

Analisis dampak penetrasi pembangkit listrik tenaga surya pada jaringan distribusi menggunakan metode aliran daya = Analysis of solar photovoltaic penetration impact in distribution network using power flow method / Yoga Mahendro

Yoga Mahendro, author

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Abstrak

[Salah satu tantangan integrasi PLTS pada jaringan distribusi adalah kemampuan sistem dalam menyalurkan energi PLTS dengan tetap menjaga standar layanan dan operasi. Kapasitas maksimal PLTS yang diintegrasikan dinyatakan sebagai besar penetrasi, yaitu rasio kapasitas terpasang PLTS terhadap beban puncak sistem. Penelitian ini bertujuan untuk mengetahui dampak dan batasan penetrasi PLTS terhadap kondisi operasi suatu jaringan distribusi dengan menggunakan metode aliran daya. Hasil penelitian menunjukkan bahwa batas penetrasi PLTS pada sistem yang diteliti adalah paling rendah sebesar 20% untuk penempatan PLTS di tegangan rendah dan paling tinggi 210% untuk PLTS di dekat substation. Faktor pembatas utama penetrasi adalah pembebanan lebih pada saluran dan transformator serta kenaikan tegangan sistem. Penempatan pada beberapa lokasi secara tersebar dapat meningkatkan batas penetrasi PLTS. Penetrasi PLTS dapat menurunkan rugi-rugi daya sistem, akan tetapi pada penetrasi yang tinggi rugi-rugi daya cenderung menjadi lebih besar.

;One of the challenges of the integration of photovoltaic(PV) generation on distribution network is the system's ability to deliver the energy of solar PV while maintaining the standards of service and operation. PV's maximum capacity that can be integrated is declared in term of penetration, defined as the ratio of the installed capacity to the system's peak load. The operating conditions of a system can be known through the power flow study. This study aims to determine the impact and PV's penetration limits on a distribution network using power flow method. The result showed that the PV's penetration limit in the system under studied is the lowest at 20% for PV placed at the low voltage side and the highest at 210% for PV placed near the substation. The main limiting factors of penetration are feeders' and transformers' overload followed by node overvoltage. Distributed placements of PV can increase the penetration limit. PV integration can reduce system power loss, but at the high penetration level power losses tend to be larger.

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