ACTIVITY REPORT

Activity Report submitted on the 12th of May 2023 for SDG 7:* Clean and Affordable Energy, *within the IAU HESD Cluster

Lead: Assam Don Bosco University

INTRODUCTION

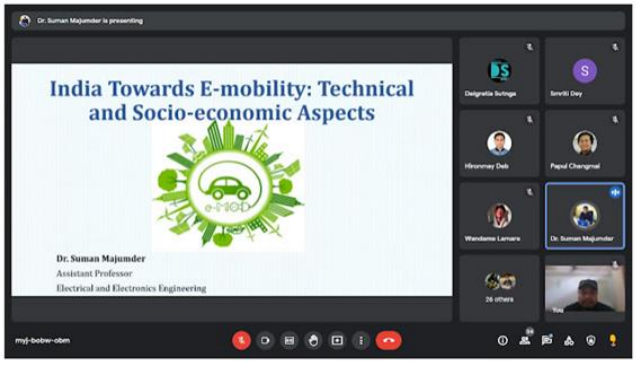
After water and food, energy is one of the key enablers of human life. Energy is central to nearly every major challenge and opportunity the world faces today and access to energy for all is essential. But energy needs to be available and affordable to all to allow future development, and it needs to be clean to ensure that the development can be sustainable. We at Assam Don Bosco University promote and support clean energy, both through research, and outreach and in their behavior and usage. Taking heed to these conditions. A solar energy-based training program is conducted every year which provides leading on-the-job education for emerging energy planners and rural youth. Our onboard research program in a multidisciplinary scheme is determining integrated practices to improve energy efficiency and resource recycling, making modern energy production cleaner and more affordable. We as a University under collaborative work, involving a broad range of stakeholders, provides a model to strengthened cooperation within and beyond the UN system. The below enlisted activities outline our progress on SDG7 and follow up into strengthening our commitments to achieve all the goals of SDG7.

Activities towards Affordable and Clean Energy: ADBU

ACTIVITY 1:<u>Academic lecture on "India towards E-mobility: Technical and socio-economic aspects"</u>

Department of Electrical and Electronics Engineering (EEE), School of Technology, Assam Don Bosco University, organized an academic lecture titled "India towards E-mobility: Technical and socio-economic aspects" on 2 March 2022 for the students and faculty members of the department. A total of 52 participants attended the session. The talk was delivered by Dr. Suman Majumder, Assistant Professor, NIT Mizoram. The main objective of the talk was aware the students about E-mobility in India. Dr. Mazumdar mentioned the use of renewable energy for charging the batteries of EVs instead of using power from coal-based generation units, which further reduces air pollution.

http://adbu-eee.blogspot.com/2022/03/



ACTIVITY 2: <u>AICTE sponsored STTP on installation of Off-grid Solar PV plant</u>

The department of Electrical and Electronics Engineering, School of Technology, Assam Don Bosco University (ADBU) has recently organized a week-long AICTE-sponsored Short-term training program (STTP) on the Installation of Off-grid Solar PV plant from 25 to 30 April 2022. The various topics covered in the STTP were Basics of solar Photovoltaic Systems, Theory on Fundamentals of Solar PV cells, Simulation of solar Photovoltaic system (Cell level), Simulation of solar Photovoltaic system (Module level), Off-grid solar PV plant, On-grid solar PV plant, Load curve generation, Theory related to Battery, Simulation related to battery, Solar Photovoltaic Plant Simulation, Theory related to Converters, Simulation related to converters/inverters, Industrial Demonstration of solar PV plant installation. http://adbu-eee.blogspot.com/2022/04/

ACTIVITY 3<u>: Inter School Electrical Quiz Competition Energizes Students to Achieve SDG 7's Ambitious Goals and Raises Awareness of Clean Energy Solutions</u>

Department of Electrical and Electronics Engineering at Assam Don University, School of Technology, Azara, Guwahati, in association with Living Thoughts Pvt. Ltd., successfully organized the Inter School Electrical Quiz Competition (ISEQC-2023) on 28-29 April 2023. The event was conducted in an online mode with the theme "CLEAN ENERGY". This initiative aimed to raise awareness and focus on one of the most crucial Sustainable Development Goals (SDGs), namely SDG 7 - "Affordable and Clean Energy," out of the 17 SDGs adopted by the United Nations.

http://adbu-eee.blogspot.com/2023/

ACTIVITY 4: <u>Community outreach campaign on Electrical Safety</u>

A week-long electrical safety awareness program has been recently organized by the department of Electrical and Electronics Engineering, School of Technology, Assam Don

Bosco University (ADBU) from 9 to 16 May 2022. The main objective of the program was to highlight the necessity and importance of electrical safety and its regular practice in all

aspects of life to prevent accidents and hazards resulting from a lack of awareness. http://adbu-eee.blogspot.com/2022/05/

Publications:

1. PapulChangmai, Shashank Kumar, Sisir K. Nayak, and Sanjeev K. Metya. "Maximum Power Estimation of Total Cross-Tied Connected PV Cells in different Shading Conditions for High Current Application." IEEE Journal of Emerging and Selected Topics in Power Electronics, DOI: 10.1109/JESTPE.2022.3105808
2. PapulChangmai, Sunil Deka, Shashank Kumar, Thanikanti Sudhakar Babu, BelqasemAljafari, and Benedetto Nastasi. " A Critical Review on the Estimation Techniques of the Solar PV Cell's Unknown Parameters." Energies 15, no. 19 (2022): 7212

Research Project:

Title: An analytical algorithm to generate high current from solar PV module even in partial shading condition.
Funding agency: All India Council for Technical Education (AICTE), New Delhi
GrantAmount: Rs 12,91,000/- (Ongoing)
File No.8-14/FDC/RPS(NER)/POLICY-1/2020-21 dated 10th March 2021
Principal Investigator:Dr. Papul Changmai
About the project: In the existing Solar Photovoltaic (PV) modules, cells are connected in series with one another. Performance of series connected PV module degrades severely during partial shading condition (PSC). To solve this issue, bypass diode is proposed in the literature. But it is very difficult to connect bypass diode for every cell inside a PV module. Further, use of bypass diode causes multiple peak (Local and Global peak) problem. In line with this, Total Cross Tied connection is proposed in this paper to connect the cells in a module which gives better performance during PSC without multiple peak issues. Detail mathematical modeling is derived in this paper to calculate the output power at any PSC.