors for voltage monitoring, fault detection	Control center building upgrades and hardening	▪ RFP issued for ADMS System ▪ Push-to-Talk Radio network upgrades (including data)	ADMS system phased implementation begins	Introduction of automated switching procedures into the distribution control center for FLISR	Marked performance improvements in SAIDI and CAIDI

PILLARS	TRANSITION	2020	2021	2022	2023	2024	END STATE 2025
Sustainable	Work with PREB to re-base and set reliability targets for SAIDI, CAIDI, SAIFI	Re-vamp and rollout Field Worker Electrical Safety & Operating procedures and systems to support a centralized operator in charge model	University partnerships, Innovation Center setup	Solar community microgrid demonstration complete	Low-impact technologies deployed (e.g., drones)		Public perception supports and agrees with value received for cost
CYBERSECURITY TECHNOLOGY							
Measure of Completion for Team	*Network Visibility allowing quick responses to security events* *Systems remediation plan in place*	*Proactive Security Tools to manage zero-day risks*	*Baseline security program with NIST/NERC frameworks in place*	*Advanced technology used to manage vulnerabilities*	*Evolution of a stable and well communicated cyber environment*	*Stable and secure environment that is self-healing*	*Stable, proactive and protective security environment*
Customer Centric	Tools to provide better visibility of the PREPA environment	Improved visibility and reporting on basic network functionality	Proof of Concept for Enterprise tools, including Access Management, IDM, SIEM and VA	Data collection and consolidation for security tools	Stabilize and increase efficiency of reporting capabilities for the security tools	Clear visibility of the Enterprise using security tools; further increase efficiency and reporting capabilities	Full visibility to the security posture of the enterprise
Affordable	Reuse/update current tools or leverage ATCO existing tools	Build business case to move some services to the cloud	Proof of concept for moving services to the cloud	Move all non-critical services to the cloud	Move critical applications to the cloud	Move most critical service to the cloud	Maintain a secure cloud-centric environment
Reliable	Review policy and governance to see where we can leverage ATCO existing practices	Further review the environment's policies and procedures; start designing a NERC CIP readiness program	Release the NIST Security Framework and Architecture standards for OT and IT environments	Design and Implement Industrial IoT integration with integration to the security framework and architecture	Conduct education and awareness campaigns for the built framework and standards	Assess the environment and fine tune as needed; perform an external assessment against this new environment	Agreed security framework is continually communicated to the organization

PILLARS	TRANSITION	2020	2021	2022	2023	2024	END STATE 2025
Resilient	Review cloud and data center security practices to see if we can leverage existing security controls	Build the business case to develop tools to build a secure cloud environment	Proof of concept for cloud security tools; develop OT to cloud security integration standards	Consolidate current and developed tools for the cloud environment; implement managed zones within the OT environment	Fine tune the existing environment to be responsive to attacks; implement threat intelligence (AI) program	Build out a self-healing environment; build out the unified threat (UTM) environment	Resilient environment that responds quickly to any cyber attack
Sustainable	Understand where PREPA needs to mitigate and isolate risk, along with identifying their current regulatory posture	Use existing regulatory security standards within ATCO to start a customized regulatory posture for PREPA	Deliver a customized environment to ensure a NERC Readiness posture for PREPA	Be audit-ready for regulatory standards within PREPA	Perform mock audits within the environment to understand gaps	Remediate gaps and position PREPA well to challenge an internal audit	Well-defined regulatory program that ensures that the environment is properly protected

H. SUPPLY PROCUREMENT

PILLARS	TRANSITION	2020	2021	2022	2023	2024	END STATE 2025
Measure of Completion	*Develop scalable supply chain services operating model to support T&D*	▪ *Develop highly engaged employees to create a customer-centric organization* ▪ *Prioritize safety culture*	*Streamline end-to-end supply chain* *Complete remaining near-term initiatives*	*Further continuation with long-term strategic priorities & improvement projects*	*Stabilization well under way; continue streamlining end-to-end process*	*Long-term high-functioning integrated end-to-end supply chain services team is in place and delivering the support model required*	*Best-in-class supply chain services*
Reliable, Resilient, Affordable	▪ Develop scalable end-to-end supply chain services operating model ▪ Establish cross-functional transition committee ▪ Evaluate procurement materials & services requirements	▪ Implement procurement materials and services strategies ▪ Implement inventory management, inventory control & replenishment strategies	▪ Optimize Procure-to-Pay process ▪ Optimize use of Asset Suite	Continuation of supply chain services optimization	Continue to measure supply chain services		Enable supply chain operating model to meet the needs of T&D
Sustainable, Reliable	Evaluate and develop inventory model requirements incorporating operating plans, sparing strategy, working capital requirements, etc.	Develop regional internal inventory planning performance dashboards	Optimize inventory replenishment/ warehousing model	Continue to optimize			Provide reliable inventory strategy for steady state and/or hurricane season
Customer Centric	Assess employee engagement	Complete Mini Pulse Check employee satisfaction survey	Continue Engagement Activities	Pulse Check employee satisfaction survey			Increase employee engagement thereby improving customer service to internal (T&D Ops) and external customers

I. FINANCIAL MANAGEMENT & ACCOUNTING

PILLARS	TRANSITION	2020	2021	2022	2023	2024	END STATE 2025
Measure of Completion	*Legal entities and respective G/L systems and banking platform set up* *Proper resources and processes in place to support PREPA's finance transformation*	*Comprehensive finance process review and risk assessment*	*Reporting compliant: timeline preparation of information in support of PREPA reporting requirements*	*Robust and effective internal control environment at U.S. public company standards*	*Information Processing Automated through technology optimization*	*Efficient Integration between Strategic Planning, Financial Reporting and Performance Management*	*Robust business insight and reporting compliance that leverages high reliance on system of internal control*
Cost Effective	▪ Establish new entities, accounting systems and key processes to execute the operator functions prior to commencement date ▪ Perform comprehensive assessment of staff capabilities and internal/external reporting requirements	▪ Implement a training program of key policies and procedures ▪ Provide timely routine reporting and analysis to PREPA stakeholders ▪ Develop reporting compliance workplan with external auditors and begin execution	Operator capable of 120-day signoff on FY2021 audit and prior				Reporting compliance: timely preparation of information in support of PREPA reporting requirements
Sustainable; Reliable	▪ Assess the current control framework and perform a control risk assessment ▪ Communicate observations and proposed remediation to PREPA stakeholders	▪ Walkthrough, redesign and implement moderate/high-risk key control environment ▪ Implement and align the internal audit workplan to the revised risk assessment	Redesign/implement remainder of key control environment; train and test effectiveness	Test/evaluate/report ongoing operating effectiveness of control environment			Internal control Environment modeled after U.S. Sarbanes Oxley requirements

PILLARS	TRANSITION	2020	2021	2022	2023	2024	END STATE 2025
Cost Effective	Walkthrough and establish best practices on the existing budget/ planning processes	Comprehensive evaluation of FY21 operating budget and evaluate FY22 improvement opportunities based on stakeholder needs	Execute enhanced budget process as part of FY22 planning	Evaluate and identify automation and RPA opportunities within existing ERP environment	Implement automation/ streamline business process through ERPA enhancements	Enhanced/optimized FY24 process as part of financial/ operational data system	Integrated and effective budget/forecast and business planning capability
Cost Effective	Understand existing business intelligence (BI) initiative	Revise BI strategy for updated short/long-term business requirements	implement short-term BI requirements; begin long-term solutioning	Automate/streamline business process through technology	Automate/streamline business process in concert with longer-term technology implementations	Enhance/optimize business information to support management and operations Strategies	Integrated and effective performance management across matrix organization

M. SAFETY MANAGEMENT

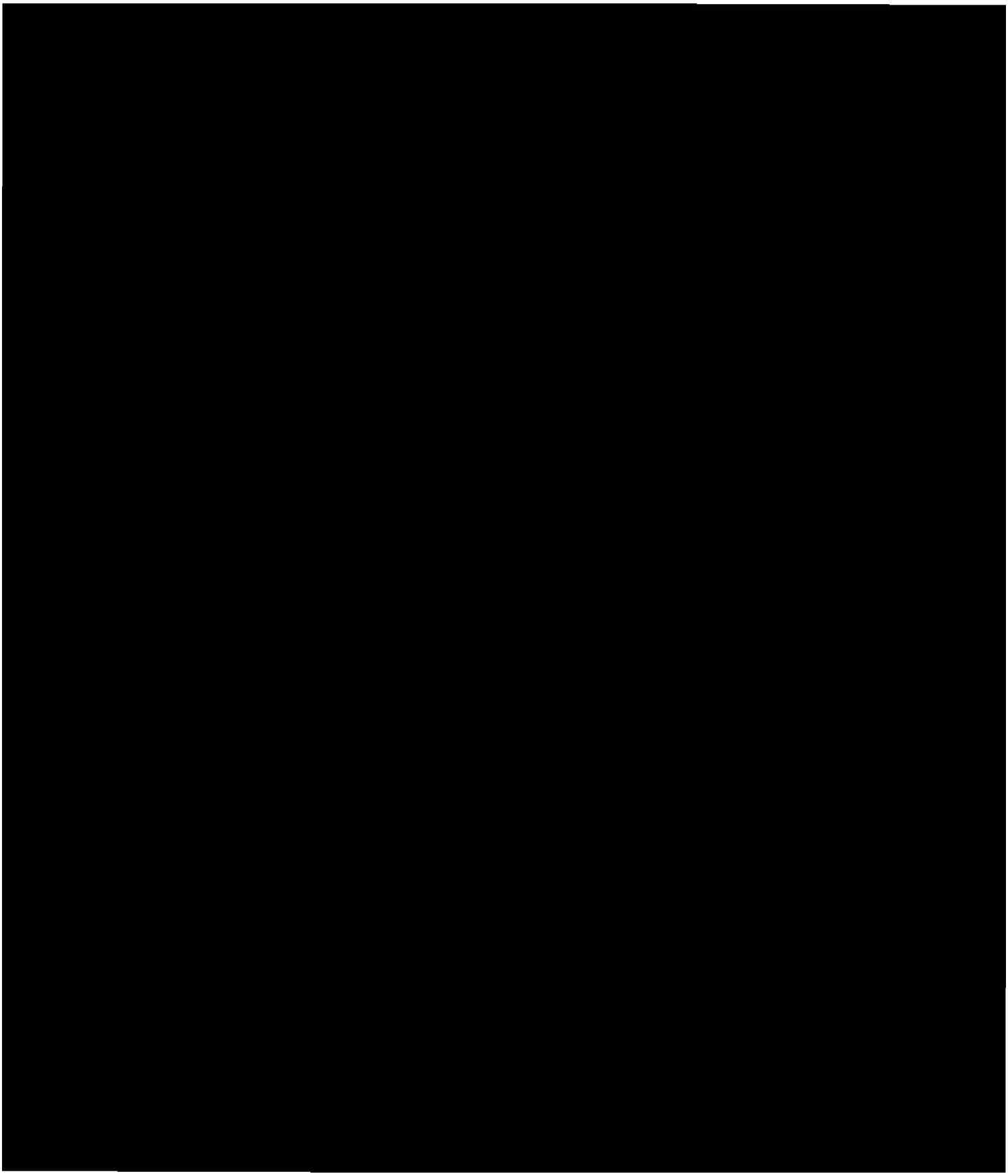
PILLARS	TRANSITION	2020	2021	2022	2023	2024	END STATE 2025
Workforce Safety & Health (S&H)	▪ Conduct interviews with all existing PREPA S&H department employees ▪ Conduct baseline gap analysis of all PREPA operations/facilities and SHEQ policies and procedures to determine compliance with minimum regulatory requirements ▪ Assess PREPA's DOT driver's compliance industrial hygiene and contractor safety programs to determine compliance with minimum regulatory requirements	▪ Establish and implement incident management procedure that includes notification procedures, injury management protocol and incident investigation requirements ▪ Establish formalized reporting and incident investigation procedures that includes a mechanism to share investigation results and lessons learned across the PREPA system ▪ In accordance with the results of the initial SHEQ gap analysis, update and implement a PREPA Safety and Health Policies and Procedures Manual that aligns with regulatory requirements ▪ Implement a formalized process for evaluating and managing high-hazard risks during the job planning process ▪ Implement DOT Driver's Compliance Program to include items such as a Drug and Alcohol Testing Policy; Medical Requirements; Hours of Service, etc. ▪ Implement a Contractor Safety Program to include the qualification and oversight of all contractors working on PREPA property	▪ Establish and implement new SHEQ performance metrics into the individual performance plans for the entire PREPA leadership team ▪ Begin implementing the Human Performance System and associated components across the PREPA organization ▪ Implement a Near Miss/Good Catch reporting incentive program. ▪ Implement a comprehensive job site observation program that will expand beyond the PREPA leadership team and safety organization ▪ Increase frontline employee engagement through various safety committees, task teams and other leadership-sponsored safety initiatives ▪ Implement a "Safe Driving Campaign"	▪ Continue work on any items not completed during 2020 and 2021 ▪ Add new initiatives based on updated gap analysis	Begin budget cycle process early; establish stakeholder needs vs. wants		
Public Safety	▪ Establish a baseline of current PREPA public safety initiatives and internal resources; formalize a 5-year plan to enhance public safety strategic initiatives and outreach to the public	▪ Various videos and reference materials with graphics to promote public safety ▪ Promote the awareness and use of "Call Before You Dig" ▪ Use social media to provide the public with safety information	▪ Electrical safety awareness events with groups such as first responders, construction trade associations, agricultural associations, tree trimmers, landscapers, etc. ▪ Electrical safety programs in schools	▪ Continue work on any items not completed during 2020 and 2021 ▪ Add new initiatives per updated gap analysis			

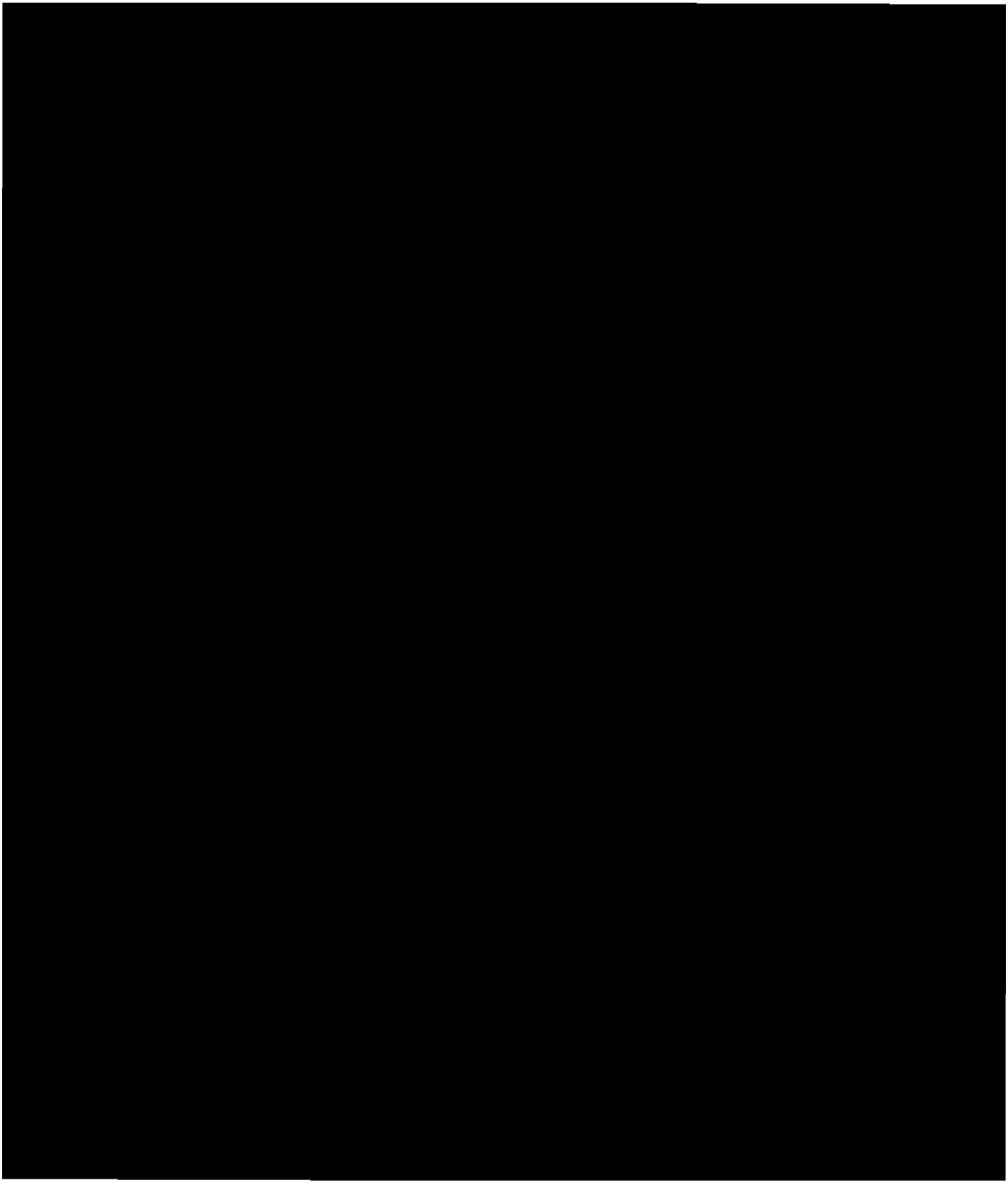
O. ENVIRONMENTAL MANAGEMENT

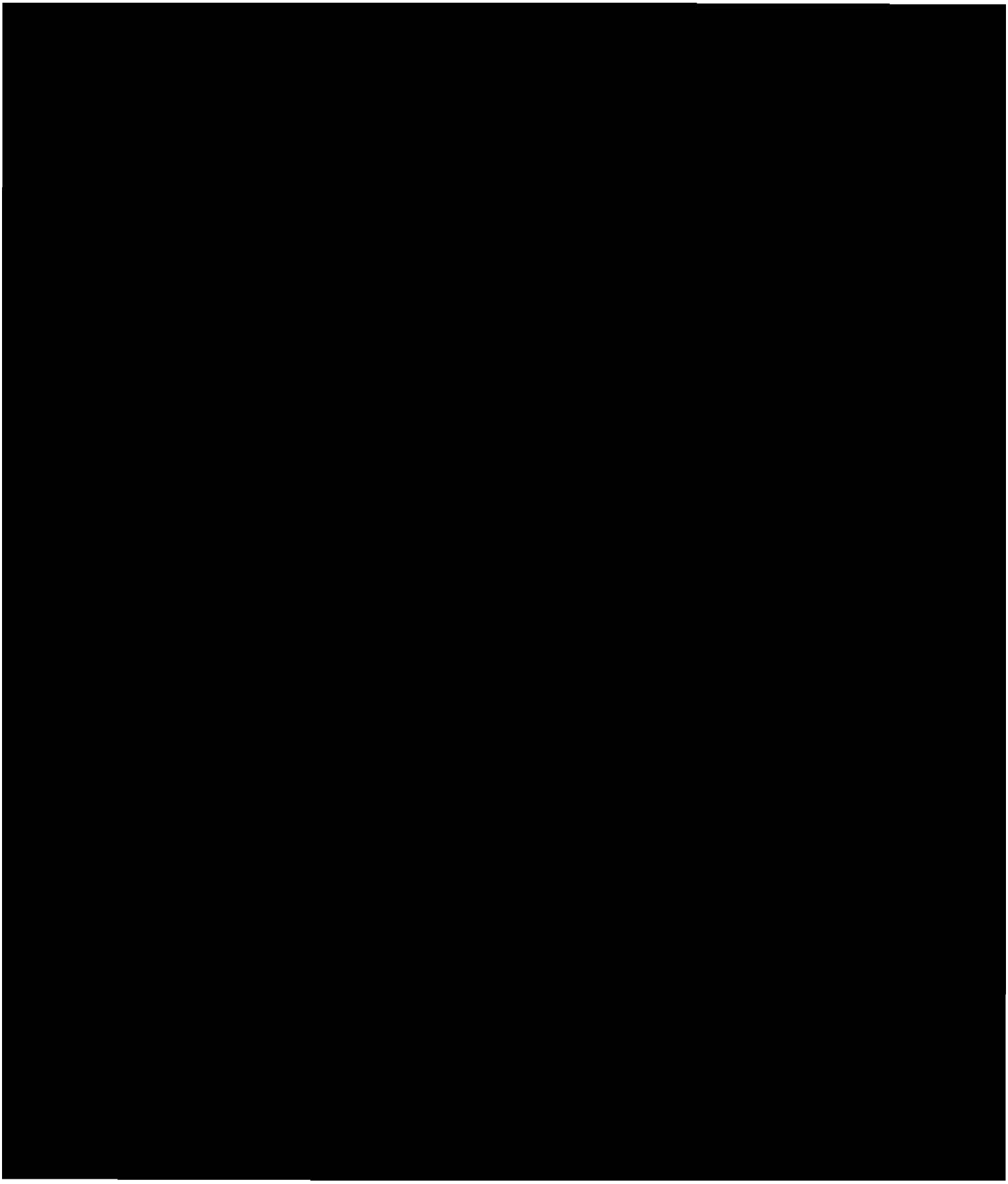
PILLARS	TRANSITION	2020	2021	2022	2023	2024	END STATE 2025
Regulatory/ Permitting Compliance	▪ Establish contact with regulatory agencies ▪ Environmental permits review and transfer ▪ Conduct environmental assessments (including Phase I and Phase II as required); develop due-care plans	▪ Identify quick wins with regulatory agencies, customers and/or employees ▪ Develop environmental compliance management tool ▪ Start working with agencies to bring permits into compliance ▪ Review, update and/or create procedures for environmental aspects and regulations	Implement environmental compliance tool	▪ Begin budget cycle process early; establish stakeholder needs vs. wants			▪ High level of trust with Puerto Rico and federal regulatory agencies ▪ 100% compliance with permits
Compliance in Field	▪ Work with Operations to review National Environmental Policy Act applicability for operations and maintenance ▪ Perform waste contractor review for all T&D operations	▪ Conduct third-party compliance audits of the grid for potential critical wildlife impacts; develop improvement plans ▪ Start rolling out environmental awareness training for all employees ▪ Develop waste contractor review program	Continue delivering training for all employees	▪ Ensure that the training goal of delivery to all employees is being achieved ▪ Employee training adequate for job functions and continuing		Culture of compliance is established and starting to self-regulate	▪ Highly trained and competent environmental professionals supporting entire business ▪ 100% compliance with environmental laws ▪ Culture that reports non-compliance and immediately addresses with corrective actions ▪ Management supports compliance and is aware of regulatory changes that could impact the

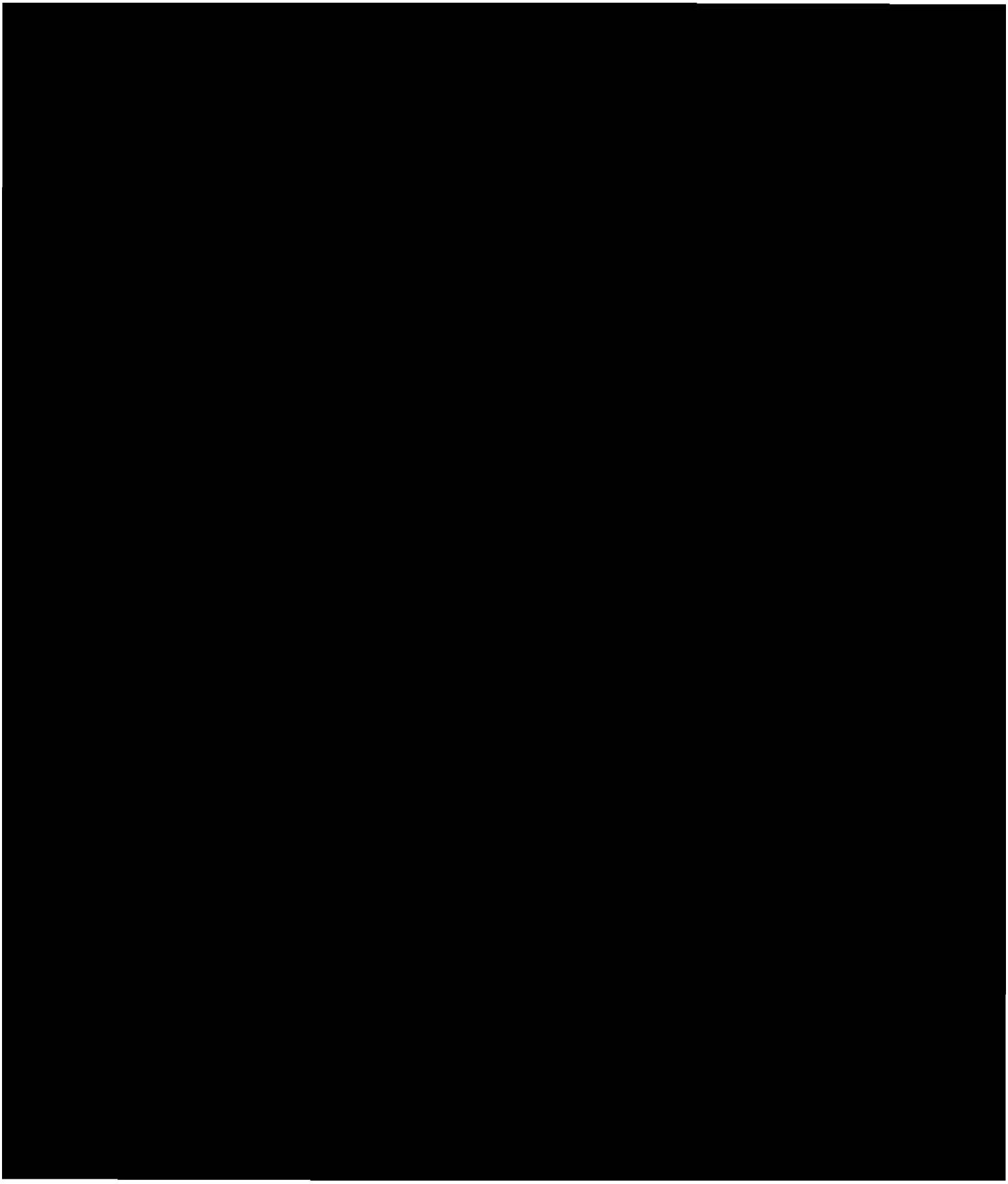
PILLARS	TRANSITION	2020	2021	2022	2023	2024	END STATE 2025
							business prior to regulatory changes
Effective Environmental Management System/ Process Improvements	Assess current state	▪ Develop environmental management system (EMS) ▪ Develop and implement initial environmental department workflows	▪ Assess and adjust environmental department workflows ▪ Begin implementing EMS with audit and compliance focus	Continue implementing and continuously improving EMS	Assess and adjust EMS implementation		▪ System that drives continuous improvement is fully integrated ▪ Workflows that allow focus on field operations are implemented
Community Environmental Awareness			▪ Publicize a community compliance alert line with follow-up actions and tracking systems ▪ Start outreach with local schools and communities	▪ Implement community involvement initiatives based on call center feedback ▪ Support community environmental programs	Continue community involvement initiatives		Communities and organizations positively engage with the utility

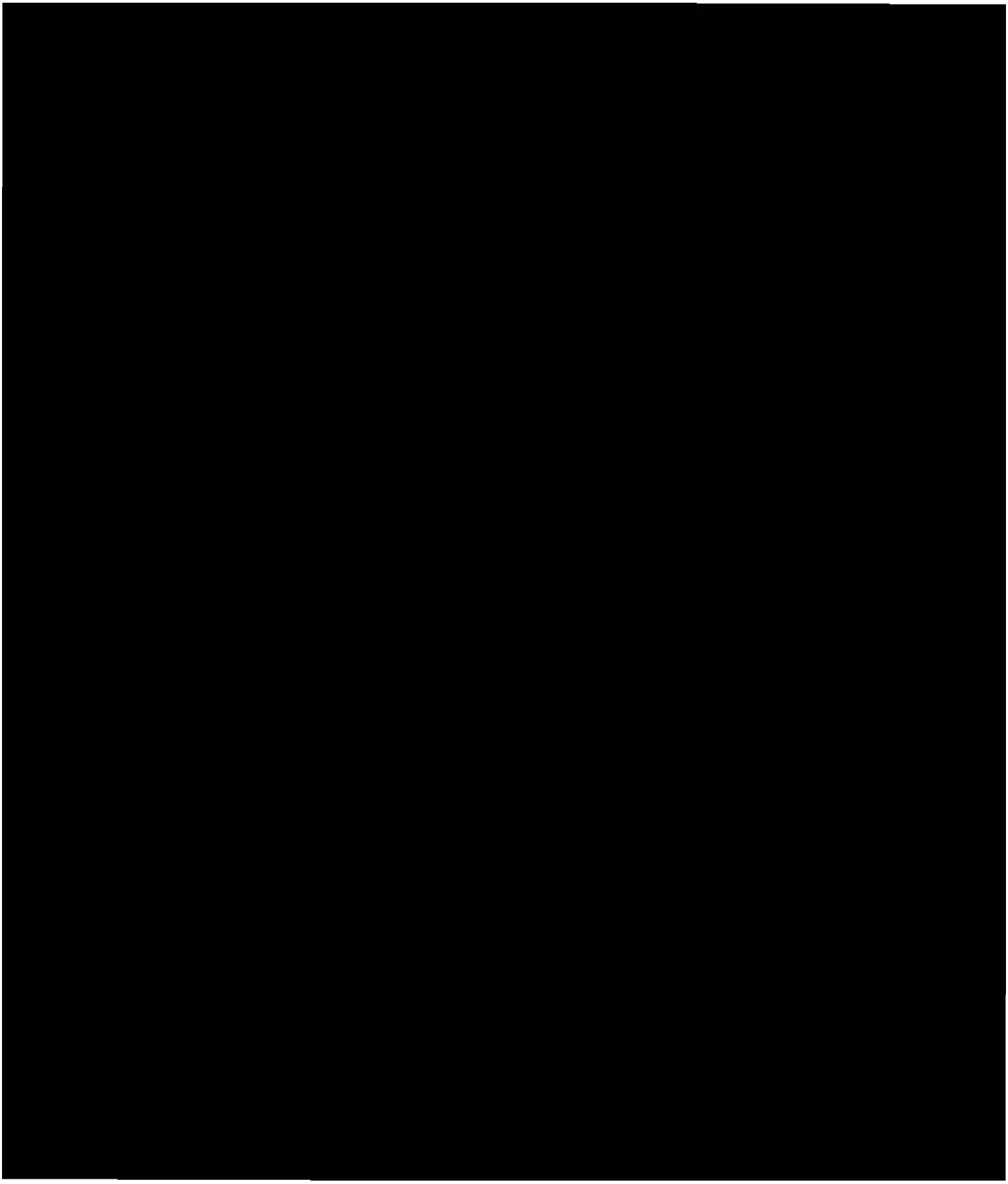
Appendix 2: Additional Detail on Emergency Response – Proprietary Information

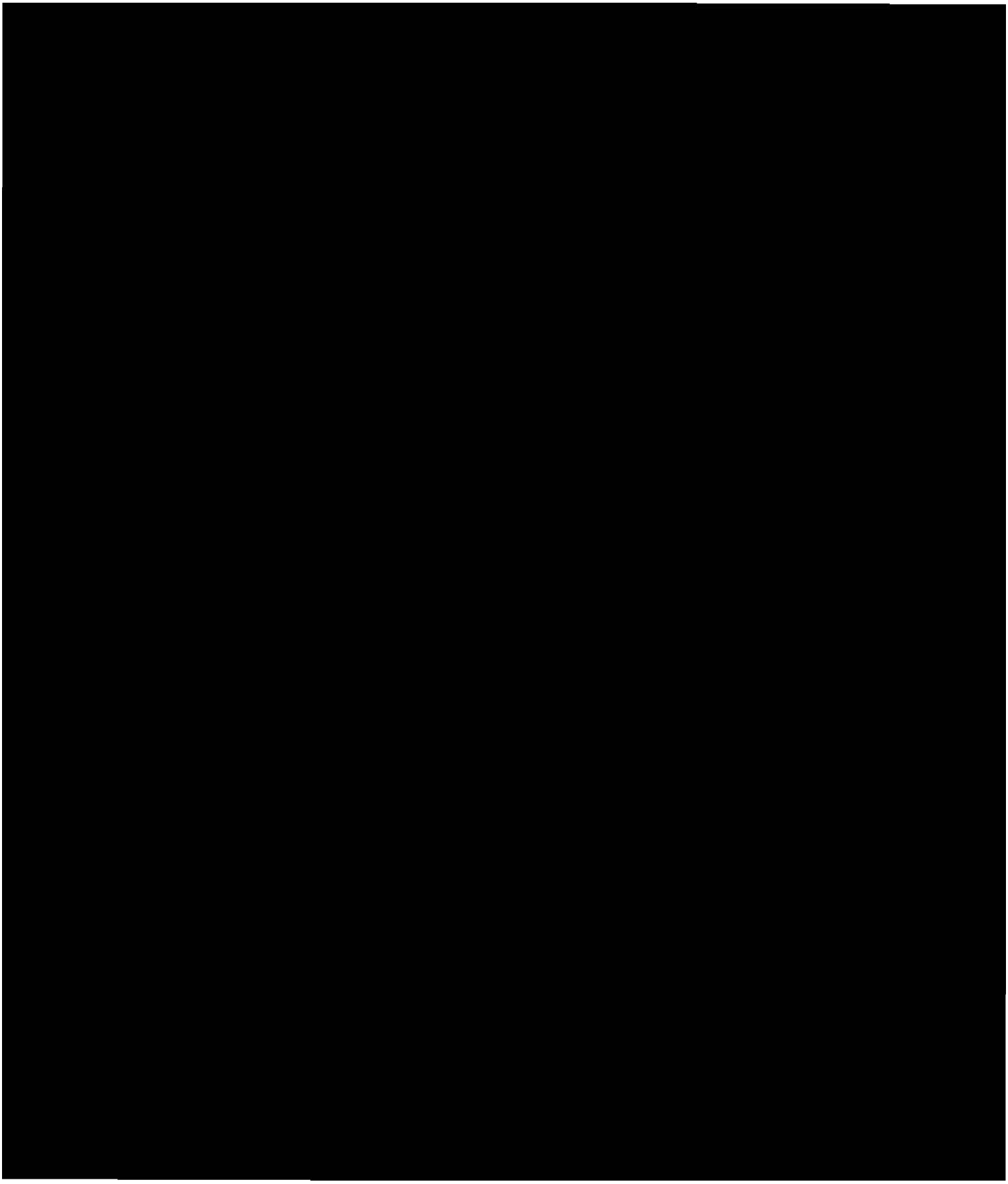


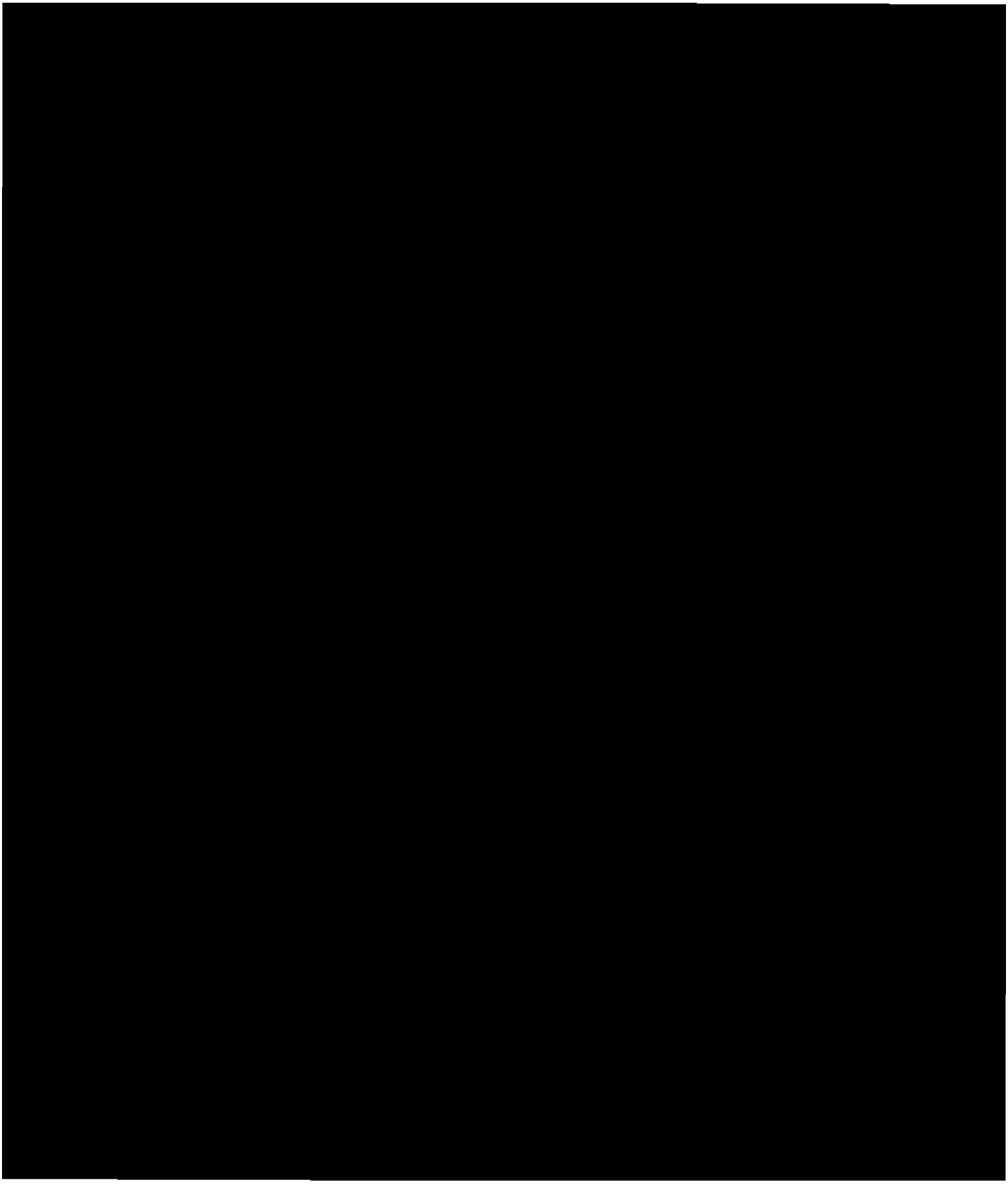


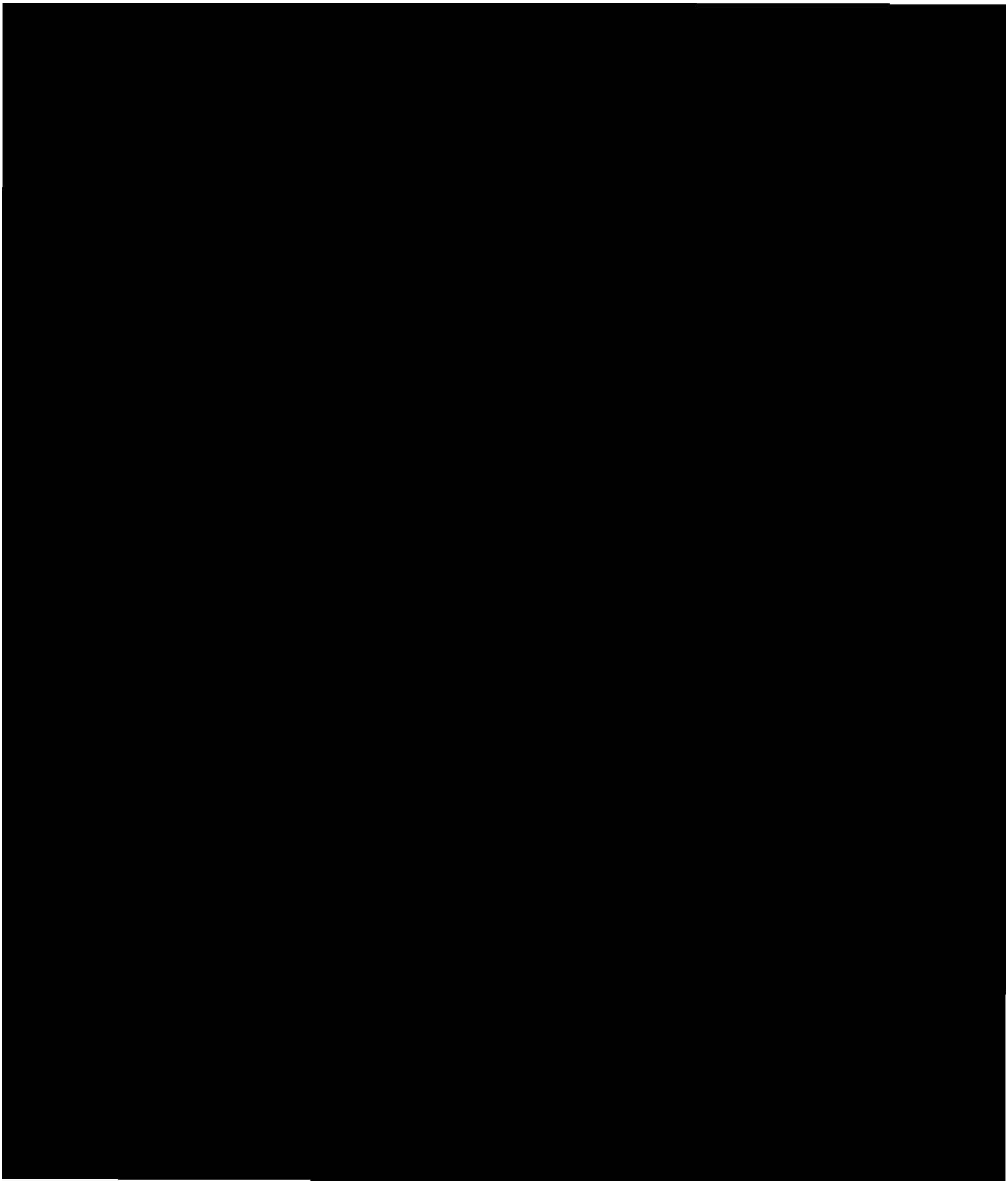


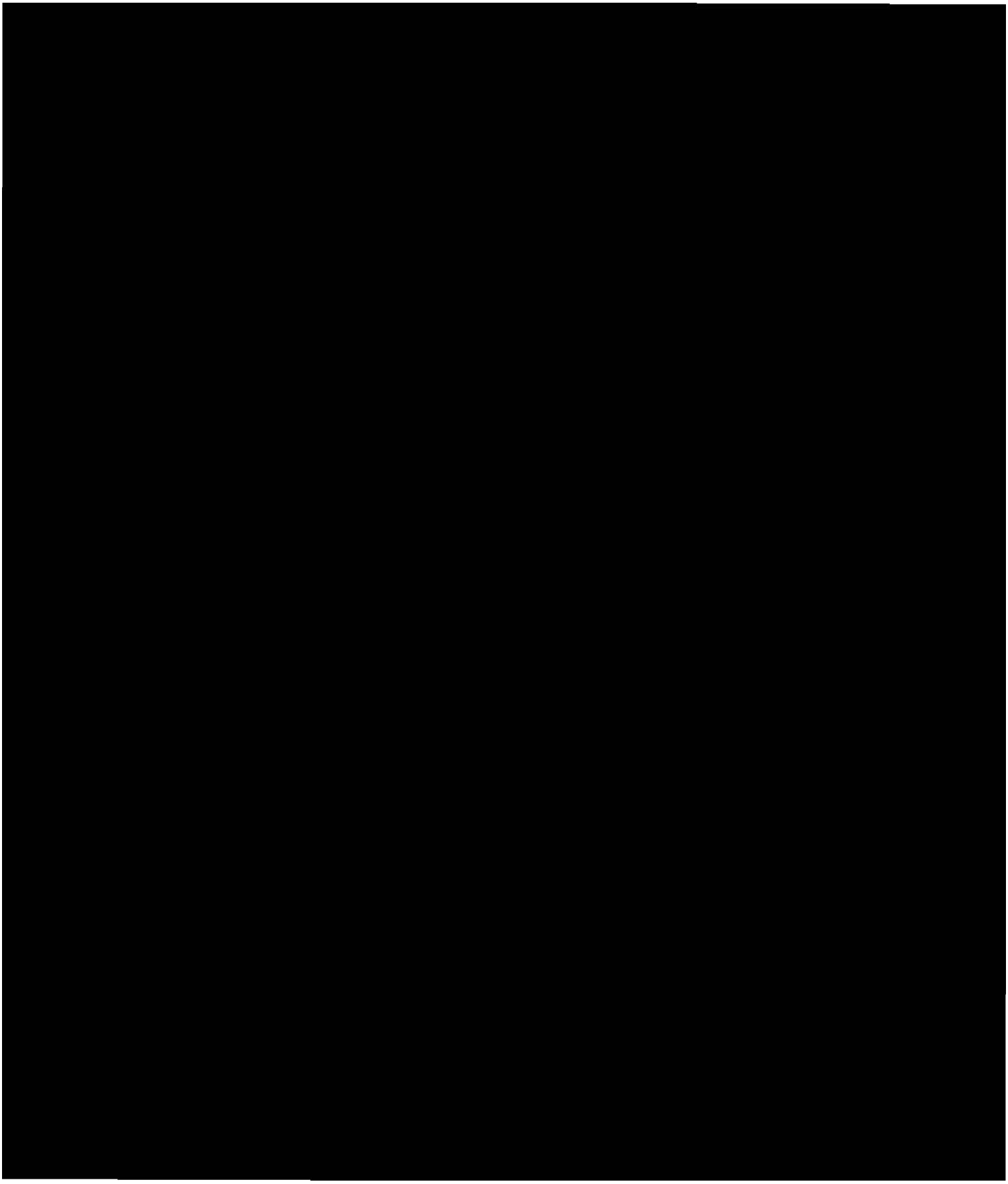


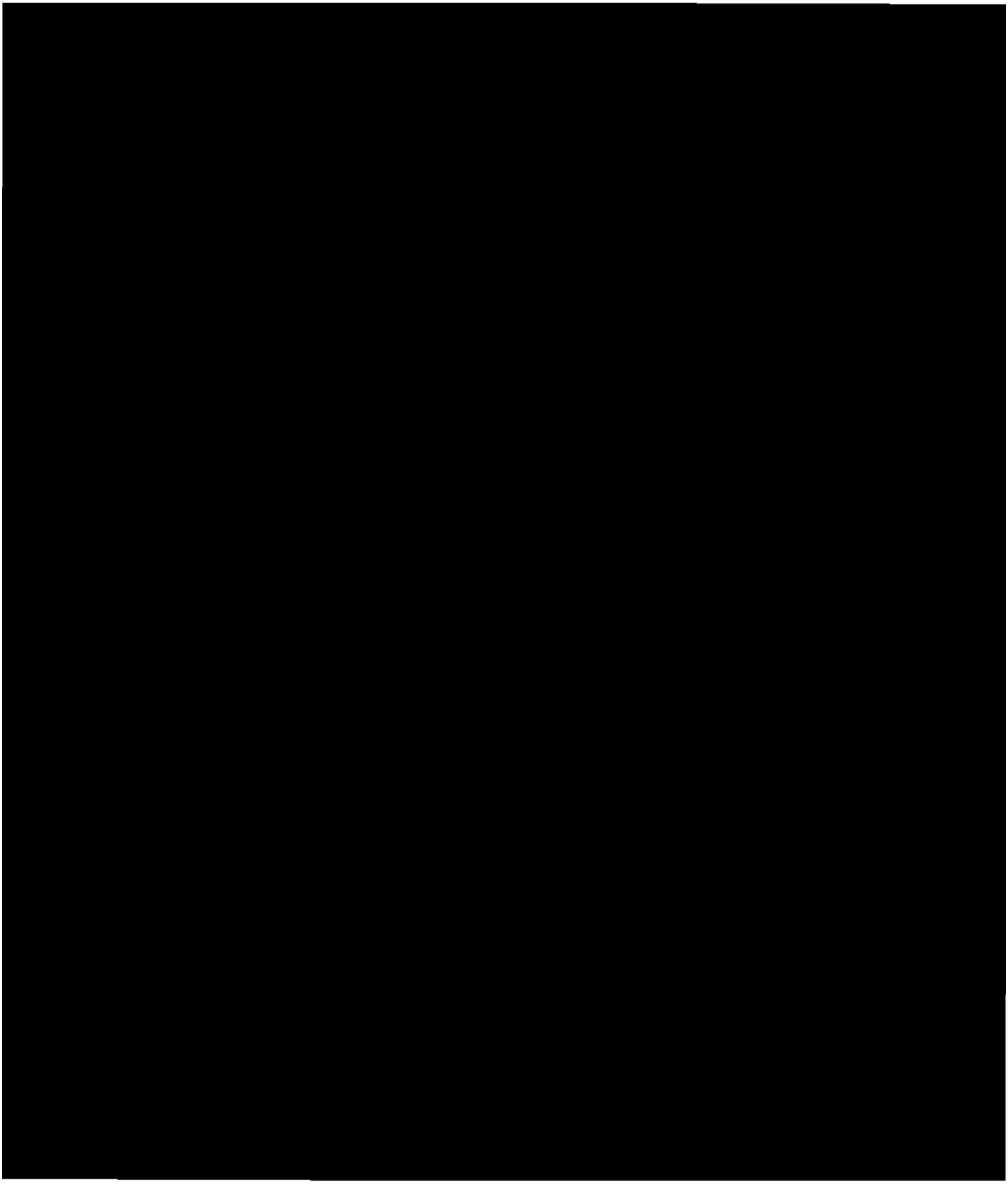


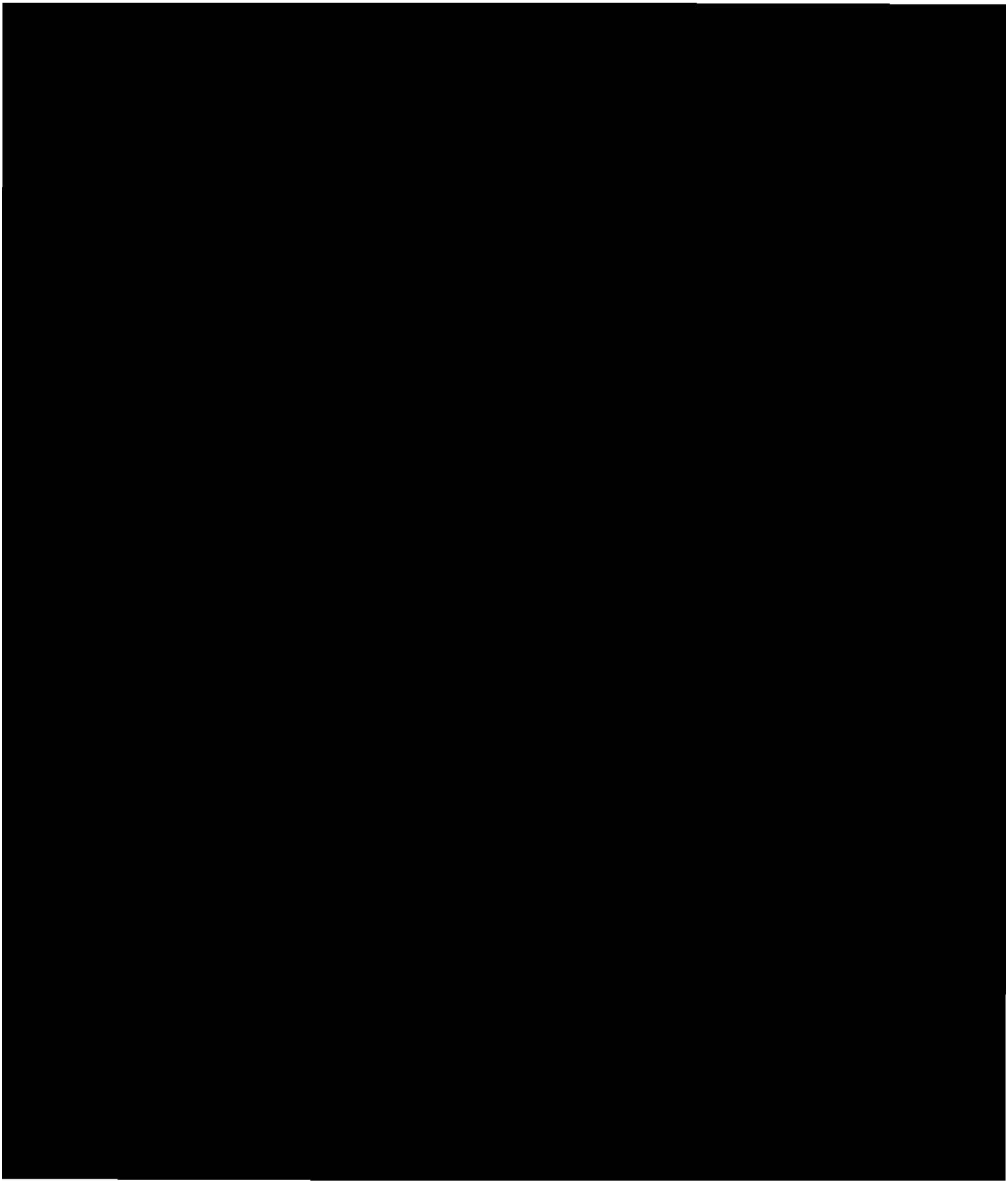


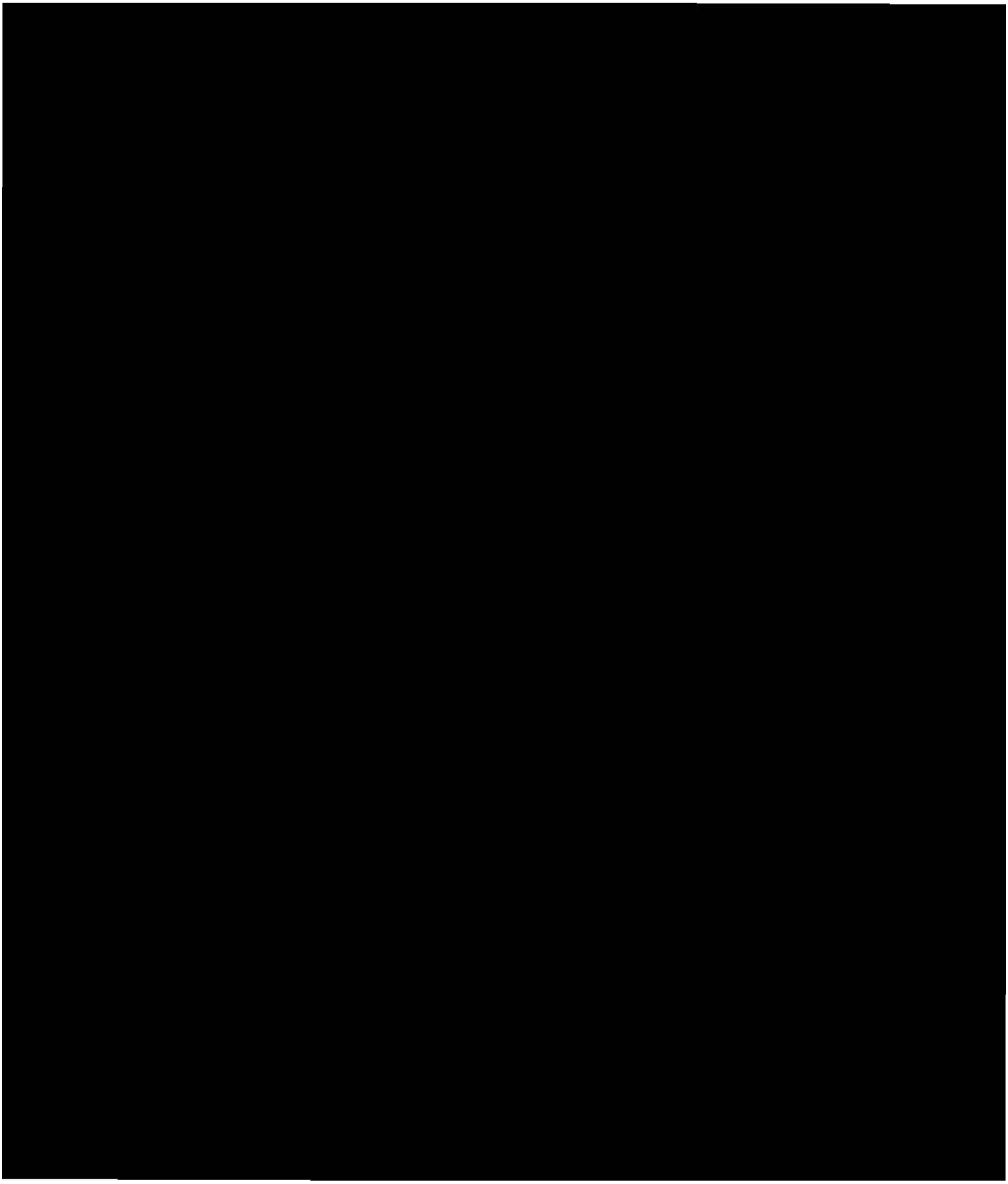


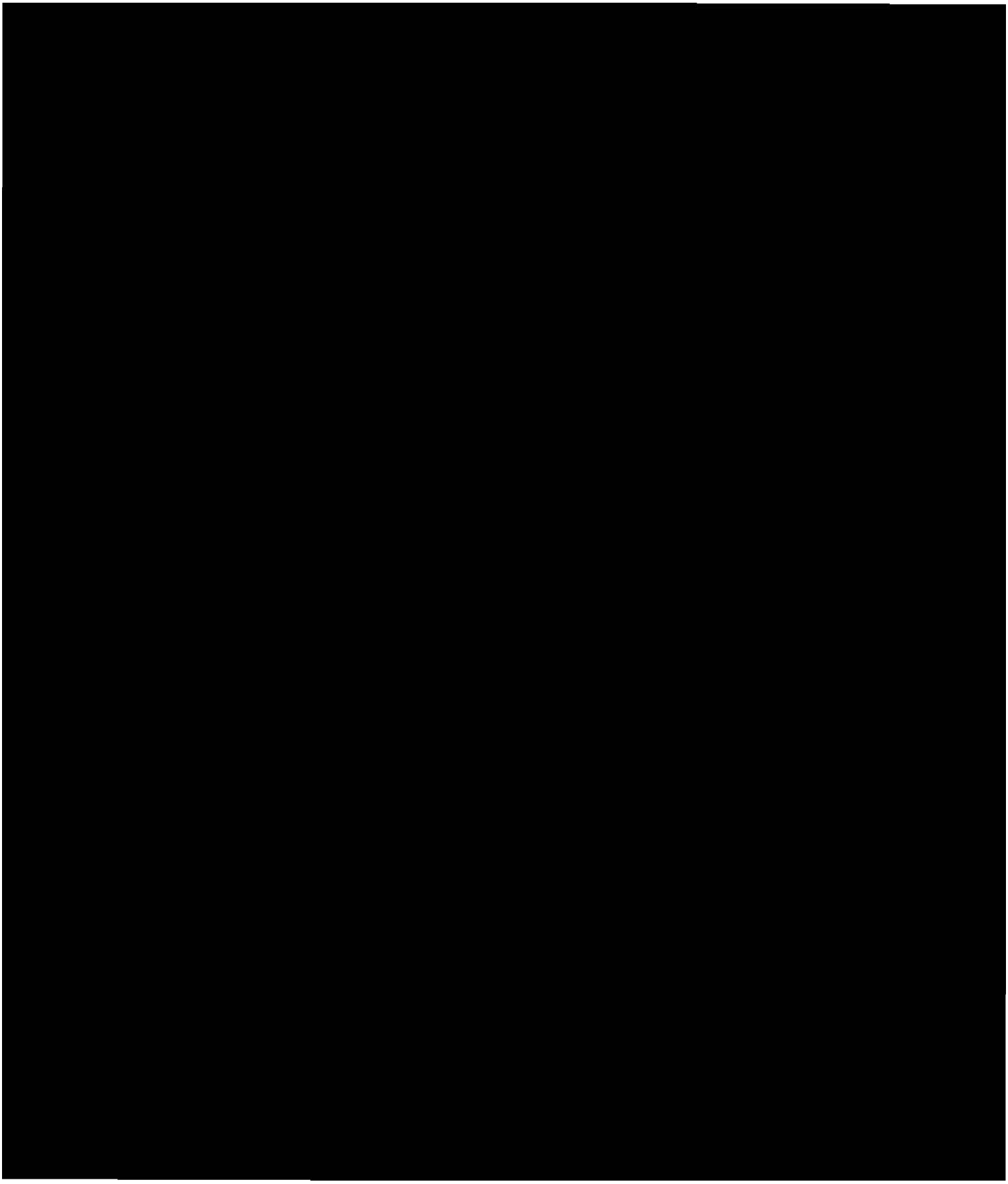


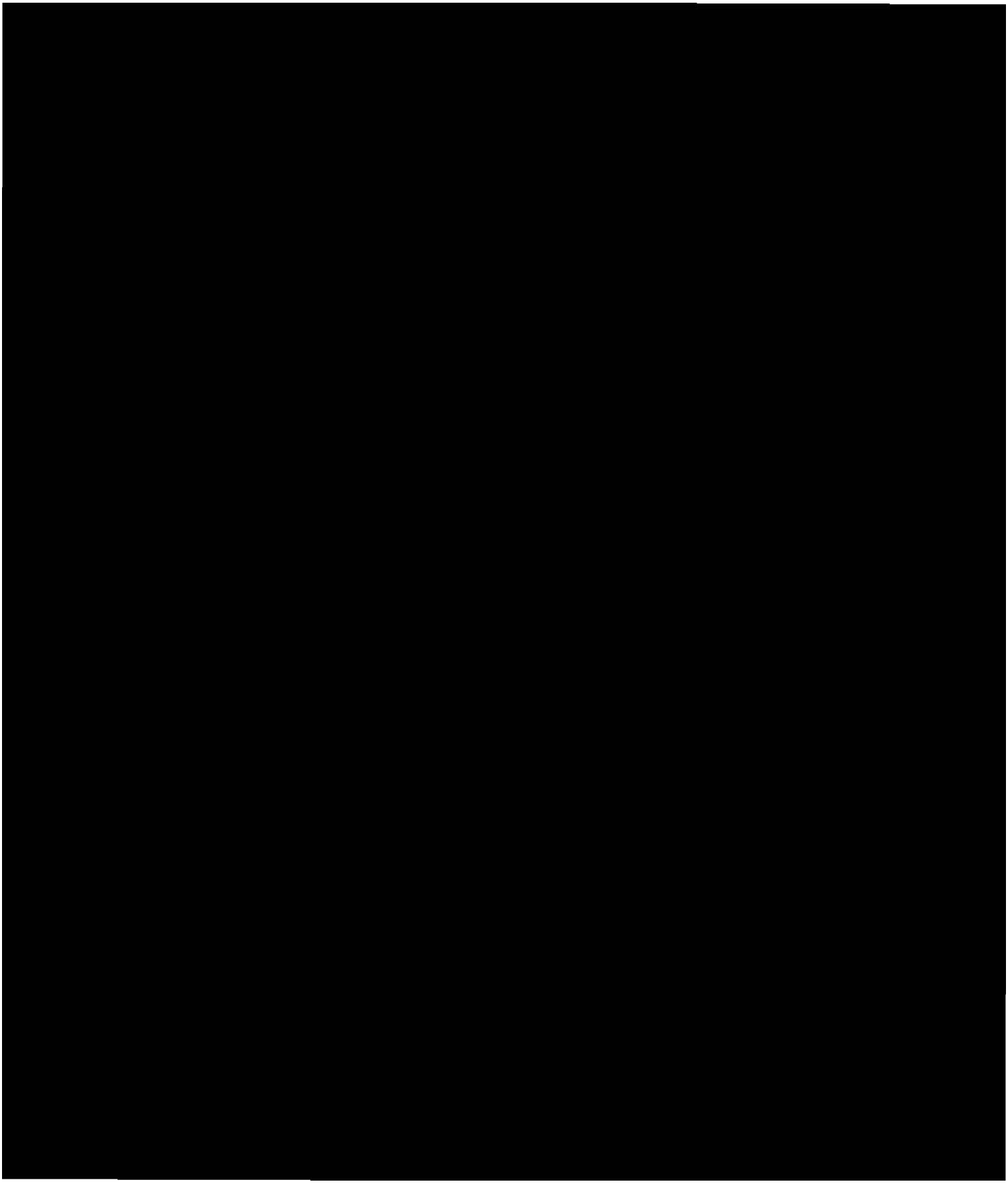


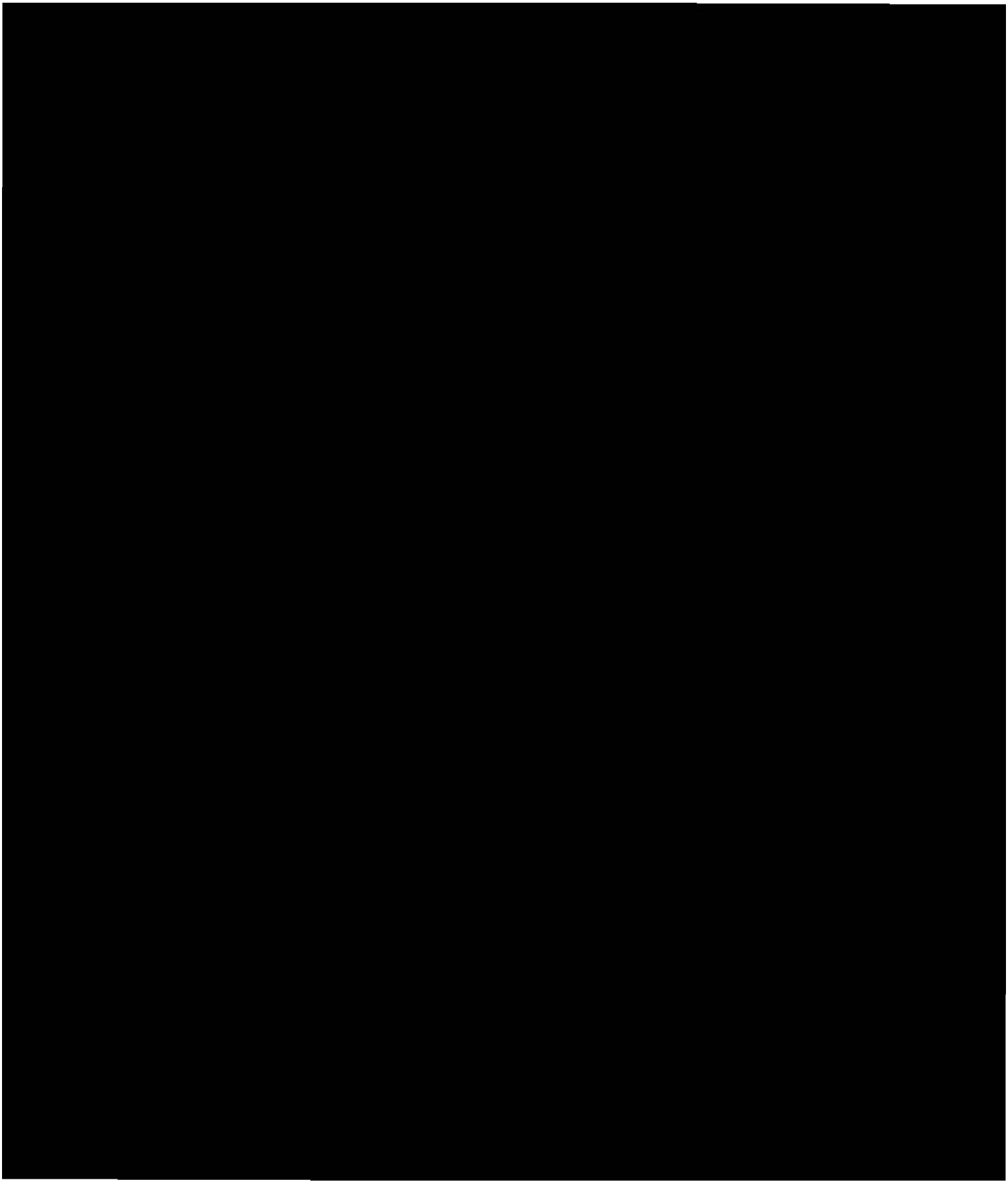


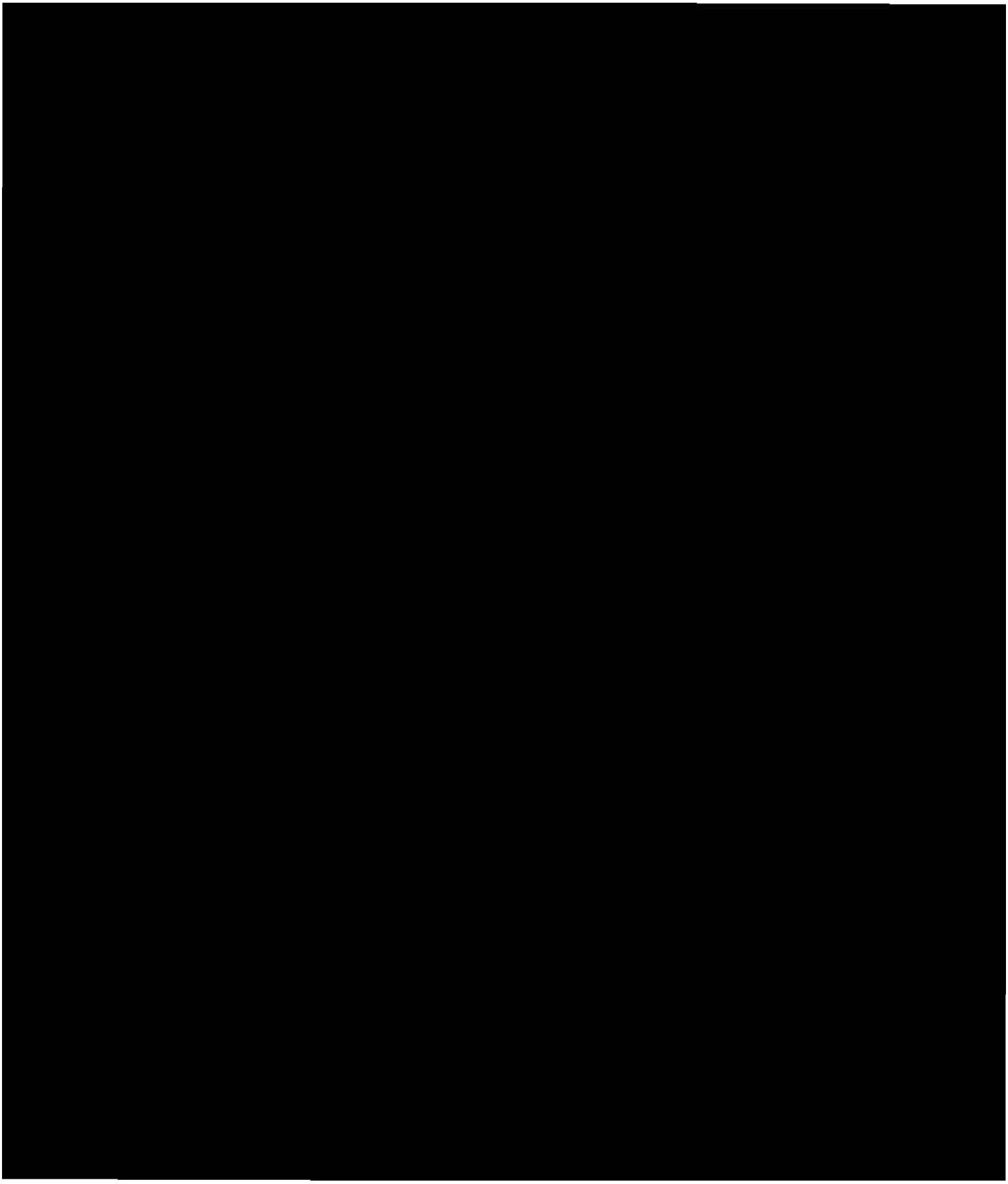


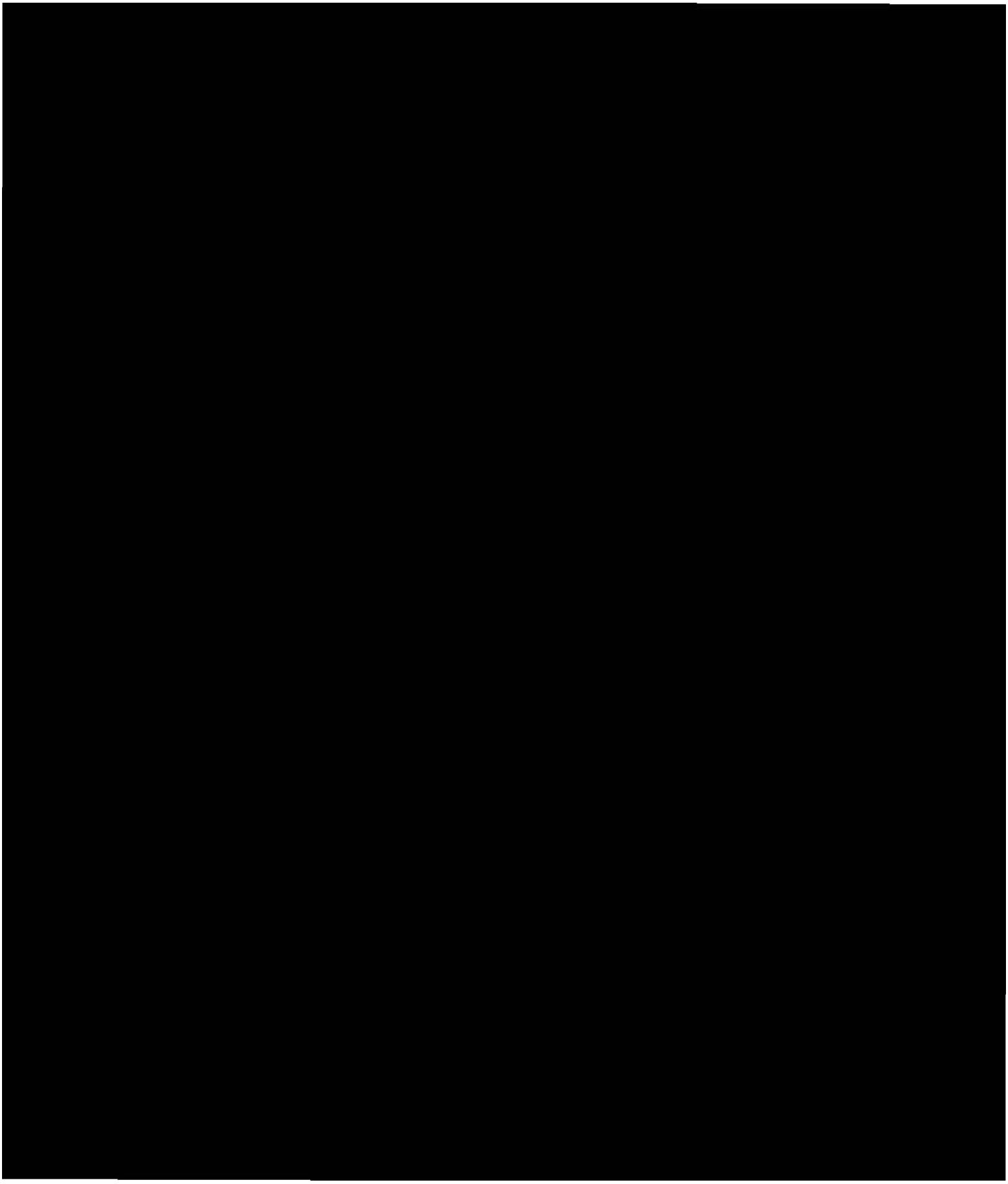


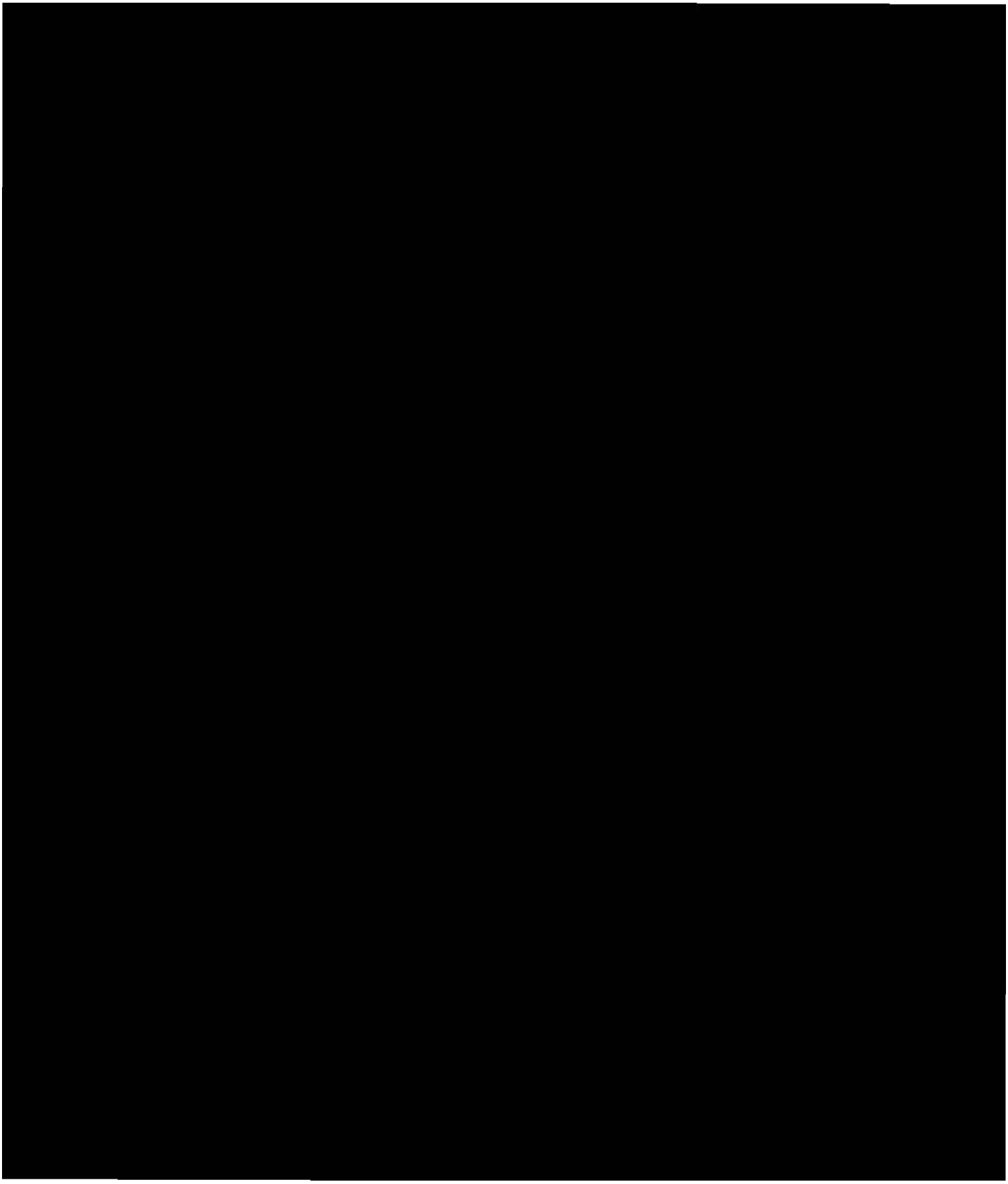


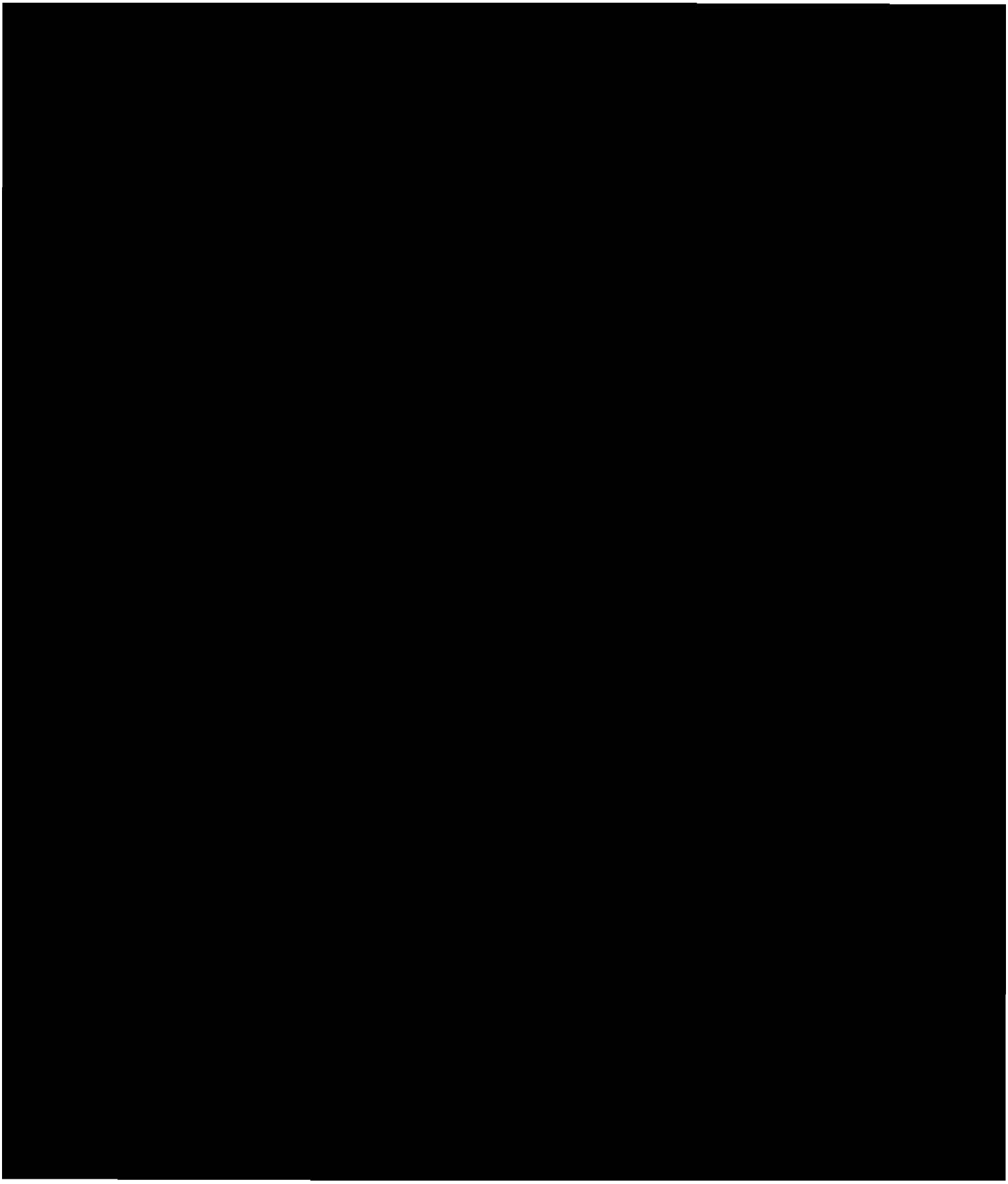


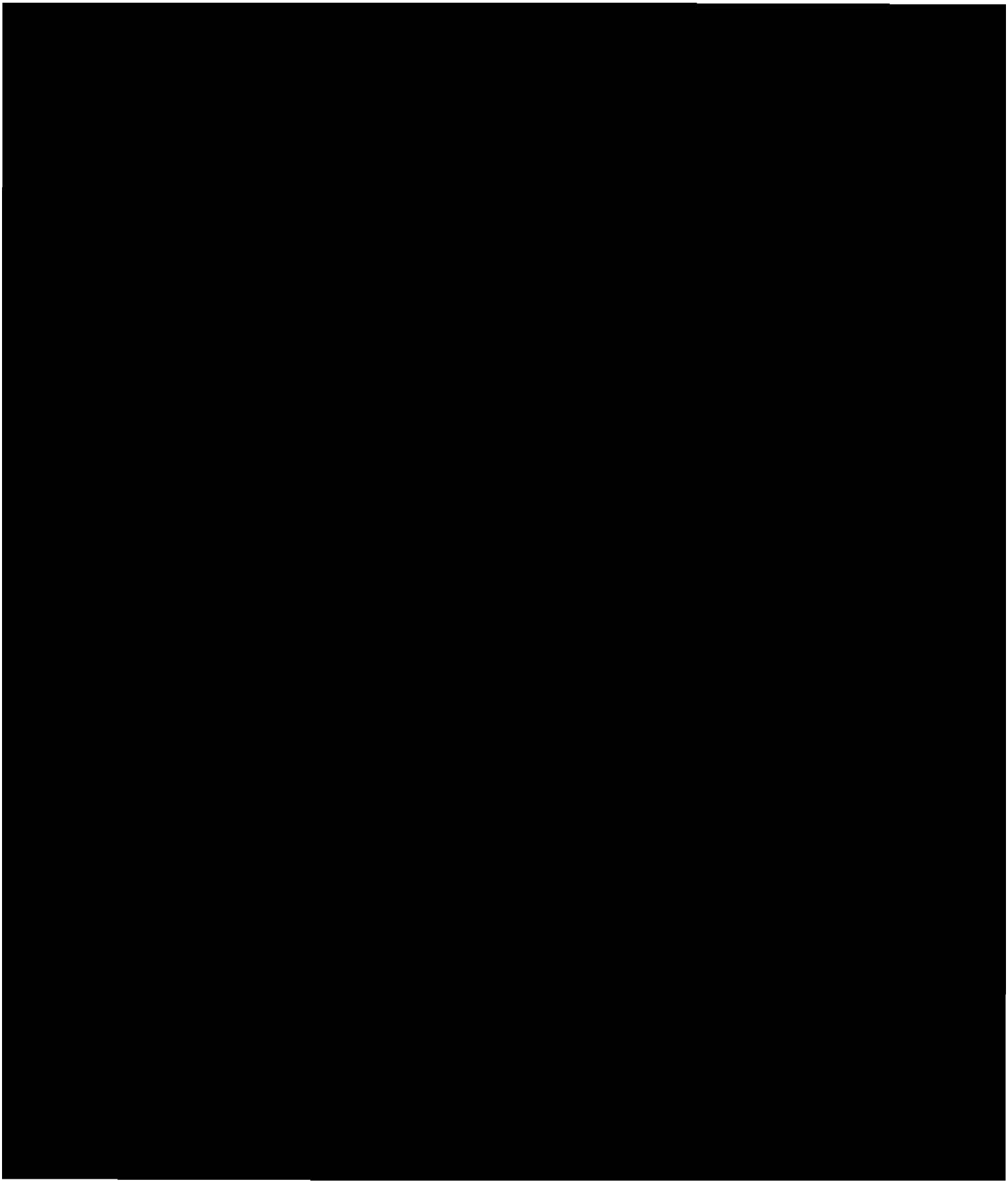


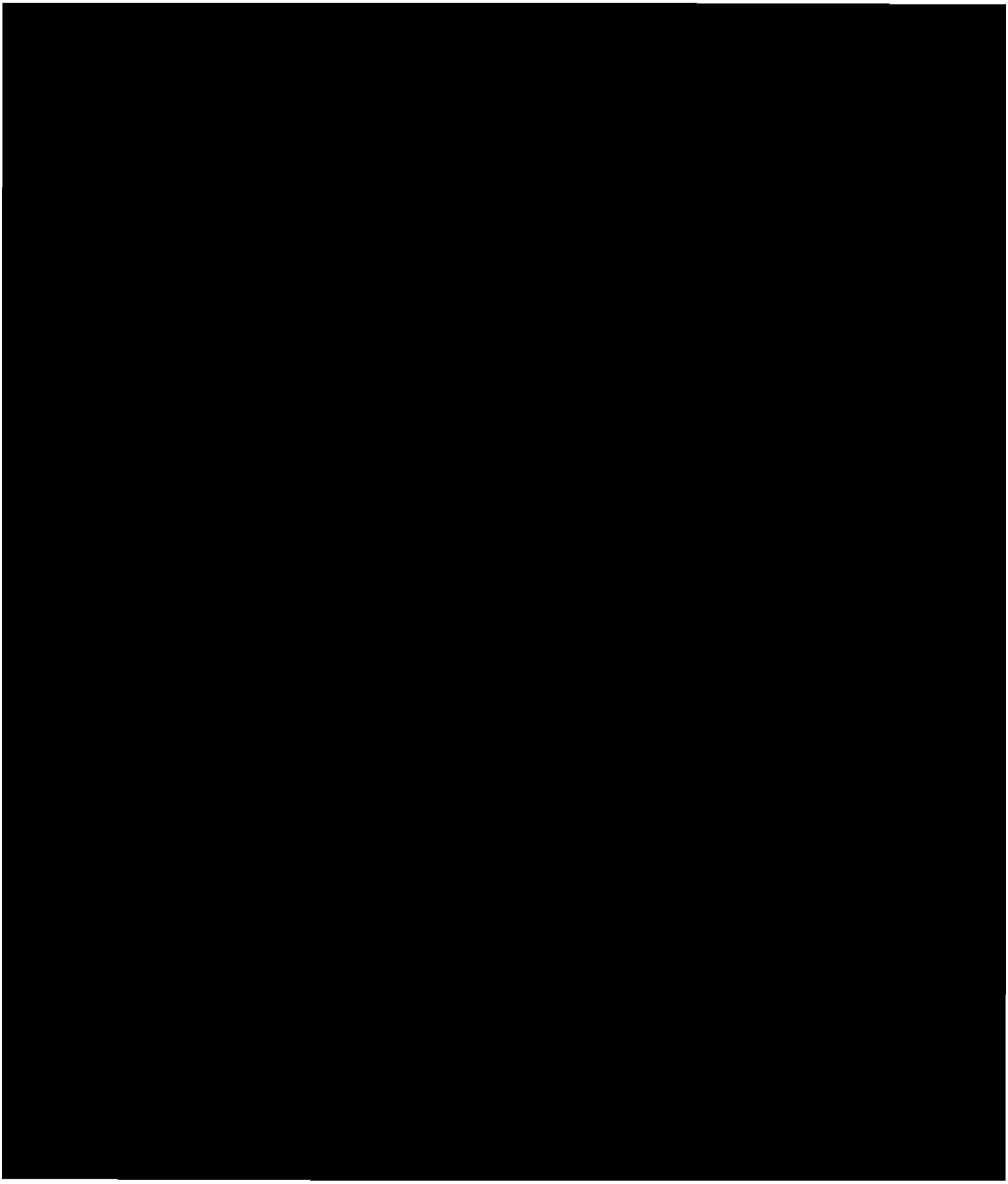


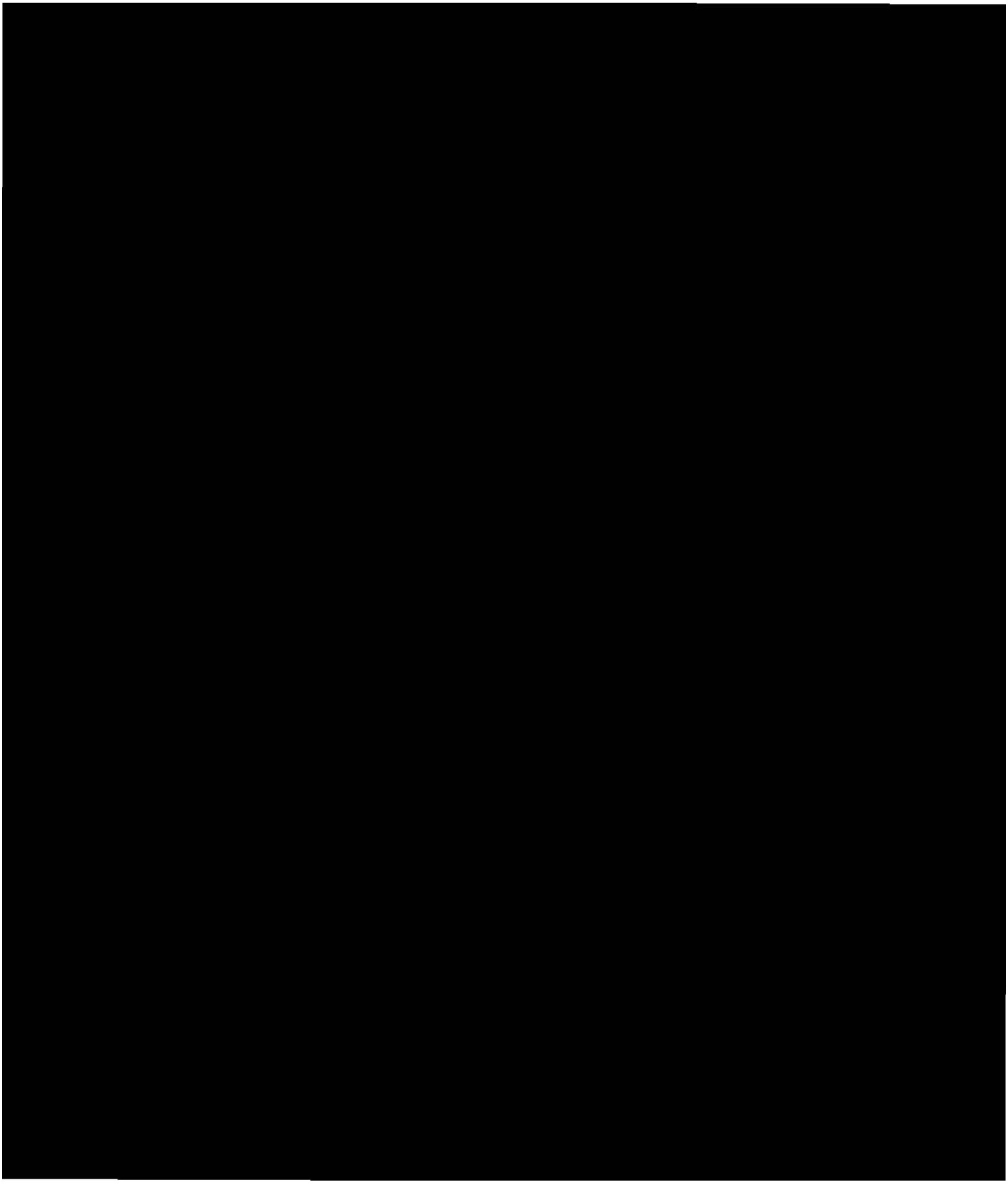


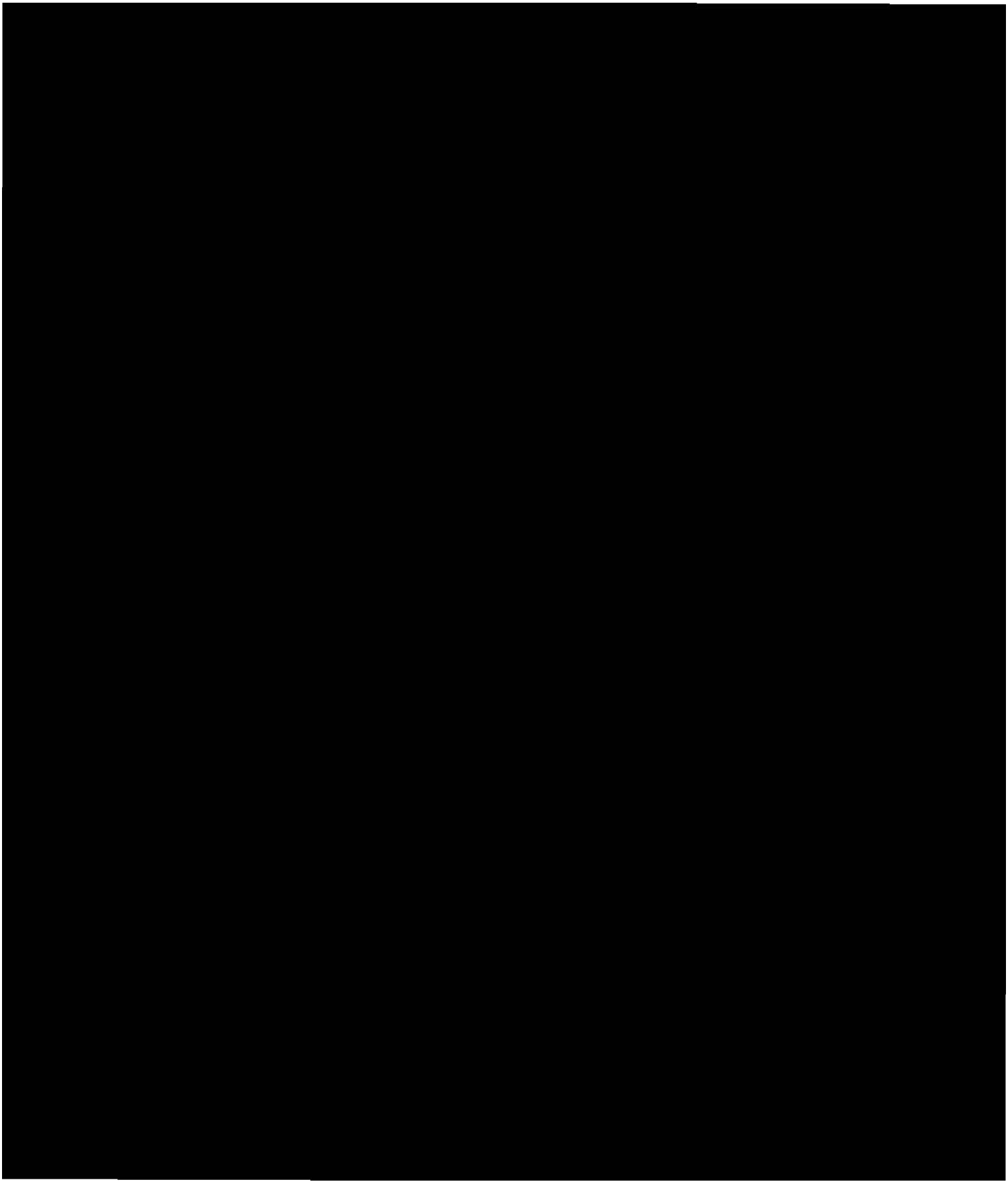


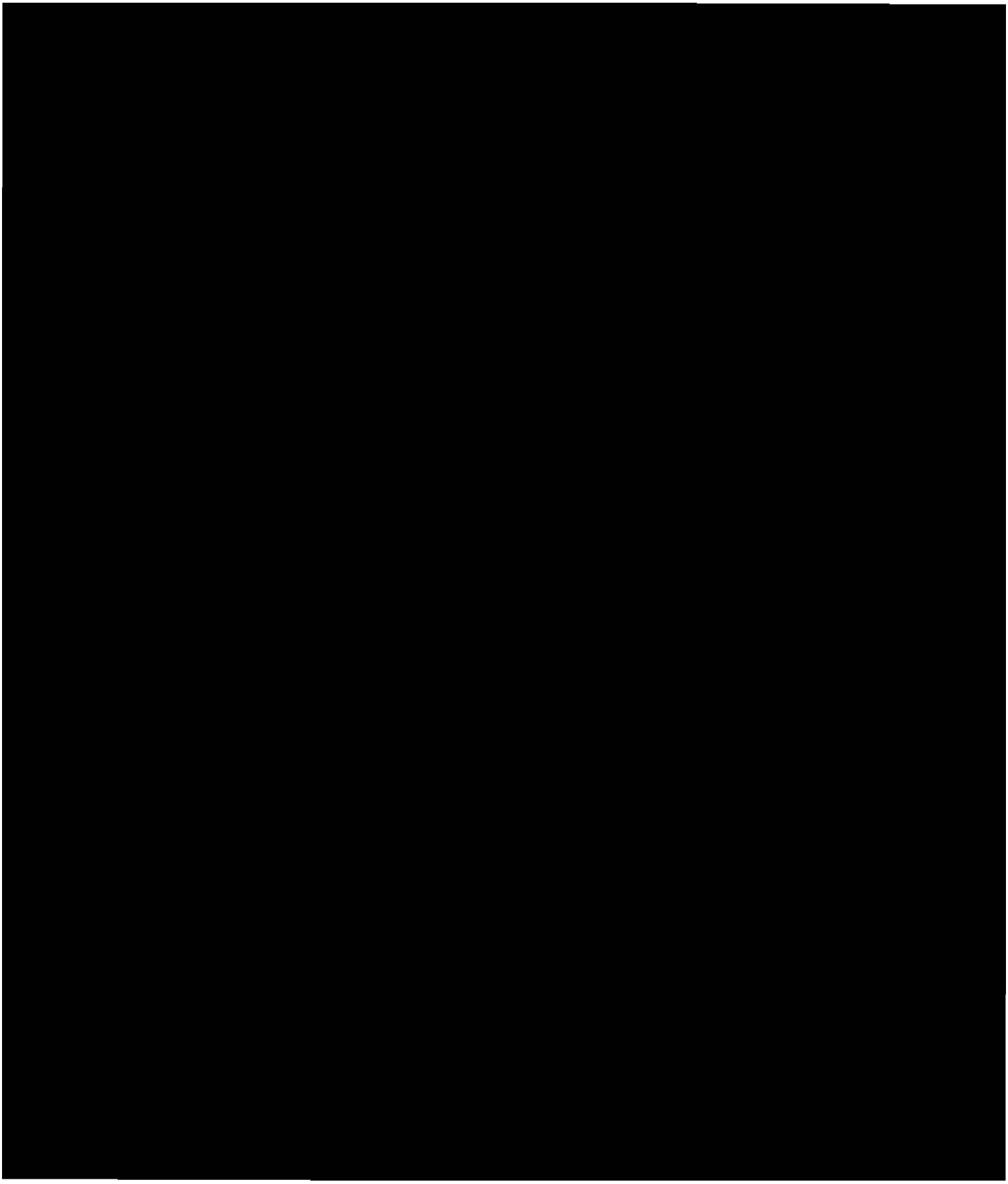


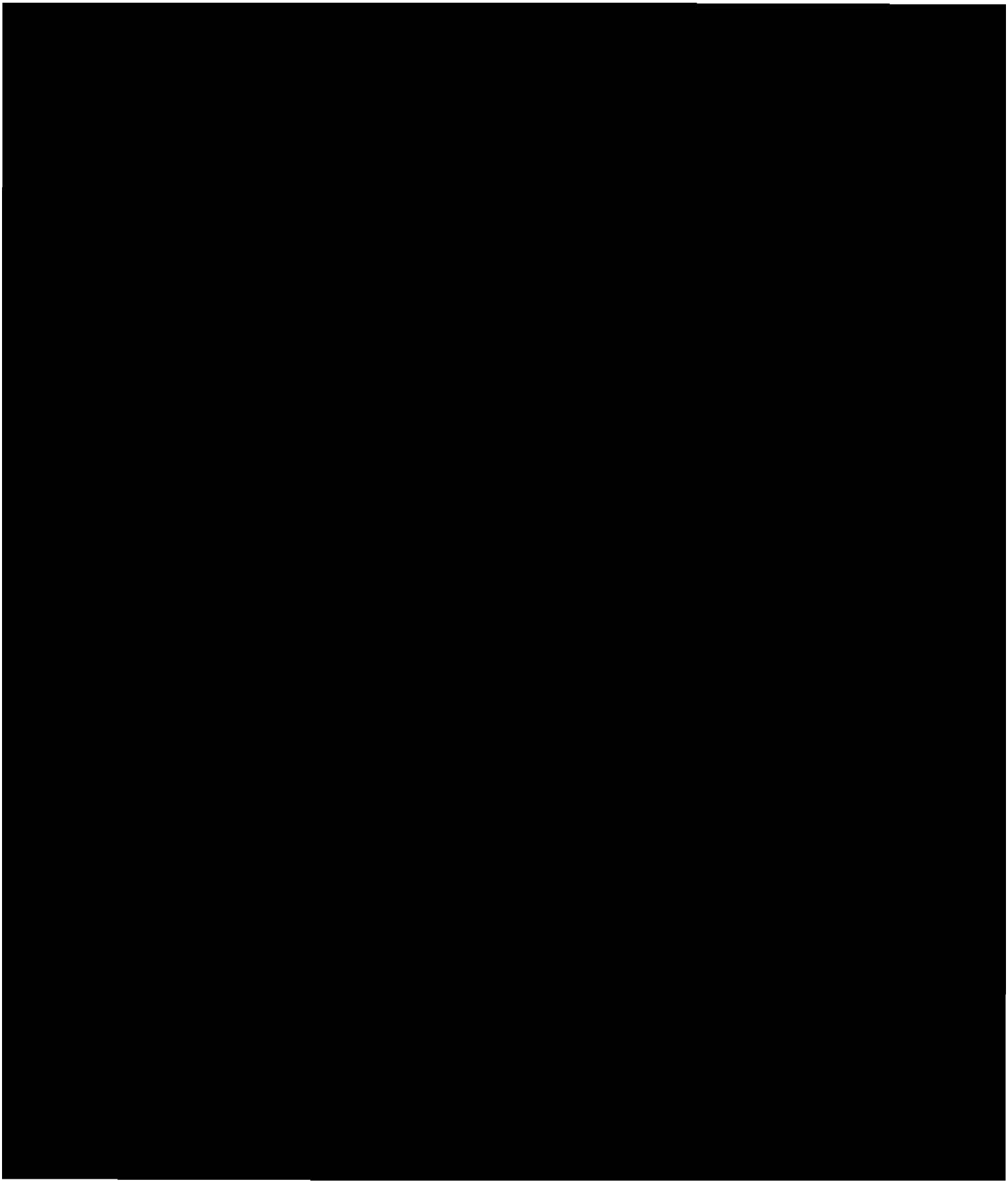


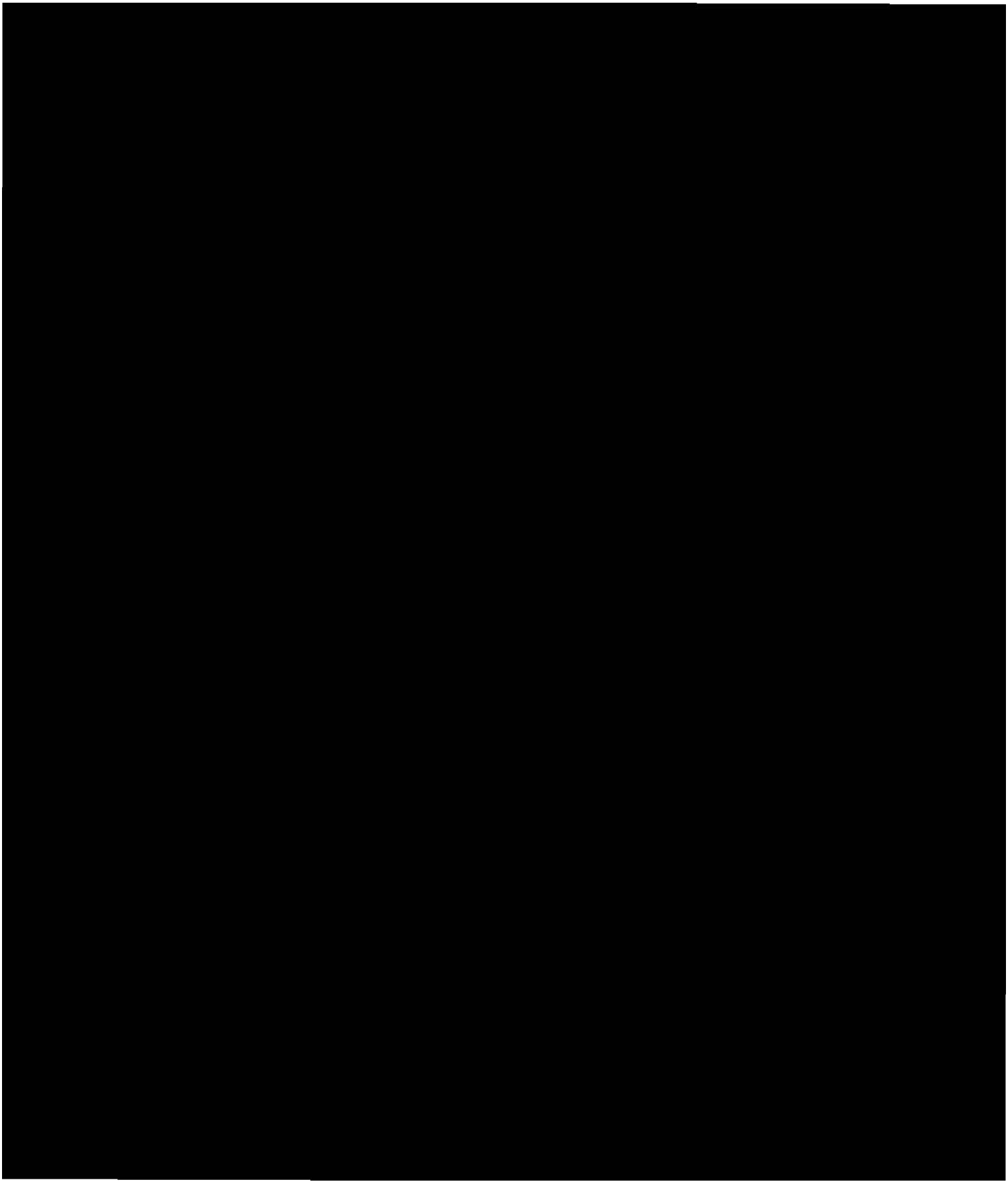


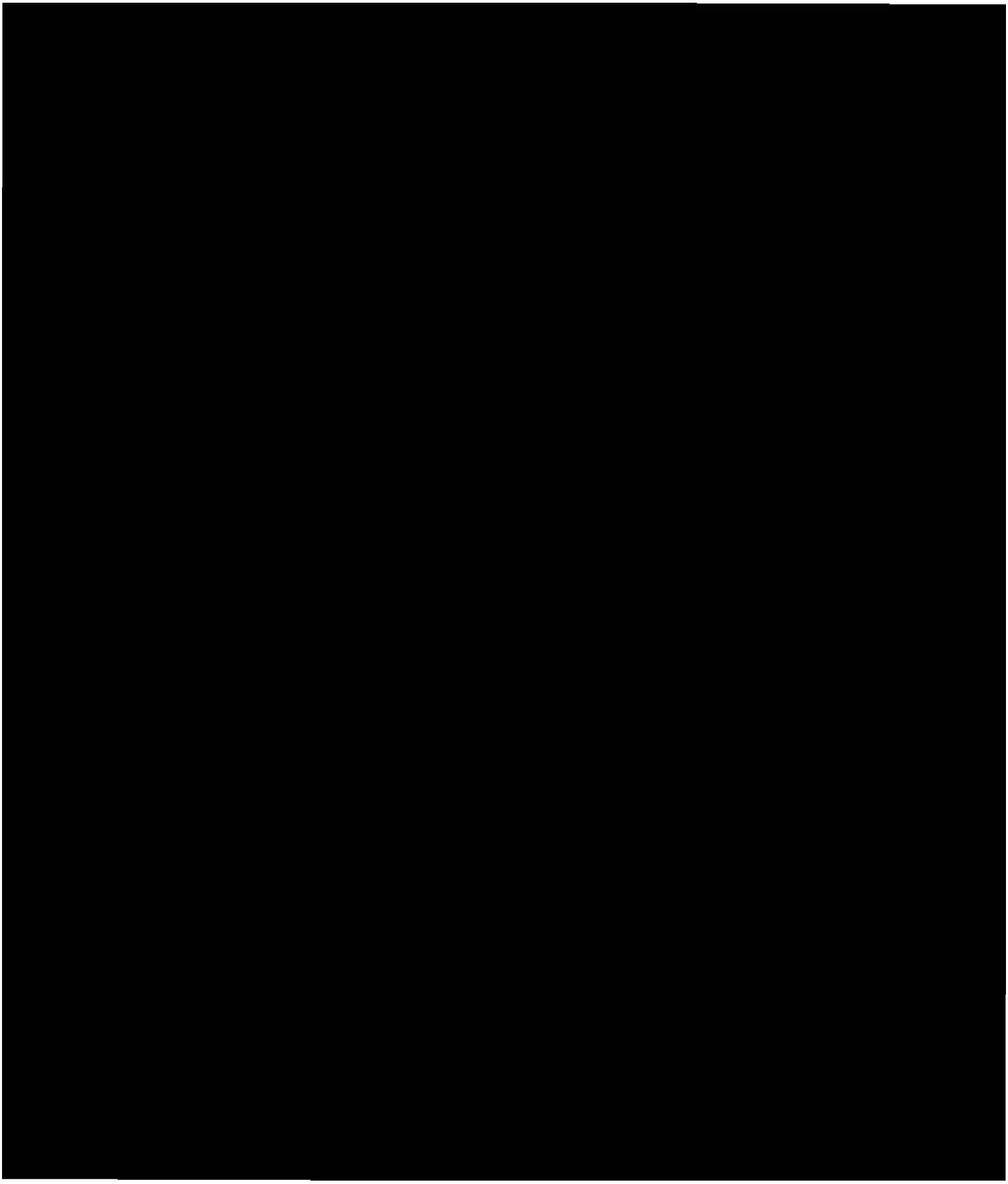


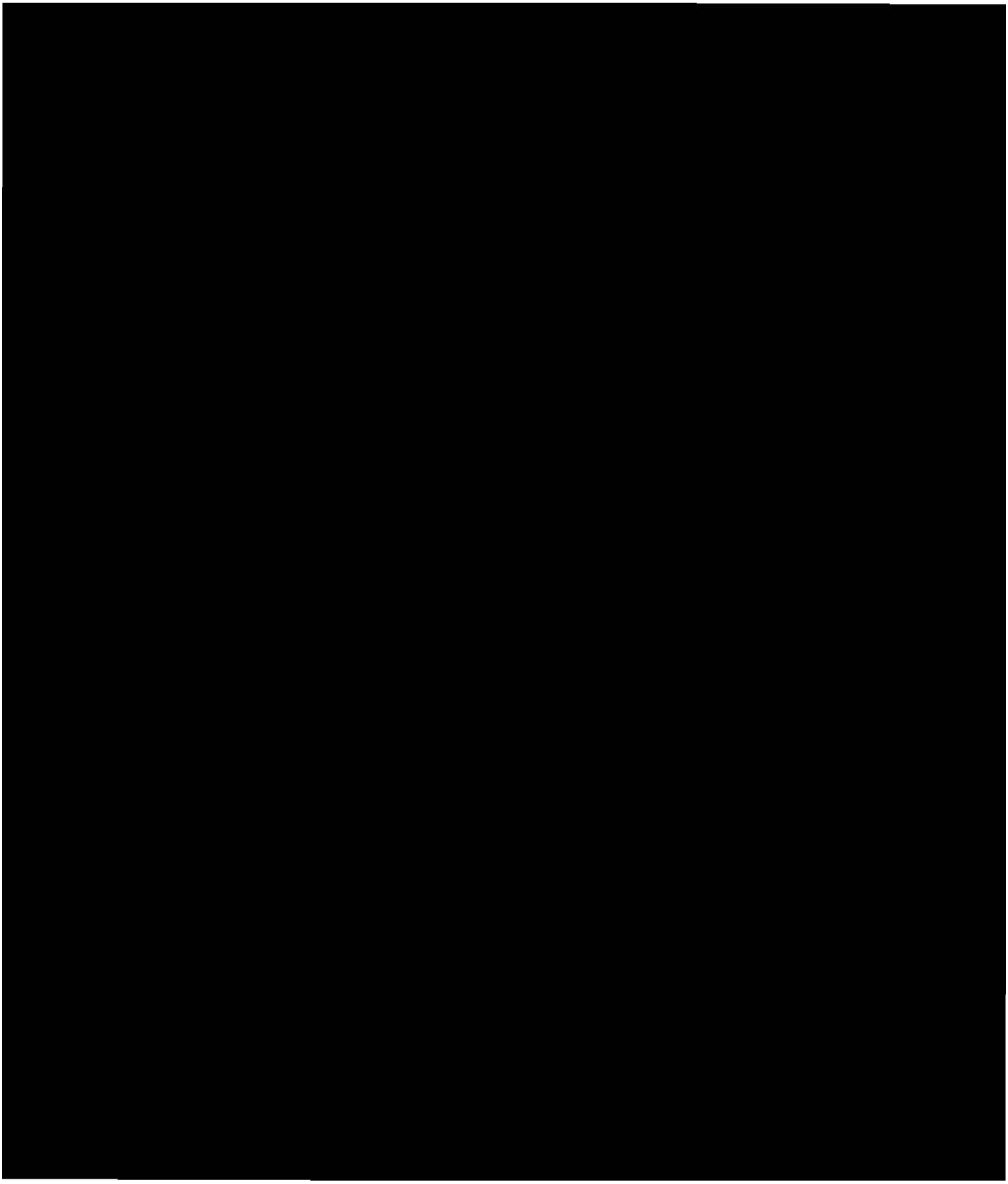


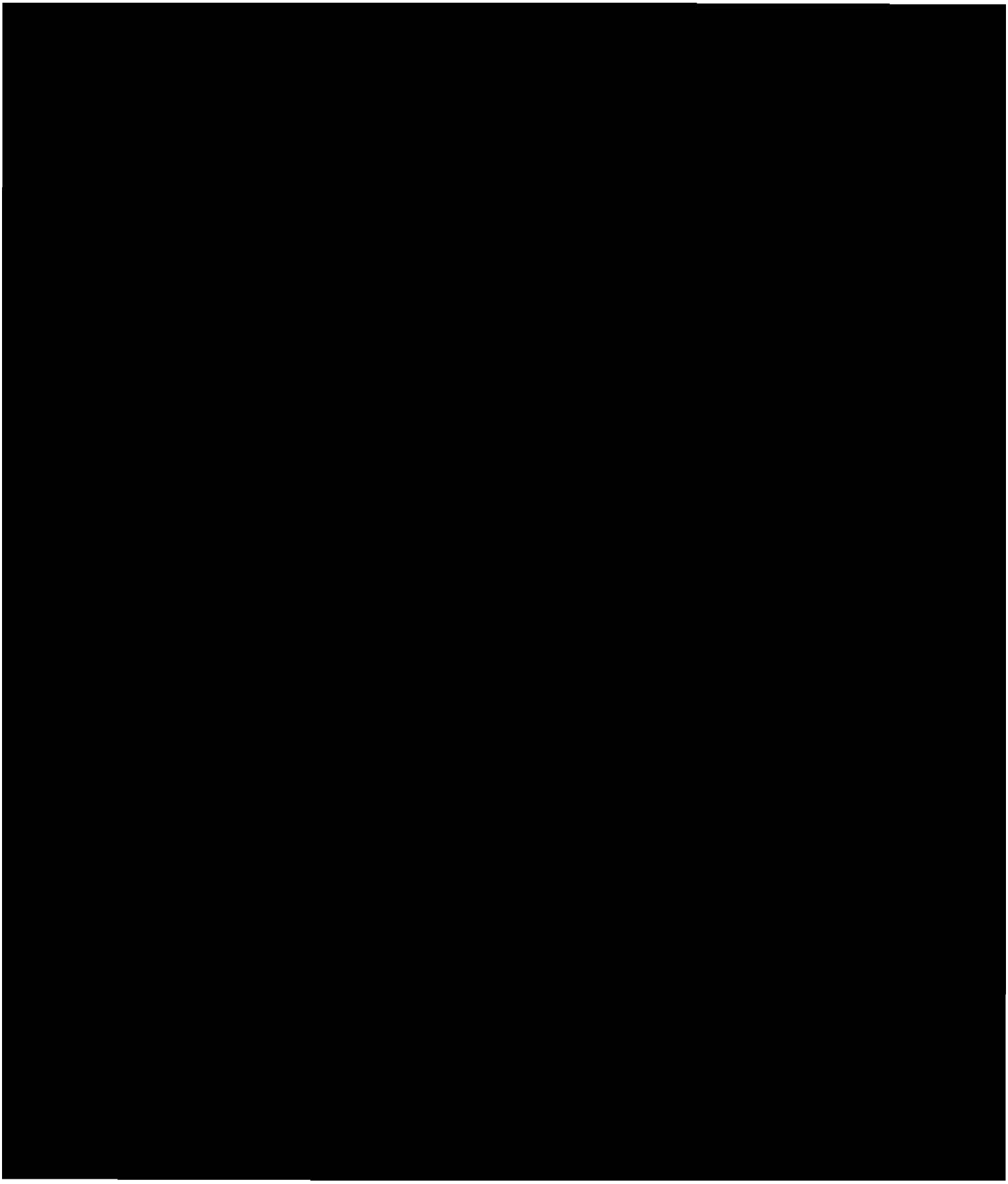












Appendix 3: Additional IEM Project Samples

GEMHSA PRE– & POST-DISASTER CONSULTING

Georgia Emergency Management & Homeland Security Agency (GEMHSA)

The GEMHSA needed a supplier to provide pre-disaster preparedness planning and response and recovery staff augmentation in the event of a disaster that exceeds the State's staffing resource capacity — particularly for events that require $250 – 350 million in FEMA grant funding. Along with agency staff reductions due to departures, FEMA has been consistently moving to a delivery model for disaster recovery that relies more on state and local jurisdictions to provide support formerly provided directly by FEMA.

PERFORMANCE PERIOD

August 2016 – present

PROGRAM VALUE

$49.8 million

After a Request for Statement of Qualifications (RFSQ) process to pre-qualify bidders meeting a stringent set of minimum qualifications, IEM won a competitively bid contract to provide pre-disaster preparedness, disaster response and post-disaster recovery consulting services to the State of Georgia on an as-needed basis. IEM can be tasked to provide planning, training and exercise support. We can also be tasked to provide surge staff to support response in the State EOC. Finally, Georgia can use this contract to obtain staff experienced in FEMA's IA, public assistance (PA) and HMA programs, as well as CDBG-DR and Long-Term Community Recovery planners.

In support of Georgia's recovery from DR-4338 (Hurricane Irma), IEM provided a project manager and four grant specialists with FEMA PA program qualifications to the joint field office (JFO) in Warner Robins, GA, for a period of seven weeks in 2017. On reevaluating their needs for surge support, the State of Georgia requested four PA grant specialists for four weeks in January 2018. During this time, IEM staff completed more than 250 exploratory calls and recovery scoping meetings. They also assisted with closing out at least 26 DR-4684 (Hurricane Matthew), Category A and B projects totaling over $9.8 million.

As Hurricane Michael began to approach the Florida Panhandle, GEMA staff began coordinating with IEM's program manager regarding potential surge support needs. After the hurricane passed and a disaster declaration was issued, GEMHSA requested four IEM PA grant specialists to work at the JFO in Atlanta for DR-4400 (Hurricane Michael). One IA specialist supported GEMHSA from the JFO and five IA specialists served as the state manager at multiple DRC locations in IA-declared counties in southwest Georgia. Finally, IEM provided an onsite project manager to GEMHSA, who initially supported the state volunteer agency liaison (VAL) in the field with FEMA VALs, later serving as the GEMHSA VAL herself on request.

The IEM IA specialist in the JFO collected daily statistics from the five DRC-based IA specialists in southwest Georgia and compiled them into a weekly master activity report per GEMHSA requirements. The five IA specialists also tracked and reported needs of disaster survivors visiting the DRCs that had not been met; the IA specialist and compiled them into a report for GEMHSA. Categories of these unmet needs included housing, appeals, other needs assistance (ONA), food, other needs (debris and tree removal, tarps, mold remediation) and advocacy benefits. Our JFO IA

specialist also managed the DRC schedules for the remaining five IA specialists and served as an information sharing resource to them.

In southwest Georgia, the five IEM IA specialists serving as GEMHSA state managers spent time with disaster survivors one-on-one as they progressed through the DRC. Where the survivor identified unmet needs, our IA specialists provided information for the necessary resources to address those unmet needs. Where there were no known resources, the IA specialists forwarded the survivors to IEM's onsite project manager/VAL and JFO IA specialist for resolution. The State DRC manager then contacted the survivor and provided the resource information, which included contacts for access and functional needs, aging services, agricultural aid, animals/pets, consumer services, contractors, crisis counseling, crisis cleanup, disaster unemployment assistance, essential needs, family and protective services, financial assistance, fraud, health-care services, housing, disaster legal services and veterans services.

IEM's onsite project manager/GEMHSA representative/VAL was collocated in a field office in Albany, GA, with the FEMA Region IV VAL (VAL supervisor) and FEMA VALs deployed to southwest Georgia. This allowed for daily communication, coordination, collaboration and cooperation between the state representative and federal recovery partners. A total of 20 counties were IA designated. IEM supported initial meetings in each county to facilitate interest in and provide support for the development of a long-term recovery group or COAD. For several of the FEMA VALs, this was their first VAL deployment so the region IV VAL and our project manager/GEMHSA VAL accompanied VAL teams in the initial county meetings, providing both a state and federal presence.

The four IEM PA specialists were located in the JFO in Atlanta to provide direct support to the GEMHSA's Director of Public Assistance. The PA specialists assisted exploratory and recovery scoping calls with FEMA. These calls ensured that FEMA understood and met the needs of counties affected by Hurricane Michael. On GEMHSA's behalf, IEM made sure that each applicant understood what services would be covered by GEMHSA and FEMA. This included daily phone calls with members of the various affected counties.

IEM PA specialists provided applicant representatives with their GEMHSA counterpart's name and contact information, as well as informational resources with details on 404 and 406 Mitigation. We also provided applicants with information on debris removal and requirements for debris disposal, coordinating such efforts with the Army Corps of Engineers and Georgia Department of Natural Resources. Finally, IEM PA specialists worked alongside our GEMHSA counterparts to complete project worksheet closeout documentation for previous disasters. This work included contacting applicants for missing documentation such as cancelled checks, insurance policies, payroll policies and timesheets.

IEM supported GEMHSA in delivering the new FEMA PA Grants model. Deputy Director of Administration and Finance Mark Sexton expressed satisfaction with IEM's support during both deployments, most recently at a meeting on February 7, 2019. During execution of both task orders, we helped GEMHSA close out many open projects from earlier disaster events, significantly reducing their backlog of open projects with FEMA.

JACKSONVILLE STATE UNIVERSITY DISASTER RECOVERY ASSISTANCE

Jacksonville State University, AL

At 8:40 p.m. on March 19, 2018, an EF3 tornado with winds up to 130 miles per hour severely damaged 50 of Jacksonville State University's (JSU's) 70 campus buildings. The IEM team quickly performed damage assessments and associated tasks required in the PA disaster recovery process. Project worksheets for review by the State and FEMA were developed from detailed damage identification and recovery costs.

There was extensive damage throughout the campus. Three buildings were considered total losses and had to be demolished. The Pete Mathews Coliseum required $6 million to repair and more than five buildings required major renovations. In all, 50 affected facilities required new roofs and basic infrastructure had to be rebuilt such as signage, emergency call boxes, bus shelters and light poles.

IEM was selected to represent this subrecipient to carry out subgrant program and administrative requirements for JSU including subapplication, reporting, cost reasonableness assurance, procurement consistent with 2 CFR 200 and other tasks associated with subrecipient subgrant support. IEM integrated mitigation best practices in the rebuilding effort to meet or exceed current development codes for buildings and infrastructure. This included burying telecommunication lines and retrofitting buildings for 150+ mph wind tolerances. More than 90 percent of all permanent work performed at JSU included 404 mitigation features for future events.

The final stage of the project entails closing out the construction work, providing the state and FEMA with proof of payment for each project and ensuring that all projects are completed within the agreed-upon period of performance and in compliance with state and FEMA rules and regulations.

JSU — the subapplicant — is pursuing four HMGP projects based on its Hazard Mitigation Plan, including a dual-use student center and tornado saferoom for an estimated $9 million.

PERFORMANCE PERIOD

May 2018 – present

PROGRAM VALUE

$124 million

JSU CAMPUS PROJECT HIGHLIGHTS

- 15 projects are obligated for approximately $27 million. IEM has 13 projects in FEMA review totaling $35 million in PA, another $5.4 million in 406 Hazard Mitigation approved and $10 million in review. Wallace Hall was approved for a replacement facility instead of repair, amounting to $13.2 million.
- More than 90 percent of all permanent work has 406 Hazard Mitigation codes and standards.
- The IEM team gathered documentation for donated resources of nearly $1 million to offset JSU's cost share. IEM also captured costs for temporary facilities being used while new facilities are going up.

HOMEOWNERS ASSISTANCE PROGRAM

Texas General Land Office

PERFORMANCE PERIOD

September 2018 – present

PROGRAM VALUE

$1.048 billion

IEM serves as program manager for the Texas General Land Office's (recipient) Homeowners Assistance Program, providing services to survivors of Hurricane Harvey across 13 counties. The post-Harvey housing recovery effort is the largest post-disaster grant program ever undertaken by the State of Texas, and IEM was tasked with supporting the recovery of a wide array of demographics and communities in two regions — from densely populated suburban areas around the Houston metropolitan area to extremely rural areas bordering Louisiana. As part of grant program delivery, the General Land Office faced the unique challenge of reaching out to widely dispersed vulnerable and special populations. These include residents with limited English proficiency, veterans, people with disabilities, families with children under 18, elderly residents and low– to moderate-income survivors. IEM met the challenge by designing a needs assessment and highly targeted affirmative marketing and public outreach plan.

To develop a truly comprehensive needs assessment, IEM combined a wide array of data from the Small Business Administration, FEMA, the U.S. Census and the National Flood Insurance Program, and consulted with a wide range of local and regional non-profit organizations. IEM used this data to develop maps in which recipients were prioritized down to the individual street level.

This needs assessment was then used to guide IEM's development of the marketing and public outreach plan. The plan micro-targeted the most vulnerable and in-need populations in each of the 13 counties. It included tools and tactics for reaching each category of most in-need individuals through the best mix of newspaper ads, TV and radio ads, social media, billboards, direct mail, text messages and grassroots events like town hall and community meetings, as well as applications fairs using mobile intake centers. We shared all this information with non-profit organization partners including the Red Cross, a variety of VOADs, emergency management agencies, faith leaders and elected officials. IEM created a web-based toolkit of communications products for these partners to use to attract new applicants. The Texas General Land Office called the outcomes of these initiatives "extraordinary": within the first 90 days, IEM had arranged more than 53 grassroots events; mailed program information to more than 18,500 households; arranged information for insertion in utility bills for 462,500 households; engaged over 430 non-profit groups and partners; and placed paid advertising in more than 11 news outlets.

IEM's scope of work covers grant administrative requirements at 2 CFR 200, rehabilitation, reconstruction, elevation and demolitions. IEM takes each applicant through the damage estimate, eligibility review, duplication of benefits review, award calculations, appeals processing and grant and subgrant closeout. This work is performed out of IEM's three HACs and is closely monitored by IEM's CDBG-DR program quality-assurance tool, Home Recovery IQ (HRIQ). It establishes performance metrics and monitors them daily at the employee and team levels from initial applicant intake through

applicant closeout. If goals are not met, IEM determines the cause and implements solutions. Production is continually monitored to ensure that resources are properly aligned to maximize benefits and minimize cost.

RESTORE LOUISIANA HOUSING RECOVERY PROGRAM MANAGEMENT

Louisiana Office of Community Development

PERFORMANCE PERIOD

April 2017 – present

PROGRAM VALUE

$1.8 billion

Until Hurricane Harvey, Louisiana's 2016 floods were widely considered the most destructive incidents to strike the U.S. since Hurricanes Katrina and Sandy. The 1,000-year floods came from storms that dumped four times as much water on the state as Hurricane Katrina had.

Since April 2017, IEM has been leading the program management services team, implementing Louisiana's CDBG-DR-funded housing recovery. IEM is providing the full lifecycle of program operations, from intake and eligibility determination through closeout, with a scope that includes program design and implementation. Louisiana recently extended IEM's contract by nearly 15 percent.

IEM is seamlessly coordinating a team of more than 12 direct subcontractors, each working their area of specialty. In 10 months, from the start of the Restore program, we have completed eligibility and award determinations for 45 percent of the active program population. No housing assistance program in U.S. history has ever moved that quickly. IEM achieved this with a strong team, extremely rapid focused startup activity, data driven goals and measurement for key production milestones.

IEM established performance metrics and monitors them at the employee and team levels. In the time since the contract was executed, IEM's team accomplishments include:

- Four offices established with 300+ employees onboarded in less than four weeks;
- Construction initiated within 50 days of LA receiving the first tranche of federal funds; and
- 27,255 awards have been made; 14,601 awards have been obligated; and 13,326 individual applications have received money with only 371 complaints from a total of 51,895 respondents.

Case Management

As part of our leadership for the Restore Louisiana program, IEM has managed a team of case managers responsible for all aspects of the application process, which includes application intake, verification for homeowner rehabilitation and buyout programs and processing for financial assistance. They review the CDBG-DR grant application to make certain that all HUD, state and local requirements are met.

Before submitting the CDBG-DR grant application for approval, case managers review the application and make the final determination on duplication of benefits (DOB). Our case managers develop and generate weekly, monthly and quarterly reports on all activates performed with CDBG-DR funding,

and coordinate with the subrecipients on the process. They work with other staff in tracking applications from the initial phase through work writeups, bid processes and notices to proceed. Case managers review each project file prior to closeout and coordinate with subrecipients on issues with applications and provide proper guidance for approval.

IEM has realized 80% complete intake, 80% case management/intake and 70% eligibility determinations.

Data Management

IEM developed key performance indicators (KPIs) for each of the program lanes, including damage assessment, lead testing, eligibility, environmental testing, awards and construction. IEM also developed sophisticated data analytics-driven production metrics for State monitoring, as well as performance measures reported to external stakeholders. These measures are reported to the governor, the Flood Recovery Task Force and funding agencies to monitor progress.

Building on the existing STR's eGrants software, IEM implemented Home Recovery IQ (HRIQ) — an agile, no-code, low-code platform for efficient workflow management and speedy recovery. HRIQ is based on technology rated by Gartner as "Magic Quadrant" for intelligent business process management.

Major Early Milestones

- Fastest CDBG-DR program for housing recovery in U.S. history
- Rapid start: Four service centers and a call center established, with more than 300 employees on-boarded, in less than four weeks
- Checks given to homeowners in the first month after contract signature
- Construction initiated on the first home within 40 days of contract signature
- Assisted STR eGrants personnel with program requirements to meet CDBG compliance
- Designed HRIQ to increase efficiency and speed of workflows for faster recovery using low-code, no-code platform rated by Gartner as in the Magic Quadrant for intelligent business process management
- KPIs, production metrics, performance measures to drive CDBG-DR recovery results

FAYETTEVILLE FEMA GRANT PROGRAM CONSULTING: HURRICANES MATTHEW & FLORENCE

Fayetteville Public Works Commission

In the wake of Hurricane Matthew, Fayetteville Public Works Commission (PWC), as the subrecipient, selected IEM to help establish and implement a recovery program that complied with federal and state requirements, identified opportunities to leverage hazard mitigation, minimized risks of de-obligation and audit findings and maximized disaster assistance funding.

PERFORMANCE PERIOD

November 2016 – present

PROGRAM VALUE

$114.3 million

IEM's scope has included identifying disaster-related losses and expenditures, providing policy and program consulting in all grant-administration areas regarding eligibility and grant maximization, developing scopes of work and cost estimates for grant applications (PWs), establishing subgrant administration procedures and protocols consistent with 2 CFR 200 to ensure ongoing compliance with federal requirements, assisting with preparing reimbursement requests to the State, providing ongoing liaising and problem resolution with FEMA and the State, identifying and developing potential HMGP project opportunities, supporting document management and retention protocols (hardcopy and electronic), ensuring that the overall recovery program is closeout– and audit-ready and tracking and reporting on project development, issue resolution and funding. Over the course of the recovery, our services expanded to include:

- Drone-aided inspections of damage and impairment of electrical and wastewater rights of way to procure necessary contract support and submit claims to FEMA and the insurance carrier;
- Participating in a state-sponsored resiliency planning initiative under the North Carolina Disaster Recovery Act of 2016 to gather information regarding unmet needs and potential recovery projects for inclusion in a HUD CDBG-DR Action Plan;
- Investigating the availability of Natural Resource Conservation Services funding to address watershed impairment caused by Hurricane Matthew-related flooding;
- Ongoing support in developing response and recovery planning, cost-recovery corrective actions and internal accounting controls;
- Assisting the Fayetteville Public Works Commission with Hurricane Matthew and Hurricane Florence claims, and Cumberland County with claims for Hurricane Florence
- Determining eligibility for government-funded assistance programs and claim analysis for FEMA or if claims were covered by client's property insurance ;
- Enabling the client to recover property insurance deductibles through FEMA projects;
- Working directly with the applicant to gather, analyze and identify claims that were eligible by meeting with individual departments, gathering invoices and purchase orders and creating FEMA's damage inventory list for the applicant within the grant's portal;
- Completing project scopes and damage descriptions, including self-certifications and monthly monitoring for the state, including updated monthly reports for large projects and state extension requests;

- Calculating force account labor (FAL), force account equipment (FAE), force account materials (FAM), mutual aid and contractor reimbursement for submission to FEMA, including debris, emergency operations center (EOC) and management costs for temporary and permanent repairs;
- Working with FEMA site inspectors for onsite visits inspecting damages to restore to the applicant's best solution: pre-disaster conditions, lowest-cost effectiveness or mitigation measures to suit the client's needs;
- Assisted budget, finance and accounting departments with internal tracking of funds, audits, direct administrative costs and forecasting;
- Conducted all Grants Portal processes for the applicant, including scope, description of damages, supporting back-up documentation and submission of FEMA projects;
- Provided the finance department with pre-audit documentation for internal and external entities; and
- Recovered $600,000 through the client's property insurance, and recovered the client's insurance deductible through FEMA projects.

FEMA GRANT PROGRAM CONSULTING: HURRICANE FLORENCE

Cumberland County, NC

PERFORMANCE PERIOD

September 2018 – present

PROGRAM VALUE

$55.1 million

In the aftermath of Hurricane Florence, Cumberland County, the subrecipient, selected IEM to help them navigate the full lifecycle of the FEMA Public Assistance (PA) Program. As a repeat client (IEM provided services for Hurricane Matthew reimbursement claims), the County requested expert technical assistance with insurance, PA/Hazard Mitigation (HM) policy, appeals and arbitrations, general grants management, estimating, HM alternatives, benefit-cost analysis, eligibility, administrative costs, state management costs, alternate/improved projects, procurement, Department of Homeland Defense, Office of Inspector General audit defense, debris, temporary facilities and floodplain regulations.

IEM provided initial damage assessments and identified disaster-related losses and expenditures; provided expert policy and program consulting on project eligibility and grant reimbursement maximization; coordinated and conducted FEMA site inspections to verify eligibility and the preliminary scope of repairs; coordinated with County departments to obtain and analyze all costs and necessary backup documentation in order to extract pertinent information for project formulation; compiled project summary reports (force account labor, force account equipment, force account materials, contracts and invoice summaries); developed scopes of work and cost estimates for grant applications (projects); resolved insurance and possible issues with duplication of funding; established grant administration procedures and protocols to ensure ongoing compliance with federal requirements; provided project technical review to ensure eligibility and adequate claim support; assisted with preparing and submitting reimbursement requests to the State; provided ongoing liaising and problem resolutions with FEMA and the state; assisted with project extension requests; identified and developed HMGP project opportunities and applications for the county as a subapplicant; supported documentation management and retention protocols (hardcopy and electronic); identified and tracked eligible project administrative costs; ensured that the overall recovery program was closeout– and audit-read, tracked and reported on project development and was responsible for issue resolution (appeal and arbitration as well as DHS-OIG audit responses). Over the course of the reimbursement process, our services expanded to include:

- Access to the Subrecipient Grants Portal system to accomplish applicant support actions for project obligation, including accomplishing Essential Elements of Information (populating comments to system questions and compiling/organizing/uploading required support documentation for submission); and
- Formulation and submission of a request for six additional damage inventory lines.

In providing PA consulting services to Cumberland County's three large projects, IEM is working to secure a multi-million-dollar reimbursement.

REBUILD FLORIDA CDBG-DR PROGRAM MANAGEMENT

Florida Development of Economic Opportunity

PERFORMANCE PERIOD

July 2018 – present

PROGRAM VALUE

$1.3 billion

IEM is providing comprehensive program design and implementation services for Florida's $1.3 billion-dollar disaster recovery grant program for Hurricane Irma. IEM provides grant program management support, including designing housing and economic development programs that comply with HUD and other federal, state and local cross-cutting rules and regulations, including Uniform Administrative Guidance. The program will result in the rehabilitation, replacement or reconstruction of 7,000+ housing units; the new construction of multi-family residential structures; acquisition and buyout of properties in high-hazard or repetitive-loss areas; business grants for equipment and inventory replacement; business mentorship grants; and job training opportunities. IEM is implementing a housing program covering single-family, rental and multi-family housing directly on behalf of the Florida Department of Economic Opportunity and providing program design, compliance and monitoring for subrecipient projects.

IEM provides grant program and project management support to the Florida Department of Economic Opportunity (recipient) across each program area. Services include policy and procedure development, grant accounting, eligibility determination of grant expenditures, reimbursement tracking, grant reporting, training, outreach/marketing, application development, eligibility determination, Stafford Act compliance, damage assessment, environmental review, grant agreement execution, construction oversight, website and public communication content support, reporting, compliance, monitoring, subrecipient management, technical assistance and grant closeout.

IEM implemented a professional call center, nine geographically dispersed and fully operational intake center and two program management offices within 30 days of contract execution. We also engaged in a strategic mobile outreach campaign that involved 130 staff members and more than 7,000 miles traveled across the state to assist applicants. The program survey period ended with more than 15,000 surveys completed. Within a six-month period, IEM also completed 3,000 damage assessment appointments and submitted more than 1,000 environmental reviews. The program's first home construction project was completed in May 2019, just 60 days after a notice to proceed was issued.

SUFFOLK COUNTY COASTAL RESILIENCY INITIATIVE

New York State Division of Homeland Security and Emergency Services (DHSES)

Key IEM employees developed the initial Phase I approach to the Suffolk County Sewer project with a substantiated BCA that was quickly approved by FEMA. Suffolk County described this project as "the largest investment in water quality infrastructure in the County in more than 40 years and will eliminate nearly 7,000 cesspools and septic systems that have been identified as the single largest source of nitrogen pollution to [the] region's south shore bays."

This project will mitigate damage to the salty marshes by reducing effluent into the western bays and other waterbodies. Activities include constructing a wastewater treatment plant, removing private cesspools and septic tanks and connecting homeowners to the public sewer/treatment system.

This project needed great attention to detail as local and state agencies lacked the capabilities and understanding of the risk the project timeline had on the entire grant.

We needed to monitor funding pools and report financial progress and how to address URA requirements when dealing with small portions of residential property including temporary easements. IEM guided the stakeholders through the waiver valuation process to minimize costs.

FEMA PUBLIC ASSISTANCE PROGRAM

School Board of Seminole County

Following Hurricane Irma, the School Board of Seminole County (SBSC) engaged IEM's assistance with navigating the FEMA PA Program to maximize SBSC reimbursement for disaster-related losses and costs. Eligible work ranged from operating public shelters for the County to restoring drainage retention ponds. Services included:

- Assisting SBSC with collecting and managing documentation required by FEMA to support project reimbursements;
- Coordinating and developing projects (former Project Worksheets) using FEMA's New Delivery Model;
- Advising SBSC and completing accurate and current analysis on FEMA regulations and best strategies for maximum reimbursements while minimizing risk of de-obligation; and
- Assisting SBSC with site inspections and developing damage inventory lists.

PERFORMANCE PERIOD

November 2017 – June 2018

PROGRAM VALUE

$16.3 million

KEY TASKS

- FEMA Public Assistance
- Grant Management
- FEMA Documentation & Compliance
- Damage Description & Dimensions

IEM attended all SBSC site inspections conducted by FEMA and gathered, organized and saved site inspection data. IEM developed the Damage Inventory (DI) List, which is a critical component of the

recovery process under FEMA's New Delivery Model. IEM captured a list of damages for each site/facility and created a damage assessment spreadsheet for each, which included estimated costs for each site. IEM served as FEMA's primary point of contact for FEMA-related questions and concerns regarding SBSC damages caused by Hurricane Irma.

SBSC started with 83 projects, and approximately 60 have been submitted to RESTART through the U.S. Department of Education.

Appendix 4: Letters of Support from Local Contractors

ALPROEM
ENGINEERING CONTRACTORS CORP.

Date: November 13, 2019

To: P3 Committee for the Operation & Maintenance
of Transmission & Distribution System

Please accept this letter as a show of support for the Quanta/ATCO proposal to the P3 Authority for the Operation and Maintenance of the Puerto Rico Transmission & Distribution System. It is my believe that this consortium will serve the people of Puerto Rico well, transform our system to world class and use as much local labor as possible. My company has been working with Quanta Services for many years and is pleased to support their application for this long-term contract. Our experience with Quanta Services is that they are professional, honest, and work with integrity and a commitment to safety and the well being of their people. Alproem Engineering Contractors Corp. is a general contractor company which specializes in the industrial sector. We are a local company doing business in Puerto Rico for the last 21 years.

We fully expect to provide local support for the Quanta/Atco consortium if they are awarded the contract. This will allow more Puerto Ricans to rebuild the power system we so desperately need. Finally, we are impressed with the Quanta commitment to training and safety. Training is the key to a strong and safe workforce and we know Quanta's leadership in this area.

Please support the Quanta/ATCO consortium proposal for our T&D system.

Sincerely,

Luis Alberto Ocasio, PE
Managing Partner
ALPROEM

100 Plaza Praderas SC
Suite 20 PMB 419
Toa Baja, PR 00949-3840
Tel. (787)995-0309 • Fax (787)288-3674

Bermúdez, Longo, Díaz-Massó, LLC
ELECTRICAL AND MECHANICAL CONTRACTORS

November 12, 2019

To the P3 Committee for the Operation & Maintenance of the Transmission & Distribution System.

With more than a half a century of existence and currently ranked as the largest specialty contractor in Puerto Rico, Bermudez, Longo Diaz-Masso LLC (BLDM LLC) has always been committed to our clients providing integrated electrical, mechanical, telecom, and renewable energy services through the dedication of our well trained team, using the highest standards of safety, value and integrity.

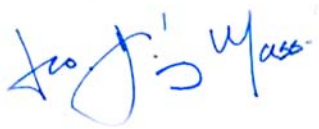
BLDM confirms its support for the Quanta/ATCO proposal to the P3 Authority for the Operation and Maintenance of the Puerto Rico Transmission & Distribution System. I have confidence that this consortium will serve the people of Puerto Rico well and transform our power system to a world class renovation, using competent and well-trained local labor.

My company has been in a business relationship with Quanta Services for many years and is pleased to support their application for this long-term contract. Given our business experience with Quanta Services, the company has proven to be a very professional, honest, and most important with integrity and a commitment to safety and the well-being of their people. BLDM has been leading the construction industry in the island for more than half a century. As the number one leading electromechanical contractor, our mark of excellence has been built into all of our projects, making our name synonymous with quality in residential, commercial and industrial development. BLDM LLC is a well-established and reputable specialty contractor, executing electrical, mechanical, and telecommunication work, along with hydro-sanitary, highway and energy infrastructure projects.

We will engage to provide support for the Quanta/Atco consortium if they are awarded the contract, as this project will allow the people of Puerto Rico to rebuild the power system in order to deliver a more reliable system.

Quanta's commitment to training and safety is remarkable with a strong leadership in the field. We strongly support the Quanta/ATCO consortium proposal for our T&D system.

Sincerely,



Francisco Díaz Massó
President & CEO
BERMUDEZ, LONGO, DIAZ-MASSO, LLC

P.O. BOX 191213 San Juan, Puerto Rico 00919-1213 / Fax: 787- 755- 0020 / Telephone: 787- 761- 3030.
www.bldmpr.com

Bonneville Contracting and Technology Group, LLC

November 14, 2019

P3 Committee for the Operation & Maintenance
of the Transmission & Distribution System

Please accept this letter as a show of support for the Quanta/ATCO proposal to the P3 Authority for the Operation and Maintenance of the Puerto Rico Transmission & Distribution System. It is our belief that this consortium will serve the people of Puerto Rico well by transforming our system to one of world class. They have committed to and use as much local labor as possible.

My company has been working with Quanta Services for many years. We are pleased to support their application for this long-term contract. Our experience with Quanta Services is that they are professional, honest, and work with integrity. They have a commitment to safety and the well-being of their people. Bonneville Contracting and Technology Group has had a working relationship with Quanta since 1998. As a past and current contractor for PREPA, we look to continue and expand that relationship.

We fully expect to provide local support for the Quanta/Atco consortium, if they are awarded the contract. This will allow more Puerto Ricans to rebuild the power system we so desperately need. Finally, we are impressed with the Quanta commitment to training and safety. Training is the key to a strong and safe workforce and we know Quanta's leadership and commitment in this area. We support the Quanta/ATCO consortium proposal for our Puerto Rican T&D system.

Cordially,

Stephen Spears
President
Bonneville Contracting and Technology Group, LLC

SES/mg

PO Box 193476 San Juan, PR 00919-3476 · www.bonnevillepr.net
Tel. (787) 747- 0757/747-0767 Fax (787) 747- 3344

ELECTRICAL & CONSTRUCTION SERVICES
www.division16pr.com
"Our Work Ethic and Core Values are the FOCUS of our Daily Operation"
Because We Care !!!

November 15, 2019

To the P3 Committee for the Operation & Maintenance of the Transmission & Distribution System,

Please accept this letter as a show of support for the Quanta/ATCO proposal to the P3 Authority for the Operation and Maintenance of the Puerto Rico Transmission & Distribution System. It is my believe that this consortium will serve the people of Puerto Rico well, transform our system to world class and use as much local labor as possible.
My company has been working with Quanta Services and is pleased to support their application for this long-term contract. Our experience with Quanta Services is that they are professional, honest, and work with integrity and a commitment to safety and the well-being of their people. Division 16 a second generation Electrical & General Construction Services company from Caguas, Puerto Rico, and we have served the local construction industry market for over 30 years in residential, commercial, institutional, and infrastructure projects. We have maintained our employees in good and in challenging times and have capacity for growth. Our team approach and commitment to excellence, accountability and responsibility is our biggest trait. We believe that Quanta has a similar company culture that will foster local companies' participation and commitment to a better Puerto Rico.

We fully expect to provide local support for the Quanta/Atco consortium if they are awarded the contract. This will allow more Puerto Ricans to rebuild the power system we so desperately need. Finally, we are impressed with the Quanta commitment to training and safety. Training is the key to a strong and safe work force, and we know Quanta's leadership in this area. Please support the Quanta/ATCO consortium proposal for our T&D system.

Sincerely,

Carlos A. Rodriguez – Division 16 LLC
President

November 13, 2019

To: The P3 Committee for the Operation & Maintenance of the PR Transmission & Distribution System

Dear Sirs:

Please accept this letter as a show of support for the Quanta/ATCO proposal to the P3 Authority for the Operation and Maintenance of the Puerto Rico Transmission & Distribution System. It is my believe that this consortium will serve the people of Puerto Rico well, transform our system to world class and use as much local labor as possible.

My company has been working with Quanta Services and is pleased to support their application for this long-term contract. Our experience with Quanta Services is that they are professional, honest, and work with integrity and a commitment to safety and the well-being of their people. Del Valle Group has been in business for more than 30 years in the construction industry in Puerto Rico, we provide a vast array of construction works in PR completing projects in an aggregate value of $1.35 billion. DVG currently employs more than 350 employees.

We fully expect to provide local support for the Quanta/Atco consortium if they are awarded the contract. This will allow more Puerto Ricans to rebuild the power system we so desperately need. Finally, we are impressed with the Quanta commitment to training and safety. Training is the key to a strong and safe workforce and we know Quanta's leadership in this area.

Please support the Quanta/ATCO consortium proposal for our T&D system.

Sincerely,

Humberto Reynolds, PE

Managing Partner

HydroEx
Non-destructive vacuum excavation

November 14, 2019

P3 Committee
Re: Operation & Maintenance of the Transmission & Distribution System

Dear Sirs,

Please accept this letter as a show of support for the Quanta/ATCO proposal to the P3 Authority for the Operation and Maintenance of the Puerto Rico Transmission & Distribution System. It is our believe that this Consortium will serve the people of Puerto Rico well, transform our system to world class and use as much local labor as possible.

Our company, HydroEx Corp. has been collaborating with Quanta Services and is committed to support their application and future performance for this long-term contract. Our experience with Quanta Services is that they are professional, honest, and work with integrity and a commitment to safety, training and the well-being of their workforce, which are qualities we share. On the other hand, for HydroEx, our priority is "Safety, Precision and Economy" in the hydro excavation services we provide, and Quanta Services recognizes and shares the importance of this.

We fully expect to provide local support for the Quanta/Atco consortium if they are awarded the contract. This will allow more Puerto Ricans to rebuild the power system we so desperately need.

Please support the Quanta/ATCO consortium proposal for our T&D system.

Sincerely,

Miguel Rivera Villamil
President & General Manager
HydroEx Corp.

M. Cecilia Llorens
Vice President & CFO
HydroEx Corp.

79 Calle Reina Alexandra Guaynabo, P.R. 00969-3273 [787] 449-4994 celular

Pro-Energy Corp.
Engineers & Contractors

November 14, 2019

To the P3 Committee for the Operation & Maintenance of the Transmission & Distribution System,

Please accept this letter as a show of support for the Quanta/ATCO proposal to the P3 Authority for the Operation and Maintenance of the Puerto Rico Transmission & Distribution System. It is my believe that this consortium will serve the people of Puerto Rico well, transform our system to world class and use as much local labor as possible.

My company has known Quanta Services for many years and is pleased to support their application for this long-term contract. Our experience with Quanta Services is that they are professional, honest, and work with integrity and a commitment to safety and the well being of their people.

Pro-Energy Corp. is a business corporation registered in May 2007, under the Puerto Rico laws with the number 172607. Founded, managed and supported by Eng. Carlos R. Nieves Rodríguez (former PREPA engineer), Pro-Energy Corp. is heading to establish strong presence on the electrical and mechanical construction and specialized field services in the industrial and power generation area.

Pro-Energy serve customers in Puerto Rico through these operating divisions:

- Electrical Products Distribution
- Electrical, Mechanical and Civil Construction and Service Division
- Electrical Protection Design and consulting services
- Electrical, control and protection maintenance services
- Electrical, control and protection acceptance tests and commissioning

We fully expect to provide local support for the Quanta/Atco consortium if they are awarded the contract. This will allow more Puerto Ricans to rebuild the power system we so desperately need. Finally, we are impressed with the Quanta commitment to training and safety. Training is the key to a strong and safe workforce and we know Quanta's leadership in this area.

Please support the Quanta/ATCO consortium proposal for our T&D system.

Sincerely,

Carlos R. Nieves Rodriguez, P.E.
Pro-Energy Corp.
President
c.nieves@pro-energycorp.com
Cell: 787.365.7188
Office: 787.707.0008

VENEGAS CONSTRUCTION CORP.
CONTRATISTAS GENERALES

November 13, 2019

To the P3 Committee for the Operation & Maintenance of the Transmission & Distribution System,

Please accept this letter as a show of support for the Quanta/ATCO proposal to the P3 Authority for the Operation and Maintenance of the Puerto Rico Transmission & Distribution System. It is my belief that this consortium will serve the people of Puerto Rico well, transform our system to world class and use as much local labor as possible.

My company has been working with Quanta Services for many years and is pleased to support their application for this long-term contract. Our experience with Quanta Services is that they are professional, honest, and work with integrity and a commitment to safety and the well being of their people.

We fully expect to provide local support for the Quanta/Atco consortium if they are awarded the contract. This will allow more Puerto Ricans to rebuild the power system we so desperately need. Finally, we are impressed with the Quanta commitment to training and safety. Training is the key to a strong and safe workforce and we know Quanta's leadership in this area.

Please support the Quanta/ATCO consortium proposal for our T&D system.

Sincerely,

Eng. Emilio M. Venegas

President

EDIFICIO MARVESA 472 AVE. TITO CASTRO - STE. 201 PONCE PR 00716-4702
TELEFONO: (787) 848-4848

Appendix 5: Letter of Intent from C.H. Robinson

C.H. ROBINSON

May 30, 2019

ATCO
10035 – 101 Street
Edmonton, Alberta
Canada T5J 2V6

Attention: Karen West

CONFIDENTIAL

Dear Karen,

CH Robinson Project Logistics is pleased to provide herein our Letter of Intent.

As ATCO's Logistics Partner, CH Robinson Project Logistics (CHRPL) is excited about the prospect of assisting and supporting ATCO with supply chain management solutions once ATCO is awarded the contract to build and assist in the recovery of Puerto Rico's infrastructure.

CH Robinson Projects expertise in project management includes and is not limited to:

- Acting in an advisory capacity from project conception. In this role CHRPL would work closely with ATCO in considering logistics requirements from early planning stages, including assessment of transportation options and considerations from various origins.
- Conducting route surveys and site surveys to confirm suitability
- Sourcing and contracting suitable storage and laydown locations
- Assessing available modes of transport and providing guidance on most suitable routing / equipment / carriers / service providers
- Assessing and contracting carriers and service providers for all required modes of transport and support services
- Arranging required transportation permits and approvals
- Arranging required Customs formalities for both export / import, including offering full brokerage services in Canada / USA
- Providing site attendance and representation as required during project execution

CHRPL would provide a dedicated local Project Manager to ATCO as a single point of contact for all communications and project execution.

Should ATCO so choose, CHRPL can provide real-time online access to shipment status during the course of the project through our operating platform NAVISPHERE.

C.H. ROBINSON

This letter furthermore grants ATCO permission to use this letter in support of any proposal or contract negotiations. We also grant ATCO permission to use CH Robinson's name in connection with any discussion regarding supply chain management and logistics.

Thank you for considering CH Robinson as a partner in this exciting and important project. We wish you great success in the undertaking and look forward to the prospect of collaborating with you.

Kind regards,

Frank Guzman
Regional Director, Project Logistics

C.H. Robinson Project Logistics Ltd. | 9910 - 39 Avenue NW | Suite 104 | Edmonton, Alberta, Canada T6E 5H8
O 780.438.6446 | F 780.438.6553 | **www.chrprojectlogistics.com**

Appendix 6: Resumes

WAYNE STENSBY, P. ENG.

ROLE

Stensby will support both the transition and management teams leading the entire organization as CEO & President

KEY EXPERIENCE

ATCO
2019 – Present
Alberta, Canada

Executive Vice President, Corporate Development
- Responsible for Corporate Development, LATAM businesses, Canadian midstream, Government Relations, Indigenous Relations and Aviation

ATCO
2015 – 2019
Alberta, Canada

Managing Director, Electricity
- Responsible for all electricity operations and growth for ATCO globally Responsibilities included generation, transmission and distribution across Canada and Mexico

ATCO Australia
2010 – 2012
Australia

Managing Director & Chief Operating Officer
- Led the ATCO Australia business, including the western Australia gas distribution network and the power generation portfolio
- Served as chair of the ATCO Australia Structures and Logistics board

ATCO Power
2012 – 2013
Ontario, Canada

Vice President, Engineering & Construction
- Responsible for ATCO Power's project engineering and construction activities

ATCO Power
2010 – 2012
Alberta, Canada

General Manager, IPP Operations
- Held full accountable for HSE, financial and regulatory performance of ATCO's Canadian IPP fleet
- Acted as ATCO representative on numerous management, owners and operating committees associated with these Joint Ventures

ATCO
1988 – 2009
Ontario, Canada, Queensland, Australia, London, UK

Various Roles – Maintenance & Engineering Services Manager, Deputy Project Manager/Construction Manager, Lead Control and Instrumentation Engineer, Station Control & Instrumentation Engineer, Various Engineering Roles

DESIGNATIONS

Chartered Engineer (UK)
Project Management Professional (PMI)
Senior Member, Institute of Electrical and Electronics Engineers (IEEE)
Member, Institution of the institution of Engineering and Techonology (IET)

EDUCATION

Bachelor of Science, Electrical Engineering, University of Alberta
Leadership Program, Ivey Business School
Executive Program, Ivey Business School

KARI FINDLEY, J.D.

ROLE

Findley will serve on both the transition and management teams as the lead for legal, insurance, risk and communications.

KEY EXPERIENCE

Quanta Services, Inc.
2012 – Present
Houston, Texas

Senior Counsel, Strategic Transactions

- West Fort McMurray - $1 Billion; structuring corporate operations, bid on concession, structure for tax, prepare agreements between Quanta entities and its Canadian partner, ATCO to form Alberta PowerLine, a limited partnership to design, procure, build and operate a 500 kilometer 500 kV transmission line from Wabamun area to Fort McMurray with two substations
- Peru Telecom Concessions - $300 Million; structuring corporate operations, bid on concession, structure for tax, prepare agreements between Quanta entities and its Peruvian partner to bid on and build and operate wireless networks in Piura Tumbes and Cajamarca, Peru
- Sale of Sunesys, Quanta's fiber optic licensing operations- $1 Billion
- Hartburg-Sabine Junction 500-kV competitive transmission project – Structuring corporate operations, bid on MISO competitive transmission project under FERC Order 1000, structure for tax, prepare agreements between Quanta entities and its partner Entergy to design, procure, build, own, operate and maintain a 500 kV transmission line and substation

Weatherford International
1999-2004
Houston, Texas

Corporate Counsel

- Responsible for drafting and negotiating documentation for merger and acquisition transactions. Worked closely with business unit Presidents, Vice-Presidents and M&A specialists to negotiate, document and close strategic corporate acquisitions for Weatherford
- Worked on technology development agreements to procure the development of key technologies
- Drafted and negotiated domestic and international distribution agreements and agency agreements
- Advised on and drafted employments agreements and consulting agreements
- Worked on real estate, bank and financing issues

KARI FINDLEY, J.D.

Griggs & Harrison P.C.
1996-1999
Houston, Texas

Shareholder, Transactional Section

- General corporate and transactional practice
- Expertise in acquisitions including mergers, stock purchases and asset purchases and contract drafting, negotiation and review
- Advised clients on issues of general corporate and partnership law and prepared and reviewed loan documentation on behalf of lenders and borrowers
- Specialized expertise in vessel construction contracts, vessel purchase and chartering, ship financing, vessel documentation and other maritime regulatory issues
- Employment law practice included preparation of employment, consulting and non-competition agreements, advising clients regarding hiring and termination decisions and personnel practices, development and implementation of corporate employment policies and handling charges of discriminating at the administrative level
- Industry focus on oil and gas service companies, offshore oil and gas industry and shipping and maritime interests

Bell & Murphy, P.C.
1988-1996
Houston, Texas

Shareholder 1993-1996**; Associate** 1988-1993

- Experience with foreign and domestic corporations and joint ventures
- General contract drafting, negotiation and review including stock and asset purchase and sale agreements, corporate documents, legal opinions, loan and security documents and general business contracts on behalf of domestic and international corporations
- Extensive experience in vessel sales, charters, financing and registration and other maritime issues
- Limited work in commercial real estate including sales and leasing
- Counseled clients regarding employment practices and handled employment discrimination charges at the administrative level
- Industry experience included foreign companies structuring operations in the United States as well as oil and gas service companies, offshore oil and gas industry and shipping and maritime interests

EDUCATION

Doctor of Jurisprudence, Law, University of Texas at Austin

Bachelor of Arts, Economics, Managerial Studies and Political Science, Rice University

CAM DAFOE

ROLE

Dafoe will serve on both the transition and management teams as the lead for information and operations technology planning.

KEY EXPERIENCE

ATCO
2019 – Present
Alberta, Canada

Business Relationship Manager

- Focus onrelationship management, influencing, negotiating, problem-solving, oral and written communications, executive selling, planning and strategizing.
- Leads a team of trusted advisors the the organization
- Functional areas include customer information systems, workforce management, asset management, meter management, geographic information and land management
- IT areas includ IT portfolio management, project accounting, lifecycle upgrades, Windows 10, Oracle Financials, Oracle Cloud, IBM Maximo, application outsourcing (Wipro), and migration to cloud computing

City of Edmonton
2015 – 2015
Alberta, Canada

Business Relationship Manager

- Managed the internal relationship between Corporate IT and the City departments of Sustainable Development, Communications and Engagement and City Clerks office
- Included strategic business planning, prioritization, risk identification, resourcing, budgeting, business casing and governance
- Focused on achieving common and shared goals and successful enterprise outcomes
- Supported strategic goals within the constraints of budgets and risk tolerance. Particular areas of focus included CRM (citizen), digital experience, work management, electronic content management and meeting management

IBM Canada Ltd.
2010 – 2015
Alberta, Canada

Associate Partner

- Established and delivered IBM application management, integration, business consulting and application development services to Alberta public sector clients
- Sought to understand client business directions and priorties and presented aligned IBM business services to fulfill needs
- Developed proficiency and emminence in business management, delivery management, client negotiations, services sales, structuring business deals, pricing, profitability, legal considerations, scope definition, statements of work, discrete projects and long term support contracts

CAM DAFOE

IBM Canada Ltd.
2001 – 2010
Alberta, Canada

Client Executive

- Developed and maintained overall client relationships in the Alberta Public Sector
- Managed sales across IBM's portfolio of product and services
- Developed understanding of client business and priorities, and brought the resources of IBM to bear on client issues, challenges and opportunities
- Held relationships with client business executives, CIOs and IT management
- Managed a virtual team of IBM specialists and practitioners to address client needs and opportunities
- Developed and executed strategic plans and communications coverage for client accounts
- Built IBM product and service offering awareness and sales programs

IBM Canada, Ltd.
1987 – 2000
Alberta, Canada

Client Manager

- Delivered IBM product and service sales to a variety of sectors including Public, Utilities, Pipeline, Distribution, Wholesale, Communications and Manufacturing
- Developed and executed territory coverage and opportunity plans
- Developed and maintained client relationships from business executives to IT

DESIGNATIONS

Certified Client Executive, IBM

Business Relationship Manager, Business Relationship Management Institute

EDUCATION

Bachelor of Science, Psychology, University of Alberta

Executive Program, IBM Certification Program, Harvard Business School

Executive Program, Stone and Webster Utilities Executive Program, University of Michigan

Executive Program, Public Executive Forum, Queens School of Business

KIM RIDDLE, SPHR, SHRM-SCP

ROLE

Riddle will serve on both the transition and management teams leading HR

KEY EXPERIENCE

Quanta Services, Inc.
2016 – Present
Houston, Texas

Vice President Human Resources

- Manage all HR functions with full accountability for consolidated benefits, retirement plans, HR compliance, diversity & inclusion, organizational performance, employee retention and other critical areas
- Collaborate closely with CEO, Board of Directors and senior management, assessing business objectives and designing global human resources strategies and initiatives that advanced the company's mission as well as maximize organizational performance, retention and engagement
- Establish and monitor critical HR metrics to drive continuous improvement. Coordinate full range of support tasks for 40,000 employees globally, including spanning workforce planning, internal training, personnel development, employee relations, executive/staff compensation, auditing and on-boarding processes

Hercules Offshore
2008 – 2015
Houston, Texas

Vice President Human Resources

- Worked with CEO, Board of Directors and senior management, assessing business objectives and designing global human resources strategies and initiatives that advanced the company's mission as well as maximized organizational performance, retention and engagement
- Created and continually monitored HR metrics to drive continuous improvements in HR programs and processes
- Led 60-member HR function, supporting over 5,000 employees, in managing areas spanning workforce planning, training and organizational development, employee relations, executive/staff compensation, benefits and staffing for the US, Nigeria, Angola, Singapore, Netherlands, Scotland, India, Malaysia and Indonesia

Deloitte Consulting
2006 – 2008
Houston, TX

Consulting Manager

- Worked with executive level clients in the Oil and Gas, Healthcare, Technology, Industrial and Education industries – conducting needs analyses and developing global total rewards programs (i.e., base compensation, variable pay plans, recognition programs and health and welfare benefits)
- Performed due diligence related to potential mergers and acquisitions to gauge fit between companies. Managed and mentored analysts, consultants and administrative staff

DESIGNATIONS

SPHR Certification
SHRM – SCP Certification

EDUCATION

Bachelor of Arts, University of Houston

DEREK CARSON, CSP, CPEA

ROLE

Carson will serve on both the transition and management teams as the lead for health, safety, environmental and quality

KEY EXPERIENCE

Quanta Services, Inc.
2019 – Present
Houston, TX

Senior Manager – Health, Environmental, and Quality

- Provides support to Quanta Corporate and Operating Units in the areas of industrial hygiene, environmental, quality, and overall injury prevention
- Manages, mentors, supports and develops direct report(s) including the Corporate Industrial Hygienist, the Corporate Environmental Manager, and the Corporate Quality Manager
- Oversees the Quanta Safety, Health, Environmental, and Quality internship program
- Represents the Corporate Safety, Health, Environmental, and Quality Department on the Mergers and Acquisitions team
- Travels to Operating Units to provide guidance and support in the areas of Industrial Hygiene, Environmental, and Quality
- Assists in the development, evaluation and upgrading of the Quanta Corporate Industrial Hygiene, Environmental, and Quality programs.
- Participates and represents the company in industry meetings including the Edison Electrical Institute (EEI)

EC Source Services
2017 – 2019
Phoenix, AZ

Director of Safety

- Responsible for all aspects of the EC Source safety and health program including injury prevention, vehicle accident reduction initiatives, and regulatory compliance
- Worked directly with EC Source Operations Executives and senior leadership team on all EC Source safety and health performance measures and initiatives
- Oversaw the development and implementation of the EC Source Safety Leadership and Skill Development program
- Provided direct supervision and oversight for all Field Project Safety Directors working on EC Source projects

American Electric Power (AEP)
2014 – 2017
Columbus, OH

Safety and Health Manager – Generation

- Served as a Corporate Safety and Health Manager supporting Generation, Fuels, Operations, and Mining (FOM), and River Operations
- Worked directly with the Region Vice Presidents and respective Plant Managers in Generation, FOM, and River Operations on all company safety performance measures
- Responsible for providing corporate support for Generation, FOM, and River Operations in all aspects of the AEP corporate safety and health programs
- Provide safety oversight for contractors working at Generation, FOM, and River Operations locations.

DEREK CARSON, CSP, CPEA

American Electric Power (AEP)
2011 – 2014
Gahanna, OH

Safety and Health Manager – AEP Ohio

- Served as the Corporate Safety and Health Manager supporting the AEP Ohio operating company
- Worked directly with the AEP Ohio President and Vice President of Operations on all operating company safety performance measures.
- Provided direct supervision for 5 field safety and health coordinators supporting AEP Ohio
- Responsible for all aspects of the AEP Ohio safety and health program including injury prevention, vehicle accident reduction initiatives, and regulatory compliance
- Responsible for leading efforts to incorporate Human Performance initiatives into the AEP Ohio safety culture
- Provided safety oversight for all Distribution and MRO contractors working on AEP Ohio property
- Received the 2012 President's Award for Safety Performance Improvement after reducing the operating company OSHA incident rate and severity rate by over 37% from 2011 to 2012

American Electric Power (AEP)
2009 - 2011
Gahanna, OH

Transmission Contractor Safety Administrator

- Directed, managed, and administered AEP's Transmission Contractor Safety Program including program development, assessment, and execution
- Served as the lead AEP interface with contractors on matters regarding safety qualification and performance
- Responsible for the enforcement and administration of all aspects of AEP Transmission's Safety Terms and Conditions for all contracted capital construction across 11 states and over 100 contract companies
- Provided necessary training and active direction regarding contractor safety oversight for Transmission Construction Representatives, Project Managers and Project Lead Engineers
- Served as AEP Transmission's primary interface with contractor senior executive management

American Electric Power (AEP)
2006 - 2009
Columbus, OH

Health and Safety Audit Consultant

- Responsible for conducting health and safety audits of AEP facilities system-wide to determine regulatory compliance and evaluate the effectiveness of the supporting ESH management systems
- Prepare formal reports for facility and upper management to determine corporate risk and liability from health and safety compliance issues
- Develop and implement audit protocol check sheets utilized for the evaluation of company health and safety programs and procedures

DEREK CARSON, CSP, CPEA

Georgia Pacific Corporation
2003 - 2006
Circleville, OH

EHS and Quality Manager

- Responsible for the development and coordination of all policies and procedures relating to the plant's environmental, quality, and safety programs
- Responsible for the tracking of all environmental, quality and safety performance data to identify trends and develop improvement plans
- Coordinated all facility environmental, quality, and safety training programs
- Received zero audit findings during biannual Corporate Environmental Audits in 2005 and 2003
- Received zero NOV's and Excursions during oversight of the plant's environmental programs
- Facilities improved their OSHA Incident Rate by an average of 33% each year, including a rate of less than 1.0 during 2004 and 2005
- Facilities improved their credit and return dollars due to quality defects by an average of at least 25% per year
- Served as a primary contact between the Georgia Pacific plant and customer manufacturing facilities for product performance and service issues
- Responsible for the contractor safety training program and daily oversight during the closure of the Philadelphia, PA facility

International Paper
1999 - 2003
Statesville, NC

Environmental, Health, and Safety Coordinator

- Reduced the facility OSHA Incident Rate from 4.86 in 1999 to 2.44 in 2000, 0.66 in 2001 and 1.20 in 2002
- Developed and coordinated all facility environmental, health, and safety training programs
- Responsible for the tracking of all health and safety performance data to identify trends and develop improvement plans
- Facilitated all activities of the hourly employee safety team
- Responsible for managing all facility workers' compensation claims
- Received the 2001 International Paper - Container Division EHS Award for *Significant Improvement*
- Supported the Operations Group by filling in as the Plant Production Scheduler during vacations and/or illnesses

South Carolina Dept. of Labor - OSHA
1995 - 1999
Statesville, NC

Industrial Hygiene Compliance Officer III

- Conducted inspections to determine compliance with all federal and state occupational safety and health regulations
- Performed Industrial Hygiene monitoring to determine exposure levels to regulated chemicals and/or elevated noise levels
- Evaluated employer written safety and health programs and training material for compliance and effectiveness
- Provided detailed reports of inspection findings, citations, and corrective action recommendations
- Assisted in the training and development of Industrial Hygiene and Safety Compliance Officers

DESIGNATIONS

DEREK CARSON, CSP, CPEA

Certified Safety Professional (CSP)
Board of Certified Safety Professionals (BCSP)
Certified Professional Environmental Auditor – Health and Safety Designation (CPEA)
Board of Environmental, Health, and Safety Auditor Certifications (BEAC)

EDUCATION

Bachelor of Science in Industrial Hygiene, Ohio University; Athens, OH

DARREN MILLER

ROLE

Miller will serve on in both the transition and management teams as the lead for overall financial management; finance, treasury, tax, accounting, procurement and real estate.

KEY EXPERIENCE

Quanta Marine Services, LLC / Bisso Marine, LLC
2013 – Present
Houston, Texas

Chief Financial Officer

- Private company experience working for a Company which, in addition to it's fleet, chartered three barges from Quanta Services.
- Managed the finance, accounting, supply chain and information technology functions as well as a Sarbanes-Oxley implementation
- Managed the start-up of Quanta Marine Services which became a successor company to Bisso Marine, a private entity while also overseeing, as CFO, two other Quanta operating units in the Oil & Gas industry
- Managed the set-up of a permanent establishment in Mexico enabling the Company to be a key contractor for the Sur de Tejas pipeline from Texas to Mexico
- Key participant in the sale of the fleet and management of Quanta's exit from the marine business

Quanta Services, Inc.
2003 – 2012
Houston, Texas

Vice President – IT and Administration

- Managed the Risk Management, Information Technology and Human Resources functions during a significant growth phase from $1.6 billion to approximately $6 billion in revenues
- Directly participated in securing surety capacity ranging upward to $2.5 billion Managed ongoing relationship with both brokers and underwriters
- Provided oversight of procurement, claims management and accounting for a high deductible insurance program with annual exposure activity of approximately $45 million
- Co-managed the successful selection, global design and implementation of an integrated accounting system (ERP) for multiple operating units
- Managed the building of the information technology infrastructure platform for connecting all of the Company's operating units
- Managed the initial implementation of the Information Technology portion of the Sabanes-Oxley controls framework
- Key participant in the divestiture of the Company's telecom business, including the subsequent decoupling of the unit from Quanta and the transition to buyer
- Rationalized the Corporate office of an acquired company following a $1 billion transaction
- Served on the Quanta Services, Inc. disclosure committee and as the primary management liaison with the Compensation Committee of the Board of Directors

DARREN MILLER

Encompass Services Corporation
1996 - 2003
Houston, Texas

Senior Vice President, Chief Financial Officer

- Led all aspects of accounting, finance, tax and treasury for company grown from a start-up operation to Fortune 500 status with over $4 billion in annual revenue
- Negotiated numerous new senior financings or amendments to senior credit agreements ranging in size from $8 million to $800 million; including the ongoing management of bank groups ranging from three to approximately 40 institutions
- Directly involved in over 50 mergers, acquisitions and divestitures individually ranging from under one million into the hundreds of millions in transaction value. Extensive experience in virtually all aspects of transactions including due diligence, negotiations, documentation, financing and integration
- Directly involved in an initial public offering of common stock, which raised over $100 million in capital, and two public debt offerings, which raised a total of $265 million in additional capital
- Participated in raising $150 million through a preferred stock investment from a large private equity firm
- Directly involved in the creation of business processes, operational and financial reports and internal control processes and procedures for a start-up enterprise. Later participated in the streamlining or replacement of many of the aforementioned processes to accommodate maximum efficiency and functionality along the growth path to becoming a multi-billion dollar organization
- Numerous public and private presentations to debt and equity investors, bond rating agencies, Boards of Directors, banks and other financial institutions
- Significant investor relations and public speaking experience

Allwaste, Inc.
1989 - 1996
Houston, Texas

Vice President, Treasurer and Controller

- Primarily responsible for all aspects of accounting and finance for this $400 million company, including numerous public filings of financial information and other corporate governance requirements
- Co-managed the successful global design and implementation of an integrated accounting systems (ERP) for multiple operating units
- Managed the Company's public debt ratings and associated relationships with the rating agencies

Arthur Andersen, LLP
1982 - 1989
Houston, Texas

Audit Manager

- External auditing experience in the following industries: environmental or industrial services, oilfield services, offshore drilling contracting, light manufacturing and private universities
- Public Company experience, including an initial public offering

DESIGNATIONS

Certified Public Accountant (CPA)

EDUCATION

Bachelor's of Business Administration – Accounting, Lamar University

MARIO HURTADO

ROLE

Hurtado will serve on both the transition and management teams as the lead for regulatory; including rates, land access, government relations and O&M agreement administration

KEY EXPERIENCE

ZUA CONSULTING,
2018 – Present
Houston, TX

Principal

- Management consulting on infrastructure development, renewables and other energy projects
- Assignments include:
    - Project management and lead for qualified consortium to manage and operate Puerto Rico electric system under a public-private partnership to rebuild electric grid and implement 100% renewable energy standard
    - Work for NextEra Energy on regulatory, project management and transition to new ownership of 350-mile electric transmission project in Oklahoma;
    - Evaluation for major European owner/operator on acquisition of wind and solar projects in Mexico; and
    - Analysis for private financial investor on restructuring opportunities for natural gas-fired project reaching PPA termination in competitive power pool

Clean Line Energy Partners
20009 – 2017
Houston, TX

Co-Founder and Executive Vice President

- Co-Founder of merchant electric transmission company focused on development and construction of long-haul lines to connect the best wind energy resources in the United States with large demand centers
- Member of management team that grew company from two-person office to 50 plus employees, oversaw development of five greenfield transmission projects in eleven states, and raised over $200 million
- Direct project execution and development for the Plains & Eastern Clean Line, a $2.5 billion, 4000 MW high voltage direct current transmission line to deliver renewable energy in western Oklahoma and the Texas Panhandle to utilities in Arkansas, Tennessee and throughout the Southeast
- Managed teams that received public utility approvals in Oklahoma and Tennessee and created a public private partnership with U.S. Department of Energy. Obtained all permits necessary for construction
- Created and managed project development team that oversaw budget, schedule, regulatory approvals at local, state and federal level, environmental permitting, community outreach efforts, and public and government affairs for 720-mile transmission line involving four states and 28 counties

MARIO HURTADO

4GAS
2008 – 2009
Houston, TX

Consultant, Project Development

- Project management and structuring for venture capital-backed company developing liquefied natural gas import terminals
- Established project development processes, risk mitigation and project finance plans for regasification and storage projects in Texas and Netherlands

Globeleq
2002 – 2007
Houston, TX

Vice President, Americas & Director, Americas

- Created shareholder value of more than $200 million by leading growth and management of regional business in Central America and Caribbean
- Within 4 years, transformed Globeleq from a minority financial investor start-up into one of the top developer/owner/operators in the region through acquisition and greenfield development
- Exceeded all financial and operational metrics for Central America and Caribbean regional assets totaling approximately 600 MW and EBITDA of $50 million
- Supervised commercial management, operations, capital investment plans, and operating budgets; oversaw local management performance and identified areas for growth and improved return on investment
- Oversaw operation of $500 million Latin American portfolio during transition to new ownership

Duke Energy North America
2000 – 2002
Houston, TX

Director, Acquisitions & Divestitures

- Closed five U.S. merchant energy transactions totaling more than $1 billion, achieving average returns of 25%
- Managed multiple aspects of transactions from origination through closing, including negotiations with counter parties, oversight of financial valuation, legal and technical due diligence, regulatory approvals, as well as coordination and internal negotiation with commodity origination and trading areas

Reliant Energy International
1996 – 2000
Houston, TX

Director, Business Development

- Negotiated and closed three major enterprise acquisitions in South America totaling nearly $3 billion in investments, including two of the top electric utility M&A deals in Latin America in 1998. Directed acquisition teams and oversaw valuation, due diligence, and negotiation with counter parties
- Initiated and maintained relationships with strategic partners and governmental authorities including negotiation of joint bidding and joint venture agreements. Led takeover and transition to new ownership of privatized companies, including hiring of senior staff, personnel and financial restructuring and board oversight

Coastal Power Company
1994 – 1996
Houston, TX

Manager, Project Development & Associate Manager, Project Development

- Developed independent power projects in Mexico, Central America and the Caribbean, including acquisition of independent power project in the Dominican Republic with +20% realized return

MARIO HURTADO

DESIGNATIONS

Languages – Fully bilingual English/Spanish. Fluent in Portuguese. Proficient in French.

EDUCATION

Bachelor of Arts, Political Science, Columbia University

Master of Arts, International Relations with Concentrations in International Economics and Latin American Studies, Johns Hopkins University

BRIAN WALSHE

ROLE

Walshe will serve on both the transition and management teams as the lead for wholesale, generation and shared services.

KEY EXPERIENCE

ION Consulting
2003 – Present
Global

President

Walshe has extensive expertise in utility regulatory and public policy forums serving regulatory commission clients. He has been involved in early stage regulatory restructuring efforts in emerging markets around the world related to unbundling the vertical utility model and developing renewable energy strategies.

Regulatory Support Services to Public Utility Commissions

- Led or supported eleven utility management audits for eight separate state Public Utility Commission clients
- Led or conducted Prudence investigations for Public Utility Commission (PUC) clients
- Authored the “Strategic and Renewable Energy Plan” (STAR Report) for the Colorado Governor’s Energy Office
- Authored the “Expanding the Role of Renewables in a Power Portfolio” Report for the American Public Power Association
- Conducting dozens of strategy workshops focused on deregulation models and lessons learned from US regulatory experience, as well as workshops related to renewable energy issues

Expert Witness and Rate Case Support

- Provided expert testimony or expert witness testimony:
    - To the Maryland Public Service Commission related to the Natural Gas Pipeline accelerated Replacement Program of Washington Gas Light
    - On valuation of portfolio of 23 landfill gas plants as part of bankruptcy proceedings for U.S. Biogas
    - In the minority owner litigation of the Comanche Peak Nuclear Electric Station I and II testimony I in the area of construction management and the comparison of industry cost trends for nuclear plants construction
    - On the rate case for Limerick Nuclear Generating Station I and II in the area of construction management and the comparison of industry cost trends for nuclear plants construction
- Served as non-testifying witness in rate case investigating the replacement purchased power cost associated with the extended forced outage of:
    - Davis Besse Nuclear Station
    - Calvert Cliffs I and II Nuclear Station
- Engagement manager:
    - Supporting Puget Sound Energy in their Power Cost Only Rate Case associated iwht the acquisition of the Frefericksон Gas Electric Station

- For confidential client preparing analysis in support of hart-Scott-Rodino review associated with the acquisition of a $1 billion specialty electrical contractor

International Utility Regulation and Public Policy

- Served SwissGrid in their negotiation to unbundle Transmission business from their vertically-integrated electric utility structure
- Led an engagement for the Office of the Heir-Apparent of Qatar, to develop a strategy to increase the national commitment to renewable energy
- Conducted several workshops in People's Republic of China in the early 1990's regarding establishment of Private Power Development projects
- Supported Eskom in its strategy development with the National Regulator, to restructure the South African Electric Sector in the mid 1990's

Energy Infrastructure and Advanced Technology

- Contributor and reviewer for the book "Securing Utility and Infrastructures" and mentioned in acknowledgements by Dr. Larry Ness, copywrite 2006 by John Wiley & Sons Inc
- Supported Cisco Systems in the development of their Smart Grid strategy
- Supported First Energy in development and regulatory treatment of proprietary technologies related to Electro-Mechanical Flux (EMF) mitigation

Power RFP Support and Transaction Advisory Services

- Assisted Puget Sound Energy in management and analysis of the competitive solicitation process for new power supplies in 2002 and 2006
- Assisted Puget Sound Energy in development of valuation models for multiple engagements.These engagements have culminated in the acquisition of almost $700 million of generation assets including gas, wind, and Purchase Power Agreements (PPAs)
- Assisted a merchant utility as it refined its generation growth strategy.
- Assisted the Lincoln Electric System to review production cost modeling software required for implementation of nodal market inside SPP
- Supporting a confidential electric IOU in the assessment of potential corporate acquisition candidates as part of a limited partnership with private equity funding
- Assisted a confidential combination gas and electric utility to value and prioritize other regulated "wires" companies in deregulated states as potential merger and acquisition candidates
- Assisted an energy holding company to develop a strategic plan for its regulated operations
- Established a new sales and marketing function designed to focus on strengthening relationships with large wholesale customers, and evaluating the long-term viability of existing diversified operations

EDUCATION

Master of Business Administration, Finance, University of Michigan
Bachelor of Science, Civil Engineering, Northeastern University

DONATO CORTEZ

ROLE

Cortez will serve on both the transition and management teams as the lead for utility transformation, including; engineering, asset management, common services, IRP planning, metering, loss reductions and physical security

KEY EXPERIENCE

Quanta Services, Inc.
October 2016 – Present
Houston, TX

Executive Business Development

- Develop electric and gas utility business opportunities
- Coordinates expertise across operating units as needed for major project opportunities
- Supports operating units by providing content to reinforce consistent message to marketplace

Avra Energy
2015 – 2016
Houston, TX

Vice President Sales and Marketing – LATAM

- Developed marketing strategies and create sales for renewable energy in Latin America
- Created marketing and sales plans currently under execution
- Developed renewable energy purchases to follow energy sales
- Developed green field renewable energy partnerships and business plans

IBM
2010 – 2015
Houston, TX

Global Business Development Executive

- Developed large business deals in the global utilities market collaborating with executives in China, Taiwan, Oman, Australia, Brazil, Chile, South Africa, Mexico, Korea, and the United States
- Created strategies for smart grid and renewables, identifying and validating opportunities to apply IBM technology solutions, and coordinating with utility executives to ensure success throughout entire sales cycle
- Worked with utility executives to create strategies for smart grids, new business opportunities, and renewables
- Developed opportunities for smart grid applications (asset management, analytics, mobility systems, customer service and smart meter management) in utilities globally
- Gained thorough understanding of IT systems to apply to utility operation systems then collaborated with different IBM areas to identify utility smart grid technology solutions
- Created business plans for utilities to implement smart grids

CenterPoint Energy Houston Electric
2001 – 2010
Houston, TX

Division Vice President

- Oversaw the electric and gas business technology strategy including the smart grid program, which encompassed the major equipment selection, overall architecture direction, contract negotiations and PUCT smart meter deployment agreements
- Manage and coordinate with personnel to oversee process improvement gas and electric utilities, Telecom Services, Fleet Services, Land and Field Services, Geographical Information Systems (GIS), Central Shop Services, Contractor Services, Distribution Engineering, Central Metering, and Safety and Environmental Services

- Managed 350 employees; projected and managed annual budgets of up to $350M
- Implemented the smart grid by developing and installing the first smart meter with Itron, obtaining a rate increase approval from PUCT for $800M for smart meter deployment and a $200M federal grant to initiate the smart grid implementation at CenterPoint Energy Houston
- Reduced operating costs $200M within six months by developing and implementing numerous sustainable innovative initiatives
- Reduced safety incidents by implementing a behavior based safety program adopted by the entire workforce
- Developed the technical communication (telecom) strategy, Network Operation Center, maintenance, and capital replacement/ implementation plans, implementing plans that included an upgrade of the fiber optics backbone network, and installation of a WiMax system, field force voice and data radio system, and a smart metering last mile communication system
- Developed and implemented an electric network damage assessment model that predicts storm impact and storm restoration workforce requirements to meet set reliability and restoration targets
- Created and managed the Emergency Operating Plan and led the hurricane restoration plan enacted during Hurricane Rita

Electropaulo
1998 – 2000
Sao Paulo, Brasil

Director of Operations

- Oversaw utility operations for approximately 3,600 professional and union employees working with telecommunication, transmission, and distribution grid engineering and operations serving one of the largest cities in the world, Sao Paulo, Brazil
- Reduced operating costs over 40% through incorporating business culture change, process improvement, and newer technology. Reduced professional and union personnel from 6,300 to 3,800 within two years.
- Developed and managed annual capital and operating improvement budgets of up to $400M
- Reduced commercial losses from 18% to 8% by developing and implementing technical and community programs
- Improved electric service reliability by a factor of 4 and fully automated 99 substations in one year
- Received two awards from ADVB for Top Company in Human Resources 1999 for recognition of the worker retraining program and Top Company in Environmental for designing and implementing a program tasking Electropaulo employees with improving a section of riverbank that crossed the city

DONATO CORTEZ

EPSA
1997 – 1998
Cali, Colombia

Chief Operating Officer

- Oversaw utility operations encompassing commercial and communications areas, transmission and distribution grid engineering and operations, and generation (gas and hydro) serving approximately 750K customers in Cali, Columbia. Managed a staff of 1,800 and annual budgets of up to $500M
- Implemented generation forecast and availability strategic, energy forecast, and operating plans
- Implemented asset and environmental management plans
- Reduced operations cost over 30% through business culture change, process improvement, and technology implementation; managed an approximately 40% reduction of professional and union personnel within one year
- Implemented a meter read to instant bill print system to mitigate hyperinflation effects and improve billing costs and revenue collections

Houston Industries Energy, Inc.
1996 – 1997
Houston, TX

Manager of Operations

- Managed operations oversight for HIEI companies operating in South America and provided due diligence and business plans fore new utility acquisitions. Created 15-year company budgets, takeover plans, and operating plans for acquisition targets
- Developed successful business plans used in the winning bids for two Argentinian Discos (EDELAP & EDESE), a utility in Cali, Columbia (EPSA), and a distribution company (Electropaulo) in Brazil, and led all four acquisition transformation takeovers

DESIGNATIONS

USA Smart Grid Consumer Collaborative
KEMA Utility of the Future Advisory Committee
AT&T Field Services Advisory Board
Professional Engineer (Alberta)
Project Management Professional (PMI)

EDUCATION

Bachelor of Science, Electrical Engineering, Texas A&M University

TODD MCLAREN

ROLE

McLaren will serve on both the transition and management teams as the lead for operations; including transmission and distribution, field engineering, customer service field crews, telecommunications, vegetation management, fleet emergency operations plan and field warehousing.

KEY EXPERIENCE

ATCO
2018 – Present
Alberta, Canada

Vice President, Engineering & Construction

- Responsible for the overall operations and maintenance of ATCO's transmission, distribution and telecommunication system, as well as project management, supply chain, project construction, commissioning, asset management, land and property functions

ATCO
2016 – 2018
Alberta, Canada

Vice President, Maintenance & Construction

- Responsible for all construction– and maintenance-related activities for transmission and distribution
- Accountable for departmental profit and loss (P&L) and health and safety results
- Responsible for strategic planning and direction, priority planning and labour relations for the company

ATCO
2013 – 2016
Alberta, Canada

Vice President, Transmission Construction & Standards

- Responsible for developing and directing the group executing and delivering ATCO's critical transmission infrastructure projects (line and substation) with total combined project values exceeding $500 million annually

ATCO
2011 – 2013
Alberta, Canada

Vice President, Eastern Alberta Transmission Line, Line Construction

- Responsible for construction planning, tender development and award, contractor management and regulatory matters for ATCO's $1.8 billion HVDC link

ATCO
2009 – 2013
Alberta, Canada

Vice President, Large Distribution Projects

- Responsible for the overall management, direction and coordination of large distribution and transmission capital maintenance projects, as well as developing, directing and controlling the Strategic Project Management Office (PMO)

ATCO
2007 – 2009
Alberta, Canada

Vice President, Special Projects, ATCO Group

- Reporting to the ATCO Group of Companies' chief administration officer, responsible for the program to implement an enterprise solution for Oracle HR & operating subsidiaries to ensure their representation with the project (> $70 million)

TODD MCLAREN

ATCO
2003 – 2007
Alberta, Canada

Vice President, Customer Care & Billing, ATCO I-Tek

- Responsible for delivering a full suite of customer call and billing services on behalf of 1.3 million customers in a centralized function on behalf of Direct Energy, The City of Red Deer, ATCO Electric and ATCO Gas; the operation won multiple North America-wide awards for customer care and customer satisfaction during this period

ATCO
1999 – 2003
Alberta, Canada

General Manager, Business Services, ATCO I-Tek

- Developed a centralized customer care and billing function on behalf of the ATCO Group of Companies for more than 1.3 million customers; responsible for developing contract procedures and performance metrics, and to begin operations on behalf of 2 external customers (Direct Energy and City of Red Deer)

EDUCATION

Finance Major, Agriculture Business Program, Olds College
Law Minor, General Studies, Southwest Texas State University

PAUL GOGUEN, P. ENG., MBA

ROLE

Goguen will serve on both the transition and management teams as the lead for capital programs; including federal funds management and overall project management.

KEY EXPERIENCE

ATCO
2017 – Present
Alberta, Canada

Project Experience: West Fort McMurray 500 kV Transmission Line — Alberta PowerLine

- Serves on the project management team and project executive committee; responsible for project development and project management

ATCO
Completed in 2015
Alberta, Canada

Project Experience: Eastern Alberta Transmission Line (EATL) — Vice President, Transmission

- Provided support to ATCO executive in the EATL's early development and planning (2004 to 2010)

ATCO
2010 – 2013
Alberta, Canada

Project Experience: Hanna Region Transmission Development (HRTD) — Vice President, Project

- Responsible for the $760 million project's overall development & execution, including project management, engineering, procurement, regulatory, right-of-way acquisition, permitting, construction & commissioning

ATCO
2017 – Present
Alberta, Canada

Senior Vice President & General Manager, Transmission & Distribution, Electricity

- Overall responsibility for ATCO transmission and distribution business, including system operations, maintenance, asset and work management, quality management, risk management, project & construction management, engineering, procurement, commercial, finance & accounting, regulatory, health & safety, environment, customer care & billing and metering & meter data management functions
- Serves on the Western Energy Institute and Winnifred Stewart Association boards of directors

ATCO
2015 – 2017
Alberta, Canada

Senior Vice President & General Manager, Transmission, Electricity

- Overall responsibility for ATCO's electricity transmission division, including system operations, maintenance, asset and work management, quality management, risk management, project & construction management, engineering, procurement, commercial, finance & accounting, regulatory, health & safety, environment, customer care & billing and metering & meter data management functions

ATCO
2013 – 2015
Alberta, Canada

Vice President, Competitive Transmission

- Responsible for developing non-regulated transmission and telecommunication projects
- Responsible for overall project development oversight, from project inception through to RFP submission (including commercial and technical aspects)

PAUL GOGUEN, P. ENG., MBA

ATCO
2012 – 2013
Alberta, Canada

Senior Vice President, Transmission Engineering & HRTD Project

- Responsible for engineering and commissioning functions for ATCO's Transmission & Telecommunication Capital Program (> $1 billion in 2012 & 2013), and for all regulatory matters related to the HRTD project ($700 million)

ATCO
2004 – 2010
Alberta, Canada

Vice President, Transmission

- Responsible for the overall operations and maintenance of ATCO's transmission and telecommunication system, as well as transmission planning and land and property functions

ATCO
2000 – 2004
Alberta, Canada

General Manager, Yukon Electrical Company Ltd., Northland Utilities Enterprises Ltd., Northland Utilities (NWT) Ltd., Northland Utilities (Yellowknife) Ltd.

- Responsible for the general management of all functions at ATCO's North of 60 companies, including O&M, capital program, government affairs, Indigenous affairs, corporate communications & regulatory

DESIGNATIONS

Professional Engineer (Alberta)

EDUCATION

Bachelor of Science, Mechanical Engineering, Queen's University
Master of Business Administration, University of Alberta
Ivey Executive Development, Ivey Business School

QUYEN NGUYEN, P. ENG.

ROLE

Nguyen will serve on both the transition and management teams as the lead for capital projects, construction and project execution.

KEY EXPERIENCE

ATCO
2017 – Present
Alberta, Canada

West Fort McMurray 500 kV Transmission Line — Vice President, Alberta PowerLine

- Responsible for the engineering, construction, procurement project control and overall execution of the $1.6 billion project

ATCO
2015 – 2016
Alberta, Canada

Site C Worker Accommodation — Vice President, Project

- Responsible for the engineering, construction, procurement, project control and overall execution of the $580 million 1,800-person lodge; Quyen's vast experience and record of delivering projects on schedule and on budget were key to meeting the projects very compressed schedule

ATCO
2013 – 2015
Alberta, Canada

Eastern Alberta Transmission Line (EATL) — Vice President, Project

- Responsible for the engineering, construction, procurement, project control and overall execution of the $1.8 billion, 500 kV EATL project

ATCO
2010 – 2013
Alberta, Canada

Hanna Region Transmission Development — Director (2012 – 2013), Senior Project & Engineering Manager (2010 – 2012)

- Director responsible for project management, engineering management, procurement, project control and execution of the $800 million HRTD project. Project included detailed site identification and routing, survey, environmental assessment, construction, operating and maintaining all associated transmission facilities. Approved the project controls, communications, environmental, quality and H&S plans developed for the project, and supervised implementation and execution
- Senior project & engineering manager responsible for project and engineering management

ATCO
2008 – 2010
Alberta, Canada

Vice Lead Transmission Design Engineer

- Lead designer for substations, transmission line and the telecom facility design team

ATCO
2003 – 2008
Alberta, Canada

Lead Engineer

- Supervised the Protection & Control group, including planning and designing all substations

ATCO
1997 – 2003
Alberta, Canada

Senior Maintenance Engineer

- Set maintenance direction for transmission substations, transmission lines and telecom facilities

ATCO
1994 – 1997
Alberta, Canada

Project Manager, Projects & Engineering

- Responsible for setting maintenance direction for transmission substations, transmission lines and telecommunication facilities

QUYEN NGUYEN, P. ENG.

ATCO
1989 – 1994
Alberta, Canada

Electrical Design Engineer

- Responsible for completing design, specification and material procurement for 240/144 kV and 144/25 kV transmission substations
- Engineered analysis and wrote specifications for transmission substation battery banks and battery chargers, and evaluated standard designs for transmission substations

DESIGNATIONS

Professional Engineer (Alberta)

EDUCATION

Bachelor of Science, Electrical Engineering, University of Alberta
Executive Leadership Program, Ivey Business School
Body of Knowledge, Project Management Institute

JESSICA LAIRD

ROLE

Laird will serve on both the transition and management teams as the lead for customer service.

KEY EXPERIENCE

ATCO Energy Ltd.
2017 – Present
Alberta, Canada

Senior Manager, Home & Energy Retail Operations

- Influence and motivate teams within the business unit and across the larger ATCO organization to develop and execute the ATCO Retail vision through strategies and operating principles
- Engage staff in developing action plans to enhance communication across divisions, strategically solve problems, and promote collaboration to deliver exceptional customer experiences
- Provide guidance to internal and external teams on policies, processes, and procedures to ensure the optimal use of resources and customer experience delivery
- Review market research and customer research to anticipate business and customer opportunities
- Negotiate mutually beneficial vendor agreements for products and services
- Use problem solving and conflict management skills to govern and manage service agreements with IT, retail product, and service vendors
- Responsible for developing the customer experience strategy by evaluating customer feedback and implementing process changes to improve customer satisfaction as well as customer experience metrics, including CSAT, surveys, insights, and quality assurance programs
- Develop and manage a budget of >$15M
- Ensure compliance with industry regulatory requirements
- Develop, launch, and operate new ATCO Retail business

ATCO Energy Ltd.
2015 – 2017
Alberta, Canada

Manager, Customer Care & Billing

- Played a key role in the development and launch of ATCO Energy Ltd
- Developed and executed the RFP process for hiring a third-party call center and billing provider
- Managed the project to set up the ATCO Energy billing system
- Managed the project to develop and document all customer care policies, processes, procedures, and training modules
- Developed the quality program for both agent onboarding and agent service delivery
- Responsible for managing call center service levels, service quality, and reporting
- Responsible for gathering call center intelligence and working with marketing and sales to develop and improve sales strategies based on voice of the customer data
- Worked effectively with the commercial & industrial sales team on lead development
- Participated in the development of marketing and sales strategies.
- Responsible for ensuring compliance with industry regulatory requirements, representing ATCO Energy at industry meetings, and liaising with regulatory bodies

JESSICA LAIRD

ATCO Electric
2010 – 2015
Alberta, Canada

Manager, Customer Care & Billing Governance

- Responsible for managing a $10M+ contract with third party service provider
- Worked with service provider to implement customer experience improvements:
    - Decreased number of customer calls >10 minutes in length by 7%
    - Decreased customer dissatisfaction by 5% through implementing customer concierge service
- Worked with service provider to determine best cost business solutions to meet organizational requirements and maintain compliance with regulatory requirements
- Developed bi-weekly dashboard reporting as a value-added service to monitor service quality
- Reviewed and analyzed customer satisfaction survey results and implemented process improvements based on results
- Developed customer experience team to include customer service employees from across the organization
- Initiated and led several LEAN process improvement projects
- Represented ATCO Electric at industry meetings with the Alberta Utilities Commission
- Represented ATCO Electric on the Canadian Electricity Associations Customer Committee
- Responded to intervenor requests on regulatory proceedings
- Developed and implemented policies, processes, and procedures

ATCO I-Tek
2008 – 2010
Alberta, Canada

Manager, Process Quality, ATCO I-Tek

- Responsible for managing a department consisting of four workgroups and 45 staff members (User Acceptance Testing, Customer Care Solutions, Charge & Statement Check, Rate Administration)
- Identified, supported and grew internal resources to meet current and future business needs:
    - Implemented industry standard training and developed scenario database to increase efficiency of User Acceptance Testing team.
    - Implemented cross training and inter-departmental communication to support company succession plan and decrease work duplication.
    - Introduced ITIL processes to department and division as an industry standard model of process and quality assurance.
- Provided superior leadership, mentorship and direction to a variety of workgroups, enabling the implementation of strategies, tools, processes, solutions, and training to support the delivery of high quality service
- Responsible for the managements of testing of all system changes and production issues for in house billing system and its interfaces
- Responsible for the management of the end to end issue resolution for operations:
    - Developed process for issue ownership and follow up decreasing the number of unresolved issues.
- Developed strategy for issue prioritization and resource management

JESSICA LAIRD

EDUCATION

Bachelor of Commerce, Organizational Analysis & Marketing, University of Alberta

Strategic Leadership Development, Ivey Business School

Developing Customer Experience Metrics – Forrester Research