

ABSTRACT

Most of the 3T (Outermost, Frontier, Underdeveloped) areas in Indonesia are inhabited island areas with limited space or mountainous areas or river upstream areas that are difficult to access. Currently, power generation planning in small and non-grid interconnected systems does not use probabilistic or economic optimization methods, but rather deterministic methods. In this method, planning is made with a maximum N-2 criteria, which means reserves must be greater than the first and second largest units by one unit. The definition of reserves here is the difference between the total capable power of existing generators and peak load. It is expected that the reserve margin in isolated systems also meets a minimum constraint of 30%. In preparing the power balance at several locations in the 3T areas, the installed generator capacity planning is generally much larger than the power demands in those areas, which then causes high generation cost in the area.

This research proposes the use of spatial electricity demand forecasting methods as an alternative that is suitable for the demand characteristics in the 3T areas. The spatial approach in power planning was first proposed by Van Wormer. This approach was then applied in distribution systems according to Lee Willis's idea. Furthermore, this spatial demand forecasting was developed in various other electricity planning models. S. Sasmono proposed its use for transmission planning and non-grid electricity transition planning on islands to grid-based electricity systems.

Based on the temporary hypothesis, the characteristics of electricity users in the 3T area are similar to those in areas that are transitioning from non-grid to grid-supported areas. Thus, there is an opportunity to apply spatial electricity demand forecasting in the 3T area, which will be followed by electricity development planning that has the potential to provide efficient power generation cost estimates in the 3T area.

Keywords: Isolated Area, Non-Grid, Optimization, Spatial Electricity Demand Forecasting, Probabilistic