Meftah Uddin

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Personal Website: Meftah Uddin **Personal Blog:** LLM4Energy **Other Weblinks:** GitHub, Google Scholar

SUMMARY

Mechanical engineer and energy professional with over eight years of experience in solar PV, solar water heater, heat transfer, HVAC, and energy system, machine learning and financial analysis. Conducted 55 energy audits, achieving $8.8M in savings, $2.2M in productivity gains, and 160M lbs. of CO_2 reductions. Developed an ML-assisted Digital Twin for real-time building energy and emissions monitoring of a campus building at the University of Missouri. Proven track record of mentoring 200 undergraduate and graduate students and publishing impactful research in top journals & conferences. Certified *LEED Green Associate*.

Skills: Solar System Design & Optimization, Building Energy Modeling, Computer Aided Design (CAD), Design of Experiments (DoE), Statistical Analysis (ANOVA, Regression, Optimization) and Machine Learning (ML).

PROJECT EXPERIENCE

OpenStudio Measure Development **Aug 2024 – May 2025**

- Developed and contributed five energy modeling measures, for example: AddPCMtoEnv and AddSolarPVT, to the OpenStudio ecosystem, enabling users to simulate phase change materials (PCM) and solar photovoltaic-thermal (PVT) systems in building energy models. Measures are published on the NREL Building Component Library (BCL) and available on GitHub under Openstudio_Measures_meftah for public use and collaboration.

Parametric Building Simulation **May 2023 – Jul 2024**

- Created parametric building energy model using (BEM) Grasshopper-Honeybee integrating python scripts to run 50,000 simulations using Latin Hypercube Sampling (LHS).
- Validation of BEM script developed in Grasshopper-Honeybee for the ASHRAE prototype buildings of five different climate zones.

Net Zero Building Design **Jan 2023 – May 2023**

- To design a baseline residential building model complying with ASHRAE Standard 90.1.2016 using perspective path.
- Addition of renewable source to the baseline model to ensure NetZero building.

TECHNICAL PROFICIENCIES

Programming Language: Python, Ruby, MATLAB, R.
Data Analysis & Visualization: Excel, Power BI, R, SQL and Python.
Cloud Platforms: Google Cloud Platform, Docker Desktop, Gitlab, Kubernetes.
HVAC Energy Simulation: Grasshopper-Ladybug and Honeybee, OpenStudio, EnergyPlus, BEopt.
Drawing and Design Tool: SOLIDWORKS, AutoCAD 2D, Rhino-Grasshopper, Revit.
CFD Simulation: ANSYS Fluent, Openfoam.

JOB EXPERIENCE

Energy Auditor at Midwest IAC, Columbia, Missouri, USA **Sep 2022 – May 2026**

- Conducted 55 industrial and commercial energy audits, serving as lead auditor on 17 audits.
- Evaluated facility utility use (electricity, gas, water, HVAC, lighting, wastewater) and conducted on-site measurements.
- Recommended energy conservation measures with ROI analysis, projected savings, and carbon reduction metrics based on ASHRAE Level II standards.
- Mentored 15 undergraduate students annually in energy auditing and efficiency engineering
- Provided clients with practical roadmaps to improve efficiency and integrate renewable systems (Solar PV and Solar Hot Water).

Research Assistant at University of Missouri, Columbia, Missouri, USA **Aug 2021 - Dec 2025**

- Developed and open-sourced reasoning LLM (EnergyPhi) to generate full building energy simulation script of around 11,000 words in supporting manufacturing plant's energy optimization.
- Parametric simulations to perform sensitivity analysis of building geometric factors on energy consumption, utilizing advanced statistical methods and Latin Hypercube Sampling (LHS) for comprehensive analysis.
- Optimized solar water heater systems through Plackett-Burman and Central Composite Design for cost-benefit analysis, maximizing system efficiency and reducing operational costs.

- Applied LSTM-based time series forecasting for energy consumption predictions and optimizing energy efficiency through predictive modeling.
- Implementing occupancy-based control (OBC) for ventilation rate and temperature setpoints/setback in campus building.
- Creating a building information modeling (BIM) of a campus building at university campus.

Graduate Teaching Assistant, University of Missouri-Columbia **Jan 2023 - Dec 2025**

- MAE 3800: Instruct and evaluate around 100 students in both Fall and Spring semester for Instrumentation and Measurement lab.

Key Experimental Devices: Oscilloscope, Digital Multimeter, Function Generator, Operational Amplifier, Soldering, etc.

- MAE 7001: Instruct building energy simulation, compliance study with ASHRAE 90.1 for energy, ASHRAE 55 for thermal comfort, and ASHRAE standard 62.1 for ventilation requirement during Fall semester.

Assistant Engineer at Sirajganj 225x3 MW CCPP (NWPGCL), Bangladesh **Jul 2018 - Jul 2021**

- Certified Combined Cycle Power Plant (CCPP) Operation Engineer with 1000 hours of Gas and Steam Turbine operation.
- Maintained and troubleshot Gas Turbines (Siemens SGT5-2000E), Steam Turbines, HRSG, Compressed Air Systems, Nitrogen Generation Systems, and Water Treatment Plants.
- Managed over $1 million worth of procurement of spares, tools, and consumables; assisted in Annual Procurement Plan execution.
- Led Major Overhaul of Steam Turbine (HRSG leak test, X-ray and Dye Penetration tests of turbine rotor and blades).
- Conducted Minor Inspection of Gas Turbine (borescope inspection, Dye Penetration tests of combustion chamber).

Executive Engineer at Square Pharmaceuticals Ltd., Dhaka, Bangladesh **Oct 2017- Jun 2018**

- Maintenance of HVAC system, Water Treatment Plant, Boilers, Compressed Air System, Nitrogen Generation Plant
- Responsible for writing and updating Standard Operating Procedure; scheduling, planning using ERP (SAP) Software.
- 2D Drawing and associated civil works for the installation of Air Compressor and auxiliaries.
- Responsible for monitoring HVAC design, Cooling Load and Air Flow rate calculation for Nasal Spray production line installation.

Engineer Intern at EnergyPac Engineering, Dhaka, Bangladesh **Aug 2017 – Sep 2017**

- Actively engaged in the mechanical design phase of a three-phase distribution transformer body, collaborating with the General Manager at EnergyPac Engineering Ltd.
- Acquired practical experience in CAD-based design interpretation, materials selection, and manufacturing feasibility analysis within a transformer production environment.

EDUCATION

PhD in Mechanical Engineering, University of Missouri-Columbia, Missouri, USA **May 2026**
CGPA: 3.92
Project: Pathways to Net-zero Building Design using Parametric Analysis and Generative AI

MS in Mechanical and Aerospace Engineering, University of Missouri-Columbia, Missouri, USA **Jul 2024**
CGPA: 3.89
Project: Demand Control Building Energy Management and Timeseries Forecasting using Machine Learning Model

BS in Mechanical Engineering, Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh **Feb 2017**
CGPA: 3.54
Project: Flow Visualization and Experimentally Calculate the Major Losses of UPVC Pipes
Capstone: Unmanned aerial vehicle (UAV) design and fabrication: an aluminum framed quadcopter

AWARD & SCHOLARSHIP

- Best Poster Award, Engineering and Informatics Category, ShowMe Research Week, University of Missouri, 2024
- "Bangladesh-Sweden Trust Fund" Travel Grand for Higher Study Abroad, 2022

PROFESSIONAL AFFILIATION

- **Student member**, Association of Energy Engineer (**AEE**)
- **Student member,** The American Society of Mechanical Engineers (**ASME**)

LEADERSHIP

- President, Bangladesh Student Association (BSA), University of Missouri **Sep 2023 – Sep 2024**
- GPC Department Representative, Mechanical and Aerospace Engineering, University of Missouri **Aug 2023 – Sep 2024**