

OWAIS AHMAD

PhD Candidate | Renewable Energy & Hydrogen Systems | Scientific Software | Power & Microgrids

Victoria, BC, Canada | owaisahmad@uvic.ca | owaistoru.live | LinkedIn | GitHub | ORCID

PROFESSIONAL PROFILE

Renewable-energy engineer and Mechanical Engineering PhD candidate at the University of Victoria with a BSc in Electrical Engineering (Power Systems), an MSc in Renewable Energy Engineering, and more than three years of professional solar-PV project engineering experience. Research spans offshore green hydrogen and liquid-hydrogen systems, renewable microgrids, energy storage, forecasting, model predictive control, optimization, techno-economic analysis, and scientific software development. Develops and validates full-year and multi-year energy-system models in Python, C++ and MATLAB, while bringing practical experience in system sizing, SLDs, BOQs, tendering, equipment selection, commissioning, troubleshooting and O&M.

RESEARCH & ENGINEERING EXPERIENCE

PhD Researcher - Energy Systems & Scientific Computing | University of Victoria | Victoria, BC **Jan 2023 - Present**

- Develop physics-based and data-driven Python/C++/MATLAB models for renewable generation, storage, hydrogen systems and operational control, including 8,760-hour and multi-year chronological simulations.
- Investigate forecast-informed model predictive control (MPC) versus conventional load-following for remote hybrid microgrids, quantifying reliability, fuel use, emissions, storage utilization, lifecycle cost and robustness to forecast quality.
- Model offshore renewable-to-hydrogen systems coupling wind generation, PEM electrolysis, hydrogen buffering, liquefaction, cryogenic LH2 storage, weather-constrained marine transfer, vessel logistics and project economics.
- Use sensitivity analysis, uncertainty analysis, regression testing, mass/energy-balance checks and structured validation to keep simulation results traceable and physically consistent; prepare peer-reviewed manuscripts, figures and technical documentation.

Research Assistant - Power for People / Northern BC Analysis | University of Victoria | Victoria, BC **Apr 2026 - Sep 2026**

- Analyzed multi-year Census, employment, industry and energy-transition datasets for Northern British Columbia using Python and Excel, with emphasis on regional labour-market structure and transition vulnerability.
- Built reproducible data-processing, comparison and visualization workflows; documented assumptions, data provenance and methods; prepared publication-ready figures, tables and concise evidence summaries for interdisciplinary review.

Project Engineer - Solar PV | Voltric Energy (Pvt.) Ltd. | Peshawar, Pakistan **Oct 2019 - Jan 2023**

- Supported commercial and distributed solar-PV projects across the lifecycle: site information review, load assessment, system sizing, design documentation, procurement coordination, installation, commissioning, performance verification and O&M.
- Prepared/reviewed single-line diagrams, BOQs, tender packages, equipment selections and technical drawings using PVSyst, AutoCAD, Excel and engineering calculations; investigated faults and supported corrective actions in the field.

RESEARCH SOFTWARE & MAJOR PROJECTS

OffshoreLH2 - Integrated Offshore Liquid-Hydrogen Research Platform | Doctoral research / software development | University of Victoria **Ongoing**

- Developing a research platform with a deterministic C++20 simulation core, pybind11 bindings, Python SDK and PySide6 desktop GUI for integrated offshore renewable-to-LH2 system studies.
- Current model scope includes offshore wind generation, PEM electrolysis, GH2 buffering/compression, liquefaction, LH2 storage/export, auxiliary demand, battery/UCAES storage options, weather-constrained marine transfer, vessel scheduling and techno-economic analysis.
- Supports reproducible .olh2 project files, scenario/sensitivity/uncertainty/interannual studies, NSGA-II design screening, study recipes and JSON/CSV/HTML outputs. Development emphasizes auditable workflows, regression testing, physics hardening and reproducibility; the platform remains under active research validation.

Remote Microgrid Dispatch & Optimization | Doctoral research | University of Victoria **2024 - Present**

- Built full-year remote-microgrid simulations combining renewable generation, batteries/long-duration storage, diesel backup, forecasts and equipment constraints; compare dispatch strategies using reliability, cost, emissions and fuel metrics.
- Developed automated scenario, lifecycle-cost, sensitivity and verification workflows, including mixed-integer MPC and load-following comparisons.

Renewable Energy Systems Research | Center for Advanced Studies in Energy, UET Peshawar | Peshawar, Pakistan **2018 - 2022**

- Performed simulation, modelling, quantitative analysis, literature review and technical reporting for hybrid renewable systems, decentralized power, solar-PV optimization and smart-grid integration research.

Power Engineer | Huawei Technologies Pvt. Ltd. - AMS/CS | Pakistan **2017 - 2018**

- Supported installation, maintenance and performance optimization of telecom-site power infrastructure and PowerCube systems, coordinating field logistics and resolving technical issues under operational time constraints.

TEACHING & ACADEMIC SUPPORT

Teaching Assistant | University of Victoria, Faculty of Engineering & Computer Science | Victoria, BC **2023 - Present**

- Teaching/laboratory support across ENGR 120/121, ECE 250, ECE 365, ECE 370, CSC 230, MECH 240, MECH 360, MECH 390 and MECH 455.
- Lead/support labs and tutorials, mark assignments/exams, troubleshoot circuits and engineering experiments, explain technical concepts, maintain course records and provide one-to-one student feedback.

EDUCATION

PhD, Mechanical Engineering - Candidate | University of Victoria | British Columbia, Canada **2023 - Expected 2027**

- Candidacy passed April 2025. Research: renewable-energy systems, offshore hydrogen/LH2, remote microgrids, storage, forecasting, optimization, control and techno-economic analysis.

MSc, Renewable Energy Engineering | University of Engineering & Technology, Peshawar | Pakistan 2018 - 2020

- GPA 3.29/4.00. Energy-system modelling and optimization, renewable integration to smart grids, electrical machines, power electronics and solar-PV systems.

BSc, Electrical Engineering (Power Systems) | University of Engineering & Technology, Peshawar / Mardan Campus | Pakistan 2013 - 2017

- Graduated with distinction. Power systems, electrical machines, control systems, power electronics, communications and engineering computation.

SELECTED PUBLICATIONS

- **Ahmad, O., et al. (2026).** "Nonlinear operability thresholds in offshore green hydrogen production: Multi-objective system design under metocean uncertainty." *International Journal of Hydrogen Energy*.
- **Ahmad, O., Ahmad, A., Ahmad, W., & Khan, K. (2021).** "Design, Performance and Feasibility Assessment of Solar PV System for Irrigation." *International Journal of Engineering Works*, 8(12), 294-297. DOI
- **Ahmad, A., Ahmad, O., Ahmad, W., & Khan, K. (2021).** "Rooftop PV Systems Development in Khyber Pakhtunkhwa: Barriers and Smart Policy Recommendations." *International Journal of Engineering Works*, 8(12), 298-304. DOI
- **Ahmad, W., Ahmad, O., Ahmad, A., & Khan, K. (2022).** "Decentralized Electrical Power System in Pakistan." *International Journal of Engineering Works*, 9(2), 47-51. DOI

CURRENT RESEARCH MANUSCRIPTS

- Multi-objective Design and MILP-Based Model Predictive Dispatch for Remote Community Hybrid Renewable Microgrids - manuscript in preparation/revision.
- Quantifying True Lifecycle Emissions: Operational-Only versus Lifecycle-Aware Optimization of Remote Microgrids - manuscript in revision.

TECHNICAL SKILLS

Programming & scientific computing	Python, NumPy, pandas, matplotlib; C++20; MATLAB scripting; pybind11; CMake; Git/GitHub; GitHub Actions
Energy modelling & simulation	MATLAB/Simulink/SimPower, HOMER Pro, OpenDSS, PVSyst, EasyPower; 8,760-hour simulation; multi-year time series
Optimization & controls	Model Predictive Control (MPC), MILP, multi-objective optimization, NSGA-II workflows, sensitivity and uncertainty analysis
Power & renewable engineering	Power systems, distributed generation, microgrids, solar-PV design, storage, electrical machines, power electronics, SLDs, BOQs
Hydrogen & offshore systems	PEM electrolysis, hydrogen buffering/compression, liquefaction, cryogenic LH2 storage, marine logistics, metocean-constrained operability
Data, tools & documentation	Excel, AutoCAD, SQLite/Flask familiarity, CSV/JSON workflows, data cleaning/QC, technical writing, publication figures and presentations

AWARDS, TRAINING & ADDITIONAL INFORMATION

- Higher Education Commission of Pakistan fully funded PhD scholarship for study at a QS Top-500 university; MSc full-fee scholarship/waiver support; BSc graduated with distinction.
- Research-security training: Introduction to Research Security; Cyber Security for Researchers; Safeguarding Your Research Partners with Open Source Due Diligence (2025).
- Languages: English, Urdu, Pashto. Based in Victoria, British Columbia, Canada.