ABSTRACT

Griya Permata Gedangan housing estate in Sidoarjo has experienced significant experiencing significant population growth, creating an urgent need for better for better telecommunications infrastructure to support modern life. Modern life. The 10-Gigabit Capable Passive Optical Network (X-GPON) technology becomes the ideal solution to increase the capacity and efficiency of the access network in the area. access network in the area.

In this X-GPON optical network planning using optisystem software to find out the previously calculated results are according to ITU-T standards or not. From the calculations carried out, the Downstream Power Link Budget attenuation results obtained have a total of 20.303 dB. While the results of manual calculations and simulations have a total manual calculation of -28.303 dBm and the results of simulation values of -19.706 dBm. And in the calculation of the Downstream Rise Time Budget using the calculation of the nearest ODP distance has a result of 16 ps. Then in the Rise Time Budget Upstream get the results of 31 ps. Both calculations have met the standard because the value of the calculated results is below 70 ps.

This research uses techno-economic methods to determine whether or not the project is financially feasible. The results of the costs incurred for investment amounted to Rp149,749,910 and the costs for operations totaled Rp1,730,969. Revenue obtained is IDR 2,628,000,000, so the result for Payback Period is 1 month, the result of Profitablity Index is 2.12, the result for Internal Rate of Return is 943%, the result of Average Rate of Return is 778%, and the result of Return of Investment is 101%. The results obtained have many advantages, but from an economic point of view, the risks of this project must be considered.

***Keywords**: X-GPON, Fiber to the Home, Griya Permata Gedangan, Optical Network, Economic.*