

PAVAN KUMAR PENKEY

MSEE, SMIEEE

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EXECUTIVE SUMMARY

Power System Protection & Control Technical Leader with 10+ years of experience owning secondary system architecture for hyperscale data centers, HVDC/HVAC interconnections, offshore wind, and utility transmission systems up to 345 kV. Led end-to-end protection design for multi-billion-dollar infrastructure programs, including AI data center mega-campuses and Oil & Gas refineries. Recognized IEEE Senior Member with a strong record of ethical leadership, mentoring and standards participation. Award-winning leader who is meticulously detail-oriented and organized, with strong interpersonal skills and experience supervising diverse teams. Committed to a resilient, secure Grid of the Future.

CORE COMPETENCIES

Protection & Control Architecture | Hyperscale Data Center Power Systems | HVDC & HVAC Grid Interconnections | Inverter-Based Resource (IBR) Integration | RTDS / HIL Validation | Protection Studies & Coordination | Utility Interconnections & Grid Integration | Emergency Power & Source Transfer Schemes (ATS) | MV Switchgear & Arc Flash | Grid Resilience & Reliability | IEEE Standards & Working Groups | Technical Leadership & Mentorship

LEADERSHIP PHILOSOPHY

- Recognized for operating as a decision-maker at the intersection of engineering rigor, system reliability, schedule pressure, and long-term scalability for mission-critical power infrastructure
- Demonstrated ability to apply first-principles thinking in complex, multi-stakeholder environments where utility, OEM, contractor, and owner priorities must be aligned
- Consistently relied upon to influence technical direction through structured reviews, sound engineering judgment, and consensus-building rather than positional authority
- Trusted mentor who develops engineering talent by strengthening judgment, ethical decision-making, and accountability under uncertainty

PROFESSIONAL EXPERIENCE

Lead Protection and Control Engineer

Feb. 2023 – Present

GSI, Grid Solutions, GE Vernova

Pullman, WA

Technical authority for hyperscale data center and HVDC interconnection protection programs

- Owned end-to-end secondary system architecture for hyperscale data center campuses, defining protection philosophy and validation strategy to reduce commissioning risk
- Improved protection performance validation by leading RTDS/HIL validation of HV protection schemes in inverter-rich environments, identifying and resolving design gaps prior to energization
- Directed protection scope for HVDC/HVAC and offshore wind interconnection projects, ensuring utility/OEM compliance and safe, reliable AC/DC interface performance
- Accelerated delivery schedules by developing standards, optimizing stakeholder documentation reviews and validation processes, reducing hand-off delays by 30% across integrated protection and station control phases

Project Engineer – Protection Supervisor

May 2015 – Jan. 2023

SEL Engineering Services

Pullman, WA

Technical Lead & Protection engineering supervisor for Mission-Critical Power systems

- Promoted from intern to Protection Supervisor through consistent delivery on complex utility, data center and industrial projects, earning responsibility for leading multidisciplinary engineering teams
- Championed design and validation of protection systems for transmission lines, transformers, buses, generators, and LV/MV/HV systems up to 345 kV, including series compensated and inverter influenced networks
- Designed innovative simulation models for Google data center protection with IBR integration, facilitating advanced testing protocols that enhanced fault detection confidence
- Standardized and automated protection design practices, reducing manual relay settings workload by 25% and improving consistency across substation deployments
- Mentored and developed five early career engineers through structured technical training and project reviews

Research/Teaching Assistant*University of Idaho*

Aug. 2014 – Aug. 2016

Moscow, ID

- Performed feasibility study of establishing a microgrid in the city of Spokane with hydro generation as main source, including microgrid modeling in PowerWorld along with capacitor and battery sizing with placement
- Taught approximately fifty junior level students in Electrical Circuits lab for two semesters and graded the course

Systems Engineer*Tata Consultancy Services*

July 2011 – July 2014

Chennai, India

- Developed store integration software using webMethods for various stores of Woolworths client in Australia
- Managed Nokia Middleware for coordination between different applications and supply chain system in Finland

PROJECTS (SELECTED)

Offshore Wind HVDC/HVAC Interconnection Projects

- Led the onshore P&C scope for the 345 kV AC interconnection cable feeder of South Coast Wind project
- Developed key design documents including HV Protection Single Line Diagrams (PSLD), Functional Design Specification (FDS), Trip/interlocking diagrams and CT/CVT selection criteria and cable schedules
- Collaborated with the HVDC team and utility stakeholders to execute the project, ensuring seamless interface between HVDC schemes and AC protection systems while developing reference solutions
- Contributed to the conceptual study and detailed design of onshore and offshore substations for the Empire Wind Project. Delivered key design documents including HV/MV PSLD, AC/DC schematics, BOM, load lists, trip/interlocking diagrams, SCADA architecture, FDS, CT/PT calculations, and protection coordination reviews

Amazon Data Center HV Substation Projects

- Spearheaded the HV Utility interconnection secondary project for the Amazon data center from inception to completion, handling scoping, protection philosophy development, and station control design
- Led the development of the entire secondary design package, including PSLDs, 3LDs, auxiliary power design, panel design, AC/DC schematics, wiring, cable schedules, interlocking/trip logic diagrams, and network architecture
- Validated protection studies such as short circuit, coordination, CT/PT selection, power factor, harmonic, arc flash, flicker, insulation coordination, and TRV. Led RTDS HIL testing, identifying and implementing improvements
- Performed DC battery and charger sizing, LV cable voltage drop calculations, and AC auxiliary power design
- Validated test documentation by collaborating with relay settings engineers, site managers, and commissioning engineers
- Worked closely with the project engineering manager to proactively resolve issues, forecasted resources and materials, and assigned tasks per the project execution plan
- Acted as technical authority for developing innovative source-transfer schemes for next-gen data center mega-campus, influencing scalable protection and control architectures
- Partnered with commissioning teams to troubleshoot protection events, perform root-cause analysis, and implement corrective actions to prevent recurrence

Google Data Center Protection Project

- Developed protection schemes for new architecture in Google data center protection with the integration of IBR
- Drafted protection philosophy for Google IBR data center protection including RMUs and specified relays
- Developed an HIL simulation model of Google data center facility in RTDS to perform extensive testing of protection and control schemes using Siemens relays and proposed new methods for IBR integration
- Tested and validated the protection schemes and response of inverter controls in data center model

Utility Protection Applications

- Designed the protection schemes for substation equipment upgrades, system retrofit design applications for Utilities, including the development of drawings and protection settings for transformers, bus upgrades, and line upgrades
- Prepared detailed design specifications for LV, MV, and HV systems including drawings for AC/DC schematics, single line/three-line drawings, logic diagrams, wiring drawings, panel arrangement, cable schedules, and BOMs
- Developed and tested protection settings with HIL simulation model for 345 kV series compensated lines with IBR sources, which includes shunt reactor protection, MV shunt capacitor control, and transformer thermal monitoring
- Modeled and maintained the power system for Utilities and Industrial customers and performed short circuit studies to calculate the settings of protection relays using simulation tools

Oil and Gas Protection Projects

- Appointed as subject matter expert for protection scope on TCO project and received numerous accolades
- Designed and developed relay protection logic, settings, schematics, functional design specifications for feeder, transformer, motor, generator, line, and bus differential protection schemes
- Implemented IEC 61850 based transfer schemes and arc flash protection schemes for LV and MV switchgear

- Performed CT saturation calculations and developed a CT selection criterion for a variety of power system equipment
- Managed large-scale greenfield installations of several MV and LV substations while testing at switchgear manufacturer facilities and integration yards of Schneider, ABB, Siemens, GE Alstom in France, Italy, and Indonesia
- Validated protection functions in SEL-751, SEL-710, SEL-751A, SEL-787, SEL-700G, SEL-735, SEL-311L, SEL-2411, SEL-587Z, SEL-849, SEL-411L, SEL-487B, SEL-487E, SEL-T401L, SEL-451 relays and more
- Collaborated with cross-domain teams to execute projects with SCADA, networking, and load shedding systems
- Resolved site issues by identifying root causes and provided solutions by replicating the issues in office

EDUCATION

Ph.D. in Electrical Engineering (Part-time) <i>University of Idaho</i>	Ongoing <i>Moscow, ID, US</i>
Master of Science in Electrical Engineering <i>University of Idaho</i>	Aug. 2016 <i>Moscow, ID, US</i>
Academic Certificate in Power System Protection & Relaying <i>University of Idaho</i>	May 2016 <i>Moscow, ID, US</i>
Bachelor of Engineering in Electrical and Electronics Engineering <i>Andhra University</i>	May 2011 <i>India</i>

TECHNICAL TOOLS & SOFTWARE

RTDS/RSCAD | ETAP | ASPEN OneLiner | PowerWorld | SKM Power*Tools | MATLAB | SEL Quickset | DIGSI 5 | IEC 61850 | PTC Mathcad | Omicron Test Universe | Doble Protection Suite

SELECTED PUBLICATIONS

- P. Penkey, N. Gaul, B. K. Johnson, and H. L. Hess, "Sizing and location identification for an electrical energy storage system in a renewable microgrid," 2016 IEEE Conference on Technologies for Sustainability (SusTech), 2016, pp. 83-88, doi: 10.1109/SusTech.2016.7897147
- P. Penkey, H. Samkari, B. K. Johnson and H. L. Hess, "Voltage control by using capacitor banks and tap changing transformers in a renewable microgrid," 2017 IEEE Power & Energy Society Innovative Smart Grid Technologies Conference (ISGT), 2017, pp. 1-5, doi: 10.1109/ISGT.2017.8086063
- P. Penkey, M. Alla, B. K. Johnson and T. R. McJunkin, "Improving transmission system resilience using an automation controller and Distributed Resources," 2016 Resilience Week (RWS), Chicago, IL, USA, 2016, pp. 89-94, doi: 10.1109/RWEEK.2016.7573313
- P. Penkey, F. Alhajeri and B. K. Johnson, "Modeling, analysis and detection of faults in grid-connected PV systems," 2016 10th International Conference on Intelligent Systems and Control (ISCO), Coimbatore, India, 2016, pp. 1-5, doi: 10.1109/ISCO.2016.7727038
- P. Penkey, Critical Load Serving Capability by Microgrid Operation, University of Idaho ProQuest Dissertations & Thesis, 2016.10149266
- P. Penkey, A. Mohammad, N. Gaul, B. K. Johnson and H. L. Hess, "Analysis of solar estimation from buildings along with demand response in a renewable microgrid," 2016 First International Conference on Sustainable Green Buildings and Communities (SGBC), Chennai, India, 2016, pp. 1-5, doi: 10.1109/SGBC.2016.7936062
- N. R. Powell, P. Penkey and B. K. Johnson, "Investigation of Improving High Voltage Transmission Rotor Angle and Voltage Stability with Distributed Generation Resources," 2016 IEEE Power and Energy Society General Meeting (PESGM), Boston, MA, USA, 2016, pp. 1-5, doi: 10.1109/PESGM.2016.7741888
- R. Gnaedinger, P. Penkey, N. Gaul, M. Phillips, B.K. Johnson, H.L. Hess, E. Lee, T. Rolstad, "Critical Load Serving Capability by Microgrid using 100% Renewable Energy," 2016 CIGRE US National Committee Grid of the Future Symposium, CIGRE USNC

HONORS AND AWARDS

- Outstanding Service and Leadership to IEEE Award, IEEE Palouse Section (2025)
- Customer Excellence Award, GE Vernova Engineering & Technology Awards (2024)
- Expert Certification under Technical Expert Program of GE Vernova (2024)
- IEEE Senior Member Award (2022)
- Distinguished Service Award, IEEE Palouse Section (2020)
- Outstanding Graduate Student Award, GPSA, University of Idaho (2016)
- Student Achievement Award and Scholarship, University of Idaho (2015)
- Technical Research Exhibition, First Place at NSBE Fall Regional Conference, San Francisco (2015)

PROFESSIONAL SOCIETY AFFILIATIONS

Senior Member, Institute of Electrical and Electronics Engineers (IEEE)
Member, IEEE Power & Energy Society (PES)
Member, IEEE Industry Applications Society (IAS)
Member, IEEE Power Electronics Society (PELS)

PEER REVIEW AND JUDGING

Judge, Washington State University Computer Science Capstone Poster Competition (2023–present)
Reviewer, IEEE PES General Meeting 2024 conference (papers: 24PESGM1587, 24PESGM1347)
Reviewer, IEEE Transactions on Power Delivery Journal
Reviewer, IEEE Transactions on Power Systems Journal
Reviewer, IEEE Transactions on Sustainable Energy Journal
Reviewer, IEEE Transactions on Smart Grid
Reviewer, IEEE TPEC 2026 conference
Reviewer, IEEE GreenTech 2026 conference

WORKING GROUP INVOLVEMENT

IEEE PES Working Group 15.05.08 HVDC & FACTS Economics and Operating Strategies
IEEE PES Working Group for HVDC Digital Twin
C52: Revise IEEE Std C37.246-2017. IEEE Guide for Protection Systems of Transmission to Generation Interconnections
C54: Data Center Protection, Automation, and Control (PAC) Systems
IEEE SA: Data Centers: Standards Needs Analysis and Recommendations

SERVICE TO PROFESSIONAL SOCIETY

Elected Section Chair, IEEE Palouse Section (approx. 300 members) (2022–present); Treasurer (2016–2022)
Professional Chapter Representative, IEEE Region 6, IEEE Power & Energy Society (2023–present)
IEEE PES Day Regional Lead (Region 6), IEEE PES Young Professionals (2025)
Chair, Professional and Educational Activities Subcommittee, IEEE PES Young Professionals (2023–2024)
Mentor, IEEE PES Young Professionals Mentoring Program; supported early-career engineers from multiple countries
Collaborated with several IEEE Distinguished Lecturers and IEEE Fellows in organizing technical events and workshops in the region and local IEEE Palouse Section

PRESENTATIONS AND OUTREACH

Session Chair, "Resilient Control Architectures for Power Systems," IEEE PES General Meeting 2024; featuring Scott Manson, Craig Rieger, Brian Johnson, Vivek Singh, and Mike Diedesch
Conference Speaker, IEEE Rising Stars Conference 2026: "Leading Effective Teams"
Presenter, SASE Stem Connect 2025: "Creating Your Elevator Speech and Personal Branding" workshop
Invited Speaker, Panel "Powering the Digital Future: Innovation, Infrastructure, and Impact," AKPESSC 2025, IEEE PES Kerala Chapter
Invited Speaker, IEEE PES Kerala Chapter Industry-Expert Interaction (Enlighten) 2023 Series: "Protection Fault Analysis Methods Using Symmetrical Components"
Organizer and Presenter, IEEE PES Young Professionals global, hands-on "Grid Game" event (2023)
Invited Speaker, Workshop "Resilient Control Architectures and Power Systems," demonstrating Grid Game benefits and uses, University of North Dakota

OTHER CERTIFICATIONS

Oracle Certified Professional, Java SE 6 Programmer (2013)
Programming in HTML5 with JavaScript and CSS3 Specialist (2013)

REFERENCES

Dr. Brian K. Johnson, University Distinguished Professor, SEL Endowed Chair, University of Idaho

Dr. Craig Rieger, Managing Director of TRECS Consulting, Retired Directorate Fellow, Idaho National Laboratory

John D. McDonald, Managing Director of JDM Associates, Retired Smart Grid Business Development Leader, GE Vernova

Dr. Armando Guzman, Distinguished Engineer, Schweitzer Engineering Laboratories, Inc.

Dr. Jessica Bian, Chief Technology Officer, RAS Fusion, Former Senior Advisor, FERC