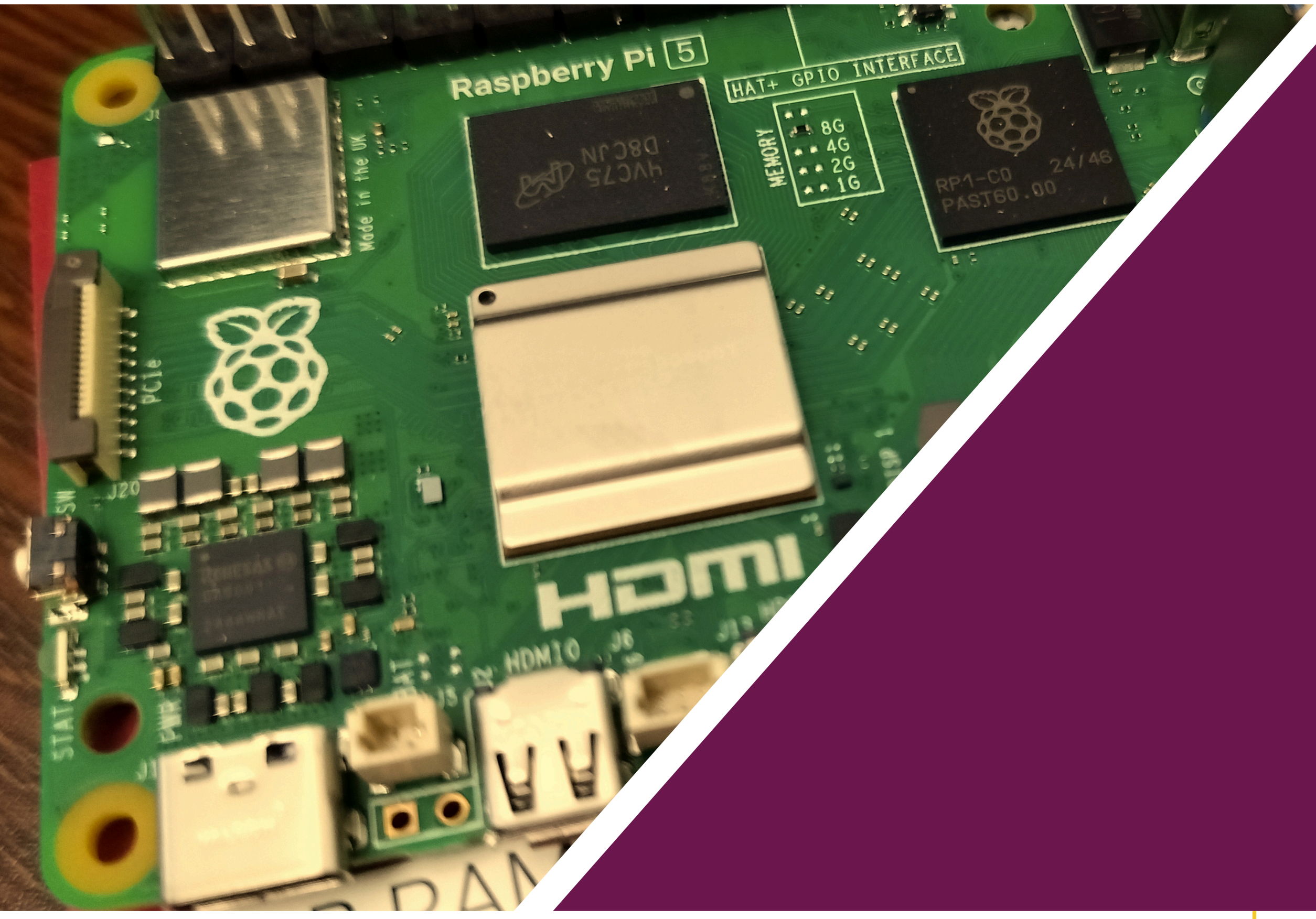
UNIVERSITI TEKNOLOGI MARA

EESEE 2025

10TH ELECTRICAL ELECTRONICS SYSTEMS ENGINEERING EXHIBITION 2025

VOLUME 1



FACULTY OF ELECTRICAL ENGINEERING
UNIVERSITI TEKNOLOGI MARA
JOHOR BRANCH
PASIR GUDANG CAMPUS

Authors

Noor Hafizah Khairul Anuar, Fazlinashatul Suhaidah binti Zahid, Nor Diyana Binti Md Sin, Zakariah Yusuf, Siti Musliha Ajmal Binti Mokhtar, Hanunah Binti Othman, Khairul Kamarudin Hasan, Masmaria Binti Abdul Majid, Siti Aminah Binti Nordin, Muhammad Asraf Bin Hairuddin, Muhammad Zairil Bin Mohd Nor, Nor Affida Binti M.Zin, Nur Asfahani Binti Ismail, Zahari Abu Bakar, Kamaru Adzha Bin Kadiran, Ezril Hisham Bin Mat Saat, Muhammad Rajaei Dzulkifli, Nur Amalina binti Muhamad, Norbaiti binti Sidik, Rozi Bin Rifin, Zatul Iffah Binti Abd Latiff, Sufian bin Mohamad, Norhalida Binti Othman, Nurul Nadia Binti Mohamad, Norlee Husnafeza Binti Ahmad, Fatimah Khairiah Abdul Hamid, Wan Suhaifiza Binti W. Ibrahim, Fadila Binti Mohd Atan, Siti Aliyah Binti Mohd Saleh, Mastura Omar, Rijalul Fahmi Bin Mustapa, Atiqah Hamizah Binti Mohd Nordin, Muhammad Zairil Bin Muhammad Nor, Shakira Azeehan Binti Azli, Siti Hazurah Binti Indera Putra, Suhaili Binti Beeran Kutty.

Editors
Sufian bin Mohamad
Kamaru Adzha Bin Kadiran

Book Graphic Designer
Kamaru Adzha Bin Kadiran

EESEE 2025 10TH ELECTRICAL ELECTRONICS SYSTEMS ENGINEERING EXHIBITION 2025

e ISBN 978-967-0033-28-0

Universiti Teknologi MARA, Cawangan Johor Kampus Pasir Gudang (Online)

Published in Malaysia by Universiti Teknologi MARA Cawangan Johor
Kampus Pasir Gudang 81750 Masai

FOREWORD BY THE PROGRAM CHAIR

Greetings from the Electrical, Electronics, and Systems Engineering Exhibition 2025 (EESEE 2025).

As the Program Chairs, it is our great pleasure to present this compilation of extended abstracts, showcasing the remarkable projects developed by our final-semester students from the Diploma in Electrical Engineering (Power) and Diploma in Electrical Engineering (Electronics) programs at Universiti Teknologi MARA, Cawangan Johor, Pasir Gudang Campus.

This exhibition marks a significant milestone in our students' academic journey, representing the culmination of years of dedication, perseverance, and learning. It also serves as an essential step toward the successful completion of their diploma studies. The projects featured this year are centered on the theme *Engineering Excellence: Bridging Technology and Life*, reflecting current trends and innovations in the engineering field.

This extended abstract book highlights not only the students' technical expertise but also their creativity, problem-solving skills, and ability to engage meaningfully with peers and industry professionals. Within these pages, you will find a diverse range of projects that embody a unique blend of knowledge, innovation, and practical application.

We warmly invite you to explore this collection, which celebrates the achievements of our aspiring engineers. Welcome once again to the Electrical, Electronics, and Systems Engineering Exhibition 2025. May the insights shared here inspire and pave the way for the next generation of innovative engineers.

Warm regards,

Dr. Fatimah Khairiah binti Abd Hamid
Dr. Atiqah Hamizah binti Mohd Nordin
Program Chairs
Electrical, Electronics, and Systems Engineering Exhibition 2025 (EESEE 2025)

Modelling and Development of Grid-Connected PV System Tool with Variation of Irradiation using Pvsyst And Matlab App Designer

Syahin Haziq Dini bin Syazreen[1], Dr. Atiqah Hamizah binti Mohd Nordin [2]
[1,2]*Electrical Engineering Studies, College of Engineering, Universiti Teknologi MARA, Pasir Gudang, Johor.*

*2022840556@isiswa.edu.my

ABSTRACT

This study focuses on the modeling and development of a tool for grid-connected photovoltaic (PV) systems under varying irradiation conditions using PVSYST and MATLAB App Designer. The primary goal is to create an integrated solution that combines the robust simulation capabilities of PVsyst with the user-friendly interface and computational power of MATLAB GUI. The modelling and development were carried out on two parts: i) PVsyst is used to model four PV systems, accounting for geographic location and irradiation factors to predict energy production accurately; ii) MATLAB App Designer is employed to develop an interactive tool that allows users to input specific parameters and visualize real-time performance metrics based on results generated from PVsyst modeling in the first part. The tool integrates PVsyst simulation results and enables users to modify system parameters dynamically, facilitating detailed analysis. The results show the developed tool successfully generate outputs expectedly and validated with the results from PVsyst. This tool offers user-friendly interface to aid

understanding of PV system performance based on variation of irradiation through its simplicity and suits for educational purpose for beginners in PV education.

KEYWORDS: MATLAB, PVSyst, PV system, GUI, irradiation

PRODUCT DESCRIPTION

The Grid-Connected PV System Tool, developing by utilizing PVsyst and MATLAB App Designer, is a user-friendly platform for simulating and analyzing photovoltaic (PV) systems under varying irradiation conditions. This tool combines PVsyst's precise energy simulation capabilities with MATLAB's interactive design environment, enabling users to assess energy performance, system efficiency, and real-time variability. Designed for education, it incorporates a user-friendly environment for testing scenarios under varying irradiation to enhance understanding on this effect on PV performance.

BLOCK DIAGRAM

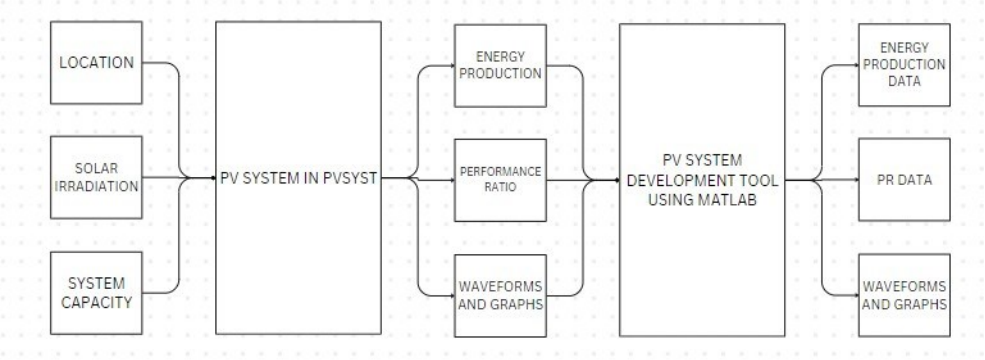


Figure 1: Block diagram of PV system tool using PVSyst and MATLAB App Designer

FLOWCHART

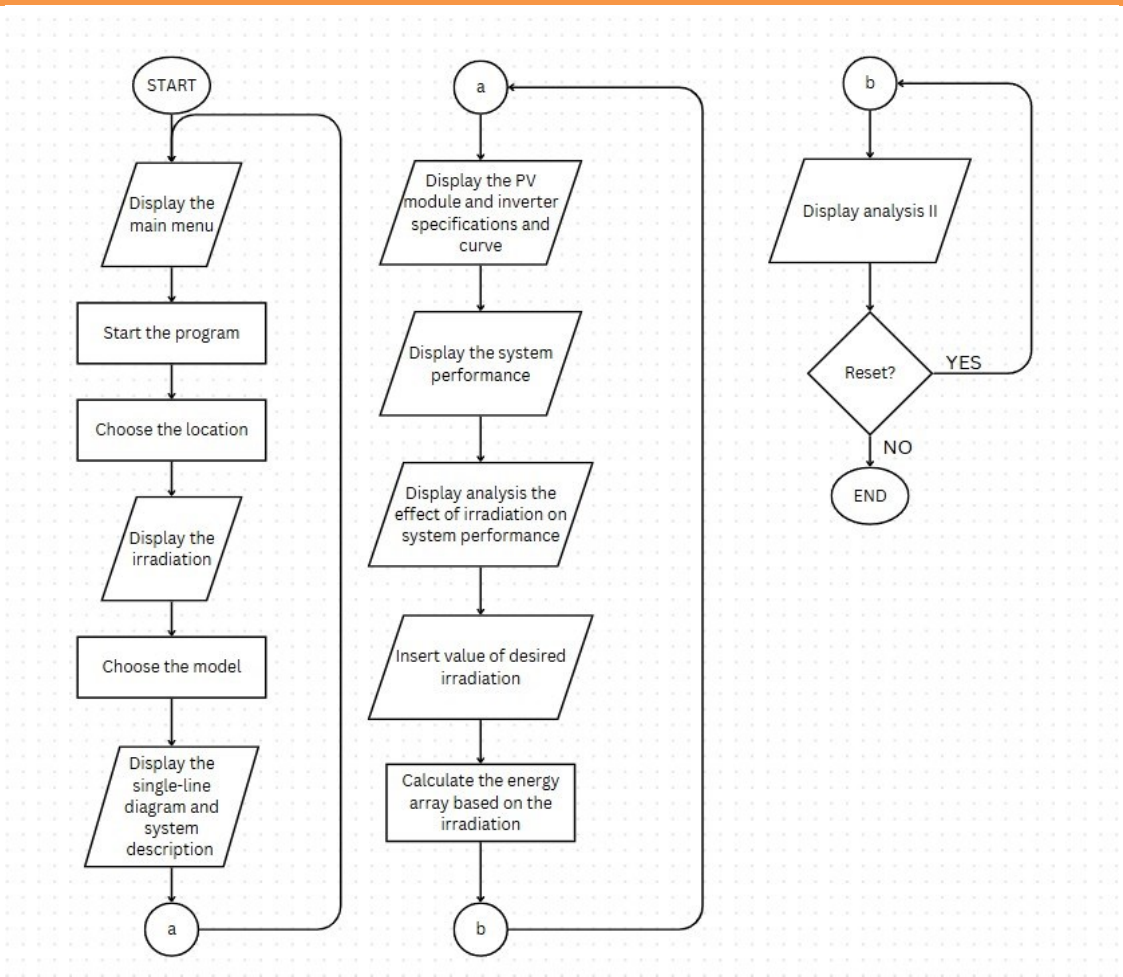


Figure 2: Project flowchart

PICTURES

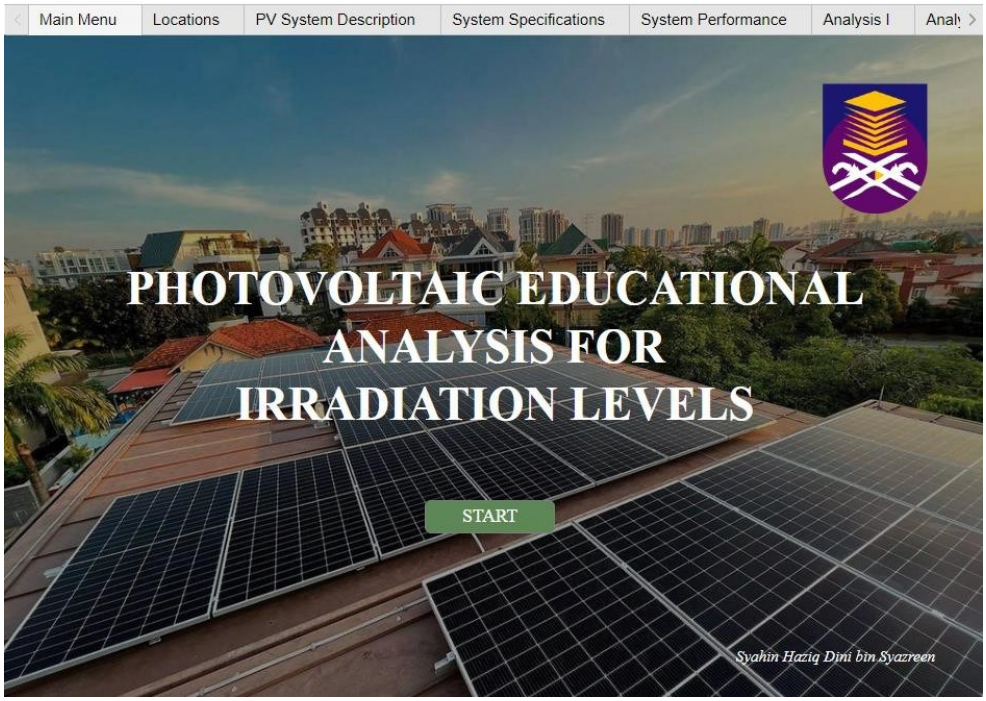


Figure 3: Main menu

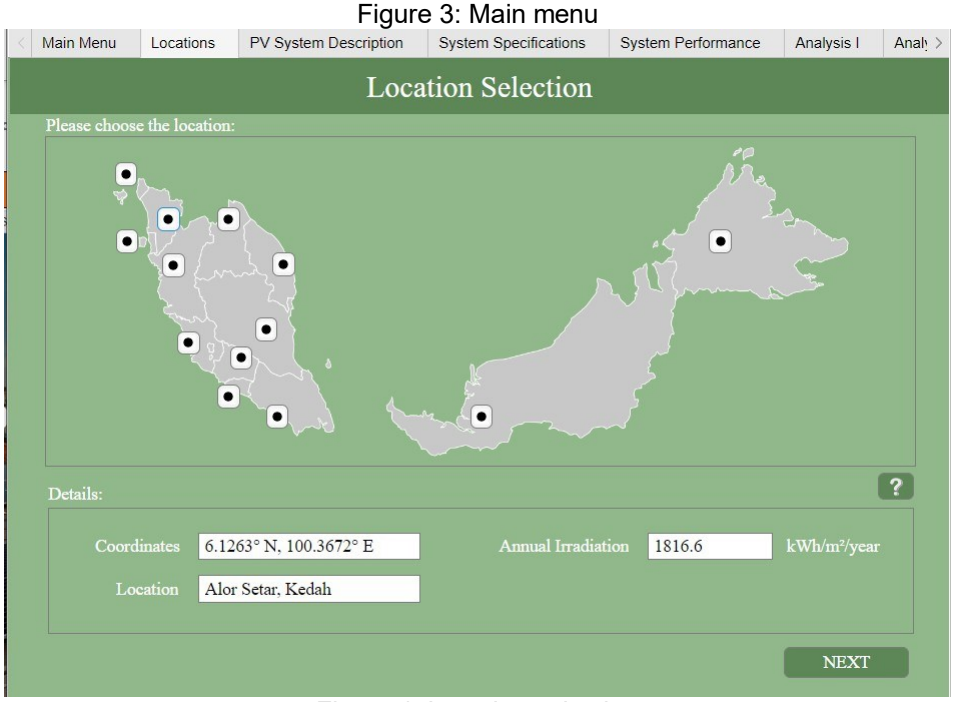


Figure 4: Location selection

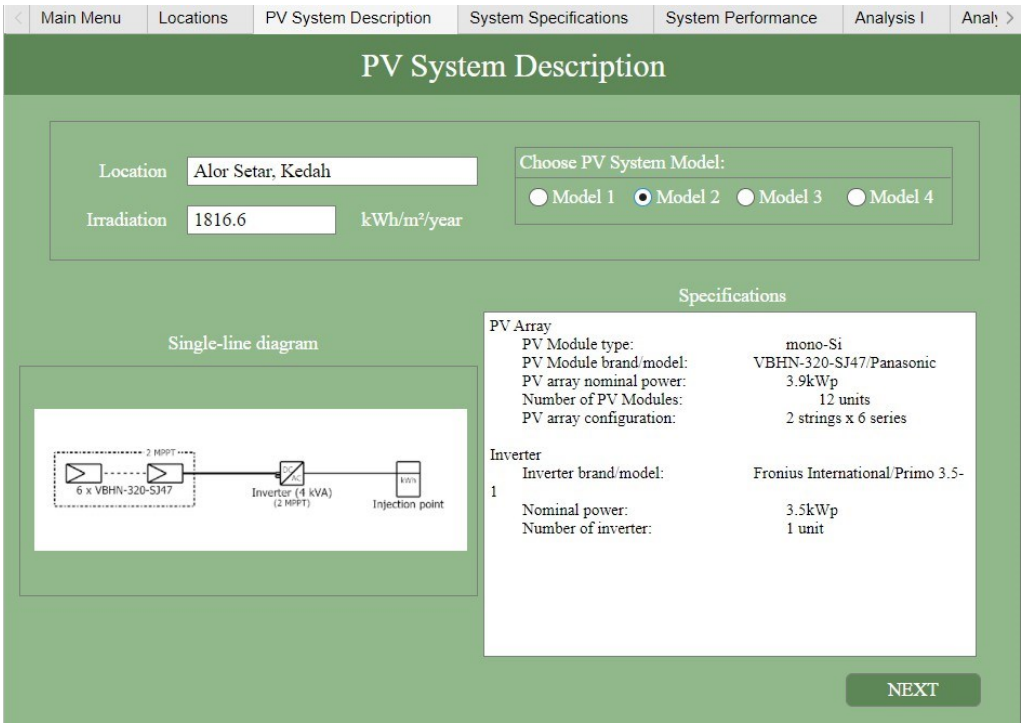


Figure 5: PV system description

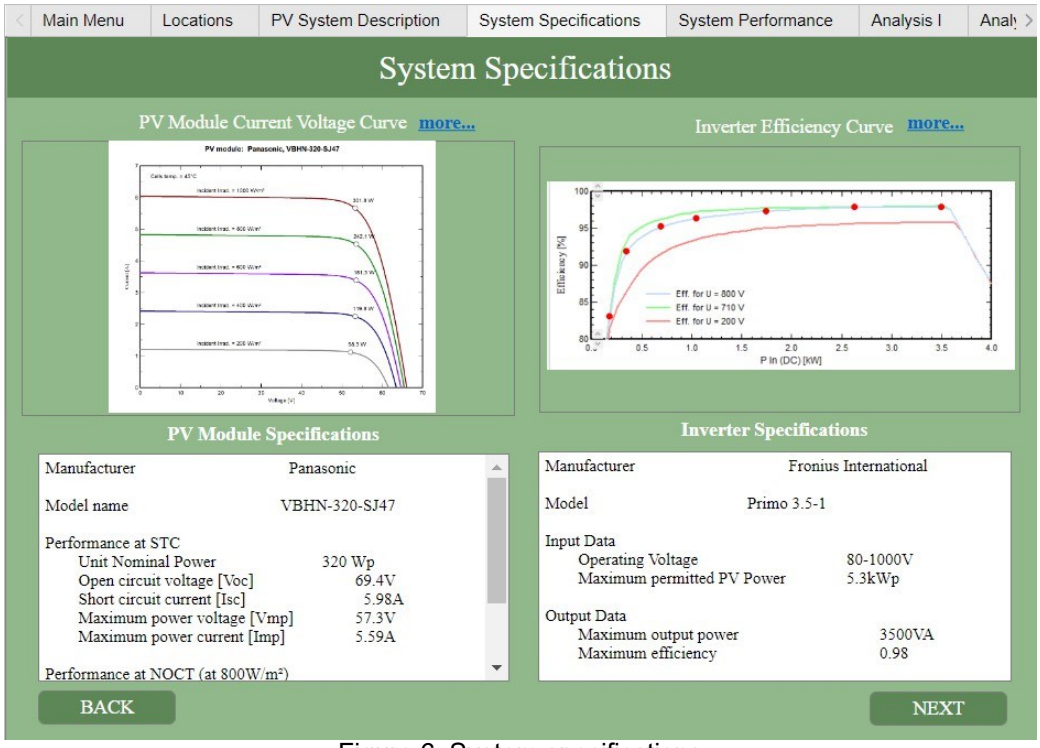


Figure 6: System specifications

NOVELTY AND UNIQUENESS

The novelty and uniqueness of the Grid-Connected PV System Tool lies in its integration of PVsyst and MATLAB App Designer for comprehensive and user-friendly simulation of photovoltaic systems under varying irradiation conditions. The combination of PVsyst's precise energy modeling capabilities with MATLAB's interactive GUI ensures a unique platform that facilitates both real-time data comparison and detailed performance analysis. Unlike conventional tools, this system allows seamless customization and visualization of grid-connected PV operations, enabling precise predictions despite of its simplicity. This tool presents a distinct approach to aiding PV education by experiential learning.

BENEFIT TO MANKIND

The Grid-Connected PV System Tool benefits educational sector by offering user-friendly tool for enhancing understanding of PV behavior to irradiation through GUI environment with interactive features.

COMMERCIALIZATION POTENTIAL

The Grid-Connected PV System Tool possesses significant commercialization potential due to its innovative features and user-friendly design. It is an ideal educational tool for universities students and educators offering a hands-on platform to learn and teach renewable energy concepts. Key markets include universities, technical colleges, and solar photovoltaic communities. Future improvement of the system with additional features could potentially be commercialized to solar system developers, and energy management companies looking to enhance PV system design and efficiency.

CONCLUSION

In summary, the Grid-Connected PV System Tool, which combines the capabilities of PVsyst and MATLAB App Designer, serves as an effective platform for simulating and analyzing photovoltaic systems under diverse environmental conditions. Its innovative approach ensures precise energy performance predictions, facilitates real-time data comparison, making it a valuable resource for academic and research. By advancing renewable energy adoption, enhancing grid stability, and encouraging innovation, this tool plays a significant role in promoting sustainable and efficient energy solutions worldwide.

REFERENCES

[1] Nazififard, M., Hashemi-Dezaki, H., & Nazififard, K. (2023, 5-6 Dec. 2023). Comparing Actual Measurement and PVsyst Simulation Results for Energy Generation of Microgrid-Connected PV Systems. 2023 13th Smart Grid Conference (SGC).

[2] Prasad, R. M., & Krishnamoorthy, A. (2017, 21-22 Sept. 2017). Design and performance analysis of solar EV under STC using matlab and under real-time using PVsyst. 2017 IEEE International Conference on Power, Control, Signals and Instrumentation Engineering (ICPCSI).

[3] Showers, S. O., & Raji, A. K. (2019, 25-27 March 2019). Frequency Regulation of Grid Connected Solar PV System Using Battery Storage System. 2019 International Conference on the Domestic Use of Energy (DUE).