

ABSTRACT

Land constraints in urban areas have encouraged the development of urban farming as an alternative form of agriculture that supports food security and environmental sustainability. To address this challenge, Telkom University Surabaya has developed energy-efficient and environmentally friendly lighting technology based on Light Emitting Diodes (LEDs). This technology has reached Technology Readiness Level (TRL) 6 and requires an economic feasibility study to advance to TRL 7 and enter the commercialisation phase.

This research aims to analyse the economic feasibility of LED technology for urban farming through a technical, market, and economic approach. The analysis is conducted through calculations of the Total Addressable Market (TAM), Serviceable Addressable Market (SAM), and Serviceable Obtainable Market (SOM), as well as estimates of labour requirements, production locations, raw materials, and investment costs. Economic evaluation was conducted using capital budgeting methods, such as Net Present Value (NPV), Internal Rate of Return (IRR), Payback Period, and sensitivity analysis on key variables.

The The analysis results show that this project generates an NPV of Rp826 million, an IRR of 55%, and a Payback Period of 3 years. Sensitivity analysis identified profit margins and production costs as the most influential factors. Based on these results, it can be concluded that this Light Emitting Diode technology is economically viable and has the potential to be developed commercially as a lighting solution for urban agriculture. This research also contributes to the achievement of Sustainable Development Goal (SDG) number 2, Zero Hunger, by supporting urban agricultural productivity, as well as SDG number 11, Sustainable Cities and Communities, by promoting the sustainable use of urban space through environmentally friendly technology.

Keywords: *Urban Farming, Light-Emitting Diode Technology, Economic Feasibility Analysis, Technology Readiness Level, NPV, IRR, Payback Period*