

A Feasibility Study on the Rooftop Solar Net Metering System for Root Level Institute Facilities in Bangladesh

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Abstract

Fast-growing economy of Bangladesh has been the problem of energy supply, mainly consisting of heavy fossil fuel consumption, high electricity prices, and frequent power outages. To tackle these problems, the country is putting a lot of emphasis on renewable source of energy. It's the government's initiative like the Net Metering Guideline and the natural sun power potential of the country that are helping it. The present work of research examines both the technical and ecological practicability of connecting solar rooftop photovoltaic systems to the grid for different institution types as a solution that is both sustainable and economical. A solar system of 10.8 kWp is going to be set up in Natore and has been previously tested by the software PVsyst alongside the NREL solar radiation data. For performing this simulation, 27 monocrystalline modules with a tilt of 30 degrees were applied. The findings of the simulation indicate that around 1,564.2 kWh/m² would be the yearly horizontal irradiation, thus confirming large-scale solar power generation potential. During the lifecycle assessment, 19,935 kg of total CO₂ emissions were calculated, which are due to manufacturing and installation processes and form the environmental baseline of the system. The research denotes that rooftop solar net metering is technically feasible, environmentally sustainable, and economically beneficial for Bangladesh's institutional sectors. The installation of such systems can help reduce electricity bills, enhance energy security, and minimize carbon footprints. In order to fasten the process of adoption and meet the national sustainability objectives, the research suggests the enhancement of policy framework, provision of financial incentives, offering of technical support, and creating public awareness.

Keywords

Rooftop Solar, Net Metering, Feasibility Study, Bangladesh and PVsyst

Biographies

Alif Al Mahamud is a recent graduate in Electrical and Electronic Engineering (EEE) from the World University of Bangladesh (WUB). His research and academic interests center on renewable energy technologies, power systems, and sustainable development. As part of his undergraduate thesis, he conducted a detailed feasibility study on rooftop solar net-metering systems in Bangladesh, focusing on the economic and environmental viability of solar energy

integration in urban areas. Alif currently works as a Customer Service Representative at Digicon Technology PLC (Agni Systems Ltd), where he manages technical support and network configuration for national internet services. He has hands-on experience with MATLAB/Simulink, PVsyst, and electrical design tools, and has actively participated in seminars on renewable energy and sustainable power adoption. Alif also serves as Vice-President of the WUB EEE Club, reflecting his strong leadership and commitment to advancing energy innovation in Bangladesh.

Md. Nayeem Hasan Mallick is an Assistant Professor in the Department of Electrical and Electronic Engineering (EEE) at the World University of Bangladesh. He received his M.Sc. in Energy Science and Technology from the University of Ulm, Germany, and his B.Sc. in Electrical and Electronic Engineering from the American International University—Bangladesh (AIUB). He previously served as Lecturer at Green University of Bangladesh before joining the World University of Bangladesh in 2015. His research and teaching interests include renewable energy, smart grids, and power system optimization, with a particular focus on solar PV integration and sustainable energy transition in developing nations. He is a recipient of the *Deutschland Stipendium* scholarship and an Associate Member of the Institution of Engineers, Bangladesh (IEB). Mr. Mallick has authored several research papers on solar energy systems, smart home technologies, and load forecasting applications.

Md. Istianatur Rahman is a Senior Lecturer in the Department of Electrical and Electronic Engineering (EEE) at the World University of Bangladesh. He holds a B.Sc. in Electrical and Electronic Engineering from East West University and is currently pursuing his M.Sc. in EEE from BRAC University. He has over a decade of teaching experience, specializing in electrical circuit analysis, power systems, and renewable energy applications. Mr. Rahman has contributed to practical projects involving SCADA system installations for the Bangladesh Power Development Board (BPDB). His academic interests include smart grid integration, digital system design, and sustainable power engineering. Mr. Rahman is known for his strong commitment to laboratory-based learning and for guiding numerous undergraduate projects in the field of applied electrical engineering.

Dr. Md. Mohsin is a Senior Assistant Professor in the Department of Electrical and Electronic Engineering (EEE) at the World University of Bangladesh. Since joining WUB in 2009, he has been actively engaged in teaching, research, and departmental development. His academic expertise includes power system operation and control, electrical machines, instrumentation, control systems, and electromagnetics. Dr. Mohsin has supervised more than fifty undergraduate research projects and played a key role in establishing the IEEE Student Branch at WUB. He has also contributed to developing the department's laboratory infrastructure and organizing academic events such as industrial visits, seminars, and technical workshops. His research interests include modern power systems, renewable integration, and intelligent control strategies. Dr. Mohsin continues to contribute to advancing engineering education and fostering innovation among young engineers in Bangladesh.

Md. Sharif Uddin Shajib is a Lecturer in the Department of Electrical and Electronic Engineering at the World University of Bangladesh (WUB). He earned his B.Eng. in Electrical & Electronic Engineering (2015) and his M.Eng. in Telecommunication Engineering (2025), both from WUB. His academic journey includes roles as Senior Lab Assistant (2016–2020) and Teaching Assistant (2020–2023) at WUB, during which he developed strong expertise in laboratory instruction and curriculum support. His research focuses on resource allocation in photonic systems, wireless communication and the evolution from 5G to 6G networks, with emphasis on simulation-driven design and performance analysis. In teaching, he covers undergraduate courses such as Electrical Circuits, Digital Electronics, Communication and Electrical Service Design, and he contributes to curriculum development and laboratory modernization initiatives. He is also Advisor, IEOM Society WUB Student Chapter.