Optimalisasi Pengembangan Sistem Tenaga Listrik Ereke = Optimization of The Ereke Electricity System Development

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Abstrak

Sistem Ereke merupakan sistem kelistrikan di kawasan sisi utara pulau Buton yang masuk wilayah Kabupaten Buton Utara. Namun pola operasi pada sistem Ereke dipasok dari sistem Baubau dan dalam beberapa kondisi dioperasikan secara isolated. Dari pola operasi tersebut, terjadi beberapa kondisi yaitu kualitas tegangan yang buruk akibat letak geografis Ereke dan Baubau terlampau jauh ±199,1 kms, kemudian apabila terjadi padam meluas/padam total (Blackout) proses penormalan pada sistem Ereke membutuhkan waktu yang cukup lama karena kondisi Ereke yang berada di ujung jaringan dan tercatat pada tahun 2021, sistem Ereke mengalami padam total sebanyak 63 kali. Dari hasil analisis diperoleh bahwa apabila menggunakan pola operasi dipasok dari sistem Baubau, maka biaya yang dibutuhkan sebesar Rp 1.159.452.493,9/bulan dengan tegangan pangkal 15,6 kV pada pelanggan serta lamanya pemulihan pasca padam meluas/padam total dan apabila isolated Rp 1.622.262.413,2/bulan dengan tegangan pangkal 19,7 kV namun biaya lebih mahal namun dapat mengurangi lama waktu pemulihan pasca gangguan karena jaringan lebih pendek dan rugi jaringan berkurang. Selain itu, nilai SAIDI pada bulan Mei 2021 yaitu 5,03 jam/pelanggan/tahun dan SAIFI 5,97 kali/pelanggan/tahun. Dengan demikian, pilihan terbaik dalam pengembangan sistem pembangkitan di Ereke adalah dengan membangun sistem Ereke interkoneksi dengan sistem Baubau dengan disertai dengan pembangunan sejumlah penyulang untuk menaikkan kualitas tegangan dan kehandalan sistem Ereke dan menggunakan simulasi pada software DigSilent. Semua analisa mempertimbangkan RUPTL terbaru tahun 2021-2030.

.....The Ereke system was an electrical system used on the northern Buton island, a part of the North Buton Regency. The operating methods on the Ereke system were the operation method which was supplied from Baubau system and, in some conditions, isolated operation. There were several conditions caused by those operating methods, which were the poor voltage quality due to the geographical distance from Ereke to Baubau that were too far (±199,1 kms) and the long duration of the normalization process if there was a widespread blackout since Ereke was located at end of the network. In addition, the Ereke system experienced a total of 63 outages in 2021. From the analysis result, it was obtained that the operating method which was supplied from the Baubau system will cost Rp. 1,159,452,439.9/month with 15.6 kV base voltage and a long normalization duration after blackout/total blackout. On the other hand, it was also obtained that the isolated operation method will cost Rp. 1,622,262,413.2/month with 19.7 kV base voltage which was more expensive but with a shorter normalization duration after interruptions due to shorter network and the decreased network loss. Otherwise, the SAIDI value in May 2021 is 5.03 hours/customer/year and SAIFI 5.97 times/customer/year Therefore, developing interconnection of Ereke system and Baubau system along with the constructions of feeders to increase the voltage quality and reliability also with the use of DigSilent simulation software will improve the quality of electrical generation development in Ereke. The latest RUPTL (2021-2030) was considered through every analysis.