

## ABSTRAK

Kebutuhan akan energi semakin meningkat seiring pertambahan penduduk dan aktifitas masyarakat. Sebagian besar energi berasal dari energi fosil, tidak dapat diperbaharui dan habis jika digunakan secara terus-menerus. Energi baru terbarukan menjadi salah satu solusi energi alternatif. Berdasarkan data Dinas Pertambangan dan Energi NTB, terdapat beberapa Dusun di Bayan Kabupaten Lombok Utara belum dialiri listrik PLN salah satunya di Dusun Pegadungan. Diperlukan perencanaan PLTS sebagai sumber energi baru terbarukan karena tingginya intensitas matahari dan rendahnya curah hujan yang terjadi dalam satu tahun.

Data pendukung penelitian seperti lokasi, kebutuhan energi, intensitas radiasi matahari, suhu, dan kecepatan angin, sebagai dasar perhitungan kapasitas panel surya, baterai, SCC dan inverter. Pada saluran distribusi direncanakan grup, jenis dan ukuran konduktor, menghitung drop tegangan dan rugi daya.

Hasil penelitian didapatkan pemakaian total energi Dusun Pegadungan sebesar 60.830 kWh. Diterapkan sistem PLTS komunal (terpusat) sistem *off-grid*. Berdasarkan perencanaan daya PLTS sebesar 25.623,08 Wp yang dihasilkan dari panel surya sebanyak 135 buah (200 Wp/ unit). Lahan yang dibutuhkan untuk pemasangan panel surya seluas 188,41 m<sup>2</sup>. Komponen yang digunakan *Solar Charger Controller* berkapasitas 180 A, baterai kapasitas total 48 V, 6.486,95 Ah dan inverter kapasitas total 45 kW. Perencanaan jaringan distribusi dibagi menjadi 3 grup dengan daya total grup I 21.050 W, grup II dan III sebesar 21.550 W. Arus nominal 32,746 A, kabel jenis NFA2X luas penampang 3 x 50 + 35 mm<sup>2</sup>. Drop tegangan yang dihasilkan masih berada pada kriteria PLN (-10% s/d +5%) yaitu 6,612 V dengan rugi daya 1.948,61 W.

**Kata kunci :** Perencanaan, PLTS, Sistem off-grid, Sistem Distribusi.

## ABSTRACT

The need for energy is increasing as population and community activities increase. Most of the energy comes from fossil energy, can not be renewed and depleted if used continuously. Renewable energy becomes one of alternative energy solutions. Based on the data from the Department of Mining and Energy of NTB, there are several hamlets in Bayan, North Lombok regency has not been powered by PLN one of them in Pegadungan hamlet. PLTS planning is needed as a renewable energy source because of the high intensity of the sun and the low rainfall that occurs within a year.

Supporting research data such as location, energy requirements, solar radiation intensity, temperature, and wind speed, as the basis for calculating solar panel capacity, batteries, SCC and inverters. In the planned group distribution channel, the type and size of the conductor, calculate the voltage drop and power loss.

The result showed that the total energy use of Pegadungan Hamlet is 60,830 kWh. Applied PLTS system communal (centralized) off-grid system. Based on PLTS power planning of 25,623,08 Wp produced from solar panels of 135 units (200 Wp / unit). Land required for installation of solar panels of 188.41 m<sup>2</sup>. Components used Solar Charger Controller with a capacity of 180 A, total battery capacity of 48 V, 6,486.95 Ah and 45 kW total capacity inverter. Distribution network planning is divided into 3 groups with total power of group I 21,050 W, group II and III of 21,550 W. Nominal current of 32,746 A, cable of type NFA2X cross-sectional area 3 x 50 + 35 mm<sup>2</sup>. The resulting voltage drop is still in PLN criteria (-10% s / d + 5%) ie 6.612 V with power loss 1.948,61 W.

**Keywords:** Planning, PLTS, Off-grid System, Distribution System.