

2019

Statement Of Qualifications



E. C. Fennell, PA
Electrical Energy Consultant Services
"Big Time Service, Quality Engineering"

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COMPANY PROFILE



FIRM PROFILE

E. C. Fennell, P. A. is an engineering and consulting company that provides consultation and technical solution services to the Electrical Energy Markets. Also known as ECF Consultants or just as ECF, our core business is to serve Utility Companies, Renewable/Non-Utility Interconnection Projects and Public Municipal Agencies on an array of projects offering energy consulting, engineering, design, procurement and construction phase services tailored to meet industry guidelines, technological advances, and most importantly client, project and system needs.

ECF has a staff of about (148) professionals committed to serving the Electrical Energy Market in developing commercially operated, reliable and efficient systems.

At ECF we look at the life cycle of any project and provide a point of view that is consistent with the industry and our client's overall objective, which emphasizes the insight into business priorities, risks, and operations on Brownfield and Greenfield projects, as well as Planning, Siting, Routing and Designing and Executing energy projects.

ECF specializes in customized and complete solutions tailored to meet our client's toughest business opportunities. Whether it is for an Investor and Municipal Utility project, Large Industrial and Renewable Generating Plant utility interconnection, collection system our experience on new, retrofit and/or refurbishment project represents our daily routine.

Our multidisciplinary project team provides services to help our clients implement complex projects from initial concept to delivery and operation. A broad range of commercial, industrial, and investor owned utility clients depend on us for customized and complete solutions to their toughest business challenges. Many of our professionals come from industry we are serving, so we know their business from first-hand experience. This gives us insight into their business priorities, risks, and operations. This industry experience assures our clients that we will deliver and execute solutions that meet your real world needs—and add true value to your operations.

ENGINEERING PROFILE

ECF is unique in the way we perform projects from the initial studies, to the detailed design and construction management, to the final commissioning, offering client's experienced seller-doer's the capability to scope, estimate, develop and execute the technical aspects associated with the following energy projects types:

-  Utility Additions, Upgrades and Refurbishments
-  Renewable/Non-Utility Interconnections and Collector Stations

ECF is comprised of experienced engineers, knowledgeable in planning, designing, and installing facilities that meet a client's financial, technical, and scheduling goals. Our professionals, unlike other companies, have designed and operated utility systems around the country as employees, and with that experience, offer specialized insight to clients. On Energy Sector Projects up to 500 kV systems around the nation, our professionals provide owners consulting, engineering, development, quality and turnkey services to help our clients implement complex CAPEX and developing projects from initial concept to energization.

ECF's professional industry experience supports industry accepted practices with practical cost effective solutions in the emerging Energy Sectors that are included with every project. Our goal is to deliver and execute quality solutions that are tailored to meet the industry guidelines, technological advances, and most importantly the client's project and system needs. We use these experiences to develop cost effective ideas that can be implemented in the most practical manner for each project.

Our staff has consistently used past experiences to develop cost effective ideas that can be implemented in the most practical manner for each project from the initial planning through final design while providing both ENERGY AND RENEWABLE Clients Expertise in the following Disciplines:

- | | |
|--|--|
|  Substations and Switchyards |  Relay Protection and Control |
|  AIS and GIS |  Civil, Structural and Site Work |
|  Brownfield and Greenfield |  Power System Planning and Studies |
|  Overhead & Underground Transmission |  NERC Compliance, SMART GRID and Automation |
|  Siting, Planning and Linear Projects |  Communications |
|  Distribution Lines and Third Party Fiber |  Grounding Studies |

AREAS OF SERVICE



UTILITY ENGINEERING SERVICES

ECF provides investor owned and municipal utilities. Our professionals have worked for major utilities around the country, and offer project and placement services to these utilities from conceptual engineering through commissioning. At ECF our Utility Engineering services perform the following disciplines as part of their daily routine.



- + System Planning
- + Consulting & Development
- + Engineering and Design
- + Project and Construction Management
- + Value Engineering

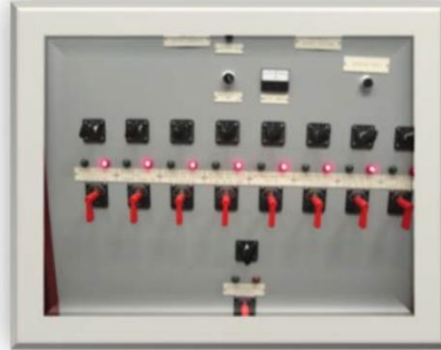
RENEWABLE/NON UTILITY ENGINEERING SERVICES

ECF provides developers, lenders, and owners the following: technical expertise, planning and feasibility studies, project oversight, design and engineering for the utility interconnection and collection systems to meet industry accepted practices in the emerging Renewable/Non- Utility Energy Sector. At ECF, our Renewable/Non-Utility Engineering services are performed for the following project types:



- + Wind On/Off Shore
- + Solar Photovoltaic
- + Hydro
- + Bio-Energy
- + Distributed Generation
- + Generation
- + Battery Storage Systems
- + Studies- Planning, Operational , Coordination
- + Protective Relay Settings
- + Compressor/Gas Stations

AREAS OF EXPERTISE



SUBSTATIONS

At ECF, our substation engineering team has developed, designed, constructed and commissioned hundreds of substations as consultants and members of utilities. We can provide services from initial concept, feasibility and planning studies, complete civil, mechanical, and electrical design. Experienced team members can deliver completed facilities from switchyards to integrated / automated substations.



ECF offers the following substation services:

- ✚ AIS & GIS Substations & Switchyards
- ✚ Station Expansions and Upgrades
- ✚ Traditional or Design-Build
- ✚ Asset Replacements
- ✚ Site Development
- ✚ Site Civil and Geotechnical Work
- ✚ Access Roads & Fencing
- ✚ Oil Spill Containment Designs
- ✚ Ground Resistance Measurements
- ✚ Conceptual Design and Studies
- ✚ Balance of Plant Detailed Engineering
- ✚ Packaged Substations
- ✚ Capacitor Bank Additions
- ✚ Protective Relaying & Control
- ✚ Automated /Integrated Systems
- ✚ Fiber Optic Cabling
- ✚ Grounding Systems Analysis
- ✚ Communication Systems
- ✚ Communication Systems
- ✚ Insulation Coordination
- ✚ Lightning Analysis
- ✚ Lighting Survey and Analysis
- ✚ Relay Coordination Studies
- ✚ Fault Studies
- ✚ Noise and Audible Studies
- ✚ EMF Analysis
- ✚ NERC Compliance
- ✚ Security Assessment and Design

RELAY PROTECTION & CONTROL

Our history of design and commissioning of relay systems, offers the range of knowledge necessary to implement simple or dual relaying systems for your complete project. From conceptual design, schematic development and device coordination, our engineers and designers can provide solutions to your relaying additions, upgrades or problems including the protective device settings. All projects from new construction to retrofit, our engineers are capable of assisting any project.

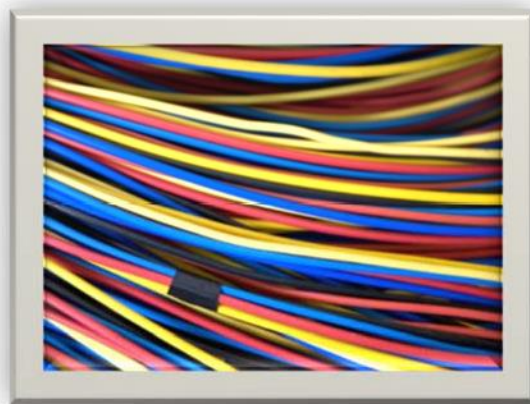


ECF offers the following protection and control services:

- ✚ One Line Conceptual Design
- ✚ Elementary Schematic Development
- ✚ Relay & Control Cabinet Design
- ✚ Front View and Wiring Design
- ✚ Relay Settings
- ✚ Substation Automation
- ✚ Substation Autore Restoration
- ✚ Short Circuit Coordination
- ✚ HMI, PLC, RTUs and SCADA work
- ✚ Relay Modifications & Commissioning
- ✚ Value Engineering
- ✚ Outage Analysis
- ✚ Relay Communication- PLC, Fiber, Spread Spectrum

COMMUNICATION

The ECF Communication Team offers an exceptional combination of power delivery skills and traditional communication project experience. This has enabled ECF to provide the best possible full service telecom solutions, such as, Broadband Optical, RF networks, and developing Local Area Networks, based on objectives, best practices, and budget to meet the needs of our clients.



ECF offers the following communication services:

- ✚ Planned expansion or upgrades of communications systems, data, voice or security networks and CCTV systems which require a third party to complete from Design to Commissioning.
- ✚ Peer level review for quality control planned expansion or upgrades of communications systems, data, voice or security networks and CCTV systems which have already been designed and engineered, that requires a third party to conduct an independent review.
- ✚ Conduct Communications, Networking, and Security Audits to provide our clients with a standard report and recommendations to improve the system.
- ✚ Develop and conduct training, policies, and standards for client projects.
- ✚ Increasing business and consumer demand for higher speed communications services (voice, video, data/Internet, etc.) in places either poorly served, or not served at all by high speed internet connectivity.

POWER SYSTEM STUDIES

ECF offers analysis and planning of transmission, distribution, and industrial power systems. Our staff of well qualified and experienced engineers understands the complex local and regional electrical grid and internal plant issues. We provide assistance and training in areas of power system relaying, conceptual design, planning and operation. Our services include:



ECF Offers the following power system studies services:

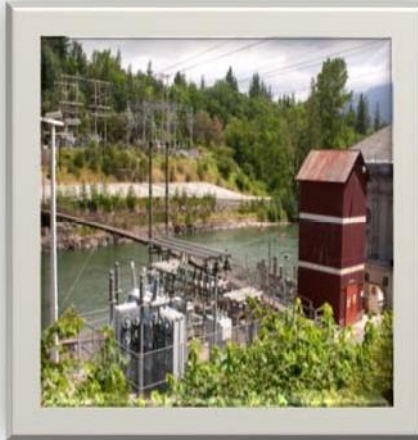
- ✚ Renewable/Non Utility Interconnections
- ✚ Compressor Interconnections
- ✚ System Plant Protection
- ✚ Switching Studies
- ✚ Transmission Planning Studies
- ✚ Feasibility Studies
- ✚ Reliability Studies
- ✚ Operational Studies
- ✚ Distributed Generation
- ✚ Short Circuit Studies
- ✚ Arc Flash Hazard Analyses
- ✚ Cranes/Motors Flicker Studies

ECF for each of the power system studies we can perform it at any stage of the project life cycle. The life cycle stages include:

- ✚ SCREENING STUDY (SS)
- ✚ INTERCONNECTION REQUEST (IR)
- ✚ INTERCONNECTION SYSTEM IMPACT STUDY (SIS)
- ✚ INTERCONNECTION FACILITY STUDY (IFS)
- ✚ GENERATOR INTERCONNECTION AGREEMENT

GENERATION/NON UTILITY INTERCONNECTIONS

ECF's generation services group provides a complete range of owners engineering, concept and final engineering development along with program and project management services. From the initial feasibility studies for Generation through Siting and Licensing to Commissioning and Construction, we are proven problem solvers in generation related projects. ECF has a dependable responsive reputation for meeting difficult interconnection issues for all power generation projects including minimizing where possible transmission or sub-transmission interconnects.



ECF has been involved in projects in all aspects of the generation/non utility field. Our services include:

- | | |
|--|--|
|  Compressor System Interconnections |  Protective Relay Coordination |
|  Hydro/Renewable Generation |  Automation Controls & SCADA |
|  Fossil Generation |  System Optimization |
|  Distributed Generation |  Power Factor Correction |
|  Offshore Generation |  Fault Current, Power Quality, & Harmonics Analyses |
|  Interconnect and Collector System Studies and design |  Backup generator & Battery Systems |
|  SPCC Plans |  Commissioning |
|  System Protection & Control Design |  FERC Part 12 Inspections |

OVERHEAD TRANSMISSION LINES

ECF transmission line professionals have developed, designed, and constructed hundreds of miles of Overhead Transmission Lines as consultants and members of utilities. ECF can provide services from initial concept feasibility and planning studies, conceptual and preliminary engineering, to complete civil, and project management. ECF overhead transmission line services include:

- ✚ Use of PLS-CADD Software
- ✚ Structural Design and Analysis
- ✚ Civil/Foundation Design
- ✚ Permitting Support
- ✚ Line Route Selection and Evaluation
- ✚ Conductor Selection and Ampacity Evaluation
- ✚ Structure Replacement/Hardening
- ✚ Conductor Replacement/Upgrade
- ✚ Right of Way Survey Points Clearance Evaluation and Remediation
- ✚ Conceptual Line Design
- ✚ Bid Packages Preparation
- ✚ Bid Evaluations
- ✚ Grounding and Bonding Studies
- ✚ Construction Management
- ✚ Special Analysis- Spans, River Crossings, Guys
- ✚ 69kV – 500kV Transmission Circuits



CONSTRUCTION, DEVELOPMENT, AND MANAGEMENT SERVICES

Whether you are seeking a vision for market entry into the world of ENERGY, have a technology or large complex project, ECF's Consulting Division offers a solution based method geared to program to effectively integrate your system. For each of the Sectors we serve our CDM services bring about these essential features as follows:

- ✚ Planning, Feasibility and Conceptual Engineering
- ✚ Owners Engineering and Value Engineering
- ✚ Project Scoping and Development
- ✚ Engineering and Design (Civil, Electrical, Transmission and Protective Relaying)
- ✚ Program, Project and Construction Management
- ✚ Material Procurement and Contract Specifications Development
- ✚ Value Engineering

PROJECT MANAGEMENT ENGINEERING SERVICES

The three most important factors to consider in the Project Management Engineering Services area are: scope, schedule, project understanding, and controls. Utilizing our staff's vast years of experience, relative to the project disciplines, we utilize the most up-to-date software that allows ECF to manage any size project to a successful completion on time and on budget. ECF has gained experience managing large complex projects, such as monitoring CAPEX projects, can become a major effort for many companies. And ECF will provide these services accordingly, to meet all aspects of your project needs. The essential PMES services include:

- | | |
|--------------------------------------|-------------------------------------|
| ✚ Scheduling | ✚ Quality Assurance/Quality Control |
| ✚ Schedule Risk Assessment (SRA) | ✚ Procurement & Material Expediting |
| ✚ Earned Value Management (EVM) | ✚ Performance Tracking |
| ✚ Financial Planning & Cost Controls | ✚ Contract Management |
| ✚ Risk Management | ✚ Staffing Plan |
| ✚ Communication Plan | |

CONTRACT AND CONSTRUCTION MANAGEMENT

ECF provides a complete range of construction management services designed to assist clients in achieving business objectives. Each construction project is assigned a manager responsible for schedules, budgets, and work products for the project. ECF construction managers are experts in their respective fields and have demonstrated the ability needed to complete projects on time and within budget. The manager will oversee a team tailored to meet the exact requirements of each client. The range of services includes:

- ✚ Specification and bid package preparation
- ✚ Contractor pre-qualification
- ✚ Evaluation and solicitation of bids
- ✚ Scheduling, cost estimates and cash flow planning
- ✚ Inspection of all phases of work
- ✚ Monitoring of safety programs
- ✚ Documentation control and management

VALUE ENGINEERING PROGRAM

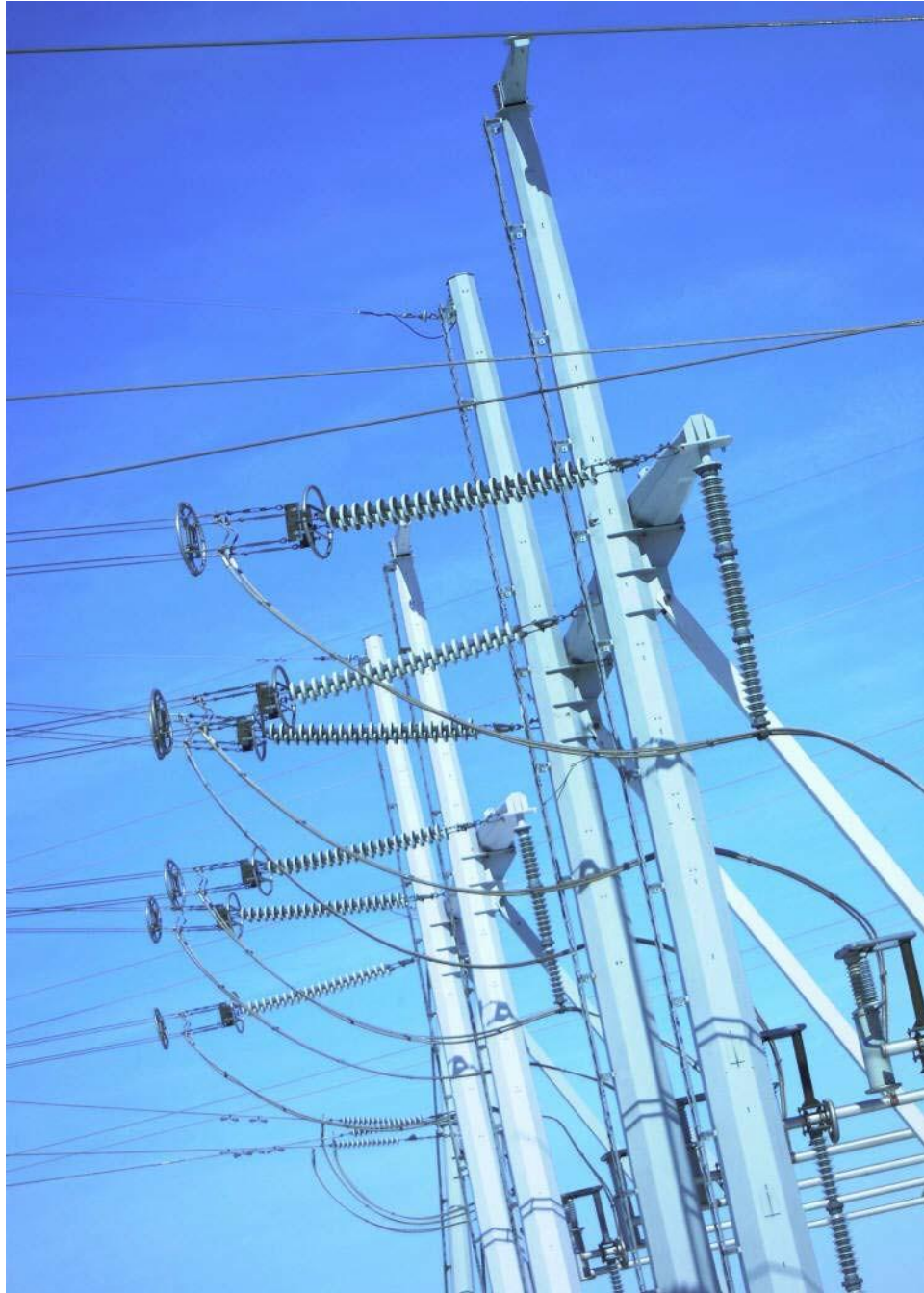
The ECF Project Team is eager to work closely with our clients to chart the best course in managing and streamlining our efforts as the project moves forward. Our Project Team will utilize a systematic approach to identify and provide the functional requirements for the project at the optimum cost, while maintaining or improving the basic design objectives. To accomplish this task, ECF's Project Team will use a Value Engineering/Construction (VEC) program that will ensure that the project's objectives will be met or exceed the desired result established by our clients. This method of providing project engineering and construction services results in a time-phase process that ends only when the final results are provided in an in-service electrical facility that meets the clients' requirements.

The ECF project team will apply VEC methodologies in managing the deliverables associated with this project. The VEC being implemented on this project follows a well-documented, proven strategy comprised of a structured process for answering the following questions:

-  What is it?
-  What does it do?
-  What must it do?
-  What does it cost?
-  What is the budget?
-  What is it worth?

The VEC process used by the ECF team will utilize formal reviews during monthly quality meetings to validate our conformance to the design, and engineering and construction matrices/indicators associated with tasks required to complete the project. This will be accomplished by using check valves during the engineering and construction phases of the project. These check valves serve as points in the process for a controlled approach in translating our client's guidelines, specifications, and operating practices into an electrical facility that fulfills the client's operational, performance, and cost requirements for the project.

PROJECT EXPERIENCE



ECF has a unique combination of resources and experience that is ideally suited to successfully 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 of energy facilities, state, regionally and nationally, will enhance your project team's capabilities. We pride ourselves on our ability to complete projects expeditiously, safely and efficiently.

Examples of projects our employees participated in or had direct relevant and lead technical experiences include the following:

DISTRIBUTION PROJECT EXPERIENCE

Client	Project Name	Description
FPL	Cable Contractor Lead Services	We assemble crew job package and give to crew GF, order material, staking if needed, ensure any environmental requirements are met, obtain all necessary switching orders for the crews, monitor progress of project to ensure due date will be met, set up any customer outages needed, remove any barriers that may hinder crew's progress, address customer complaints / inquires, and obtain all necessary switching orders for the crews. Perform crew safety visits at a minimum of 3/week, approve any additional work the crews request beyond what is engineered on job print, ensure post project restoration work is completed satisfactorily, attend weekly project status/workload conference calls, and work with FPL PL in completing job in WMS and assist in closeout and payment process. Some Cable Services CPL's also do AMS data updates and run reports from WMS for the FPL manager and are also available for storm restoration assistance.
FPL	Condition Assessment Contractor Lead Services	This involves the visual detailed foot assessment survey on overhead distribution feeders. The purpose of the assessment is to locate and identify any potential problems with overhead equipment that could affect the reliability of the feeder. Each feeder is surveyed using a visual criteria that identifies disconnect switches that have Damage, Corrosion, are Misaligned, or have Flashed Insulator(s), Broken Insulator(s), Missing or Blown Arrestor Stations and are usually in an open or closed position. We perform a thorough and complete visual inspection designed to detect any and all potential problems that can affect the reliability of the line. A thorough and complete foot assessment involves a stop at the location of the equipment being inspected to ensure all potential problems are identified.

FPL	Crandon Park and Trividia Health Facility	Provided engineering services for a 750kW UPS (Uninterruptable Power Supply) optional standby unit for the Crandon Park tennis center and the Trividia Health Facility. The UPS was used to mitigate voltage sags, surges, and momentaries which occur when both customers lost power and had to be switched over to an emergency feeder. The UPS was engineered in series with the customer's in- coming utility service after the service meter. Since this was after a service meter installation, ECF produced signed and sealed engineered drawings which were used to secure a permit from the building department in order to start construction. The client's criteria for the installation of the UPS was that it had to be removable from the customers' existing utility service, so it could be relocated and used at another site. ECF was challenged with not only this criteria but also making sure the customer maintained utility power while the UPS was being removed. ECF was able to achieve this, leading to the project completed successfully and on schedule.
FPL	Install Automatic Field Switching SSN Communication equipment System	Installed Antenna, SSN ebridge Radio, Substation Communication Platform and other site upgrades to support FPL Distribution System Automatic Field Switching installation.

FPL	Hardening Contractor Lead Services	We perform pre-project constructability meetings Lead Services with project designer and GF. Receive work package from FPL admin tech – ensure all necessary paperwork is included and attend project pre-construction meetings. We order material, staking if needed, ensure any environmental requirements are met, ensure tree trimming is completed if needed and obtain all necessary switching orders for the crews. Monitoring progress of project to ensure due date will be met, set up any customer outages needed, remove any barriers that may hinder crews progress, address customer complaints/inquiries, and perform crew safety visits at a minimum of 3/week. We approve any additional work the crews' request beyond what is engineered on job print, ensure post project restoration work is completed satisfactorily, and attend weekly project status/workload conference calls. We work with FPL PL in completing jobs in WMS and assist in closeout and payment process and are available for storm restoration assistance.
FPL	Smart Grid Florida – IED technical support	Project work involved the configuration (programming field devices) of radios that are paired with intelligent electrical devices (IEDs), program management and technical troubleshooting of Automated Feeder Switches (AFS) and their associated communications, as well as process and application improvement support.

FPL	Smarts Grid Devices FCI (Fault Current Indicators) 2017 Deployment	The Remediation Team is responsible for identifying The malfunction of smart devices and trouble shoot diagnosis and resolutions of any issue in collaboration with the other group part of the Reliability program. The Forensic Storm Team prepares to respond after natural event (Storm/ Hurricane/ Tornado/ Flooding) to track and diagnosis any effect on the functionality of the smart grid devices. We also respond efficiently to bring back up service from unit damage cause by natural events. We patrol any part of the Distribution or Transmission lines that are part of the FPL Electric Grid. The Field Service Group Smart Devices troubleshoot field service for the Smart Devices in some of their components to design and maintain the reliability of the communications of the devices. This is done to visualize through multiple applications the signals from the system and data analysis is collected to increase the reliability of the electric system. This is all done with the goal to minimize the time response under emergencies as well as normal service interruptions for customers, and providing data accuracy and geography data to respond more efficiently.
CLW, FL	City of Lake Worth Beach Electric Systems: Review engineering of others for distribution feeder arrangement and construction. Engineer distribution feeders	Provide review services for others that were doing upgrades, modifications, and new construction of feeder facilities. Provide engineering services for ECF to do upgrades, modifications, and new construction of feeder facilities. Evaluate ampacity and cables/conductors.

ECF – TRANSMISSION LINES PROJECT SAMPLES

Client	Project Name	Description
FPL, FL	Oakland Park-Pompano 138kV	Existing wood pole structures replacement with new round spun concrete poles. Project scope included developing PLS CADD model, selecting new route/poles locations, developing permit and construction drawings, cost estimates, construction packages, and ordering poles and materials.
FPL, FL	Oakland Park-Sistrunk #2 138kV	Project initially started as a hardening project consisting of replacing existing wood pole structures with new round spun concrete poles. Due to the inaccessibility for construction and maintenance of existing wood structures the decision was made to relocate the portion of line on to existing road right of way. Project scope included developing PLS CADD model, selecting new route and poles locations, developing permit and construction drawings, cost estimates, construction packages, and ordering poles and materials.
FPL, FL	Lauderdale-Palm Aire 138kV	Project consisted of the replacement of three wood pole structures including two wood H-Frames structures inside a Power Plant right of way. Project scope included developing PLS CADD model, selecting new route and poles locations, developing permit and construction drawings, environmental permitting support, cost estimates, construction packages, and ordering poles and materials.
FPL, FL	Airport-Dade 138kV Line	Project consisted of the replacement of existing wood pole structures and relocation of a portion of line thru Dade County School Board property/park. Project scope included permitting support for a new easement thru Dade County School Board property/park, replacing/upgrade of existing 556 ACSR conductor to 954 ACSR conductor, evaluation of existing structures and insulators for new conductor size, developing PLS CADD model, developing permit and construction drawings, cost estimates, construction packages, and ordering poles and materials.

FPL, FL	Coast-Myakka 138kV line ampacity upgrade	Project consisted of an ampacity upgrade study on a section of line to increase ampacity from 1015A @75C to 1320A @115C and the replacement of five existing double circuit concrete H-Frames with two new single circuit round spun concrete poles. Project scope includes developing PLS CADD model, performing survey point clearance evaluation, selecting poles locations for the double circuit concrete h-frames replacement, developing permit and construction drawings, environmental permitting support, cost estimates, construction packages, and ordering poles and materials.
Alcan, Canada	Grounding and Shielding Study	Performed an evaluation and testing of approximately 50KM of 345kV line counterpoise grounding and bonding system to determine the line risk exposure to lightning strikes and the effective grounding of the towers.

FIELD CONSTRUCTION MANAGEMENT PROJECT EXPERIENCE

FPL	Transmission Construction Lead/ Oversight Transmission	We have approximately 15 employees who perform the role of a Construction Lead/Oversight individual in support of all Transmission Projects ranging from 13kV to 240kV as assigned by the respective FPL Construction Lead. Tasks that each individual performs include but are not limited to the tasks associated with Construction Lead / Oversight of activities by contractors such as Major Site Development including right of way construction; major site clearing; trenching; installation of poured & pre-cast foundations and landscaping. Pole setting (direct embed and poured foundation) of concrete, wood and steel poles including all required grounding. Framing of poles including all bonding. Wire pulling including single / multi conductor; overhead ground wire and overhead fiber installation. Conductor transfer. Installation of guying and associated anchors. Installation of underbuilt Distribution on transmission structures. Advanced rigging and Lift Plan development. Identify & Perform OSHA Lockout/ Tag-out when required for project scope.
FPL	Substation Construction Lead/ Oversight Substation	We have approximately 6 employees who perform the role of a Construction Lead/Oversight individual in support of all Substation Projects as assigned by the respective FPL Construction Lead. Tasks that each individual performs include but are not limited to the tasks associated with Construction Lead/ Oversight of activities by contractors such as: Minor Site Development including clearing; trenching; installation of poured & pre-cast foundations; installation of fencing and landscaping. Conduit; Raceway; Junction Box and associated support installation. Cable & Fiber pulling, testing and terminating. Installation of equipment grounding. Installation of both low and high voltage equipment. Basic Rigging and Lift Plan development.

GENERATION PROJECT EXPERIENCE

Client	Project Name	Description
CPV	Various (8) Locations Combine Cycle and Wind Power Plants	Negotiated interconnection agreements with electrical utilities, developed alternative interfaces, scopes of work, and technical considerations associated interconnection Competitive Power Ventures generation to electrical power system.
FPL	DeSoto County PV – 25 MW (part 1 of 100 MW project)	Design, engineer and installation support for new PV facility.
FPL	Helios, Tuckers and Skylight	Convert drawings that were provided by the vendor Substations to FPL Standard Substation Drawings format.
FPL	Martin County Solar 10 KW	Design, engineer and installation support for new PV facility.
FPL	NASA Center PV – 2 MW	Design, engineer and installation support for new PV facility.
FPL	Solar Site GSU	Develop an FPL System Relay Standards for the interconnection wiring associated with equipment installed in the GSU Relay Vault for Utility Scale PV sites.
FPL, FL	Develop IED Configuration Setting Guidelines for a FPL Combustion Turbine Generator	These guidelines outline the methodology for the preparation of configuration settings for the various protective, control and data acquisition functions in the Generator Protection Systems being applied on FPL combustion turbine generators.
FPL, FL	Developed manual outlining the preparation of relay settings for a FPL Combustion Turbine Generator	This manual is intended to provide guidance in establishing the set point and tripping philosophy for the various protective functions in the Generator Protection Systems being applied on FPL combustion turbine generators.
FPL, FL	Martin 500kV Switchyard	Engineered the replacement of a breaker, one wave trap and two sets of CCVT's.
Fla Hydro	Water Turbine Generation Interconnection	Developed conceptual design for the interconnection facilities required to interconnect Pacific Gas & Electric (PG&E) Transmission System in the San Francisco, CA Bay area to 10 MW and up to 200 MW blocks of tidal driven generation. This design used latest smart grid technologies in the operation, control and data acquisition systems required for this installation.
MWRA, MA	Deer Island Power Plant and Distribution System	Performed electrical engineering tasks associated with the detail design of the 70MW On Site Thermal Power Plant (OSTPP) EPC, the Main Substation and the 15kV power distribution system for Deer Island. Duties included preparation of a complete Engineering, Procurement, and Construction contract (EPC) for the island.

NAES	DeSoto County Generating Company	Provided technical support to the generator owner in documenting the methodology for determining facility rating (per NERC FAC-008 & 009 and CAN-008) of its Generating Facility from point of interconnection to the GSU.
NEER	Genesis Solar plant (CA)	Steam Turbine Generators Protective relay setting review (European relays).
NEER	Paradise/ Montua Creek (PA)	Photo-Voltaic and Battery Storage installation relay setting and operation design review.
NEER	Puerto Rico's Power Authority	Proposal lead for Battery Storage for PV facilities to help with the stability of the grid and the problems resulting from variable generation.
NEER/ FPL	Power Plant Modifications- Martin, Manatee, Ft Myers, Sanford, Ft Lauderdale	Generator Protective Relay Replacement for multiple FPL sites with microprocessor relays: Generator protective relay settings -(Martin, Manatee, Ft Myers, & Sanford combined cycle units - FPL: Large generating facilities / Power Plants- Motors protective relay settings using microprocessor relays.
NEER	Red Mesa (NM)	Design Build Harmonic Filter Bank and Battery Storage 35 kV feeder design and installation.
NEER	Termosol (Spain) Solar	Solar Generating Auxiliary Motors Protective relay setting review: large Facility medium voltage motors protection, auxiliary plant transformer protection and small low voltage motor protection.
NextEra, CO	Peetz-Logan Switchyard and capacitor Bank Substation	EPC Contract for new SCADA System and upgrade of breaker controls.
NextEra, Spain	Nodal Substation	Provided professional services in the assessment and field verification of conformance of the proposed commissioning and testing program of the substation P&C systems.
NextEra, Spain	Termosol Power Plant Units 1 & 2	Provided technical services in reviewing the plant and switchyard proposed relay protective devices configuration setting and set points.
Sun Edison	Sun Edison I Project	Developing and design of PV Inverter Modules for Power One Inverter SUN EDISON I project.
Various	Various Projects – 10MW	Complete balance of system of system design review for a 10MWP solar farm including single line diagram, DC schematics and grounding.
Various	Various PV Projects	Interconnection feasibility and system impact studies using PSS/E.
Various	Various PV Projects	Pre-design and post-commissioning Clean Development Mechanism (CDM) compliance.
Various	Various PV Projects	Harmonic studies for inverter harmonic contribution using ETAP.
Various	Various PV Projects	Inverter protection and alarm settings for SMA sunny central models.

POWER SYSTEM STUDIES PROJECT EXPERIENCE

Client	Project Name	Description
Anza	Transmission System Study	Develop a conceptual design for several interconnection options and performed a lifecycle cost analysis which includes all initial and future capital expenditures, plus all appropriate operating costs required to develop and maintain an operational facility.
FPL	Arc Flash Analysis of 13Kv Distribution System to Ensure Compliance with OSHA, NFPA and IEEE Guidelines	An analysis of all 13kV feeders applying the IEEE1584 Arc Flash Guidelines for 8cal/cm ² incident Energy level was completed. A study determined that the SynerGEE Arc Flash module incident energy calculations are in 100% agreement with the IEEE spreadsheet results at the 13kV voltage level.
FPL	Distribution Field UG Vault Brickell	Distribution Field UG Vaults for network systems.
FPL	Distribution Field UG Vault Miami	Distribution Field UG Vaults for network systems.
FPL	Distribution Relay Vault Design	Prepared a Specification for a Prefabricated Distribution Relay Vault and reviewed associated drawings prepared by FPL. This was a permanent prefab relay vault that will be a similar size to the building previously developed by FPL for its Roberts/Magnolia Transmission Substations, but for the distribution station. Additionally, ECF put together a spreadsheet for use when ordering the building to support the specification by defining who would be providing what items, including how they will be delivered.
FPL	GSU Protection Relay Panel Solar Site	Developed an FPL System Relay Standard and Specification for the GSU Protection Relay Panel.
HES	Interconnection Studies & Misoperations Correction	- Distribution Field Switch (AFS) - Solving nuisance trips of distribution feeder relays - 138 KV Transmission Line Relay Settings
FPL, FL	Port Everglades, Hendry and Palatka Power Plants	Provided professional services in developing the conceptual scope of work and cost estimate for the changes required to FPL transmission substation facilities to support these future generation projects.

FPL, FL	St. Lucie Power Plant, Florida	Managed structural/conditional assessment and design, where necessary, to bring the switchyard steel structures and foundations at the coastal nuclear power plant to code. Current code requirements include, among other criteria, a top wind speed of 150 mph and consideration of corrosion rates.
FPL, FL	Various Substations	Performed Ground Potential Rise Studies (250 sites) for the purpose of providing the required data needed for procuring telephone communication Service from local substation Telephone Company.
FPL, NextEra& Progress Energy	Ground Grid Analysis and Lightning Viability Studies	Perform Grounding Grid and Lightning Studies through testing and Analysis of multiple substation and switchyard via the application of CDEGS and WIN IGS software.
PEF	Various Substations	Performed Ground Potential Rise Studies (30 sites) for the purpose of providing the required data needed for procuring telephone communication Service from local substation Telephone Company.
PEF	Develop IED Configuration Setting Guidelines for Transmission and Distribution Schemes	These guidelines outline the methodology for the preparation of configuration settings for various Progress Energy Florida protection platforms. These guidelines are intended to provide direction and guidance to engineers in changing over to smart technology devices for various protection and control and data acquisition functions.
HES	Interconnection Study	Developed several modifications to HES Power System to accommodate a new 138 kV interconnection between Florida Power & Light Co. (FPL) and HES Networks. Final recommendation was a new intertie by looping the FPL Davis to Florida City #2 138 kV Line and HES Lucy 138 kV Line at the new HES Redland Distribution Substation site.
HES, FPL, NEER	NERC Compliance	Provide technical support in resolving the Florida Reliability Coordinating Council, Inc. (FRCC) Compliance Monitoring and Enforcement Program On-site Compliance Audit Findings.
PEF	Develop Relay Setting Guidelines for Transmission and Distribution Schemes	These guidelines outline the methodology for the preparation of settings for various Progress Energy Florida Relay applications. These guidelines are intended to address the goal of developing consistent and error-free calculations relay settings by providing guidance in establishing the set point and tripping philosophy for the various protective elements.

RGE	RGE Power System Breaker Duty Study	Perform Study and provided Finding Report to Rochester Gas & Electric (RGE) summarizing the evaluation of their power system distribution breakers interrupting ratings.
FPL, FL	FPL: - Various distribution system flicker studies - Interconnection studies	-Flicker Studies For large commercial & industrial facilities, including Port of Miami RTG Cranes, Port Everglades RTG Cranes, -Gas compressor motor & starting studies- Turkey Point, Port Everglades -Interconnection studies for Cogen facility less than 20MW including solid waste methane gas to electric facilities in Central & South FL
SEC	Seminole- distribution system flicker studies	Perform study and corrective recommendations for voltage issues on complex distribution feeder with multiple stations and Solar PV injection interactions with regulators.
NYSEG	Falls Park and Churchtown: Settings/Modelling for configuration settings and fault study	ASPEN modelling of the system in order to provide coordination studies, configuration settings, and settings basis for GE & SEL protection relays. Developed HMI interfaces & data maps between HMI equipment, RTAC, IED relays, meters, etc. Developed communications and modem & Ethernet setups as well. Performed field FAT tests and designed the FAT procedures.
FKEC	Florida Keys Ground grid measurements & study	Ground grid measurements to obtain data for doing ground grid and grounding study using CDEGS
BPL	Bahamas Power & Light Ground grid and ground study	Ground grid measurements and running Ground Study with CDEGS
BPL	Bahamas Power & Light	Relay Coordination Study and modelling, including generator facilities and 132kV and 33kV transmission lines. Reaffirm generator protection & dynamic load modeling.
FPL, FL	Various substations and power plants LED Illumination upgrades and study and surveillance camera systems	Upgrade the station lighting system & perform computer study for proper illumination levels. Add Security cameras.

RELAY PROTECTION PROJECT EXPERIENCE

Client	Project Name	Description
CNYOG / TRES PLACIO	NS1 230/13.8 kV and NS2 138/13.8 kV Transmission and Distribution Substations	Engineered substation automation platforms for transmission and distribution substations. This project included networking substation IED's for SCADA, local annunciation, local Distributed Control System, protection functions and data acquisition local/remote to establish a full operational smart facility using state of art technology. At TP added large gas compressor (13.8kV); provided substation 69/13.8kV protective relay design and settings; interconnection protective relay design of the substation to the South Texas Electric Coop.
EBCI	Eastern Band of Cherokee Indians Reservation Communication Network	Worked in concert with the client to developing conceptual design of communication network for bring broadband network access to residential and business clients located on the Qualla Boundary, Graham County and Cherokee County communities.
FPL	Distribution Substations Scheme 9 double Bus Outage Scheme Upgrades at 22 Substations	Distribution station scheme 9 DBOS (Double Bus Outage Scheme) consists of sub panel, which is integrated with existing scheme 9 overcurrent and differential panels to add oscillography, communications and enhanced automatic station restoration to the existing scheme 9. The DBOS panel consists of two SEL 751A relays with associated terminal blocks, test blocks, and wiring designed to be installed on a 19" relay rack. The panel is 16 rack units (28") tall.
FPL	Increase Station Capacities	Increase the capacities of existing distribution station by adding transformers with LMS systems and other associated supportive equipment (breakers, circuit switchers, regulators, switches, etc.).
FPL	MPLS Projects – Over 200 Substations Communication Network's upgrade	FPL data requirements in the substations are increasing. The existing substation SCADA data circuit technology has reached end-of-life and were upgraded to data rates up to 1.5MHz. The enhancement performed required additional infrastructure to be compliant to the communication provider's protection tariffs involving GPR studies and High Voltage Isolation.
FPL	Upgrade Substation Battery monitoring System at Over 100 Substation	Installation of IED type Battery Monitoring System as a part of FPL's Energy Smart Florida Project consist of but is not limited to the removal of the existing battery alarm module, the installation, assembly, termination, testing and commissioning of BA300 battery alarm monitor. This new system will automatic check and notify operations the status and health of the battery system.

FPL, FL	Smart Grid Substation Upgrades	Engineer, Construct and Commission upgrades at 256 substations communication, protection, automation and control systems. This included replacement of electromechanical protection relays with IED microprocessor based relays and fiber optic communications; reclosing controls modifications; Installed or modified the three types of Novatech Substation Communications Processors used for interrogation of new and existing IEDS for direct access into SCADA data repository.
FPL, FL	Various Substations	Installed Automatic Field Switching SSN Communication Systems in Various Distribution (90) Substation.
FPL, FL	Various Substations	EPC contract to upgrade (DBOS/DBOM at 22 sites) the substation controls to allow automated control in restoring the substation load.
FPL, FL	Various Substations	Performed Engineering for the upgrades (over 200 sites) of existing substation SCADA data circuit because of technology reaching end of life.
FPL, FL	Various Substations	Replaced existing 500 and 230kV transmission line terminals (4) protective systems.
HES	Communication Network/SCADA/AGC Systems	Design, engineer and installation of the new Automatic Generator Control and SCADA system along with SONet communication network system using latest smart technologies.
FPL, FL	Various Substations- Scheme 8 DBOS	Engineer upgrade to Scheme 8 DBOS differential protection in a cabinet where no space was available in the control room. Where space is available in the control room, then panel replacements.
FPL, FL	Various Substations- RTUs & SCADA	Replace or upgrade RTUs for the SCADA in both transmission and distribution substations. This includes the interface to Substation Communications Processors for direct communication to Protective Relays and other IEDs in the substation control room and out in the switchyard, typically with Fiber or RS485 connections.
FPL, FL	Various Substations- Pumphouses & Cable Alm Systems Flagami, Port Everglades, Arch Creek, Turkey Point, Miami	Replace Underground Cable Pumphouses- control circuits, AC/DC supplies, Generators, Alarms for Annunciator and SCADA.

SUBSTATION PROJECT EXPERIENCE

Client	Project Name	Description
FPL	Levee Substation	Expand the Levee 500kV switchyard to the west to create two breaker and half bays with two additional line pull-off structures.
FPL	Levee Substation	Levee Substation was identified as critical substation susceptible to contamination based outages. The source of the contamination is primarily dust from the dirt road and surrounding property. For this, project all 500kV insulators in the 500kV Switchyard shall be replaced with RG insulators per FPL substation standards and best practices.
FPL	Levee Substation	Replace six (6) 500/230kV Single Phase Autotransformer. This design included the capabilities of performing the transfer of an installed transformer to a standby transformer.
FPL	Quarry Substation	Construct a new 500/230kV (Quarry) substation with two 500kV (4000A) bays, four 230kV bays, and four single-phase 500/230kV, 500 MVA autotransformers, where one will be used in the spare position. The Quarry substation layout is to accommodate a future ultimate plan for two additional 500kV lines, second autotransformer and additional 230kV lines. Also, allow space for future tertiary shunt reactors and 230kV capacitor banks.
FPL	Quarry Substation	Perimeter LED's & Security Camera Perform Illumination Study for Sugar site including new 500kV Yard Expansion and replacement of all existing HPSV lighting with LED. Update all relevant substation prints to incorporate the cameras and security related equipment including but not limited to card readers and gate motor operators as stipulated by Corporate Security as well as required conduits, grounding, circuits, and any other required details.
FPL	Raven Substation	New 230/115kV Substation – Construct one (1) 230kV bay rated for 2000 amps with one (1) line pull off structure and connections from the West 230kV and 115kV buses to the autotransformer and three (3) 115kV bays rated 2000 amps with five (5) line pull-off structures as shown in figure A. Install station lightning system, cameras and card reader.
FPL	TRV Modernization Project	Engineered and designed the Addition of Reactors & Taming Capacitors to multiple stations.
FPL, FL	500/230kV Poinsett Substation	Modified the 500 and 230kV yards protection for the addition of a 500kV bus tie breaker.
FPL, FL	Bobwhite Substation	Designed and Engineered a New Transmission Substation with five (5) 230kV 3000A breaker and a half bays.

FPL, FL	Duval and Palatka Substations	Installation of new 230 kV Transmission Capacitor Banks and protective systems.
FPL, FL	Clear sky 500/230kV switchyard	Developed layout for a 6 breaker 500kV yard with two single-phase banks of 500/230kV Autos and a six bay 20 breaker 230kV dead end towers.
FPL, FL	Levee 500kV yard	Reconfigure 500kV yard using CIGT in order to remove the 500kV dead end towers.
FPL, FL	Martin 500kV Switchyard	Engineered the replacement of breaker, one wavetrap and two sets of CCVT's.
FPL, FL	Various Substations	Replaced existing 138 and 230 kV transmission Capacitor Banks and protective systems.
NextEra, USA	Various Switchyards	Conducted Relay Loadability review pursuant to NERC PRC-23 "Transmission Relay loadability" requirements.
NEER, USA	Relay settings & modifications	– Genesis Solar plant relay review – Lamar power plant: relays replacement, battery monitor, generator breaker TC, CC monitor – Marcus Hook power plant: relays replacement (multiple projects), generator breaker TC, CC monitor – Harper Lake Solar plant relay replacement – Silver States Solar facility relay setting review
FPL, FL	Various Substations- Cap Banks- Dsbn or Transmission	Add or replace Distribution Capacitor Banks and protection packages. Add or replace Transmission Cap Banks Systems.
FPL, FL	Various Substations- Dsbn breakers and upgrade ampacity projects and distribution power transformers additions or upgrade replacements (Breakers, switches, transformers, circuit switchers, MOs, foundations, bus and insulators, oil containment)	Replace distribution feeder breakers and bus tie breakers; add new feeder positions including breakers, switches, regulators, fbcts, etc. both in "old pipe rack" stations as well as in "newer moduflex" stations. During transformer additions or increase capacity projects, revise breaker load balancing for bay assignments to a given transformer and revise autore restoration & fault bus schemes as required. Evaluate foundations and oil pit containment as required. During increase ampacity projects, modify bus and switches to accommodate new ratings.

FPL, FL	Various Substations- Battery Systems (Chargers, Batteries, Alarms, Transfer & Disconnect Switches, Backup Chargers, Redundancy Separation of circuits)	Evaluate sizing, install, or replace battery bank systems in transmission and distribution substations. In transmission redundancy projects, this includes separation of the DC circuits for primary systems and secondary systems where two battery bank systems are being used.
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TRANSMISSION LINES PROJECT EXPERIENCE

Client	Project Name	Description
FPL, FL	Oakland Park-Pompano 138kV	Existing wood pole structures replacement with new round spun concrete poles scope included developing PLS CADD Project model, selecting new route/poles locations, developing permit and construction drawings, cost estimates, construction packages, and ordering poles and materials.
FPL, FL	Oakland Park-Sistrunk #2 138kV	Project initially started as a hardening project consisting of replacing existing wood pole structures with new round spun concrete poles. Due to the inaccessibility for construction and maintenance of existing wood structures to be replaced it was decided to relocate the portion of line on existing road right of way with a portion of the line sharing an existing distribution easement. Project scope included developing PLS CADD model, selecting new route/poles locations, developing permit and construction drawings, cost estimates, construction packages, and ordering poles and materials.
FPL, FL	Lauderdale-Palm Aire 138kV	Project consisted of the replacement of three wood pole structures including two wood H-Frames structures inside FPL Lauderdale Plant right of way. Project scope included developing PLS CADD model, selecting new route/poles locations, developing permit and construction drawings, environmental permitting support, cost estimates, construction packages, and ordering poles and materials.
FPL, FL	Airport-Dade 138kV Line	Project consisted of the replacement of existing wood pole structures and relocation of a portion of line thru Dade County School Board property/park. Project scope included permitting support for a new easement thru Dade County School Board property/park, replacing/upgrade of existing 556 ACSR conductor to 954 ACSR conductor, evaluation of existing structures and insulators for new conductor size, developing PLS CADD model, developing permit and construction drawings, cost estimates, construction packages, and ordering poles and materials.

FPL, FL	Coast-Myakka 138kV line ampacity upgrade	Currently working on an ampacity upgrade study on a section of line to increase ampacity from 1015A @75C to 1320A @ 115C and the replacement of five existing double circuit concrete H-Frames with two new singles circuit round spun concrete poles. Project scope includes developing PLS CADD model, performing survey point clearance evaluation, selecting poles locations for the double circuit concrete H-Frames replacement, developing permit and construction drawings, environmental permitting support, cost estimates, construction packages, and ordering poles and materials.
Alcan, Canada	Grounding and Shielding Study	Performed an evaluation and testing of approximately 50KM of 345kV line counterpoise grounding and bonding system to determine the line risk exposure to lightning strikes and the effective grounding of the towers. Existing 300kV substation ground grid resistance field measurement and ground grid integrity tests- Performed station ground grid step and touch potential rise. Provided ground grid study resulting in additional ground conductors to improve step and touch potential to meet IEEE safety standards.
CLW, FL	City of Lake Worth Beach - Engineer total upgrading and rebuilding existing substation. - Engineer new Dsbn substation - Provide Project Management	Revised existing substation to new design and provided new design standards to CLW for all work in the substation. Providing design and engineering for constructing a new distribution substation and oversight for commissioning personnel.
FPL, FL	Various Substations i.e. Garden- Little River- Market- 40 th Street 138kV- Miami Shores- Cutler Johnson 138/240kV- Manatee- Cape Canaveral- Brevard- Bunnell- Transmission Line Panel Replacement Redundancy	Replace existing transmission line panels, replace differential panels in order to perform redundancy modifications to separate the dc systems and tripping so that primary equipment and tripping is on one battery bank and secondary equipment and tripping is on the second battery bank. Replace Power Line Carrier equipment. Add DFR modules and revise configuration of DFRs. Evaluate CVTs, Tuners, and connection cables. At some locations, upgrade station ampacity by replacing or adding Autotransformers.
FPL, FL	Various Substations- CVTs, free standing CTs, PTs- replace or new installs 69kV to 500kV	Engineer the addition or replacement of various instrument transformers, such as CVTs, free standing CTs, PTs, Metering Units (MUs-Electromechanical as well as Fiber).

PARTIAL CLIENT LIST



CUSTOMER LISTING

Indicated below are the Client members of the ECF Management Team that have performed consulting, engineering, and design for over the past twenty five years. Detailed information with regard to projects and scope is available upon request.

ABB, Inc.
AREVA
AES Corporation
Bahamas Power & Light
Chevron
Competitive Powers Ventures
Competitive Power Ventures
Consolidated Edison Consolidated
Edison of NY, Inc. Duke Energy
El Paso Electric
Florida Power & Light (FPL)
General Electric
Georgia Pacific Corporation
Georgia Power Company
Transmission Company
Homestead Electric Services (HES)
Lake Worth Beach (CLU)

NextEra (NEER)
Northeast Utilities
NRG North America
NSTAR/Boston Edison Company
NYSEG
PEPCO
PHI - Companies
Progress Energy
Public Service of New Hampshire
Rochester Gas and Electric
Seminole Electric Coop

KEY PERSONNEL



Indicated below are the key members of ECF Management Team. Detailed information and resumes of our key personnel and management team is available upon request.

Everett C. Fennell, P.E. – Managing Principal/CEO & President- West Palm Beach, FL – (BSEE Tenn State U)

Mr. Fennell has over 45 years of experience and progressive responsibilities in the electrical power business. Providing services in project development activities, marketing, designing and studies for electrical facilities associated with electrical utility infrastructures. His qualifications include hands-on planning, managing, designing, cost estimating and project management with a background of experience which includes extensive service with public and private-sector clientele including electrical utilities, large industrials, project developers and government entities.

Richard Ware, P.E – Project Manager & Civil Engineer- (BS in Civil Engr- U of AL)

Mr. Ware is a licensed professional engineer with over 20 years of extensive design and project management experience in engineering and construction projects. He started his career as a structural engineer and has advanced through various levels of responsibility including lead structural engineer, substation design engineer, construction site engineer, project manager for substation and transmission line projects, and most recently managing projects and directing a design group including substation design engineers, protection & controls engineers, designers and drafters. He also has experience in construction and client relations/business development. He possesses the technical knowledge as well as the necessary management and organizational skills necessary to lead and direct project teams.

Alberto Teira, P.E. – Principal Substation Engineer- (BSEE in Power & BS in Civil/Construction- U of FL; MBA- U of Miami)

Mr. Teira has over 43 years of experience and progressive responsibility in the electric utility engineering design and consulting. His qualification includes 35 years as a Substation Engineer with project work including new installations, modifications and upgrades of substation facilities for all aspect of the power system. Additionally Mr. Teira was the Manager of the Substation and Transmission groups for FPL.

Jerome Fennell – Senior Systems Engineer

Mr. Fennell has over 35 years of experience in system/equipment life cycle design and development for DOD and Commercial customers. As a Senior Systems Engineer Mr. Fennell possess strong leadership, technical knowledge and experience in system/product reliability,

maintainability, system safety, logistics engineering and project management. Hardware and software technical aptitude includes: Reliability Block Diagram (RBD), failure rate allocation and assessment, Trade Studies, Reliability/ Maintainability/Availability (RMA) modeling and prediction, Failure Modes Effects and Criticality Analysis (FMECA), Fault Tree Analysis (FTA), Maintenance Task Analysis (MTA), test and evaluation, Failure Reporting and Criticality Analysis System (FRACAS), etc. Mr. Fennell is also a team leader/individual contributor performing in multi team environments.

Joe H. Chau, P.E. – Principal Electrical Engineer- (MSEE- GaTech; BSEE GaTech)

Mr. Chau has over 46 years of experience in electrical engineering, design and application of protection and control on the electrical power system while providing services in project development activities, marketing, designing and studies for electrical facilities associated with an electrical utility infrastructure. His qualifications include hands-on planning, managing, designing, cost estimating and project management with a background of experience which includes extensive service with public and private-sector clientele including electrical utilities, PV site design, large industrials, project developers and government entities. Was also a member of IEEE WG SC21 on PV Interconnection Std P929.

Bruce Pickett, P.E. – Principal Electrical Engineer & Vice President of Engineering & Studies- (BSEE U of Miami; ASET-MDJC)

Mr. Pickett has over 50 years of experience in electrical engineering, design and application of protection and control on the electrical power system and field commissioning. He has provided services in designing and studies for electrical facilities associated with an electrical utility infrastructure. His qualifications include hands-on commissioning and testing with a background of experience which includes extensive service with public and private-sector clientele including electrical utilities, large industrials, project developers and government entities. Mr. Pickett has participated in the IEEE PSRC working groups for the IEEE committee for over 31 years, also holding the position of Vice-Chair of the Substations Protection Subcommittee for three years.

Tyrone Westcarth, P.E. – Manager of Protection & Control Engineering & Studies- (BSEE Power Syst- FL International U)

Mr. Westcarth has over 15 year of experience in Protection and Control, which also includes his past experience as an electrical design engineer with experience in the design of 250Kw generators, wastewater plants, water plant expansion, public work facility 4000 gallon fuel station, roadway lighting, and power distribution. Mr. Westcarth has had the responsibility of overseeing the design of electrical and photometric roadway lighting and illumination studies, engineering and specifications for a master lift station equipped with 2- 75hp pump and stand by generator, the electrical redesign of a master lift station consisting of 30- 60hp pumps and storm water pump stations 1&2 electrical design. In addition to managing the P&C Engineering group, Mr. Westcarth also performs relay system modelling & studies, and protective relay settings.

Headian Plummer, Supervisor of Substation Engineering- (BS Biomedical Physics & Mathematics- City College of NY; BSEE CA Nat'l U; Diploma Electrical Power Engineering- U of Technology Jamaica)

Mr. Plummer has over 17 years experience in the utility and consultant field with a strong background in Electrical Engineering and Design. Years of successful experience designing multifaceted projects in New York and Florida related to substations operating and transmission organization, including corrosion/cathodic protection. Grounding and Ground grids using CDEGS.

Tarek El-Sadek, P.E., Principal Planning Engineer (Graduate work in Power Engr & BS Computer Engr N.Carolina State U.; Subst Design Certificate- Milwaukee State U; OSHA 10 Certified)

Mr. El-Sadek has over 18 years of technical experience in the following power systems analyses areas: Feasibility Studies, System Impact Studies, Power Factor Requirements Studies, System Security Assessment Studies, Capacitor Switching Transient Studies, Stability Model Assessment and Development, Short Circuit Studies, Relay Settings, and Coordination Studies.

Fernando Rodriquez – Transmission Engineering Manager – (BSEE U of Miami)

Mr. Rodriguez has over 25 years of progressively responsible experience in the electric utility and consulting engineering designing overhead transmission lines. His transmission line engineering experience includes new overhead transmission line projects, existing line relocations, line re-conductoring and upgrades, proposal development for transmission line projects and conceptual/preliminary line design. Prior to ECF, Mr. Rodriguez held positions with three large IOU's as well as several major consulting engineering firms. Mr. Rodriguez has a BSEE from the University of Miami and is an avid audiophile who enjoys building high end vacuum tube audio equipment.

Jerry Wong, PhD, P.E., F.SEI - Sr. Staff Structure Engineer- PhD & MS-Structural U of Cincinnati, OH;; BSE Taipei Institute of Tech

Dr. Wong has over 52 years of experience in structural engineering field. This also includes holding research and teaching positions at university level. His areas of focus is mostly in wind engineering and wind-induced vibration study, material utilization, as well as computerized structural modeling techniques. Before retired from FPL, he was responsible for many major tasks related to transmission grid structural enhancements. With his technical background, Dr. Wong is an active member of several ASCE/SEI technical committees and a Principle Member of NESC Subcommittee 5, "Overhead Lines - Strength and Loading". A career design engineer with construction background, his projects win many awards in buildings, bridges, and electrical transmission engineering fields. Dr. Wong is one of the 64 inaugural members selected to the "Fellowship" in Structural Engineering Institute and a past recipient of SEI "Gene Wilhoite Innovations in Transmission Line Engineering Award" in 2004 (a life-time achievement award).

D. Sean Cummings- Project Manager (MBA-Loyola U; BSE- Louisiana State U; Power Syst Certif- GaTech)

Mr. Cummings has over 18 years of experience in Substation Engineering Design and Project Management, having worked at Entergy Services and ECF. In addition to his BSE, he also has his MBA. Responsibilities at ECF progressed from substation engineer, to manager of substation engineering to project manager for local utility clients. Qualifications include hands-on planning, managing, designing, cost estimating and project management with a background of experience which includes extensive service with public and private-sector clientele including electrical utilities, large industrials, project developers and government entities.

Jolie Gonzalez- Manager of Distribution Engineering Services, (BSEE U of Miami)

Mrs. Gonzalez has over 20 years of experience in the power industry, from distribution customer manager to P&C project engineer. She is highly analytical and research orientated. She has developed the Distribution Contract Services division at ECF Consultants where she currently serves as Manager and is experienced as a project manager, designer, and analyst. As a P&C

engineer, she worked on 138kV – 500kV substations breaker replacements, increased capacity, and fault recorders. In the distribution arena, she has used SCADA and reliability data to determine reasons for customer outages for utility clients, increased reliability to meet the client targets by “owning” feeder lines, and assisted in saving the client over 1 million dollars by reducing O&M spending. In addition, currently as the Manager of Business Development, she recruits and hires engineers and field supervision and discovers new opportunities to grow the company.

CONTACT INFORMATION



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