

The Capstone Design of Solar Farm for Alternative Energy

T P Sari^{1*}, R B Anggoro¹, R A Raharjo, S T Umaroh^{2,3}

¹Department of Mechanical Engineering, Faculty of Engineering, Universitas
Pembangunan Nasional Veteran Jawa Timur, 60294, Indonesia

²Post Graduate, Universitas Negeri Surabaya, 60213, Indonesia

³Mechanical Engineering Education Undergraduate Study Program, Faculty of
Engineering, Universitas Negeri Surabaya, 60231, Indonesia

*Corresponding e-mail: tria.puspa.tm@upnjatim.ac.id

Abstract. The capstone design integrates advanced technologies to optimize energy capture, storage, and transmission, addressing key challenges in traditional solar farm configurations. The study delves into the conceptualization, engineering, and performance evaluation of the proposed solar farm, emphasizing its potential for enhanced efficiency and sustainability. Additionally, the article discusses the environmental impact and economic viability of the free space solar farm, highlighting its role in advancing the transition to a more sustainable and resilient energy infrastructure. The results of this design use polycrystal type solar panels with a panel length of 1995mm and a width of 990mm which will be installed on empty land that has been provided with a land area of 80m x 40m, 50 rows of solar panels are obtained and the total energy produced before being converted into KWP with a total of 50 rows of panels is obtained 325 WP and multiplied by the total existing panels, namely 36 solar panels, the result is 11,700 WP, then converted to KWP and the result is 585 KWP for 1 day. The findings contribute valuable insights to the field of renewable energy engineering, offering a comprehensive understanding of the practical application of free space for solar energy generation.

Keyword: Solar Panel, Solar Farm, Renewable Energy, capstone design.