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Safiullah Shirzad

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ABOUT ME

Energy Systems Engineer and researcher with experience in renewable energy systems, solar PV and PV–battery integration, and techno-economic analysis. Currently pursuing a Master's degree in Energy Systems Engineering, with hands-on and research-based experience in energy system modeling, optimization, and performance assessment using tools such as PVsyst, EnergyPLAN, and Python. Has worked on reliability-focused energy studies in fragile grid contexts and contributed to academic research and institutional energy analyses, with strong skills in analytical thinking, technical reporting, and interdisciplinary collaboration.

WORK EXPERIENCE

UNIVERSITY TEACHING ASSISTANT – GHAZNI TECHNICAL UNIVERSITY – 07/06/2022 – Current – GHAZNI , AFGHANISTAN

Lecturer at the Energy Engineering Department (Electro-Mechanic Faculty).
Teaching undergraduate courses related to energy systems and renewable energy.
Supervising senior students' graduation projects and research activities.
Active member of research, student counseling, cultural, and examination committees.

ARTICLE REVIEWER – JOURNAL OF INFRASTRUCTURE, POLICY AND DEVELOPMENT, USA – 12/08/2024 – 11/04/2025 – ONLINE, UNITED STATES

Peer-review of research articles in energy, infrastructure, and policy-related fields.

ENERGY ENGINEER – ZULARISTAN ENERGY FOR AFGHANISTAN – 12/12/2020 – 13/03/2021 – NANGARHAR, AFGHANISTAN

Operation and maintenance of electrical power systems.
Troubleshooting system faults and ensuring reliable electricity supply.
Team leadership and on-site technical training.

SOLAR PV TRAINER – MERCY CORPS – 14/12/2019 – 12/12/2020 – PARWAN, AFGHANISTAN

Delivering technical and practical training in solar PV and solar thermal systems.
Training on design, installation, and maintenance of off-grid, mini-grid, and hybrid systems.

EDUCATION AND TRAINING

14/09/2025 – 12/12/2027 Çorum , Turkey
MSC. ENERGY SYSTEMS Hitit University

Website https://hitit.edu.tr/tr | **Field of study** Energy Systems | **Level in EQF** EQF level 7

11/10/2015 – 09/08/2019 Kandahar , Afghanistan
B.ENG Kandahar University

Website https://kdru.edu.af/ | **Field of study** Energy Engineering | **Level in EQF** EQF level 6

27/10/2025 – 03/11/2025 Online, Denmark
CERTIFICATE Aalborg University

Field of study EnergyPLAN

LANGUAGE SKILLS

Mother tongue(s): **PERSIAN/DARI**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C1	C1	C1	C1	C1
TURKISH	C1	C1	B2	C1	B2
PASHTO	C2	C1	C1	C2	C2

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

SKILLS

Renewable energy system design and analysis | Solar PV system simulation (PVsyst, HOMER Pro) | Energy systems modeling and feasibility studies | Research methods, academic writing, and peer review | Microsoft Office (Word, Excel, PowerPoint)

PUBLICATIONS

2023
Design and economic analysis of on-grid solar rooftop PV system using PVsyst software

Most businesses heavily rely on a consistent and reliable supply of electricity to sustain their operations. Unfortunately, the utility
grid in Ghazni suffers from poor energy security and high electricity costs. As a result, many of these establishments have resorted to using
diesel generators to meet their energy demands. This study focuses on the design and economic analysis of an on-grid solar rooftop
photovoltaic (PV) system, utilizing PVsyst software. The research findings indicate that the designed on-grid solar rooftop PV system
has a specific solar PV capacity of 10 kW, capable of generating an estimated annual energy output of 19,323 kWh. The economic
analysis reveals that the initial capital required to establish this Solar system amounts to US$ 5213. The payback period is estimated to
be 6.3 years, with a projected return on investment of 457 %.

Serat, Z., Fatemi, S. A. Z., & Shirzad, S. (2023). Design and economic analysis of on-grid solar rooftop PV system using PVsyst software. Archives of Advanced Engineering Science, 1(1), 63-76.

Authors: Z Serat, SAZ Fatemi, S Shirzad | **Journal Name**: Archives of Advanced Engineering Science | **Volume, Issue and Pages**: 2023, Vol. 1(1) 63–76 | **Publisher**: Bon View

2025
The Impact of Net Metering Policies on Solar Rooftop Adoption in Afghanistan

This research evaluates the potential influence of Afghanistan's net metering policies on the adoption of solar rooftop systems. A survey of 17,000 individuals indicates a high level of awareness (78.6%) and approval (86.7%) of the policy, with 90% having adequate rooftop space. Despite financial obstacles, only 26.7% are able to afford systems independently, but 92.9% are open to adopting them through loan-based financing. Enhance loan accessibility for solar rooftop adoption.

Shirzad, S. (2025). The Impact of Net Metering Policies on Solar Rooftop Adoption in Afghanistan. Energy RESEARCH LETTERS, 6(Early View).

Authors: Safiullah Shirzad | **Journal Name**: Energy Research Letters | **Volume, Issue and Pages**: Vol. 6, Issue Early View, 2025July 14, 2025 AEST | **Publisher**: scholasticahq

2023

Design and development of grid-connected solar pv power plant using pvsyst

As we know, the biggest problem that threatens today's world is climate change and global warming. Alongside that, Afghanistan does not have a reliable source of power, and people who live in cities do not have full access to electricity. So, we need immediate access to electricity. Therefore, among all other renewable sources, the only one that is feasible in the target area and could solve this problem soon is investing in a solar PV power plant. This study aims to develop a standard procedure for the design of grid-connected solar PV systems using PVsyst software. The project began with a broad database of meteorological data, including global daily horizontal solar irradiance, and also a database of various renewable energy system components from different manufacturers. This paper will explain the grid solar power limited in the year 2023. The photovoltaic power plant has a solar radiation of 6.22 KWh/Sq./day, covering 162.66 acres of land. The operating module temperature varies from -40°C to 85°C, with a tilt angle of 32 degrees. The various power losses (PV losses due to irradiation level, temperature, soiling, inverter, wiring, power electronics, grid availability, and interconnection) amount to 2006 KWh/m2, with a total production of 60513314 KVAh/ year, and the performance ratio is calculated from simulation, giving an annual PR of 75.16%.

Shirzad, S., Fazli, A. M., Zgham, W., & Fatemi, S. A. Z. (2023). Design and development of grid-connected solar pv power plant using pvsyst. Ajrsp, 5(52), 67-86.

Authors: Safiullah Shirzad(1), Agha Mohammad Fazli(2), Wahidullah Zgham(3), Sayed Ahmad Zamir Fatemi(4) | **Journal Name**: Academic journal of scientific Research and Publishing | **Publisher**: AJRSP

2023

Feasibility study of theoretical efficiency calculation for flat plate collectors in solar water heating systems

Solar energy stands as a paramount clean, abundant, and renewable power source holding remarkable potential to address our escalating
energy needs. Among its crucial utilization methods, solar water heating systems integrating flat-plate collectors (FPCs) emerge as vital contributors
in harnessing and converting solar energy into utilizable heat. This study delves into the realm of FPCs' theoretical efficiency assessment, employing
mathematical models and factoring regional weather conditions to meticulously evaluate the efficiency of single-glazed and double-glazed collector
variants. The outcomes spotlight the single-glazed collector's efficiency at 0.669 and the double-glazed collector at 0.713, underscoring the
discernible performance gap. In a landscape where industries, hospitals, residences in Kandahar, and comparable settings extensively depend
on hot water, often derived from fossil fuel-driven heating, this research's implications hold particular relevance. By transitioning toward solar
water heating, this study underscores a concrete method not only to curtail carbon emissions but also to significantly reduce energy expenses
linked with conventional heating techniques. The findings beckon a departure from the status quo, emphasizing that cleaner energy options
are attainable, even for regions demanding hot water requirements. As society navigates complex decisions concerning energy sourcing,
embracing solar water heating stands as an auspicious stride toward a sustainable future, beckoning us to collectively embark on a path of
energy-conscious choices for the greater good of our planet and the generations that will inhabit it.

Fatemi, S. A. Z., Zgham, W., Shirzad, S., & Serat, Z. (2023). Feasibility study of theoretical efficiency calculation for flat plate collectors in solar water heating systems. Archives of Advanced Engineering Science, 1-12.

Authors: Sayed Ahmad Zamir Fatemi1, , Wahidullah Zgham1, Safiullah Shirzad1 and Zainullah Serat1 | **Journal Name**: AAES | **Publisher**: Bon View

2024

Land Use and Energy Comparison of grid-connected Monocrystalline, and Heterojunction with Intrinsic Thin-layer Solar Technologies using advanced PVsyst Software (A Case Study in Kabul Province, Afghanistan)

This study aims to compare the performance and land use requirements of grid-connected monocrystalline and heterojunction with intrinsic thin-layer (HIT) solar technologies in KabulProvince, Afghanistan, using advanced PVsyst software. A 3 kWp PV system was designed andsimulated for both technologies. The results show that HIT panels outperform monocrystallinepanels in terms of annual energy production and performance ratio (PR). HIT panels generated6108 kWh annually with a PR of 85.49%, while monocrystalline panels produced 5969.5 kWhwith a PR of 83.56%. Additionally, HIT panels required approximately 8.1% less installation areacompared to monocrystalline panels, making them more space-efficient. The findings suggest thatthe adoption of HIT solar technology can lead to

improved energy output and more efficient useof available land, contributing to more sustainable and effective solar energy solutions in theregion. Despite potentially higher initial costs, HIT panels can provide better long-term benefitsthrough higher efficiency and lower land use requirements. Further research is recommended toexplore the cost-benefit analysis, long-term performance evaluation, sensitivity analysis, grid integration, and policy frameworks related to HIT solar technology in Afghanistan. By addressing these areas, a more comprehensive understanding of the practical implementation and long-term sustainability of HIT solar technology can be achieved, ultimately supporting the transition towards more efficient and environmentally friendly renewable energy solutions in the country.

Shirzad, Safiullah, et al. "Land Use and Energy Comparison of grid-connected Monocrystalline, and Heterojunction with intrinsic thin-layer Solar technologies using advanced PVsyst SoftwareA Case Study in Kabul Afghanistan." Ajrsp 6.63 (2024): 121-133

Authors: Safiullah Shirzad, Wahidullah Zgham, Fida Mohammad Mohammadi, Agha Mohammad Fazli, Sayed Ahmad Zamir Fatemi | **Journal Name**: Academic Journal of Research and Scientific Publishing | **Volume, Issue and Pages**: Vol 6 | Issue 63

Link https://www.ajrsp.com/en/Archive/issue-63/5.pdf

NETWORKS AND MEMBERSHIPS

23/05/2022 – CURRENT Hung Kong
Energy Engineer