

SLATT UNDERGRADUATE STUDENT FELLOWSHIP PROGRESS REPORT

SLATT SCHOLAR:	Musodiq Ogunlowo
FACULTY ADVISOR:	Abigail Mechtenberg
REPORT PERIOD:	
PROJECT TITLE:	Empowering Nigerians to Power Nigeria: Understanding the relationship between demand and capacity shortage to Design Multiple Energy Source Input Charge Controller with Locally Built Systems.
CONNECTION TO ND ENERGY'S RESEARCH AREAS (CHECK ALL THAT APPLY):	<input checked="" type="checkbox"/> Energy Conversion and Efficiency <input type="checkbox"/> Sustainable and Secure Nuclear <input checked="" type="checkbox"/> Smart Storage and Distribution <input type="checkbox"/> Transformation Solar <input type="checkbox"/> Sustainable Bio/Fossil Fuels <input type="checkbox"/> Transformative Wind

MAJOR GOALS AND ACCOMPLISHMENTS:

List your major research goals and provide a brief description of your accomplishments (1-2 sentences). Indicate the percentage completed for each goal. Please use a separate sheet to share additional details, technical results, charts, and graphics.

MAJOR RESEARCH GOALS	ACTUAL PERFORMANCE AND ACCOMPLISHMENTS	% OF GOAL COMPLETED
Simulation and Reproduction of relevant literature HOMER results	All required simulations currently completed with results similar to published results in relevant literature	90
Review of current charge controller designs	Current work in progress; analysis of PWM and MPPT controllers	30

RESEARCH OUTPUT:

Please provide detailed information below regarding any output resulting from your research project. Please check with your faculty advisor if you are unsure how to respond.

CATEGORY	INFORMATION
EXTERNAL PROPOSALS	(Sponsor, Project Title, PIs, Submission Date, Proposal Amount)
EXTERNAL AWARDS	(Sponsor, Project Title, PIs, Award Date, Award Amount)
JOURNAL ARTICLES	(Journal Name, Title, Authors, Submission Date, Publication Date, Volume #, Page #s)
BOOKS AND CHAPTERS	(Book Title, Chapter Title, Authors, Submission Date, Publication Date, Volume #, Page #s)
PUBLIC PRESENTATIONS, SEMINARS, LECTURES	(Event, Presentation Title, Presentation Date, Location)
AWARDS, PRIZES, RECOGNITIONS	(Purpose, Title, Date Received)
INTERNAL COLLABORATIONS FOSTERED	(Name, Organization, Purpose of Affiliation, and Frequency of Interactions)
EXTERNAL COLLABORATIONS FOSTERED	(Name, Organization, Purpose of Affiliation, and Frequency of Interactions)
WEBSITE(S) FEATURING RESEARCH PROJECT	(URL)
OTHER PRODUCTS AND SERVICES (e.g., media reports, databases, software, models, curricula, instruments, education programs, outreach for ND Energy and other groups)	(Please describe each item in detail)

RESEARCH EXPERIENCE:

Please let us know what you thought of your research experience: Did this experience meet your expectations? Was there something else that could have been done to improve your research experience? Were lab personnel helpful and responsive to your needs? What could have been done differently, if anything, to achieve additional research results?

After some energy devices were built by my team, there needed to be a focus on the importance of these energy devices and where there could be solid use cases for them. The pursuit of the optimal use of these devices resulted in the analysis of energy systems for health care clinics and how previous literature have ignored capacity shortage. In the current system we continue to develop, we are looking at a problem of multiple energy source input charge controllers while understanding the load profile of hospitals and the continual disregard of capacity shortage which is important to the reliability of a health care clinic and safety of its patients. If such locally designed systems can be built in tandem with other energy sources available, charge controllers would be needed for a synchronous operation while dealing with an issue that is very important. The research met my expectations as I developed more analytical skills and proficiency in relevant software. In order to achieve a very robust result, more literature would be analyzed and circuit designs for the charge controller would be physically built to test.

The experience was a very interesting and challenging one as I got the opportunity to do research in a completely new place I had not been to while understanding the peculiarities of the environment. The experience met my expectations as I was able to realize a core part of my research which is the building of locally designed energy devices that would be used in tandem with each other. With this already achieved, I feel a lot more confident about attaining my overall goal of building the charge controllers. I believe most of the help I got was fantastic and my advisor was specifically responsive to my needs. I believe most of the things that could have been done differently would revolve around the logistics of my travel to build devices and gather data.

MAJOR GOALS AND ACCOMPLISHMENTS

(Additional Details, Technical Results, Charts and Graphics)