PAVAN KUMAR PENKEY

MSEE, SMIEEE

pavanpenkey@outlook.com   Pullman, WA, US
(208) 596-7555   LinkedIn Google scholar

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 | HVDC & HVAC Interconnections | Hyperscale Data Center Power Systems | Inverter-Based Resource (IBR) Integration | RTDS / HIL Validation | Protection Studies & Coordination | Utility Interconnections | Grid Resilience & Reliability | IEEE Standards & Working Groups | Technical Leadership & Mentorship.

STRATEGIC, TECHNICAL & PROGRAM LEADERSHIP

- 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, GSI, Grid Solutions, GE Vernova, Pullman, WA   Feb 2023-Present

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, SEL Engineering Services, Pullman, WA,   May 2015-Jan 2023

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 the 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, project reviews.

Research/Teaching Assistant, University of Idaho, Moscow, ID, US   Aug 2014-Aug 2016
- Performed a feasibility study of establishing a microgrid in the city of Spokane with hydro generation as main source.

- Study involves microgrid modeling in Powerworld along with capacitor and battery sizing with placement.
- Taught about fifty junior level students in Electrical Circuits lab for two semesters and graded the course.

Systems Engineer, Tata Consultancy Services, Chennai, India   July 2011-July 2014
- 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.

DETAILED PROJECT EXPERIENCE (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 and project.
- Developed the 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, commissioning engineers.
- Worked closely with the project engineering manager to proactively resolve issues, and forecasted resources and materials, assigning tasks per the project execution plan.
- Acted as technical authority for developing innovative source-transfer schemes for next-gen data center mega campuses, 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)	University of Idaho, US	Ongoing
Master of Science in Electrical Engineering	University of Idaho, US	Aug 2016
Academic Certificate in Power System Protection & Relaying	University of Idaho, US	May 2016
B.E. Electrical and Electronics Engineering	Andhra University, India	May 2011

TOOLS

RTDS/ RSCAD® | ETAP® | ASPEN OneLiner™ | PowerWorld® | SKM Power* Tools® | MATLAB® | SEL Quickset |

DIGSI 5 | IEC 61850 | PTC Mathcad® | Omicron Test Universe | Doble Protection Suite

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 AFFILIATIONS AND ACTIVITIES

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 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 several 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.

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, MD of TRECS Consulting, retd Directorate Fellow, Idaho National Laboratory.
- John D McDonald, MD of JDM Associates, retd 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.