PORTFOLIO

PowerGrid
ENGINEERING LLC

Engineering Solutions Done Right

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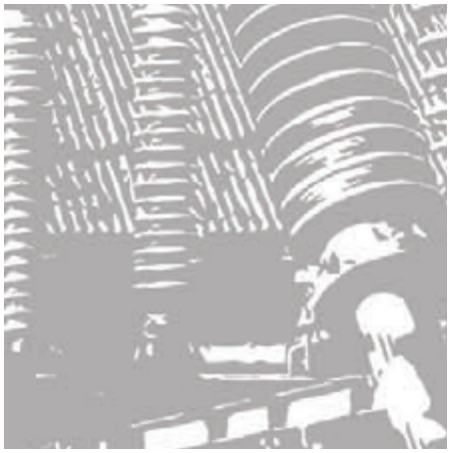


Welcome to Power Grid Engineering

This portfolio provides information to current and potential clients about the services offered by Power Grid Engineering. In the following pages, you will explore our history, mission and corporate values, as well as the details of our most recent and relevant project experience.

The principals of Power Grid Engineering are particularly proud of our team as well as the relationships and partnerships we have worked to establish and maintain since our founding in 2007.

As we grow into the next decade, Power Grid Engineering leadership continues to seek new clients and colleagues with whom we can establish a strong working relationship for continued mutual success.

COMPANY PROFILE

Offices in Orlando, FL, Birmingham, AL, Wichita, KS and Raleigh, NC

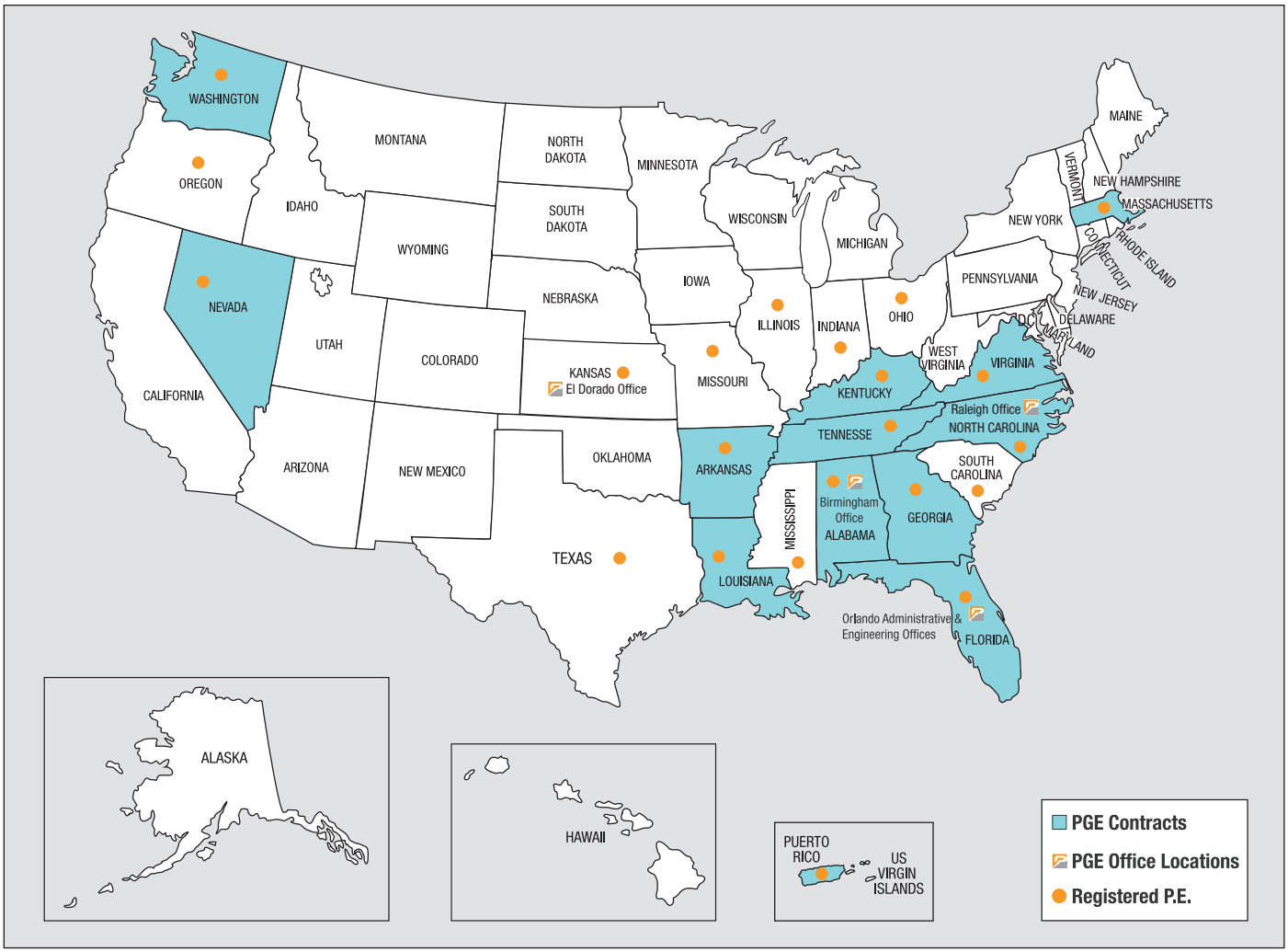
Power Grid Engineering, LLC (PGE) specializes in engineering design and consulting for the power systems industry. Our corporate headquarters, located in Central Florida and our offices in Birmingham, Alabama, Wichita, Kansas and Raleigh, North Carolina are all equipped with the most current computer technologies, software, equipment and resources available in the industry.

The founders of *PGE* are dedicated to providing the highest quality services and product design to our clientele. The members of our corporate leadership team provide our clients with experience and qualifications earned over decades of providing utility-grade engineering services to some of the largest investor-owned utility companies in the U.S. Safety is our highest priority. We recognize that it's the highest priority for our clients and thus, we do nothing short of leading by example. It's reflected in everything we do.

PGE is proud to have developed in-house project teams comprised of highly-qualified technical engineers and operational professionals, with exceptional Quality Assurance (QA) / Quality Control (QC) processes assuring our clients superior levels of service and excellence.

As part of our commitment to ensure quality assurance, we have developed unique QA/QC processes dedicated to each service line. Out multi-step, peer-review approach ensures clients' needs and expectations are met according to their organizations standards and specifications.

From inception, our team has banded together with our clients and partners to exceed all expectations – whether related to service, quality or revenue generation – *PGE* has enjoyed healthy and consistent growth despite turbulent economic conditions. We are honored to work with various utility companies, across the country and abroad, from small industrial entities to Fortune 250 investor-owned utility companies.



Power Grid Engineering, LLC (PGE) is an electrical engineering firm headquartered in Central Florida, servicing investor owned utilities throughout the United States and Puerto Rico. Founded in 2007, *PGE* has experienced tremendous growth. Now with four offices located in Florida, Alabama, Kansas and North Carolina, *PGE* remains committed to consistently providing high quality services to all our clients.

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QUALITY ASSURANCE PROGRAM

Our stringent QA process enables us to consistently provide the highest quality design for our clients within established deadlines

Proactive Client Communication
As a *PGE* client, you can expect open and regular communication with your *PGE* team throughout the project. We believe it is our responsibility to keep our clients informed in a **proactive** manner in order to address challenges and to **increase efficiency**; thereby creating a **seamless project design experience**. To that end, we ensure a member of our team is accessible to you when you need us – by phone, email, or in person (on or off site) – throughout the duration of your project.

Throughout the electric/utility industry, a need has been identified to address the lack of adherence to Quality Assurance practices. These practices mitigate common errors frequently encountered in engineering design and commissioning of utility infrastructure.

PGE is an industry leader in quality assurance and considers it the key to our client's satisfaction and success. Since PGE's inception, we have worked to foster a culture rooted in quality. We have developed, tested and continue to improve our Quality Assurance practices by engaging our most valuable resources, our staff. Our pro-active approach to quality and consistent approach to design has proven successful in mitigating errors at every level of engineering.

The Power Grid Way

On-Boarding
Understanding that every organization is different, not to mention regional differences that may exists within an organization, we strive to minimize the learning curve in an effort to mitigate errors from the start of the client/ consultant relationship.

Our QA/QC process starts at the client's on-boarding. During this time, PGE gathers information regarding our client's engineering philosophy, engineering standards, , operations, graphics and print standards, so deliverables, seamlessly align with the client's internal engineering department.

Additionally, at the project level, we ensure that project necessities and other stated codes and regulatory requirements applicable to the project's scope of work are reviewed and clearly defined, prior to beginning the design package.

Three-Phase Design Process
Following on-boarding, the client's work advances though a three-phase review and approval process.

Phase One identifies the engineering details, deliverables, and outlines the project plan and schedule. Preliminary engineering is completed, deliverables are quality control checked and peer-checked using our Phase One checklist; revisions are made and then submitted to the client for review and approval.

Phase Two creates the detailed deliverables according to the project plan. Again, deliverables are quality control checked, and peer-checked using a second checklist specific to this phase; revisions are completed and then turned over to the client for review and approval.

Phase Three finalizes all deliverables to be issued to the client. The final phase undergoes a rigorous comprehensive quality control check of all deliverables. Corrections are completed and then a peer-review is performed. Any findings from the peer check are reviewed and incorporated into the deliverables. Only then are deliverables submitted to the client.

PGE's multi-step process ensures our clients' needs and expectations are met according to their specifications. Our multi-phase QA/QC process allows us to consistently provide superior service within established deadlines and budgets.

PGE is committed to providing both our clients and employees with a safe and secure work environment. Safety training saves lives and helps reduce the severity of injury associated with accidents. As such, *PGE* is committed to providing our employees with resources and training programs that reduce or eliminate personal and economic loss associated with injuries and health hazards.

To ensure safety remains a top priority, *PGE* maintains a stringent safety program consisting of monthly safety training meetings and oversight provided by *PGE*'s Chief Safety Officer.

Safety Training

Upon on-boarding, all *PGE* employees complete the standardized OSHA safety training (including the T & D Baseline and Substation specific courses) through PowerSafe*.

Each year following, field personnel are required to complete an eight hour safety training course, and office personnel must complete a four hour course. Should a client require additional safety standards be met for an engineer or technician working on their project, *PGE* will ensure they receive the additional training.

Safety Meetings

Each month, *PGE* holds a safety meeting which all employees are required to attend. Safety meetings are approximately 30 minutes long and employees must complete 12 safety meetings per year. In the event that an employee cannot attend a safety meeting they will be required to attend a make-up safety meeting.

"Safety around the clock" is an important company core value and as such meeting attendance is part of each employee's annual goals. Non-attendance will affect an employee's annual evaluation.

Chief Safety Officer (CSO) Oversight

All safety records must be documented and reported to the CSO who will ensure each employee meets *PGE*'s minimum safety training requirements.

The CSO conducts regular on-site safety observations and ensures proper adherence to procedures.

Each year the CSO evaluates safety objectives and creates an annual safety improvement plan based on safety observations.

Additionally, the CSO conducts on-going training and competency checks with all employees and addresses individual specific safety concerns. Based on an individual's evaluation, the CSO may require additional safety training for any employee found to be in violation of *PGE*'s safety standards.

*PowerSafe is administered by the Safety Council LCA (SCLCA), a non-profit member association that has been providing comprehensive educational programs, seminars and training materials to improve safety awareness on the job and in the community for more than 50 years.

PGE maintains rigorous safety guidelines for our employees, and client's protection

OVERVIEW OF KEY SERVICE AREAS

"Engineering Solutions Done Right"

The technical strength of the *PGE* team, coupled with the specific expertise of our strategic partners across the country, enables *PGE* to engineer solutions correctly; the first time.

At any given moment, you can find *PGE* working on projects of all sizes and complexity for a range of clientele, including investor-owned utilities and municipalities, as well as industrial and commercial organizations in the following service areas:

- Relay Protection & Control Engineering
- Field Services (Testing and Commissioning)
- Transmission System Planning & Power System Studies
- Communications Engineering and Substation Automation
- Power Systems Training
- Substation Engineering
- Transmission Services Engineering
- Relay Settings

Relay Protection & Control Engineering

Relay Protection & Control Engineering services have been a primary service line since *PGE*'s inception. Technological advances coupled with stringent regulatory compliance requirements have combined to create an increasingly complex and sensitive landscape.

The *PGE* team understands these complexities and is committed to ensuring each team member is armed with the most up-to-date resources, training and knowledge in topics pertinent to relay engineering.

Power Grid Engineering prides itself on providing and delivering the best engineering solutions possible to meet our clients' Relay Protection & Control needs. *PGE* provides all Relay Protection & Control designs adhering to our client's requirements and makes recommendations based on IEEE standards and manufacturers recommendations.

The *PGE* Relay Protection & Control team focuses on the following key service categories:

Relay Design
- One Line Functional Diagrams
- Relay Control Panel Layout
- Point-to-Point Wiring Diagrams

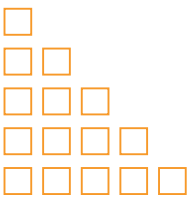
Relay/RTU/Meter Programming
- Meter Settings
- RTU Configuration
- HMI/PLC/SCADA Configuration

Equipment Specification
- Remote/Network Terminal Unit
- Substation Networking
- IED Hardware
- Transformer/Breaker Monitoring

Technology Evaluation & System Analysis
- HMI Configuration
- Substation Automation
- Remote IO Configuration
- Data Concentrator Configuration

Relay Settings
- Fault Studies
- Coordination Studies
- Control Logic
- Communications
- Transmission Line Protection
- Transformer Protection
- Bus Protection
- Generation Protection
- Feeder Protection

We deliver designs adhering to your specifications



RELAY PROTECTION & CONTROL ENGINEERING

PROJECT SAMPLING

230kV Bus Protection Master Template Duke Energy, FL	Designed a company standard for applying protection to the 230kV bus connected to a 500/230kV transformer. Design included Primary-1 and Primary-2 panels and all associated drawings. The result was a standard drawing package that could be used by engineering staff to apply the protective scheme to either new or existing facilities.
Gannon Substation Upgrade Tampa Electric Company, FL	This project involved the addition of a new control house with all new protection and controls for a 138kV, four position ring-bus. The new control house required a RTU, three line protection panels, telecom panel, a new DFR, four breaker panels, and one 230/138kV autotransformer protection panel. The design package included all P&C prints including the one line, panel arrangements bill of materials, AC/DC schematics, wiring diagrams and connection diagrams.
High Speed Communications Upgrade Projects Sumter Electric Cooperative (SECO), FL	Upgraded substation protection and control at four distribution substations with new SEL-351 relays, SEL-3530 RTAC and eliminating the legacy RTU's. *PGE* did the print design, the relay settings and the communications configuration at nine SECO substations.
51st Street Substation Duke Energy, FL	Added new control house, two 230kV lines, new 230/115kV autotransformer, upgraded 115kV protection and control for four lines and upgraded protection for two 115/13kV distribution transformers and 10 feeders.
Ross Prairie Substation Duke Energy, FL	Added transformer paralleling scheme for two 230/69kV autotransformers using Beckwith transformer paralleling controls.
Central Hardon Substation East Kentucky Power Cooperative, KY	Added a new control house and upgraded all protection and control for this 138/69kV substation including two 138kV lines, one 138/69kV autotransformer and two 69kV lines.
Crystal River Plant Duke Energy, FL	Upgraded the 230kV protective primary and secondary line relays for the Central Florida Transmission Line and upgraded the control relays for two 230 kV breakers.
DBOS Substation Modifications Florida Power & Light, FL	Designed a modification to multiple FPL substations to split the bus differential into two zones such that one transformer or bus fault does not trip off the entire substation. This group of projects required a substation specific design package adding a new panel with new differential relays, modified trip and lockout circuits and updated wiring diagrams.
500 kV Breaker Replacement Nelson Substation Entergy, LA	Replaced existing 500kV breaker with a new Mitsubishi 3000A breaker. Associated existing CT column was replaced with new Ritz 3000A unit. Existing 500/230-13.8 kV transformer metering CT circuit was retapped at 2000/5. All protection & control relays remained.
SmartGrid Family of Projects Various Substations Duke Energy, FL	Installed new DSCADA RTU systems, separated transmission and distribution SCADA systems, upgraded telecom infrastructure to support SCADA systems and upgraded protection and control for distribution feeders.

PROJECT SAMPLING (CONTINUED)

Origin Wind Collector Substation **ABB, RES, ENEL**	This project involved adding a wind collector substation to connect a 150MW wind power plant to Oklahoma Gas & Electric's 138kV transmission system. The substation consisted of 2, 138:34.5kV, 85MVA Transformers and 2, 38kV GIS switchgears connected to 6, 38kV collector circuits. PGE was responsible for all the Protection and Control deliverables that included: Protection Single Line Drawings, Communication Architecture, AC Schematics, DC Schematics, Panel Layout, Panel Wiring Diagrams, Field Wiring Diagrams, Cable Schedule, Point to Point list, Short Circuit Modeling, Coordination Study, SCADA I/O list, relay setting files, and SCADA setting files.
Moses Power Dam GSU Replacement Project **ABB, NYPA**	This project involved developing a design impact assessment report to assess and recommend changes to the protection and control scheme as a result of replacing the generator step up transformers. The power dam consisted of 6, 230:13.2kV, 86MVA Transformers and 6, 115:13.2kV 86VMA Transformers. The design impact assessment addressed the condition of the following items: conduits, cables, termination cabinets, and protective devices. The design impact assessment also assessed the difference in transformer design and if the existing protection scheme was adequate to protect the new transformers.
Sheridan Substation **Entergy, AK**	500kV Multistage project that involved a capacity increase of all the limiting elements at the station. The replacements included two 500kV Breakers, three Wave traps, and several line and breaker MOS's. The primary and secondary protection packages for three 500kV lines were also upgraded.
Sorrento Substation **Entergy, LA**	A 138/115kV autotransformer was replaced with a higher capacity autotransformer which included a new bus differential relay. The project included replacement of a 115kV Breaker and the associated MOS's. A new protection and control package was installed for the 138/115kV Transmission line. A new 115kV bus differential was also part of the design.
Entergy, AK	The protection and controls were upgraded on three existing 115kV lines. One new 115kV line was added which included a new breaker and all of the associated protection and controls. The existing bus was reconfigured to include a transfer breaker and new 115kV line. A new bus differential relay package was installed to protect the newly reconfigured bus.
500kV Breaker Fail Master Template **Duke Energy, FL**	Designed a company standard for applying Breaker Failure Scheme to the 500kV breakers arranged in a breaker and a half configuration. Design could be easily modified for alternate station configurations. The result was a standard drawing package that could be used by engineering staff to apply the protective scheme to either new or existing facilities.
New 115kV Reactors **Sudbury Substation** **NSTAR, MA**	Installed two new 115 reactors. Installed two new 115 kV, 3000A gas breakers. Relay protection for the reactors included: Primary 1-SEL 387A, Primary 2-SEL 421, breaker control and breaker failure-SEL 352. Modified existing 115 kV bus differential schemes to include new breakers.

RELAY PROTECTION & CONTROL ENGINEERING

PROJECT SAMPLING (CONTINUED)

500kV Bus Protection Master Template Duke Energy, FL	Designed a company standard for applying protection to the 500kV common bus connected in a breaker and half configuration. Design included Primary-1 and Primary-2 panels and all associated drawings. The result was a standard drawing package that could be used by engineering staff to apply the protective scheme to either new or existing facilities.
500kV Line Protection Master Template Duke Energy, FL	Designed a company standard for applying protection to 500kV bus connected in a breaker and half configuration. Design included a Primary-1, Primary-2 and Primary-3 panels and all associated drawings. The result was a standard drawing package that could be used by engineering staff to apply the protective scheme to either new or existing facilities.
Carver 726 Substation NSTAR, MA	Replaced an existing 345/115kV autotransformer with a higher-capacity autotransformer. Provided relay settings for existing relays that require to be modified.
Medway 446 Substation NSTAR, MA	Replaced two existing 345/115kV autotransformers with two higher-capacity autotransformers. Upgraded transformer and bus differential relays for both autotransformers. Provided relay settings for new relays to be installed.
Central Florida Four Phase Project Duke Energy, FL	Multi-phase project to reconfigure and expand the 500kV yard, relocated 500kV Line, installed four new single phase 500/230kV transformers, replaced three existing single phase 500/230kv transformers with four single phase 500/230kV transformers, and removed failed 500/230kV three phase transformer. Project included reconfiguration and expansion of existing 230kV yard, relocated two 230kV lines, and upgraded four existing 230kV breakers. Project also included reconfiguration and expansion of the existing and 69kV yard, replaced one 230/69kV autotransformer, added a 69kV line, and replaced seven 69kV breakers. All protection and control associated with the 500kV and 230kV yards was relocated to the new control house. Legacy RTU was upgraded to service existing electromechanical protection and control associated with the 69kV yard. Managed related drawings to incorporate numerous scope changes that occurred during the design phases.

PGE's Field Services delivers essential technical and equipment knowledge to keep our client's electrical systems performing to their unique specifications and requirements. Additionally, *PGE*'s test engineers are trained to safely operate either Omicron or Doble test sets and are capable of utilizing Pro-Test or RTS software to conduct comprehensive testing. *PGE* conducts all study analysis and provides results based on applicable NERC MOD and TPL standards.

Our Field Test Engineers are equipped to perform the following services:

- Relay Testing & Commissioning
- Substation Construction
- Construction Management
- Relay & Meter Calibrations
- AC/DC Hi-Potential Testing
- Power Circuit Breaker & Disconnect Switches Testing
- Transformer & Ground Testing
- Control System Acceptance Testing
- Instrument Transformers & Medium Voltage Switchgear Testing
- Satellite Testing of Line End-to-End Line Relay Schemes
- Primary & Secondary Injections Verifying Current & Potential Circuitry

PGE's test engineers are trained to safely operate either Omicron or Doble test sets

PROJECT SAMPLING

Relay Tech Services/Staff Augmentation	*PGE* supplies utilities with several full time relay technician staff to supplement its own staff of relay techs and test engineers to perform maintenance, construction, troubleshooting and emergency operations.
Florida City Redundancy Project Florida Power & Light (FPL), FL	This project involved working with a substation construction contractor to install new conduit, control cables and panels to add redundant protection to one 230/138kV autotransformer. *PGE* provided the construction management and team of test engineers to perform the panel replacement of the existing autotransformer protection panel with one that provided redundant protection. This project involved three weeks of preparation time followed by a four day outage.
Battery Monitoring Installations Florida Power & Light (FPL), FL	Installed battery monitoring systems at approximately 190 FPL substations over an eight week period in support of the Smart Grid Initiative.
Sanford Plant Autotransformer Protection Upgrade Florida Power & Light (FPL), FL	Upgraded protection panels for two 230/138kV autotransformers at FPL's Sanford Power Plant.

PROJECT SAMPLING (CONTINUED)

Generator Protection Upgrade RRI Energy, FL	This project replaced primary generator protection of three combustion turbine generators with an SEL-300G.
Substation 5 Troubleshooting University of Florida (UF), FL	*PGE* assisted in troubleshooting a misoperation of a sudden pressure relay that operated during switching. *PGE* developed a series of tests and was able to duplicate the event and confirm the root cause (incorrectly applied ground) by research with the manufacturer of the sudden pressure device.
End-to-End Line Testing Seminole Electric Cooperative, FL	*PGE* field engineers performed end-to-end line testing on three Seminole 230kV transmission lines using Doble F6150 with Satellite Synchronization. *PGE* used the ASPEN file to create specific line fault simulations and performed the tests on POTT and DCB end-to-end schemes.
Malabar Redundancy Project Florida Power & Light (FPL), FL	Constructed, tested and commissioned FERC mandated redundancy project to add redundant system to four 138kV lines, three 230/138kV autotransformers, two 138kV busses and two 230kV busses. As prime contractor, *PGE* worked with a substation construction contractor to install 8,000 feet of conduit, 20,000 feet of control cable, added six dual core over CT's, replaced 18 CCVT, added a second DC system (battery bank, battery charger, DC load center), added a new DFR and replaced nine control panels. *PGE* provided the construction management and the team of test engineers to oversee this project successfully over a 14 week period. The approach used was to complete as much preparation work prior to taking the outages. *PGE* worked with the client to schedule six major outages to replace the existing protection panels with new panels that have primary and secondary protection systems.
Collier Redundancy Project Florida Power & Light (FPL), FL	Constructed, tested and commissioned FERC mandated redundancy project to add redundant system to four 115kV lines, two 230/115kV autotransformers, two 115kV busses and two 230kV busses. As the prime contractor, *PGE* worked with a substation construction contractor and installed new conduit and control cables for all new secondary systems, added six dual core slip over CT's to an autotransformer, added six CCVTs, replaced three line tuning units, added a second DC system (battery bank, battery charger, DC load center), added a new DFR and replaced nine control panels. *PGE* provided the construction management and the team of test engineers to oversee this project successfully over a 16 week period in the energized substation. The client provided the engineering prints and *PGE* developed the construction plan for implementation.

PGE has utility experience with planning, operating, and maintaining the bulk electrical system and is proud to offer Transmission Planning Services. We offer a variety of studies to assist utilities in compliance with applicable NERC, Regional Reliability, industry and client standards. Our engineers have extensive experience in the generator interconnection process and offer third-party evaluation for utilities and generation developers.

Short & Long Term Power System Studies

- Contingency Analysis
- Reliability Analysis
- Economic Analysis
- Thermal/Voltage Analysis
- P-V Analysis
- Short Circuit Analysis
- Transmission Service Request
- Maintenance Outage Evaluations

Generation Interconnection Evaluation

- Feasibility Studies
- System Impact Studies
- Renewable Generation Integration

Interface Evaluation

- Total Transfer Capability (TTC) Analysis

Technology Evaluation & System Analysis

- PSS/E
- PSS/E MUST
- Power World
- CAPE

PGE offers a variety of studies to properly evaluate risk, reliability and stability concerns

PROJECT SAMPLING

Generator Interconnection Studies Duke – FL, Southern Company	Studies included a review of the steady state (thermal and voltage), stability and short circuit impacts of numerous proposed generating units applying for interconnection agreements through the Large Generator Interconnection Procedures (FERC ORDER 2003 LGIP). Network upgrades were identified as applicable to remain in compliance with applicable NERC, Regional Reliability and transmission provider planning standards.
RRO Study Group Representation (SERC) Dominion Virginia Power	Represented the client's interests on the SERC Near Term Study Group (NTSG) and the Eastern Interconnection Reliability Assessment Group (ERAG) by participating in coordinated study efforts for regional and inter-regional reliability assessments. This assessment involved performing voltage, thermal and transfer analysis to assess the amount about that could be transfer among the SERC participants.
Transient Stability Review Southern Company, Brookfield Renewable	Review of the transient stability of numerous nuclear, coal, combined cycle, combustion turbine and hydro units to demonstrate compliance with NERC TPL, MOD, FAC and PRC standards. Study also provided operational guidance for equipment and relay outages. Mitigation strategies included limiting maximum MW output of units and temporary relay settings. Technical guidance was also provided for potential closing angle issues.
Generator Interconnection Representation Pioneer Green	Represented and provided independent review of Feasibility, System Impact and Facilities Study results (thermal, voltage, short circuit, stability and required network upgrades) for generation developers' Generator Interconnection Requests.

TRANSMISSION SYSTEMS PLANNING & POWER SYSTEM STUDIES

PROJECT SAMPLING (CONTINUED)

Transmission Expansion Planning **Southern Company**	Project consisted of performing short and long-term transmission planning studies and economic analysis in order to recommend the most cost effective transmission capital additions while ensuring compliance with applicable NERC Reliability Standards. These studies also included periodic coordinating results and facilitating approval of necessary Transmission Capital additions among joint transmission owners within the State of Georgia.
Total Transfer Capability Determination **Southern Company**	Performed daily and monthly analysis to determine reliable Total Transfer Capability (TTC) levels for several ATC Paths. During the evaluation, it was also necessary to consider the simultaneous interaction among several paths. In addition, certain paths were required to be coordinated among entities of adjacent regions.
Fault Induced Delayed Voltage Recovery (FIDVR) **Georgia Integrated Transmission System**	Review of the North Georgia metropolitan area for susceptibility to Fault Induced Delayed Voltage Recovery for NERC Category C and D events. Study proposed different mitigation strategies including relay settings changes, addition of redundant relaying, installation of independent-pole operated (IPO) breakers, and under voltage load shedding (UVLS) schemes to comply with applicable NERC TPL and PRC standards. This study also addressed the operational time frame and provided short term mitigation strategies including temporary relay settings requirements and generation dispatch for all feasible system load levels and system configurations until the long term projects could be implemented.
Out-of-Step Protection for Hydro Units **Southern Company**	Study consisted of a review of the transient stability of several hydro units to provide settings for out-of-step protection for the units. The study provided the impedance trajectory expected during an un-stable swing as well as a stable swing. Relay settings were provided for a distance relay that would trip for unstable swings and not trip for stable swings.
Generation and Transmission Outage Evaluation **Southern Company**	Assessed the system impacts of accommodating transmission and generation maintenance outage requests. Provided and coordinated alternate outages dates and times if necessary.

The industry is increasingly dependent on protection-class communications networks to support mission-critical processes while maintaining compliance with applicable standards. Utility operational and business needs are driving the implementation of dependable, secure and cost-effective communications networks in the harsh substation environment. While older telecom services included POTS (Plain Old Telephone Service) and SCADA (Supervisory Control and Data Acquisition), it is not uncommon today, to find Time Domain Multiplexed or Ethernet backhaul networks at the substation. These networks support corporate business network access, remote IED (Intelligent Electronic Device) access, broadband backhaul connections for field-installed Smart Grid devices, revenue metering, relay protection, distribution automation, Synchrophasors and other emerging applications.

With deep and practical utility experience in designing fiber networks and helping to "bridge the gap" between relay protection, SCADA, substation, transmission and distribution line engineering and Telecom-IT teams, PGE has the experience and qualifications to solve communication challenges.

PGE is ready to assist in all phases of communication systems support, including:

- Outside Plant Fiber Design (Overhead & Underground)
- Inside Plant Fiber Design
- Multiplexed Network Design
- Ethernet Network Design
- Communications Facilities
- AC/DC Plant Design
- Standby Generation & Alternate Power Source Design
- Telecommunications Class Grounding & Bonding Design
- Telecommunications Class Structures Specification Development
- Fall-of-Potential Studies
- Power Line Carrier Studies

Through our teaming partners, *PGE* can also provide:

- RF Testing, Design & Installation
- Fiber Construction
- Network Installation & Commissioning Services

PGE has the experience and qualifications to solve your communications challenges

COMMUNICATIONS ENGINEERING

PROJECT SAMPLING

Wind Farm Multiplexed & Ethernet Networks ME	Designed and implemented OC-48 fiber optic network to integrate wind farm collector substations in a utility's OC-48 optical network. Services provisioned included SCADA, Mirrored Bits protective relaying, Direct Transfer Trip relaying, POTS, Ethernet, RS-232 based metering and RS-232 based remote IED access.
Investor Owned Utility Outside Plant Fiber Experience FL	Developed OSP fiber standards including cable design, pole attachment hardware, splice cases, underground handholes and pull boxes facilities location attachment points. Designed substation and data center cable routes including documenting routes along transmission easements, plan and profile updates, optimizing location of fiber splice boxes, designing and documenting fiber entrance cables. Provided construction and project management. Worked with ESRI geolocation software to document fiber routes and related asset locations. Approximate network size: 1200 fiber miles, eight rings.
Investor Owned Utility Outside Plant Fiber Experience NY	Developed strategic plans for migrating legacy point-to-point copper pilot wire and communications network to ring based, optical communications network topology. System size 48 locations including substations, operations centers and four interconnected rings.
Investor Owned Utility Inside Plant Fiber Experience FL, NY	Developed standards for fiber termination panels and standardized rack design for optical network equipment. Modified existing site documents (control house floor plans, telecom room floor plans and facilities documents) to record specific location of fiber entrance cables, wall-and-rack mounted fiber termination panels and fiber network equipment.
Investor Owned Utility Multiplexed & Ethernet Networks FL	Recommended specific vendor equipment to support substation and operations center network needs. Developed strategic bandwidth allocation for the following services: Protective Relaying, SCADA, POTS, Ethernet, Remote Access and Metering. Bandwidth ranged from optical DS-1 through OC-48. Familiar with GE JungleMUX SEL ICON, SEL Managed Switch, RuggedCOM Switch, RFL IMUX and Pulsar Focus 2000. Network size: 1200 fiber miles, eight interconnected rings.
Industrial Facility Multiplexed & Ethernet Networks Saudi Arabia	Developed OC-48 based Ethernet network to support the implementation of IEC-61850 automation for an industrial complex involving 12 substations, a data center and the SCADA Master site.
Investor Owned Utility Communication Facilities & Miscellaneous NY, FL	Performed power line carrier calculations and frequency coordination studies and provided recommendations to ensure proper power line carrier performance. Specific projects included splitting bulk transmission lines (230kV) to insert collector substations for wind farms and other transmission work and reallocating frequencies, performing calculations to ensure avoidance of creating null points and interference with neighboring power line carrier circuits. Completed reports and filled out forms for the Utility Telecom Council which has oversight for overall power line carrier and microwave frequency coordination in the USA.
Investor Owned Utility Communication Facilities & Miscellaneous NY, FL, ME	Coordinated the format, protocol and data rates of relay, meter and SCADA circuits between IEDs and the communication networks that carry the circuits from point to point. This included RS-232 for SEL's Mirrored Bits, DNP and Modbus for SCADA, four wire analog data, DS-1, CSU/DSU applications, metering, telephony (POTS and VoIP), RS-485, IRIG-B and others.

PGE has extensive experience developing, designing and commissioning complex types of substation projects for the utilities industry. Our team successfully completed numerous projects for a multitude of clients, addressing complex issues related to Substation Engineering from concept and feasibility, to civil, physical/structural and electrical design.

PGE has a unique set of internal resources and experience that is ideally suited to meet all of your project needs. With our hands-on experience as owners, operators and consultants, the knowledge we bring to execute efficient design and construction management of energy facilities, will enhance your project team's capabilities. We pride ourselves on our ability to complete projects safely, expeditiously, and efficiently.

Electrical Engineering

- Substation and Switchyard
- Electrical System Studies
- Station Configuration Layouts
- Ground Grid Design
- Lightning Shielding
- Equipment & Construction Specifications

Project Management

- Project & Construction Management
- Field Inspections & QA/QC
- Subcontract Administration
- Scheduling & Progress Reporting
- Safety Coordination
- Bid Solicitation & Evaluation

Civil Engineering

- Land Planning/Development Support
- Drainage & Flood Studies
- Roadway Design
- Permitting

Structural Engineering

- Structural Design (Steel, Reinforced Concrete, Wood)
- Geotechnical Reviews
- Foundations
- Floors & Roofs
- Investigations & Evaluations
- Supports & Lifts
- Code Analysis

We pride ourselves on our ability to complete projects safely, expeditiously, and efficiently

SUBSTATION ENGINEERING

PROJECT SAMPLING

Central Florida 500/230/69 kV Substation Duke Energy Florida, FL	This multi-year, multi-phase project added two new 4-bank 500/230 kV single phase transformers (three transformers and a spare) and replaced one 230/69 kV three phase transformer. The design included expanding the breaker and a half scheme for both the 500 kV and the 230 kV, adding four new 500 kV breakers, several new 230 kV breakers and the change out of nearly a dozen 69 kV breakers and associated switches. Site expansion required new local and FDEP permitting. A new SWPPP and updated SPCC plan were also required.
New Substations Duke Energy Florida, FL	Designed more than a dozen green field 69/13 kV distribution substations in less than six years following utility standard design practices. Civil design included local, FDEP and FDOT permitting as necessary.
230 kV Expansion Reliant Energy, TX	Added 230 kV line terminal for an inter-connect with a local utility generator. Required coordination and interface and necessity to follow local utility company requirements.
230/69 kV Expansion Duke Energy Florida, FL	Designed a unique expansion of a built out 230/115/69/13 kV substation facility. The existing 230 kV six position ring was connected via transmission lines to an adjacent property to allow for the installation of an additional 230/69 kV transformer and a future two bay 230 kV breaker and a half and three bay 115 kV breaker and a half.
115 kV Upgrade Westar Energy, KS	Replaced three existing 115 kV, 1200 amp OCBs with 2000 amp SF6 breakers. Project also included the replacement of eight existing GOAB switches with new 2000 amp switches to facilitate ampacity upgrade requirements.
Standard Documentation Westar Energy, KS	Created a Substation Construction Manual that documented the typical standard design and arrangements for the typical 138/13 kV distribution substation. The book was expanded to include standard 230 kV and 345 kV structures.
Capacitor Bank Design Various utility companies	Designed capacitor bank installations including 34.5, 69, 115, and 230 kV voltages ranging from less than 6 MVARs through 110 MVARs, each including back to back switching. Capacitor banks included grounded and ungrounded banks; fused, fuseless and internally fused design; and switched with various methods to match and/or meet utility standards.

PGE provides customized course curriculum to meet your company's and employees' needs

PGE offers several extensive week-long Relay Philosophies training courses which are approved by the Florida Board of Professional Engineers for PDH/CEU credits.

Courses have been specifically developed for engineers, engineering technicians and field relay technicians, and aim to provide attendees with a strong basis of knowledge in relay protection philosophy and design theory.

In addition to the Relay Philosophies training series, *PGE* is equipped to provide a more individualized program of courses specifically developed to meet the training and professional development needs of our clientele.

PGE's comprehensive training programs cover the following topics:

Power Systems 101: Relay Philosophies I

- Substation Layouts & Protection Zone Diagrams
- Functional Diagram Exercise
- Current Transformers
- Breaker Control
- Differentials
- Transformer Protection
- Line Protection
- Breaker Failure

Power Systems 102: Relay Philosophies II

- Generator Theory
- Generator Protection
- Capacitor Banks
- Reactor Banks
- Underfrequency
- DC Systems
- Distribution Protection
- Electric Utility Communication Systems
- Power Line Carrier
- SCADA Systems

POWER SYSTEMS TRAINING

SEMINAR SAMPLING

Protection & Control Philosophies 2007-Present –32 hour course	This week-long course is designed for P&C Engineers and Relay Technicians. This class covers the "big picture" elements of protection and control.
Jacksonville Electric Authority 2011-Present – 32 hour course	Each year, PGE conducts the Relay Philosophies I course, on-site, for JEA's field and relay technicians.
Seminole Electric Co-op Line Protection Fundamentals & SECI Line 11 Explanation – Six hour course	*PGE* taught a custom class for Seminole Electric based upon the Line Protection Philosophies Class. *PGE* reviewed the P&C prints and settings provided by the client to teach a custom class on how the line protection on three line segments work.
East Kentucky Co-op Line Protection Fundamentals, Satellite End-to-End Testing – Eight hour course	*PGE* taught East Kentucky Power Co-op the Line Protection Philosophies class and custom developed an End-to-End Testing class focused on why Satellite-based End-to-End testing is needed and how it works.
Distribution Protection & Control University of Florida – Four hour course	*PGE* taught a custom class to the field staff at the University of Florida focused on their specific methods of distribution protection and control. This class covered overcurrent curves, overcurrent coordination, hot line tagging procedures, automatic reclosing, cold load pickup and ABB DPU 2000R push button control options.
Progress Energy 2003-2006 Protection & Control Philosophies – 40 hour course	Taught by Michael J. Wright, PE, this week-long course was designed for P&C Engineers and Relay Technicians. This class covered the "big picture" elements of protection and control.

REPRESENTATIVE LIST OF CLIENTS

ABB Inc.
Electrical Engineering
Protection & Control Engineering
North Carolina

Beckwith Electric, Inc.
BSE
Florida

City of Leesburg
Engineering Department
Florida

Dominion Virginia Power
Transmission Planning
Virginia

Duke Energy
Protection and Control Engineering
Relay Construction Maintenance
Smart Grid
Transmission & Distribution Services
Florida

Power Delivery Engineering
Relay Construction & Maintenance
North Carolina

East Kentucky Power Cooperative
Engineering Department
Kentucky

Entergy Services, Inc.
Entergy Transmission
Louisiana

Florida Power & Light
Construction Maintenance
Florida

Gainesville Regional Utilities
Engineering Department
Florida

Georgia Power Company
Relay Construction & Maintenance
Georgia

NSTAR
System Control & Protection
Massachusetts

NV Energy
System Protection
Nevada

SECO Energy
Engineering Department
Florida

Tampa Electric Company
Engineering Department
Florida

University of Florida
Physical Plant Division
Florida

TESTIMONIALS & REFERENCES

David D'Amico, PE
Field Operations Supervisor
Georgia Power Company
Georgia

Thomas Branch
Systems Project Engineer
Beckwith Electric Co, Inc.
Florida

Collier Jones
Project Manager
Progress Energy
Florida

Kenny Rodrigue, PE
Manager of Substation & Transmission
Sumter Electric Cooperative, Inc
Florida

Jorge Pardo, PE
Standards Engineer
Progress Energy
Florida

Richard Otte, PE
System Protection Engineer
East Kentucky Power Cooperative
Kentucky

Ridiberto R. Perez, PE
Substation/P&C Construction Leader
Florida Power & Light Company
Florida

George Moscos
Systems Control & Protection
Engineering Manager
NSTAR Electric Gas
Massachusetts

Paason Rojanatavorn
Protection & Control Engineer
ABB Inc.
North Carolina

Eliminate the text right above this stickie ("Combine the six…")

KEY PERSONNEL

Name and Designation	Years of Experience	Education	Areas of Expertise
Michael J. Wright, PE *Co-Founder* *President*	15+	**University of Florida** BS in Electrical Engineering **Rollins College** MBA	Relay Protection & Control Design Settings Design Technical Process Development Power Systems Training

- Holds Professional Engineering Licenses in Alabama, Arkansas, Florida, Georgia, Illinois, Indiana, Kansas, Kentucky, Louisiana, Massachusetts, Missouri, Nevada, North Carolina, Ohio, Oregon, South Carolina, and Texas.
- Serves on Education Advisory Board at University of Florida and Valencia College
- Served as an adjunct professor at Valencia Community College teaching Fundamentals of A.C./D.C. Circuits
- Worked as a Lead Engineer for Progress Energy Florida from 1998-2007

William "Glenn" Durie, PE *Co-Founder* *Vice President* *Engineering*	12+	**University of Florida** BS in Electrical Engineering With specialization in Power Engineering	Relay Protection & Control Design Electrical Substation Design Quality Control Process Development Employee Training

- Holds Professional Engineering Licenses in Florida and Mississippi
- Active Member of IEEE Power Society since 2008
- Completed Progress Energy Florida's Peer Leadership Program, a program designed to enhance leadership effectiveness skills
- Worked at Progress Energy as an Electrical Engineer in Transmission Protection and Control and Substation Apparatus Design from 2001-2007

Andre Uribe *Co-Founder* *Vice President* *Business Development*	10+	**University of Central Florida** BS in Electrical Engineering	Relay Protection & Control Design Technical Process Development Business Development

- Member of IEEE Power Society and Chair of Power Systems Relaying Committee (PSRC) Working Group 12
- Worked at Progress Energy Florida as an Electrical Engineer in Transmission Relay from 2004-2007
- U.S. Small Business Administration North Florida Office 2013 Small Business Person of the Year
- Served in the United States Navy as an Interior Communication Technician from 1991-1996

J. Dale Oliver, PE *Vice President* *Operations*	30+	**Georgia Institute of Technology** BS in Electrical Engineering **Georgia State University** MBA	Transmission Operations & Maintenance System Operations Relay Protection & Control Regulatory Affairs NERC Compliance

- Holds Professional Engineering Licenses in Florida, Georgia and North Carolina
- 30+ years of electric utility experience (Georgia Power and Progress Energy)
- Served in several executive roles at Progress Energy, responsible for Region Operations and Transmission Operations and Planning
- Participated in numerous industry groups, such as IEEE, EEI, Transmission Forum, SEE and AEIC
- Testified before the Florida Public Service Commission in rate proceedings and cost recovery hearings

Name and Designation	Years of Experience	Education	Areas of Expertise
Jose Rodriguez *Director* *Engineering* *Florida*	10+	**University of Puerto Rico** BS in Electrical Engineering **Polytechnic University of Puerto Rico-Orlando Campus** MS in Engineering Management	Relay Protection & Control Design Electrical Substation Design Technical Process Development Quality Control Process Development Power Systems Training

- Active member of IEEE Power and Energy Society since 1999
- Member of IEEE Power Systems Relay Committee (PSRC) Working Group 12
- Adjunct Professor at Polytechnic University-Orlando Campus instructing Power Engineering courses
- Extensive Protection & Control, Relay-Testing & Commissioning, Transmission Maintenance & Operations and Systems Reliability Management experience

Edward "Eddie" Powell *Director* *Engineering* *Alabama*	10+	**Auburn University** BS in Electrical Engineering	Relay Protection & Control Design Electrical Substation Design Technical Process Development Quality Control Process Development Network Analysis Transmission Planning

- Member of IEEE Power Society
- Coordinate and lead multi-discipline and multi-level solution teams to develop detailed solutions for transmission projects
- Extensive transmission testing, maintenance, planning and operations experience from Southern Company Services (SCS), Georgia Power, Alabama Power and Progress Energy Florida

Charles "Chuck" Haahr, PE *Director* *Engineering* *Kansas*	20	**Kansas State University** BS in Electrical Engineering **Washburn University** MBA	Electrical Substation Design Project Management Design Standards Development Construction Drawing Reviews Ground Grid Design Lightening Shielding Conceptual Layouts

- Holds Professional Engineering Licenses in Florida and Kansas
- Member of IEEE Power Society: Web Master PES Substations Committee; Secretary for Working Groups D3 and E1; Technical Editor for Working Group D5
- Extensive experience as Lead Substation Engineer
- More than two decades of substation design experience

Duane Buchanan, PE *Director* *Engineering* *North Carolina*	10+	**North Carolina State University** BS in Electrical Engineering BS in Computer Engineering	Relay Protection & Control Design Project Management Relay Coordination Studies Relay Setting Files, SEL, ABB, GE Short Circuit Modeling, Aspen OneLiner Equipment Drawing Reviews

- Holds Professional Engineering Licenses in North Carolina, Nevada and Washington
- Member of the IEEE Power System Relaying Committee
- Many year' experience as Lead P&C Engineer

KEY ENGINEERING PERSONNEL

Name and Designation	Years of Experience	Education	Areas of Expertise
John Elmore *Principal Engineer*	40+	**University of Florida** BS in Electrical Engineering **Florida Atlantic University** MBA	Relay Protection & Control High & Mid-Voltage Transmission Systems Planning
Randy Cunico, PE *Principal Engineer*	35+	**Georgia Institute of Technology** BS in Electrical Engineering MS in Electrical Engineering	Protection & Control Design Relay Coordination Studies Short Circuit Studies Short Circuit Modeling, Aspen OneLiner & Cape NERC Compliance Technical Process Development
Adrian G. Zvarych, PE *Principal Engineer*	30+	**Carnegie-Mellon University** BS in Electrical Engineering	Communication Facilities Design & Management Power Control Design Relay Protection & Control Electrical Substation & Line Design Fiber Optics Networks Smart Grid
D. Dushaune Carter, PE *Principal Engineer*	15+	**Mississippi State University** BS in Electrical Engineering **Mississippi State University** MS in Electrical Engineering	Network and Reliability Analysis Operational Planning Transmission Planning Base Case Development Power Systems Training
Glenn A. Jones, PE *Senior Engineer*	28	**University of Alabama-Birmingham** BS in Electrical Engineering	Distribution Operations & Maintenance Generation Stations Operations & Maintenance Relay Protection & Control Instrumentation, Controls, and Automation Project Management
Chris Salter *Lead Engineer*	15+	**University of Alabama** BS in Electrical Engineering	Protection & Control Design Relay Coordination Studies Short Circuit Studies Short Circuit Modeling, Aspen OneLiner & Cape
Wes Baker, PE *Senior Engineer*	7	**University of Florida** BS in Electrical Engineering **Georgia Insitute of Technology** MS in Electrical Engineering	Power Systems Stability Analysis

Name and Designation	Years of Experience	Education	Areas of Expertise
Mark Myers, EIT *Senior Engineer*	10+	**North Dakota State University** BS in Electrical Engineering	Protection & Control Design Substation Design
Dolly Villasmil, MsIE *Senior Engineer*	7+	**University of Central Florida** BS in Electrical Engineering MS in Industrial Engineering	Relay Construction Protection & Control Design
Clayton Keene *Project Manager*	10+	**University of Central Florida** BS in Electrical Engineering	Project Management
Jeffrey Hall *Lead Engineering Technician*	40+	**University of Wisconsin** Continuing Education Credits	Drafting Services Detailed Engineering Design Project Estimating Bus, Transmission, Transformer, Generation Protection

KEY FIELD SERVICES PERSONNEL

Name and Designation	Years of Experience	Education	Areas of Expertise
Victor Laird *Director* *Field Services*	10+	**Florida A & M University/Florida State University** BS in Electrical Engineering	Relay Protection & Control Power Systems Operations Safety Transmission Line Scheduling Generation & Interchange Operations

- Chief Safety Officer responsible for safety training and maintaining safety standards and employee compliance
- Member of IEEE Power Engineering
- NERC Certified Systems Operator
- Extensive experience working with high-voltage substations
- Member of Tau Beta Pi Engineering Honor Society

Andres Villalobos, PE	30+	**University of Puerto Rico** BS in Electrical Engineering	Testing & Commissioning Protective Relay Coordination Relay Settings
Alberto Villarreal, PE	25+	**Florida International University** BS in Electrical Engineering	Protection & Control Engineering Telecommunications Network Planning
Juan Alvarez, PE	30	**Renesselear Polytechnic Institute** BS in Electrical Engineering	Testing & Commissioning Protection & Control Engineering SCADA Systems Electrical Engineering Consulting
Don Ware	35+	**University of Central Florida** BS in Electrical Engineering	Testing & Commissioning Relay Protection Project Management
Edmund Smith	35+	**Engineering Council of South Africa** Professional Engineering Technologist	Electrical Consulting Testing & Commissioning Field Services Engineering
Bob Timlin	35+	**University of South Florida** BS in Engineering Technology	Protection & Control Engineering Construction & Maintenance of SCADA Hardware Substation Maintenance
Luis Peña	28	**Need University** BS in Electrical Engineering Power Systems & Controls	Testing & Commissioning Relay Protection SCADA Systems
Troy Davis	25+	**Louisiana State University** BS in Electrical Engineering	Transmission & Distribution Engineering Testing & Commissioning Protective Relay Coordination

Name and Designation	Years of Experience	Education	Areas of Expertise
Francisco Castellanos	20+	**Southwestern College** BS in Mathematics **Wichita State University** MS in Electrical Engineering	Protection & Control Engineering Substation Relaying Research/Test Engineering
Larry Frow	20+	**University of Central Florida** BS in Electrical Engineering	Protection & Control Engineering Substation Engineering Testing & Commissioning Fault Detection Relaying
Alexei Prado	18	**University of Havana Cuba** BS in Electrical Engineering	Testing & Commissioning Relay Protection SCADA Systems
Milentije Gavrilovic	15+	**University of Sarajevo, Bosnia & Herzegovina** BS in Electrical Engineering	Testing & Commissioning Protection & Control Engineering Software Engineering
Jesus Serrano	10	**Polytechnic University of Puerto Rico** BS in Electrical Engineering	Testing & Commissioning Protection & Control Systems Design
Earl McGinley	7+	**ITT Technical Institute** BS in Electronics Engineering	Testing & Commissioning Telecommunications

TEAMING PARTNERSHIP

We excel in solving the most challenging quandaries

The *PGE* leadership team understands the need for turnkey or procurement solutions.

Throughout our tenure, *PGE* has developed strong teaming partnerships to leverage both expertise and flexibility, while providing our clients with a single point of contact throughout the duration of a project.

Partnering with a highly respected engineering firm enables *PGE* to create an unparalleled team of professionals that excel in solving our clients' most challenging engineering quandaries. *PGE* has partnered with this firm on numerous projects to develop processes and procedures that ensure our clients receive the highest quality solutions.

GERS USA
CONSULTING ENGINEERS

GERS USA Consulting Engineers

GERS USA was founded in 1981 to provide comprehensive consulting services in electrical, electronic, civil, environmental and mechanical engineering. The company has offices in Cali, Colombia to attend the Latin American Market and in Weston, Florida for the North American and overseas markets.

With more than 40 professional engineers, some of whom are involved with local universities, and more than 20 technicians plus support staff, GERS is well capable of undertaking projects of all types and sizes, and is able to carry out all levels of studies and designs.

Dr. Juan M. Gers, PE - Principal Engineer

Gers USA

Dr. Juan Gers obtained his B.S. in Electrical Engineering at University of Valle, Colombia, in 1977. In 1981, he finished his M.S. in Power Systems at the University of Salford in England, and then his PhD in 1998 at the University of Strathclyde in Scotland with research in Distribution Systems Automation. He devotes time to academic activities and is in charge of several Power Systems courses at Penn State University and Gonzaga University. He is co-author of a book entitled, "Protection of Electricity Distribution Networks", published in 1998 by the IEE (now IET) with a second edition in 2004, and is the author/co-author of over 40 technical papers. Dr. Gers is a Chartered Engineer of the IET and member of IEEE. Dr. Gers currently participates in several of the IEEE Power System Relaying Committee (PSRC) working groups.

Distribution Systems Engineering

The *PGE* team offers a wide array of Distribution Engineering services to provide our utility, industrial and commercial clients with comprehensive engineering solutions for projects of all sizes and levels of complexity. Our Distribution Engineering team has provided services across the client spectrum from highly-complex projects required by Fortune 250 companies all the way to small distribution engineering projects such as a state university system.

Our scope of service in this area of design includes:

- LV/MV/HV Conceptual Designs
- Control, Protection & Metering Designs
- Motor Control Centers
- Grounding Designs
- SCADA System
- Programs For Reduction of Power Losses & Energy Cost
- Distribution Automation
- Equipment Specifications & Bill of Materials
- Motor Bus Transfer Design
- Shielding
- AC/DC Auxiliaries
- Energy Efficiency & Conservation Plans
- Coordination Studies

Our Distribution Engineering team provides services around the globe

DISTRIBUTION ENGINEERING EXPERIENCE

Campus Substation Relay & SCADA Upgrade University of Florida (UF), FL	Designed and created SCADA control and monitoring system including the Protection and Control for 12 substations to over 200 feeders. Provided field verification, updated existing prints and created an AutoCAD version of each drawing. Submitted a final set of functional diagrams, AC schematics, DC schematics, wiring diagrams and connection diagrams for all equipment.
Santurtzi Plant Spain	Engineered two motor bus transfer designs for a main-main 4.16 kV application at clients combined cycle generation plant. Utilized the Beckwith Electric M-4272 Motor Bus Transfer Relays and standards.
CT Lada Spain	Engineered two motor bus transfer designs for a main-tie-main 4.16 kV application at clients combined cycle generation plant. Utilized the Beckwith Electric M-4272 Motor Bus Transfer Relays and standards.

COMMUNITY OUTREACH

PGE believes there is nothing more powerful than a strong community. That is why we take an active role in building and supporting our local communities – identifying opportunities that will provide a lasting impact and thoughtfully committing our resources and time to them.

Since the company's inception, *PGE* has been committed to creating a company that fosters community outreach by taking part in community events as a corporate entity while encouraging our employees to do the same.

Our motivation is simple. *PGE* may be an electrical engineering firm primarily serving utility companies, but we are also a local company, and more importantly, a neighbor in every community where we live and work. And we cannot think of a better investment.

Below you will find a small sampling of the many charitable and volunteer activities in which *PGE* has contributed.

A Gift for Teaching Annual Back to School Drive

A Gift For Teaching is a non profit in Seminole County with a mission to improve public education by providing resources and materials free to teachers for their students in need. Each fall, *PGE* employees collect donations, which are then matched by *PGE* for this cause.

Heart of Florida United Way Emerging Leaders Program Participant

United Way Emerging Leaders (UWEL) a United Way program designed to engage young professionals under 40 within Central Florida to make a positive and lasting impact in our community through their commitment to service and philanthropy.

Leadership Seminole – Class 18, 19, 20, 21, 22

Leadership Seminole is a program in Seminole County that brings present and future community leaders together for the sharing of knowledge that will inspire them to step forward and make a difference in our community.

First Engineering Competition for High School Students - Team Sponsor

Polytechnic University of Puerto Rico's Orlando Campus held a competition among high school students encouraging students to pursue studies in the field of engineering. *PGE* sponsored a team of high school students competing in this competition.

American Heart Association "Heart Walk" Team Sponsor

The American Heart Association is a national voluntary health agency whose mission is "Building healthier lives, free of cardiovascular diseases and stroke."

Second Harvest Food Bank Annual Food Drive

Second Harvest Food Bank is a local pantry providing emergency food services to families in Seminole County. Each November, *PGE* hosts a food drive and matches employee donations.

Education & Industry Board Leadership

Michael J. Wright, PE
Advisory Board Member
University of Florida, Electrical & Computer Engineering
Valencia College, Electronics Engineering Technology

Andre Uribe
Chair
IEEE Power Systems Relaying Committee (PSRC) Working Group 12

Dale Oliver, PE
Board Member
St. Petersburg College Board of Trustees

PGE is honored to have received numerous industry and community awards during our years of service. These awards serve as a reminder of *PGE*'s commitment to quality performance as well as our commitment to the core values that have been with us since our founding in 2007.

Ernst & Young Emerging Leaders Finalist - 2013

Small Business Association Entrepreneur of the Year - 2013

Andre Uribe

Orlando Business Journal 40 Under 40 - 2013

Michael J. Wright PE

Orlando Business Journal C-Level Awards - 2013

Glenn Durie, PE

Top 100 Diversity-owned Businesses in Florida - 2012, 2013

Awarded by DiversityBusiness.com

PGE was selected as a 2012 Top Business recipient by DiversityBusiness.com. As one of the 2,500 awardees from around the country, this award places the principals of *PGE* in the distinguished company of the leading entrepreneurs in the United States.

Orlando Business Journal Book of Lists - 2012, 2013

Named one of Central Florida's Largest Engineering Firms

PGE was listed as the 11th largest engineering firm in Central Florida (up from 17th in 2012). This recognition highlights *PGE* as an industry leader among engineering firms of all disciplines in the Central Florida region.

Birmingham Business Journal Book of Lists - 2013

Named one of Birmingham's Largest Engineering Firms

PGE was listed as the 24th largest engineering firm in Birmingham, AL after just five months of operation. This recognition highlights *PGE* as an industry leader among engineering firms of all disciplines in the greater Birmingham area.

Small Business of The Year - 2012

Awarded by Seminole County Regional Chamber of Commerce

This annual award recognizes companies contributing to the economic vitality of Seminole County, making it a better place to work, live and play.

Florida's Best Companies to Work For - 2011 & 2012

Awarded by Florida Trend Magazine

This annual award program is based on anonymous survey responses from the nominee's employees. Employees answer basic questions about policies, practices and demographics, as well as a more rigorous survey addressing themed topics such as leadership and planning, corporate culture and communication, role satisfaction, work environment, managerial relationships, training and development, pay and benefits, and overall engagement.

Florida Companies to Watch - 2011

Awarded by GrowFL, ACG and the Edward Lowe Foundation

The "Florida Companies to Watch" awards program was developed by the Edward Lowe Foundation to honor second-stage companies that demonstrate high performance in the marketplace and exhibit innovative products or processes, or that are otherwise "worth watching."

Outstanding Small Business - 2011

Awarded by the Orlando Business Journal

PGE was named the top winner in the 26-60 employee category of this award series, based on factors such as revenue growth and increase in employees during the previous two years, in conjunction with corporate community engagement.

LICENSING

Power Grid Engineering, LLC is fully licensed and meets all industry and government requirements and qualifications. Proof of licensure is available on request.

Professional Engineering Licenses:

Michael J. Wright, PE
- Alabama Board, PE #30181-E
- Arkansas Board, PE #15856
- Florida Board, PE #59555
- Georgia Board, PE #033722
- Illinois Board, PE #062.065539
- Indiana Board, PE #11300205
- Kansas Board, PE #22975
- Kentucky Board, PE #2801
- Louisiana Board, PE #0037019
- Massachusetts Board, PE #49793
- Missouri Board, PE #2013005432
- Nevada Board, PE #21630
- North Carolina Board, PE #038836
- Ohio Board, PE #77727
- Oregon Board, PE #88516PE
- South Carolina Board, PE #30641
- Texas Board, PE #114963

William Glenn Durie, PE
- Florida Board, PE #75638
- Mississippi Board, PE #25235

J. Dale Oliver, PE
- Florida Board, PE #57856
- Georgia Board, PE #16298
- North Carolina Board, PE #040517

Charles "Chuck" Haahr, PE
- Florida Board, PE #54462
- Kansas Board, PE #15355

Duane Buchanan, PE
- North Carolina Board, PE #035692
- Nevada Board, PE #22024
- Washington Board, PE #49872

D. Dushaune Carter, PE
- Alabama Board, PE #24678
- Tennessee Board, PE #116115
- Virginia Board, PE #0402051260

Mark Jenkins, PE
- Alabama Board, PE #33237
- Arkansas Board, PE #16012

Adrian Zvarych, PE
- Florida Board, PE #41278

Glenn A. Jones, PE
- Alabama Board, PE #26321
- Arkansas Board, PE #15937
- Georgia Board, PE #038624
- North Carolina Board, PE #041145

Alberto Villareal, PE
- Florida Board, PE #49367

Andres Villalobos, PE
- Puerto Rico, PE #8956

Wesley Baker, PE
- Georgia Board, PE #036061

Randall W. Cunico, PE
- Georgia Board, PE #015266

Certificates of Authorization

*State of **Florida** Board of Professional Engineers Certificate of Authorization
Power Grid Engineering, LLC - #27284
Power Grid Services, LLC - #29975

Alabama State Board of Licensure for Professional Engineers Certificate of Authorization
Power Grid Engineering, LLC – CA-3702-E

Arkansas State Board of Licensure for Professional Engineers and Professional Surveyors
Power Grid Engineering, LLC- COA#2684

State of **Georgia** Board of Professional Engineers Certificate of Authority
Power Grid Engineering, LLC – PEF #005510

State of **Illinois** Department of Financial and Professional Regulation
Power Grid Engineering, LLC- 184.006786

Indiana State Board of Registration for Professional Engineers Certificate of Authority
Power Grid Engineering, LLC – 2013043000516/2013043007918

State of **Kansas** Board of Technical Professions Certificate of Authorization
Power Grid Engineering, LLC – E-2253

State of **Kentucky** Board of Professional Engineers Certificate of Authority
Power Grid Engineering, LLC – #3425

State of **Louisiana** Professional Engineering Board Certificate of Authority
Power Grid Engineering, LLC – 10318594#QWM73

*State of **Massachusetts** Board of Registration of Professional Engineers Firm Number
Power Grid Services, LLC – P-1104
Power Grid Engineering, LLC- 001123840

Missouri Board for Professional Engineers Certificate of Authority
Power Grid Engineering, LLC – E-2013015537

Nevada State Board of Professional Engineers Certificate of Authority
Power Grid Engineering, LLC – #16119

*State of **North Carolina** Board of Examiners for Engineers and Surveyors Certificate of Authority
Power Grid Engineering, LLC – C201117900088
Power Grid Services, LLC – C201222800494

Ohio State Board of Registration for Professional Engineers and Surveyors Certificate of Authorization
Power Grid Engineering, LLC – 04189

State of **Oregon** Secretary of State Corporate Division Certificate of Authority
Power Grid Engineering, LLC - 988636-90

LLR **South Carolina** State Board of Registration for Professional Engineers and Surveyors
Power Grid Engineering, LLC – 4778

State of **Tennessee** Secretary of State Division of Business Services Certificate of Authority
Power Grid Engineering, LLC – SOS Control #699120

Texas Board of Professional Engineers Certificate of Registration
Power Grid Engineering, LLC- F15526

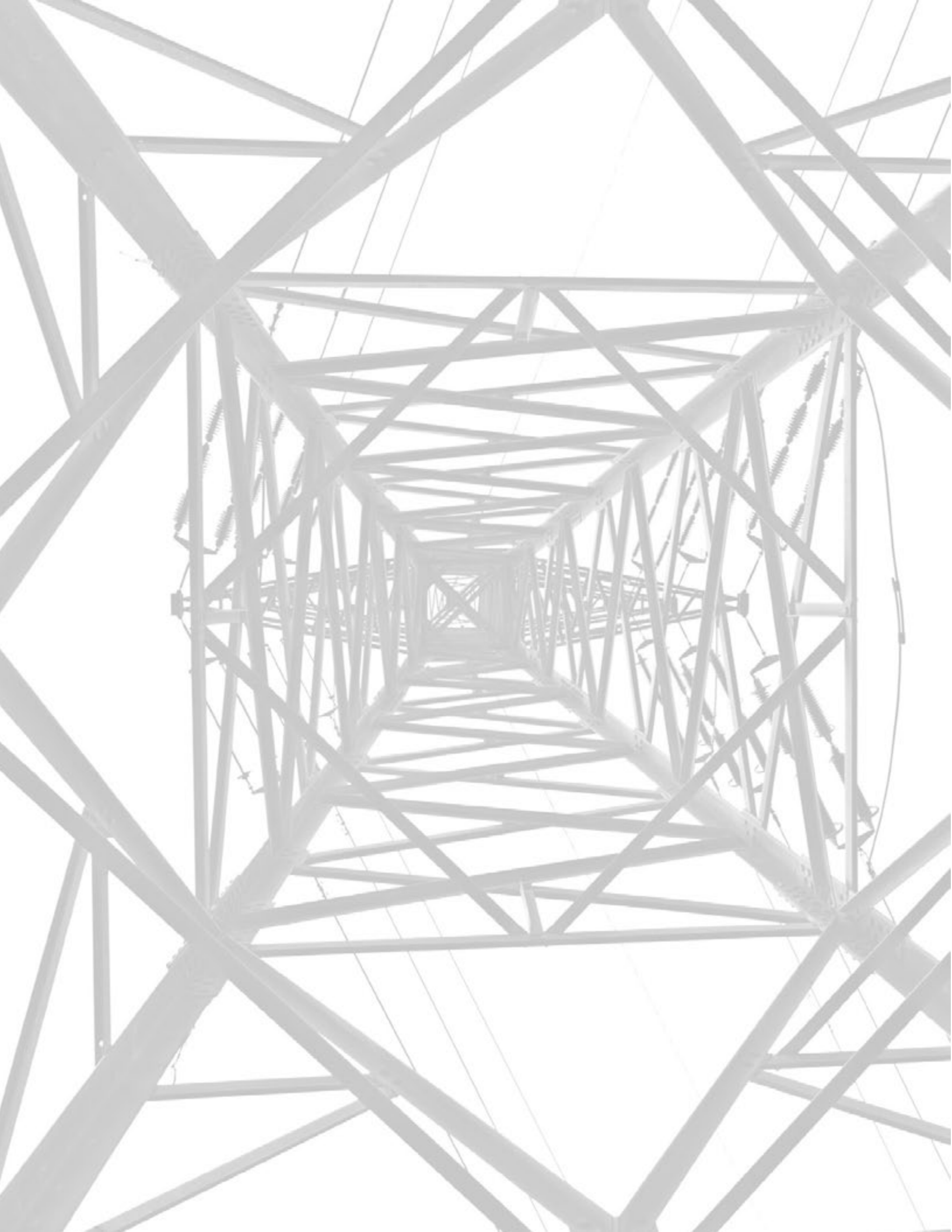
Commonwealth of **Virginia** Board for Professional Engineers Certificate of Authority
Power Grid Engineering, LLC – CIS0368

The State of **Washington** Board of Registration for Professional Engineers and Land Surveyors
Power Grid Engineering, LLC - 3276

*In the States of Florida, Massachusetts, and North Carolina, business is conducted under the entity name "Power Grid Services, LLC" and "Power Grid Engineering, LLC""

*In the State of North Carolina business is conducted under the entity name "Power Grid Services, LLC" and "Power Grid Engineering, LLC"

PGE holds 22 Certificates of Authority in 20 different states



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