Voltage profile improvement of the 20 kv painan distribution system with multiple distributed renewable energy generation

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Abstrak

This paper analyzes the effect of multiple Distributed Renewable Energy Generation penetration on improving the performance of the B3 feeder typical distribution system structure in Painan, Indonesia. Analysis uses a simple concept of load and distributed generation current injection at the distributed main, lateral and sublateral lines. The algorithm begins from completion of the main line variables, then uses an algorithm to complete the lateral line variables associated with the main line variable, and finally calls algorithms to resolve the sublateral variables associated with the lateral line variable. The results have shown that integrating three Distributed Renewable Energy Generation units to this distributed system has increased the minimum voltage of the main line from 17.35 kV to 20.37 kV, reduced active power loss from 1914.747 kW to 569.925 kW, and diminished reactive power loss from 650.747 kVAr to 188.624 kVAr.