PROPOSAL

RFP 22-25 – Docket No. TBD, Pattern Energy, ex parte. In re: Application for Certification of the Southern Spirit Transmission Project

Critical Technologies Consulting, LLC
Innovative Ideas for Shaping the Future
November 9, 2022

Critical Technologies Consulting, LLC

Kathryn H. Bowman
Executive Counsel
Louisiana Public Service Commission
602 North Fifth Street (Galvez Bldg)
P.O. Box 91154
Baton Rouge, Louisiana 70821-9154

November 9, 2022

Dear Ms. Bowman,

We are pleased to submit this Proposal to the Louisiana Public Service Commission for outside consultants related to RFP 22-25 Docket TBD, Pattern Energy, ex parte. In re: Application for Certification of the Southern Spirit Transmission Project. The outside consultants will assist Commission Staff in the review of the upcoming application by Pattern Energy ("Pattern Energy" or the "Company"). This application will request certification of the Southern Spirit Transmission Project, consisting of a new High Voltage Direct Current ("HVDC") 525 kV transmission line beginning in northwest Louisiana, at the Texas border, and extend approximately 400 miles to Mississippi. Pattern Energy has indicated the anticipated filing will occur by December 31, 2022.

Pattern Energy seeks this approval in accordance with the Commission's General Order dated October 10, 2013, which requires advanced notice and certification for any transmission facility that is owned or controlled by an independent transmission company and will be located in whole or in part within the State of Louisiana.

Critical Technologies Consulting, LLC, (CTC) with our main office located in Mesa, Arizona, and satellite offices in Massachusetts, New Jersey, and Kentucky is registered as a small woman-owned business that specializes in consulting and independent engineering, procurement, and construction management (EPC) consulting in energy and power projects. We are made up of a group of highly specialized professionals with extensive credentials. As a team, CTC personnel have worked together on numerous projects over the past 35 years as you will see in our proposal. We have the knowledge, experience and understanding of the issues, design challenges, appropriate costs, installation methods, and operational and maintenance issues which are being addressed in this Docket.

Our expertise and experience working with a variety of clients and our extensive Consulting, Engineering/Procurement, Construction Management, and

Operations and maintenance experience with numerous energy projects including HVDC ensures we will deliver the best value for this assignment.

CTC personnel participated in an Independent Engineering and Consultants assignment in which we conducted an engineering due diligence review of the electrical systems by reviewing, and providing comments on Siemens 2.3 MW wind turbine generators and balance of plant electrical systems; the transmission grid system impact study and technical requirements and energy supply agreement. We also monitored the installation, testing and commissioning of approximately 200 KM of high voltage power transmission lines over the Andes mountains for the Parque El Arrayan Spa Project in Chile, which was designed and constructed by Pattern Energy.

Our personnel have also accomplished numerous independent engineering assignments for lenders and developers involving HVDC applications in the Northeast of the US and in the mid-Atlantic area and participated in the design of infrastructure projects supporting HVDC designs such as the converter stations.

We sincerely hope you find our proposal acceptable, and we look forward to working with you in this important Project.

Sincerely,

_____

Ben Hill, President

Critical Technologies Consulting, LLC.

Critical Technologies Consulting, LLC

Innovative Ideas for Shaping the Future

Consulting, Engineering, Procurement, Construction Management, Due Diligence, and Risk Management

Critical Technologies Consulting, LLC

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PROPOSAL

EXECUTIVE SUMMARY

Pattern Energy is a renewable energy and infrastructure development company that develops, constructs, owns, and operates wind and solar generation, transmission, and energy storage facilities. Pattern Energy developed the first HVDC transmission line in California and has developed other transmission lines throughout the United States, and worldwide.

The Southern Spirit Transmission Project ("Project") is a new transmission line under development by Pattern Energy to connect regional grid systems - the Electric Reliability Council of Texas ("ERCOT") with energy markets in the southeastern United States. Per the Company, the Project will facilitate a valuable connection to diverse energy resources and provide significant reliability benefits throughout both regions, where there is currently no connection between these two regions. As indicated above, the Project will begin near the Texas border in northwest Louisiana and extend approximately 400 miles to eastern Mississippi. The Project will connect into ERCOT by way of the Rusk to Panola transmission project in partnership with Garland Power & Light and will connect to southeastern markets at strategic locations.

Per the Company, a siting study has been developed by Burns & McDonnell, Inc., which has evaluated rights of way, land use, and environmental considerations in connection with the Project, and which supports the selection of Pattern Energy's preferred route. As a starting point, CTC personnel will review this siting study for adequacy in accordance with standard engineering practices and in conformance with any requirements LPSC Staff may impose on this Project.

In preliminary conversations with Pattern Energy, the Commission's approval may or may not be necessary for the Project based upon requirements within Commission General Order dated October 10, 2013; however, out of an abundance of caution, Pattern Energy anticipates filing this request for certification in order to provide specific Project information to the Commission and allow the Commission to make the determination on whether certification is necessary.

We have included in this proposal a Scope of Representation, a proposed Approach and Action Plan, to support the Commission Staff in this matter. We also include the experience and qualifications of our team, a preliminary list of deliverables, our proposed rate schedule and an estimate of the costs based on the scope of work and potential schedule for the assignment.

CTC brings to the Staff a team of highly experienced personnel with the necessary technical, utility, and regulatory expertise and backgrounds in HVDC project evaluations to provide real value to the Commission in evaluating Pattern Energy’s independent transmission Project.

The CTC team will assist the Staff and bring the CTC team’s experience collaboratively in the design and independent reviews of Pattern Energy’s HVDC transmission towers, converter

stations and other systems and equipment involved in the safe and reliable HVDC transmission of electric power.

We include in this proposal materials which describe our expertise and qualifications, along with a narrative that describes our anticipated approach to supporting the Commission Staff in this matter. We do not have any conflicts of interest that would impair our ability to provide these services to the Commission and we are free to do so.

INTRODUCTION

Critical Technologies Consulting (CTC) is pleased to submit its proposal to the Louisiana Public Service Commission to assist its Staff to assess the status and maintenance of the HVDC transmission grid being proposed by Pattern Energy which would be crossing Louisiana for approximately 400 miles as well as to investigate whether there may be any impacts to the citizens of Louisiana or the State of Louisiana. CTC will assist the Staff in examining the options available and areas that may affect the safety, and resilience of Pattern Energy's HVDC grid system design.

SCOPE OF REPRESENTATION

The scope of representation consists of assisting Staff in the review of Pattern Energy's certification application, along with testimony and exhibits; draft and assist in the drafting of data requests; analyze data responses; participate in formal status conferences, pre-trial conferences, depositions, and hearings (whether contested or stipulation); draft and prepare pre-filed testimony in support of Staff's ultimate recommendation, together with exhibits supporting the pre-filed testimony; review and respond to any rebuttal testimony; assist in preparing any necessary direct and cross-answering testimony; assist in trial preparation, including cross-examination of witnesses and drafting pleadings, motions, and exceptions related thereto; review and analyze potential stipulation terms; and assist in drafting briefing sheets and orders of the Commission, as necessary. Additionally, CTC personnel shall be available to participate in informal conference calls, meetings and conferences with the Commission and Staff as well as attending any B&Es related to the application. The scope of the work shall continue through the conclusion of the certification docket(s) through Commission vote, regardless of whether said vote is the result of a stipulated agreement or contested hearing recommendation.

PERIOD OF REPRESENTATION

The time-period estimated to complete the Scope of Representation is approximately 4 to 6 months.

PROPOSED APPROACH AND PLAN OF ACTION

The Proposed Plan of Action to assist Staff is broken into various **Tasks** shown below using the Scope of Representation and scope of work presented in the Request for Proposals RFP 22-25.

A **Kick-off session** will be held with Staff to meet and greet the key personnel, identify key roles and responsibilities, agree on the various aspects and Task definitions of this assignment, review prior work accomplished by the Commission's Staff, and the expected schedule of activities.

The Definitions of the **Tasks** are as follows:

1. **Review** any briefings, reports and documents which have been provided by Pattern Energy to the LPSC Staff up to this point.
2. **Set up coordination with Staff** to discuss and prioritize those issues or points the Staff wants assistance from CTC. Sign confidentiality agreements to allow the review to be conducted properly.
3. **Review documentation** submitted by Pattern Energy on their Southern Spirit Transmission Project, the Project, including technical information, methods of funding this Project and other types of information such as the status of federal permit applications and applications in Louisiana, Texas and Mississippi.
4. **Conduct an independent due diligence** review and analysis of the Burns and McDonald Siting Report and any other documentation including, conceptual design, environmental impact evaluations, permit applications in Louisiana and schedules and cost estimates Pattern Energy may have available for the Staff and CTC for review.
5. **Requests for Information (RFIs)** will be requested to Pattern Energy on the key features of this Project and its impact on Louisiana.
6. CTC will **evaluate any impacts on Louisiana and rate payers and any positive attributes the Project provides Louisiana and its people. CTC may** provide recommendations to the Staff and the Commission to benefit potential Louisiana customers in safety, reliability, and resiliency even though it is not envisioned by Pattern Energy to interconnect within the State of Louisiana based on preliminary review of publicly available information attached to this proposal.
7. **CTC will develop conclusions** from the due diligence reviews conducted to achieve the objectives of the Commission, and assist with the drafting of Staff recommendations, A

Summary Report (power point format) will be issued for discussion with the Staff and the Commissioners to identify the key issues which need attention.

Select CTC experts will attend and testify at the Commission's Business and Executive Sessions as needed. This task will be further identified and approved by Staff once CTC jointly with Staff determine what are the specific issues the CTC team will be called upon to defend, participate and testify on.

8. **CTC will act as a catalyst to hold collaborative discussions** with Pattern Energy to identify and develop solutions to the potential risk issues which may be identified during this independent review being conducted by Staff and CTC personnel.
9. **Recommend an audit schedule to be developed with Staff** to confirm that these solutions are properly implemented by Pattern Energy over the time frame agreed.
10. CTC commits to work jointly with the Legal Staff of the LPSC in implementing this independent review.

DELIVERABLE PRODUCTS

CTC will develop reports and documentation as requested by Staff.

There are reports CTC has presently identified as part of its proposed Action Plan for use to communicate with Staff and jointly develop strategies and plans to support the Commission on this Docket. These reports will be issued in power point format and are as follows:

Progress Report

At the beginning of every month, a progress report covering the activities accomplished the prior month will be issued in power point format to Staff to indicate what has been accomplished, the key issues being addressed, schedule progress, cost monitoring and any recommendations CTC may have for Staff to consider.

Project Independent Review Report:

A summary report will be issued identifying the documents reviewed, the status/results of the RFIs and the preliminary conclusions based on the documents and responses received. This report will be reviewed with the Staff and comments discussed and resolved.

Slide Presentation:

A power point presentation will be developed and presented to the Commissioners as to the results of the joint Staff/CTC reviews.

CONFLICTS OF INTEREST

CTC and its personnel do not have any conflicts of interest concerning this Docket scope of representation and none of the CTC personnel have any work with Pattern Energy or any of the entities subject to the Louisiana Public Service Commission (LPSC) regulatory responsibilities.

CTC personnel have worked in the past for various utilities, public service commission staffs, ISOs, IPPs, regulatory bodies and other entities in the power and oil and gas fields as part of their employment history with other companies in the past. Their resumes indicate that kind of experience.

CTC currently represents the Louisiana Public Service Commission, Arkansas Public Service Commission, and the Public Utility Commission of New Orleans in the evaluation of the prudence of the decisions by Entergy during the operations and outages at the Grand Gulf Nuclear facility. A detailed report of technical deficiencies at Grand Gulf as well as a detailed Prudence review and written as well as oral testimony are being performed.

Additionally, CTC supports the Louisiana Public Service Commission Staff in Dockets No. R-35394 and Docket No. R-36226. These assignments are not considered as conflicts of interest.

CTC RESUME AND QUALIFICATIONS

The CTC team has the requisite knowledge of the topics involving this Docket and discussed in the RFP 22-25, in addition to those provided in the Commission's General Order dated November 10, 2014. CTC has been pre-qualified by the Commission to receive this RFP under Docket TBD.

CTC has assembled a very experienced and qualified team of personnel with the requisite knowledge, of the topics covered in the RFP's Scope of Representation and the proposed Action Plan to achieve the Commission's strategic objectives under this Docket.

Key personnel among the CTC personnel have substantive experience with HVDC and the challenges it poses. We have evaluated various projects in the US such as the undersea and above ground HVDC lines being considered as part of the offshore wind power development going on in offshore New England.

The CTC is familiar with and have experience involving HVDC transmission construction, certification, and cost-allocation as well as the operation of the LPSC requirements applicable to LPSC-jurisdictional electric utilities, including state and federal jurisdictional and regulatory compliance issues related to transmission planning and construction. In addition to those CTC personnel are qualified and are prepared to render expert testimony regarding and have knowledge of:

1) Public interest criteria for approval and monitoring of electric generating and transmission facilities.
2) Construction, design and operation of transmission facilities.
3) NERC, SERC, SPP, MISO, and any other applicable standards associated with bulk electric transmission facilities to be located within Louisiana.
4) Environmental criteria associated with the design and construction of bulk electric transmission facilities.
5) Appropriate accounting standards and practices applicable to the Southern Spirit Transmission Project.
6) Cost allocation methodologies for the allocation of investment and expenses among affiliates and utilities, including the relationship of a parent company to its subsidiary operating companies; the transfer of investment and costs among affiliates and utilities, and the provision of services among affiliates and utilities.
7) Applicable utility tariffs, including, but not necessarily limited to SPP and MISO tariffs.
8) Principles associated with resource acquisitions and the competitive process, including but not limited to analyzing utility resource needs and whether the considered resource(s) is able to meet those needs, particularly for renewable/solar resources.
9) SPP and MISO tariffs, rules and planning processes, generally, and specifically related to resource adequacy planning processes and use of zonal resource credits.

CTC will be able to provide technical advice regarding HVDC industry standards and widely accepted industry practices regarding transmission grids, and maintenance thereof, as outlined above. CTC understands that Staff will give consideration for experience and knowledge of transmission system standards, as well as utility regulation and cost allocation methodologies.

The CTC team has consulting personnel who are licensed engineers and in good standing with applicable engineering licensing and certification boards.

More specifically, the team assembled by CTC for this assignment, are experienced professionals in multidisciplinary areas specifically applicable to the needs specified in this Docket including HVDC Transmission lines:

- Engineering and design, procurement, construction of all aspects of electric transmission and distribution including:
    - Converter Stations (AC to DC and DC to AC), Switchyards, substations, grids and microgrids, energy storage and utilizing lines at various voltages including 550 kV down to 4 kV.
    - Transmission towers and structural support systems made of wood, composites, reinforced concrete, and steel.
    - Renewable and other generation supply types.
    - Emergency planning and restoration planning for various disruptive events.

  - Drone inspection systems.
- Project Technical/Financial Transactions.
- Asset Acquisitions.
- Program Designs.
- Program Management and Operations and Maintenance Management.
- Engineering, Procurement and Construction Management from generation plants to transmission and distribution systems at various locations throughout the country.
- Independent technology evaluations of HVDC systems including distributed systems, advancing resilience in transmission and distribution systems, climate change minimization, advanced thermal and renewable technologies and other technologies involving decarbonization such as the use of hydrogen with natural gas, etc.
- Independent evaluations of HVDC transmission and distribution systems
- Commercial and regulatory evaluation of new technology developments.
- Emergency plans and restoration programs development involving disruptive events at renewable, fossil, and nuclear power stations.
- Development of resiliency plans and programs.

The CTC team professional experience consists of a combined expertise of:

- Our team has an average of 35 years of experience of working in the engineering field involving engineering, procurement, construction, and operations and maintenance services to electric utilities from generation to transmission, distribution to interconnection to residential, commercial, and industrial customers and the management of such services.
- Bringing the potential of over 40 personnel with a variety of specialized expertise in the areas important to the issues on this Docket TBD.
- Since the mid-1980s, CTC personnel have worked in over 300 projects involving independent engineering services and consulting to a variety of clients, from utilities, lenders, investors, operators, DOE, PSC staffs, local regulatory agencies, and many other clients in various states such as Arkansas, Louisiana, Georgia, Texas, Florida, Mississippi, Alabama, Missouri, Massachusetts, NY, Connecticut, Maine, New Hampshire, Canada, Virginia, California, Arizona, New Mexico, North and South Carolina, Utah, and other states and international locations.

Successfully utilizing the strengths, talents, and expertise of our seasoned professionals, we provide customized, innovative, high quality and customer focused consulting services to the Staff. Our professionals have the industry expertise and knowledge closely following technical, managerial, and business market trends in the Power industry covering transmission and distribution and generation systems.

RECENT ASSIGNMENTS

Client	Description	Location
Anbaric and other developers	Independent evaluation of HVDC technology application to offshore wind gathering stations and conversion from AC at the wind station to DC for undersea transmission to OH transmission in-land of the HVDC power to be converted to AC at appropriate substations.	**Offshore New England**
Neptune Cable	Assisted Siemens in the design and construction of Converters both in NJ and NY (LI). Participated as independent consultants to review the designs and provided value engineering to minimize infrastructure costs this being the first HVDC cable undersea at NY Harbor	**NYC Harbor from NJ to NY (Long Island)**
Various Project Developers	Conducted independent engineering reviews of various HVDC projects along the Hudson and in Lake Champlain covering undersea and Overhead HVDC transmission	**NY and Vermont**
Louisiana Public Service Commission Staff	Proceeding to Examine Options Pertaining to Pole Viability, Pole Attachments, and all Areas that may Affect the Reliability and Sustainability of Louisiana's Electric Utility Distribution Grid	**State of Louisiana**
Stone Pigman (Representing LPSC) **Denton (representing CNO)** **Stinson, LLP (representing APSC)**	Technical reviews/reports/testimony related to the Grand Gulf Nuclear Power Plant imprudence case before FERC.	**Grand Gulf Nuclear Power Plant** **Louisiana** **Arkansas** **City of New Orleans**
Mississippi Public Service Commission Staff (MPUS)	Conducted Independent Engineering due diligence on the new 600 MW Integrated Gasification Combined Cycle (IGCC) – including the technical and commercial viability, cost, schedule, engineering, and construction monitoring, including 7 switchyard modifications and 150 miles of new Transmission poles and cabling.	**Kemper Project Meridian, MS**
Banking Lenders Group (Mizuho)	Independent engineering of a 1000 Liters/second desalination plant including 100 miles of 36" in-ground piping and 75 miles of Transmission poles and cables.	**Antofagasta Chile**
Enbridge Project	500kV GIS/GIL Transmission Project. The project scope included conducting an independent technical evaluation and fatal flaws analysis, technology review and a risk assessment for this 500kV transmission project which consists of the engineering-procurement-construction of three 500kV GIS switching stations, 30-miles of 500kV overhead transmission line and 3-miles of double-circuit underground Gas Insulated 500kV transmission line installed in a tunnel.	**California**
Florida Public Service Commission and FP&L	Conducted a detailed technical and commercial independent engineering due diligence and provided written reports and testimony on the prudency of FP&L in the implementation of various upgrades of the FP&L nuclear power plants and transmission systems to accommodate these upgrades	**St Lucie and Turkey Point and switchyards and substations**

Client	Description	Location
Mississippi Public Service Commission Staff (MPUS)	Independent Engineering services and monitoring of the installation of a flue gas desulfurization system for (2) 500 MW Coal Fired Units – Cost, Schedule, Risk Management, and Construction Monitoring.	**Plant Daniel Mississippi**
Independent System Operator (ISO) New England	Conducted independent evaluations of the technical quality, costs, and schedules of projects in the ISO que to determine if they can meet the schedules agreed with the ISO	**New England States**
US Department of Energy Loan Guarantee Program	Participated in independent engineering assignments in over 15 transmission and renewable energy projects under the US DOE Loan Guarantee projects. Provided detailed IE reports on each project with an evaluation of the new technologies involved including commercial viability, assessment of the scoping, construction contracts and cost and schedules and risk management of each project. Conducted construction monitoring over these projects after financial close.	**Various States in the US including Nevada, Arizona, Texas, California, etc.**
Office of Arkansas Attorney General	Review for Prudence of actions and expenditures during forced outages for potential adjustment of customer rates for the Public Service Commission/AG Office.	**Grand Gulf Nuclear Power Plant Arkansas Mississippi**
AEI Energy El Arrayan	115 MW Wind Farm (50 Units) Acting as Independent Engineer representing the Lenders in reviews of the ongoing project and in approval of financial disbursements by the Lenders monthly. This also included 20 miles of new roadways and 45 miles of new transmission and distribution poles and cabling with 3 new switchyards.	**La Serena, Chile**
Georgia Public Service Commission Staff	Representing the Public Service Commissioners and the Ratepayers of the State of Georgia, CTC is responsible for the overall monitoring of the construction, financial, cost and schedule adherence, project progress, and providing twice yearly written and oral testimony in GPSC Hearings.	**Vogtle Nuclear Power Plant Units 3&4 (New Construction)**
PacifiCorp/ Rocky Mountain Power	Red-Butte 345kV Transmission Line Scope included design for this ~200-mile Greenfield transmission line with towers through the mountains of UT and the (2) remote substation expansions including the addition of a series capacitor.	**Red-Butte, Utah**
X24, 69kV Transmission and Distribution Reconductoring & Refurbishment Project	Preparation of Scope Documents and Construction Documents. Engineered structure modifications and replacement structures in accordance with client, regional, and NESC standards. Analysis for various aspects of the transmission line using PLS-CADD. Calculated insulator swing and integrated it into the structure work list to determine where insulator swing issues existed and how much weight needed to be added to meet swing tolerance. Provided field support during construction.	**Mass to Vermont**
Y25, 69kV Line Reconductoring Project	Preparation of scope document. Preparation of Construction Document. Conducted field inspections. Engineered structure modifications and replacement structures in accordance with client, regional and NESC standards. Analysis using PLS-CADD. Created spreadsheet to calculate insulator swing and the amount of weight to add to each conductor to eliminate uplift and to ensure an insulator swing of less than 30 degrees under user defined conditions.	**Mass to Vermont**

Client	Description	Location
Ticonderoga-Republic, Republic-Whitehall, 115kV Refurbishment Project, NY	Line refurbishment of (112) mile long transmission line primarily made up of wood pole structures. Environmental issues and excessively long spans were some of the challenges associated with this project as this line runs through the Adirondack Mountains of upstate NY. Preparation of Construction Document. Conducted field inspections. Engineered structure modifications and replacement structures in accordance with client, regional and NESC standards. Analysis for various aspects of the transmission line using PLS-CADD.	**Ticonderoga, NY**
Private Investor	Conducted an independent technical evaluation and condition assessment of the transmission and distribution assets of a utility in Louisiana for potential lease or acquisition	**Louisiana**
AEI Energy and Lenders **Jaguar Energy Guatemala**	300 MW CFB Coal Project, Acting as Independent Engineer representing the Lenders in reviews of the ongoing project and in approval of financial disbursements by the Lenders monthly, including 70 miles of transmission and distribution poles and cabling.	**Antigua, Guatemala**
AEI Energy **Fenix Project**	520 MW Combined Cycle Project Acting as Independent Engineer representing the Lenders in reviews of the ongoing project and in approval of financial disbursements by the Lenders on a monthly basis including 66 miles of Transmission and Distribution poles and cabling and 1000 feet of outfall piping.	**Lima, Peru**
U.S. Department of Energy (DOE) Loan Guarantee Program	716 MW Integrated Gasification Combined Cycle (IGCC) – Cost, Schedule, Engineering and Construction Evaluation.	**Taylorville, IL**
US Department of Energy (DOE) Loan Guarantee Program	South Texas Nuclear Power Project Units 3 and 4 – Preparation of an Independent Project Review and Analysis including Preparation of the Cost and Construction of the project.	**Bay City, TX**
City Public Service	4 LM6000 Combined Cycle units. Owner Engineer.	**Texas**
Rochester Gas & Electric	300 MW Coal Fired Power Plant – CFB Boiler Based Expansion.	**New York**
Reunion Power	35 MW and 45 MW Biomass Power Project FEED Study.	**Ludlow, VT**
Unistar	Independent technical and commercial review of the 1600 MW Gen 3+ Nuclear Power Project.	**Calvert Cliffs, MD**
Department of Energy	Oversight of the removal of the 440 Building, Nuclear Weapons Plant at Rocky Flats Environmental Technology Site	**Rocky Flats, CO**
Department of Energy	Complete Cost Estimate – Title I, Engineering Phase for the Accelerator Production of Tritium (APT) Project.	**Los Alamos, NM** **Aiken, SC**
Department of Energy	MFFF – Independent Evaluation of Project Construction Costs for Savannah River.	**Aiken, SC**

ESTIMATE OF COSTS

CTC presents below the schedule of hourly rates to be used for the services to be provided. Our standard hourly rates per hour normally vary per consultant from $150.00/hour to $395.00/hour, however, we have discounted our fees for the commission such that they range from $120.00/hour to $265.00/hour as shown below:

Rate Schedule for 2022/2023:

Position	Standard Rate	Discounted Rate
Senior Executive Consultant	$395	$265
Executive Consultant	$370	$230
Senior Consultant	$285	$190
Consultant	$200	$165
Senior Specialist	$250	$190
Specialist	$225	$165
Research and Management	$150	$135
Analyst	$135	$120
Expenses	Actual Cost	Actual Cost

For this assignment CTC has developed a cost estimate of $40,000 for the review of the Burns and McDonald siting report, and another $ 30,000 allocated for RFIs and interrogatory services to be provided. We have included four (4) trips to the Commission offices or other sites for a cost of $2000 per trip or $8,000 in expenses. Total assignment cost of $78,000.

CONCLUSIONS

The CTC team believes that it is well qualified to provide the Staff with the independent engineering expertise, innovation, codes and standards knowledge, utility knowledge, emergency planning and restorative management knowledge needed to assist Staff in examining options pertaining to pole viability, pole attachments, and all areas that may affect the reliability and sustainability of Louisiana's electric utility distribution grid.

CTC key team members are experienced in participating in cases involving public utility regulation, including the presentation of direct testimony, reports and recommendations, assistance in developing cross examination of witnesses, and the analysis of comments and exceptions to proposed recommendations.

Collectively, the CTC professionals possess a full understanding and ability to assist Commission Staff in reviewing the issues related to this Docket. Indeed, the combination of our team members' educational backgrounds, achievements, specific expertise, and prior experience best positions us to provide the LPSC and Staff with the most innovative, extensive, and comprehensive consulting services to assist Staff in achieving the goals and objectives of the Commission for this Docket No. R-36226.

PROPOSED SCHEDULE – BY TASK

1. Receipt of the B&M Siting Report and review of such report (2 months)
2. Interrogatories and reviews of responses (1 to 2 months)
3. Potential meetings with the Commissioners and Staff personnel (1 to 2 months)
4. Estimated time: approximately 4 to 6 months

APPENDICES

A. Detailed Breakdown of Costs (Spreadsheet)

B. Key Personnel BOI's and Resumes

APPENDIX A

Detailed Breakdown of Costs

	Senior /Executive			Specialist			Technical			Research &		
	Average			Average			Average			Average		
Task	HRS	Rate	Total	HRS	Rate	Total	HRS	Rate	Total	HRS	Rate	Total
1	14	$265	$3,710	8	$190	$1,520	0	$160	$0	0	$135	$0
2	8	$265	$2,120		$190	$0	0	$160	$0	0	$135	$0
3	30	$265	$7,950	16	$190	$3,040	0	$160	$0	0	$135	$0
4	70	$265	$18,550	8	$190	$1,520	0	$160	$0	0	$135	$0
5	20	$265	$5,300	8	$190	$1,520	0	$160	$0		$135	$0
6	30	$265	$7,950	16	$190	$3,040	0	$160	$0		$135	$0
7	12	$265	$3,180	0	$190	$0	0	$160	$0		$135	$0
8	12	$265	$3,180	0	$190	$0	0	$160	$0		$135	$0
9	8	$265	$2,120	0	$190	$0	0	$160	$0		$135	$0
10	0	$265	$0	0	$190	$0	0	$160	$0		$135	$0
Rpt 1	10	$265	$2,650	0	$190	$0	0	$160	$0		$135	$0
Rpt 2	10	$265	$2,650	0	$190	$0	0	$160	$0		$135	$0
	224		$59,360	56		$10,640	0		$0	0		$0

Total all Task Work	**$70,000**
Expenses = Four (4) Trips at $2000/Trip = $8,000	**$8,000**
TOTAL ESTIMATED COST	**$78,000**

APPENDIX B

Key Personnel BIOs (Detailed Resumes previously submitted) and Detailed Resume of Ram Saini, P.E.

BEN HILL

President/Senior Executive Consultant

Education

Bachelor of Science, Business Management – Stony Brook University

Certificate in Construction Project Management: University of Florida

Career Highlights

As an Executive Consultant for Construction and Project Management in the Power market, provided all construction and project related activities as well as Owner Engineering, Independent Engineering, and Construction Management Services.

Provided Construction and Project Consulting Services in the power arena including IGCC, coal, nuclear, gas, and renewables. Typical activities included overall project management, pre-construction studies such as labor analysis, cost studies and analysis, economic impacts, construction development of plans and procedures, nuclear plant outage coordination, project layout and reviews of conceptual designs, constructability reviews and preparation of bid documents. Performed post-construction claims mitigation and analysis to determine prudency of performance. Also performed acquisition due-diligence studies.

ALBERT FERRER

Executive V P – Independent Engineering & Consultanting / Project Director

Education

Executive Development Program, Northeastern University

Global Institute for Leadership Development Program

MS Nuclear Engineering, New York University

BS Mechanical Engineering, Manhattan College

Career Highlights

Executive Vice President of Consulting Services with over 40 years of professional experience in the US and international power industry. Al Ferrer is responsible for business development and marketing of all the power consulting services Critical Technologies Consulting provides to its clients including Owner's Engineering, Independent Engineering, due diligence, acquisition services, power plant performance improvement, CO2 strategies, operational risk management, air emissions control retrofits, upgrades and life extension, covering nuclear, coal, gas and combined cycle, biomass, geothermal, IGCC, circulating fluid bed, renewables such as solar, wind and biomass, and other power plant generation technologies.

He worked for Stone & Webster most of his career with his last position serving as Senior Vice President and Managing Director.

He worked for Burns and Roe as VP of the Consulting Division and brought the Consulting Division from 8 personnel to 85 personnel when he left. He has directed and executed work in the US, Canada, Chile, Brazil, Mexico, Malaysia, Indonesia, Thailand, Japan, and Korea. He holds a BS in Mechanical Engineering and an MS in Nuclear Engineering and has participated in Executive Management Educational Programs.

Mr. Ferrer has hands on experience in evaluating HVDC projects in North America having directed the independent engineering evaluations of HVDC technologies and applications in various projects listed in our corporate resume; these included developers and utilities transmitting power from Canada to NYC and developing offshore New England wind projects bringing power to switchyards on the coast using HVDC and transmitting this power to converter stations which then switched to high voltage AC power to be distributed throughout New England and NY State.

CONSTANTINOS (DINOS) NICOLAOU

Exec VP/Executive Consultant

Education

Master of Business Administration – University of Puget Sound, Tacoma, Washington

Bachelor of Science, Economics and Accounting – Staten Island College (CUNY)

Career Highlights

Mr. Nicolaou has over 38 years' experience in project controls and construction planning and scheduling for engineering, construction, start

up and outage projects, within both home and field offices, for major energy projects. His background encompasses IGCC, nuclear and fossil generating stations, with extensive hands-on experience in the use of PRIMAVERA and several other scheduling tools.

RAM K. SAINI, P.E.

Senior Executive Consultant

Education

M.S. in Electrical Engineering, New Jersey Institute of Technology.

B.S. in Electrical Engineering, Birla Institute of Technology and Science

Licensed Professional Engineer in many States in USA

Senior Life Member, Institute of Electrical and Electronics Engineers (IEEE) and Power Engineering Society (PES).

Published a number of Technical Papers in Professional Magazines and presented a paper on BESS in CIGRE Conference.

Career Highlights

Over 45 years of experience in the engineering and design of electrical systems in the United States of America on Power Generation and High Voltage Power Delivery Projects. Supervised and managed the development of conceptual and detailed electrical engineering and design documents for:

New and retrofit of existing power generation facilities including nuclear, coal-fired, combustion gas, waste-to-energy, compressed air energy storage, ocean thermal energy (OTEC) and wind turbine generation projects, solar power plants and battery energy storage system projects.

Engineering and Design of High Voltage AC and AC/DC Converter Station Projects conforming to National and Regional Grid Codes and allowing inter-regional power exchanges. Prepared Generator Interconnection Applications for Independent System Operators (ISOs) and reviewed and provided comments on Feasibility Studies, System Impact Studies, Facility Studies and HV system upgrade costs performed and submitted by ISOs

for interconnection of new power plants to high voltage transmission systems. Performed on-site inspections of new and existing project facility sites and prepared Due Diligence Reports.

Prior Project Experience
(Partial Listing)

HIGH VOLTAGE POWER DELIVERY PROJECTS

- **GE-Linden Cogeneration Power Plant, New Jersey**

  Performed an Independent Engineering Due Diligence for the proposed VFT and the 345 kV cable Forced Cooling Project.

- **Consolidated Edison-Goethals & 49th St GIS Substation Upgrade, New York**

  Prepared a study report for the New York ISO that determined the system upgrade requirements because of the power exchange issues between New Jersey PSE&G and New York Con-Edison by the GE VFT.

- **Irkutskenergo Generation/Transmission Expansion Study, Russia**

  Supervised development of conditional assessment reports for the Irkutskenergo's (Russian Republic) major high voltage substations and transmission lines, and performance of transmission system load flow and short-circuit analyses.

- **PSE&G, Roseland/Jefferson Transmission Line Projects, Maryland, Pennsylvania**

  Developed technical parameters and conceptual designs for the 500 kV transmission lines and conducted cost estimates for the substations.

- **Azerenergy HV Substations, Republic of Azerbaijan**

  Performed on-site walk-down and conditional assessments of Azerenerji's major high voltage substations and transmission lines. Developed implementation plans and cost estimates for the upgrades, supervised performance of short circuit and load flow calculations, and recommended solutions to prevent overloads on transmission lines.

- **Eastern Interconnection Project/Lease Management Corporation, New Mexico**

  Performed technical evaluation and cost estimates of the Eastern Interconnection Project undertaken by the Public Service Company of New

Mexico. The project comprised of a 345 kV transmission line, associated switching equipment, **back-to-back DC converter station** and a 230 kV switchyard.

- **Government of Hong Kong – Transmission & Distribution Studies**

  Reviewed Hong Kong's generation and Transmission and Distribution, and Generation Development Plans with new combined cycle units. Reviewed the electricity demands and generation management strategies and performed optimization studies of the power generation, transmission, and distribution systems.

- **Kennecott Utah Copper, 275 MW Utah Power Plant Repowering, Combined Cycle, Magna, Utah**

  Supervised development of electrical design for HV switchyards and transmission lines for various options. The work consisted of preparation of one-line diagrams, performance of load flow analysis of the KUCC 138kV / 44kV transmission and distribution system utilizing PSSE software.

RENEWAL ENERGY GENERATION PROJECTS

- **National Grid Corporation BESS Energy Center, Nantucket Island, Massachusetts**

  Developed a Technical Specification for 48 MWHr Battery Energy Storage System (BESS) and performed feasibility assessment for connection to the 13.2 kV substation facility with 10 MW CTG generation.

- **Diamond Generating Corporation, Mariposa Energy Center, California**

  MW Battery Energy Storage System (BESS): Reviewed feasibility assessment reports prepared by ZGlobal and EPC proposals submitted by S&C Company and prepared a list of codes and standards applicable to BESS projects.

- **Almosa 30.5 MW Solar Generating Project, Cogentrics Energy, Colorado**

  Provided input to Independent Engineers (IE) Report to DOE on the electrical systems in support of their decision to be a loan guarantor for financing of the project using High Concentration PV (HCPV) technology.

- **Antelope Valley 230 MW Solar Ranch 1 (AVSR1) Project**

  Provided consulting services to DOE as specialized Solar Consultant. Provided input on the electrical systems in the Independent Engineers (IE) Report in support of DOE's decision to be a Loan Guarantor for financing of the Project. Reviewed and analyzed sponsor's technical submissions on the electrical systems from technology maturity level, competitive longevity and long-term reliability aspects. Provided comments on SC-ISO System

Impact Study Reports, assessed Project's engineering & design approach & construction methodologies, equipment specifications & selection process and performance guaranties, in particular for large size **DC to AC inverter.**

- **Gochang Solar Park 15 MW Project, South Korea**

  Visited the Gochang Solar Park Power Plant, located at Gochang, South Korea. Witnessed plant operation, reviewed information and technical documents, including equipment specifications, one-line diagrams, and assessment of plant assets. Provided input to Independent Engineers (IE) Report to MPC holdings on the Technical Due Diligence in support of their potential investment in the project.

- **AEI/Pattern Energy Group LP, Parque Eo´ico El Arraya´n Spa, Chile; 115 MW Wind Farm Power Plant Project**

  Conducted an engineering due diligence review of the electrical systems and provided input to an Independent Engineering (IE) report to lenders. Reviewed and provided comments on Siemens 2.3 MW wind turbine generator and balance of plant electrical systems, transmission grid system impact study and technical requirements of the energy supply agreement.

POWER GENERATION PROJECTS

- **COMBUSTION TURBINE SIMPLE AND COMBINED CYCLE PROJECTS**

  Was responsible for developing conceptual designs, including one-line diagrams, EPC specifications for a number of 13.50 MW to 1050 MW simple and combined cycle power plants. Established interface with the Utilities and developed EPC specifications and general arrangement drawings for the AIS/GIS switchyards, and prepared generator interconnection applications for Independent System Operators (ISOs) and reviewed the study results and provided recommendations to the plant Owners.

COAL-FIRED POWER PLANT PROJECTS

Developed conceptual designs including electrical engineering design criteria, single line diagrams, and EPC specifications for 300 MW to 2000 MW coal fired power plant projects and 500 kV transmission lines and substations. Provided technical support during contract negotiations with the EPC Contractor and Purchase Agreement (PPA) with local Utilities. Attended HV interconnection meetings with the utility engineers. Reviewed EPC Contractor generated documents.

NUCLEAR POWER PLANTS PROJECTS

- Development of electrical engineering and design basis documents for the Westinghouse Advanced AP600 Power Plant, Modularized High Temperature Gas Cooled Nuclear Reactor Plant, Advanced Liquid Metal Reactor /Fuel Rod Fabrication Facility, Indian Point Nuclear Plant Unit 2, Savanah River Production Reactors Plant, Philippine Nuclear Plant, three Mile Island Nuclear Plant

CHRISTOPHER HILL

Senior Specialist

Education

Warren University
Bachelor's Degree: Management of Information Systems
Microsoft Corp
Microsoft Certified Systems Administrator – Windows 2000, XP, Windows 7, Windows 10
Comptia
A+ Certified
Net+ Certified
Server+ Certified

Career Highlights

Business and Information Technology Executive with 26 years of experience in multiple industries. Excellent record of creating tangible benefits in large organizations. Areas of specialty are system configuration, resource utilization, process design, waste identification and elimination, and security and identity management. Highly effective in roles requiring project planning, scope analysis, communications, and deployment. CIO for independent construction monitoring service and consulting firm.

- 24 years of experience in Information Technology Management in various industries: Industrial Construction, Aviation, Mill/Manufacturing, and big-box retail.
- 6 complete Life-cycle SAP implementations involving SAP R/3, APO, CRM, SCEM 5.0, BW and NetWeaver.
- 20 years of experience in Fortune 500 Companies.
- Bilingual: English and Spanish
- Six Sigma Yellow Belt, Change Acceleration Process (CAP) Certification, Facilitation certified

TARA JENKINS

Research and Management

Education

UNIVERSITY OF MEMPHIS – Memphis, TN Graduated August 2017

- *Bachelor of Business Administration (BBA), Accountancy*
- *Graduated Magna Cum Laude*

Career Highlights

Highly motivated and proactive professional accountant with over 15 years of experience in accountancy and bookkeeping. Proficient in bookkeeping and project coordination. Confident in communication skills including negotiation and presentation; attentive to details, organized and process-minded. Continually seeks process improvements and operational efficiency including time-management and technology skills. Proficient with MS Office (Word, Excel, Outlook, PowerPoint), SharePoint, Sage (Peachtree) and QuickBooks. Comprehensive knowledge of accounting and auditing principles, payables/receivables, payroll functions, general ledger postings, invoicing, as well as account reconciliations. Driven to succeed and to help businesses be more confident through consulting and collaboration.