

Potensi daur ulang greywater untuk kebutuhan air operasional (kajian: pemanfaatan air bekas wudhu untuk kebutuhan air non-konsumsi di Masjid Istiqlal, DKI Jakarta) = Greywater recycling potential for operationsl water necessity (study of utilization waste ablution water for non-consumption water necessity in Istiqlal Mosque, DKI Jakarta)

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Abstrak

Mayoritas masyarakat Indonesia adalah umat Islam. Kegiatan wudhu dapat menghasilkan sumber daya air untuk peruntukan tertentu. Rata-rata pengunjung yang datang ke Masjid Istiqlal sebanyak 328.000 orang per bulan. Tujuan penelitian ini adalah mengkaji kualitas serta potensi limbah air bekas wudhu yang tergolong greywater untuk didaur ulang. Kajian teknologi daur ulang meliputi 3 pengolahan greywater yang terdiri atas constructed wetland, biofilter anaerob aerob, dan biosand filter. Kajian teknologi pengolahan greywater dilakukan berdasarkan aspek investasi, biaya operasional dan luas lahan. Kajian teknologi diperkuat dengan metode Analytical Hierarchy Process terhadap persepsi ahli.

Hasil pengamatan diketahui kegiatan operasional non-konsumsi (mencuci lantai, menyiram taman, dan mencuci mukena) di Masjid Istiqlal membutuhkan air sebanyak 477 m³/bulan. Hasil uji kualitas greywater masih memenuhi rentang baku mutu greywater Australia. Hasil kajian potensi air dari bekas wudhu (greywater) sebanyak 875 m³/bulan, dapat menghemat penggunaan air bersih hingga 35%. Pengunjung Masjid Istiqlal sebanyak 81% setuju bahwa air bekas wudhu layak untuk didaur ulang. Proses pengolahan limbah greywater menurut para ahli yaitu biosand filter. Biaya yang diperlukan untuk membangun teknologi biosand filter sebesar Rp. 31.826.653 dengan harga per kubik air daur ulang Rp. 2.604/m³. Pemanfaatan daur ulang greywater dapat mengurangi air bersih sebanyak 85.860 m³ selama 15 tahun.

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The majority of Indonesian people are Muslims. Ablution activities can produce water resources for a particular allocation. The average visitor who comes to the Istiqlal Mosque as many as 328.000 people per month. The purpose of this study is to assess the quality and the potential of waste water used for ablution belonging greywater recycling. Study of recycling technologies covering 3 greywater treatment comprising constructed wetland, anaerobic aerobic biofilter, and biosand filter. Greywater treatment technology assessment is based on aspects of investment, operating costs and land area. Technology assessment is reinforced by the Analytical Hierarchy Process to the perception of experts.

Results of observation water needs operations of non-consumption (washing floors, watering the garden and washing mukena) in Masjid Istiqlal as much as 477 m³/month. Greywater quality test results still meet the quality standard range greywater Australia. The results of the study potential of waste ablution water (greywater) is 875 m³/month, it can save clean water use save up to 35%. Visitors Istiqlal Mosque as much as 81% agree that decent ablution water used for recycling. Greywater waste treatment process according to the experts, namely biosand filter. Cost required to build biosand filter is Rp. 31.826.653 at a price of recycled water per cubic is Rp. 2.604 /m³. Utilization of greywater recycling can reduce as much as 85.860 m³ of clean water for 15 years.