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ELVIN E. MAZWIMAIRI (ELECTRICAL DESIGN ENG)

PERSONAL SUMMARY

Innovative and adaptable Junior Engineer with a strong foundation in electrical systems, industrial design, and control engineering. Experienced in developing and implementing software-driven solutions, power optimization systems, and renewable energy technologies (solar and BESS). I also have experience with electrical power machines and distribution systems, with proven ability to bridge engineering, IT, and business. Passionate about designing, developing, and implementing efficient, reliable systems that drive performance and reliability.

BASIC INFORMATION

Date of Birth:	26/11/2000	Driver's License:	Class 4 (Clean)
Gender:	Male	Languages:	English, Shona

SKILLS

CAD & Software
AutoCAD Electrical.
MATLAB/Simulink.
PSCAD, ETAP, DIgSILENT.
Altium Designer.
NI Multisim, SPICE tools.
Xilinx Vivado, LabVIEW.
Python, JS, C/C++.
PVSyst, Homer, PVSol.
Ms. Office Suite.

Electrical
Control and Power Systems Modelling & Analysis.
Renewable Energy Systems – Solar + BESS + Grid Integration.
Electronics and Circuit Design, Prototyping & Testing.
Power System Sizing & Analysis.
Protection Scheme Design.
SLDs, P&IDs, Schematics Design.

Soft & Other
Research Oriented;
Capable Leadership.
Effective communication.
Creative Independent Thinker.
Collaborative Team Player.
Adaptable and Self-Motivated.
Digital Systems Dev.
Creative Design

WORK EXPERIENCE

Systems Design Engineer, Mazenel Industries, Freelance, Zimbabwe *(October 2024 – Present)*

- Conducting renewable-energy system design: site shading analysis, feasibility & ROI studies, PVSyst/AUTO-CAD array layouts, single-line diagrams, and energy-yield simulations.
- Preparing technical specifications, interconnection drawings, and equipment schedules; ensuring compliance with IEEE, NEC, and local utility regulations.
- Sizing and integrating battery-storage solutions: configuring charge controllers, inverters, and BMS to maximize self-consumption and backup capacity.
- Integrated Systems design, development, and optimization.

Electrical Engineering Intern, Delta Beverages, Harare, Zimbabwe *(March 2023 – August 2023)*

- Assisting with servicing of plant electrical systems, including motors and generators, equipment control panels, and plant power distribution systems.
- Assisting with maintaining power machinery, troubleshooting faults, and performing repairs.
- Supporting procurement and inventory management of engineering equipment accessories.
- Preparing plant reports and presentations to communicate plant metrics to higher management.

Motor Rewinding Technician Assistant, Elgen Electrical, Harare, Zimbabwe *(Jan 2023 – Mar 2023)*

- Performing insulation resistance (megger) and continuity (multimeter) tests to diagnose motor/generator faults.
- Assisting in dismantling, rewinding, and reassembling rotors and stators, ensuring precision coil placement and insulation integrity.

Projects Research & Development Officer, Enactus Uz, Harare, Zimbabwe *(Aug 2021 – August 2022)*

- Researching and developing initiatives for new projects, conducting feasibility studies, and technical assessments.
- Collaborating with cross-functional teams to develop prototypes, manage on-site project activities, and provide technical assistance.
- Preparing technical reports and presentations to communicate project findings and recommendations.

EDUCATION

BSc (Hons) in Electrical Engineering (Upper Second Class), University of Zimbabwe, Harare, Zimbabwe
Aug 2019 – June 2024

- Relevant coursework - **Electrical Machines, Control Systems, Systems Modelling, Load Flow Analysis, Power Systems and Energy Conversion, Analog, Digital, and Power Electronics, Measurements and Instrumentation, Circuit Design, Programming, Embedded Systems**

ZIMSEC Advanced & Ordinary Level Certifications, Mandedza High School, Seke, Zimbabwe |*2013 - 2018*

- **A Level:** Pure Mathematics (A), Physics (A), Chemistry (A), Computer Science (A)
- **O Level:** 9 A'S & 1 B (Inclusive of English, Maths & Science)

SELECTED PROJECTS

Utility Field Deployment and Fault Management System (React Native + Nodejs + Python)
April 2025 – Present

- Developing a cross-platform field operations and fault management system for utility networks, integrating geolocation, asset tracking, and outage coordination.

- Enables artisans to log, assign, and resolve field faults in real time, improving response efficiency and data accuracy.
- Streamlined utility field workflows and enhanced service restoration times through synchronized backend and mobile interfaces.

Optimizing Battery Energy Storage System (BESS) Performance for Real-Time Grid Stability and Intensive Renewables Integration (MATLAB/Simulink + Xilinx Vivado + DIgSILENT PowerFactory)
October 2024 – March 2025

- Designed an **FPGA-based control system** to enhance BESS performance, improve grid disturbance response, and ensure stability in renewable-heavy grids.
- Integrated real-time HIL co-simulation using MATLAB/Simulink and Vivado, achieving **12% improvement in charge/discharge efficiency** and faster transient response.
- Modeled renewable integration (50 MW solar, 4 MWh BESS) and validated adaptive inverter algorithms under grid disturbance conditions.

Off-Grid, Versatile Portable Power System with AC & Solar Charging (Altium + KiCAD)
Dec 2024 to Present (Circuits and Prototyping Completed)

- Designed a **modular off-grid portable power system** with solar and AC charging for sustainable, mobile, and backup power applications.
- Developed battery pack and system management circuits, implementing DC–DC (push-pull) and DC–AC (H-bridge) converter stages.
- Achieved **over 90% power conversion efficiency** and stable off-grid operation during prototype field testing.

Real-Time Monitoring and Adaptive Protection of Renewable Energy Systems (RES) for Grid Stability Enhancement (Simulink)
Jan 2025 to March 2025

- Developed a **real-time interactive monitoring and adaptive protection system** for RES-integrated grids to enhance fault response and code compliance.
- Simulated AC/DC fault scenarios and implemented adaptive voltage relays and DC isolators for dynamic protection under variable RES penetration.
- Improved **operator situational awareness** and fault response times, supporting more resilient grid operation.

Design of an FPGA-Based Real-Time Control System for Automated Optical Inspection System in Packaging Quality Control (AutoCAD Electrical + VivadoFPGALab + Python/C)
Aug 2023 to May 2024

- Developed a **real-time AI-powered inspection system** using FPGA and YOLOv5 for high-speed container quality control.

- Designed a **servo-controlled rejection mechanism** and user interface for live monitoring, data logging, and control.
- Improved **defect detection accuracy to over 95%** and **line efficiency by approximately 30%** compared to traditional laser systems.

Public Transport Optimization System (Python + node.js + react.js)
Feb 2022 to June 2022

- Built a **smart public transport platform** integrating real-time bus tracking, route optimization, and fleet management.
- Enabled users to view live bus positions and schedules, while contractors managed dispatches, routes, and finances centrally.
- Integrated a **machine learning engine** for dynamic scheduling and demand prediction, improving **route efficiency and service delivery during peak transportation hours**.

REFERENCES

ENG. W.T SEKESO
Electrical Power Systems Engineering, University of Zimbabwe - Electrical
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FOREMAN V. KATONHA
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ENG. Y. MUFAMBI
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