Analisis Emisi Gas CO2 dan Skenario Reduksi Emisi dari Instalasi Pengolahan Air Bersih di Kota Bogor = Analysis of CO2 Emissions and Emission Reduction Scenario from Water Treatment Plant in the City of Bogor

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Abstrak

Terjadinya fenomena perubahan iklim didorong oleh peningkatan konsentrasi gas rumah kaca (GRK) di atmosfer. Peningkatan tersebut disebabkan oleh meningkatnya emisi GRK oleh kegiatan manusia. Salah satu kegiatan manusia yang mengemisikan GRK adalah kegiatan pengolahan air. Di Kota Bogor terdapat beberapa instalasi pengolahan air (IPA) diantaranya IPA Dekeng dan IPA Cipaku. Tujuan dari studi ini yaitu menghitung emisi GRK dari IPA Dekeng dan IPA Cipaku berdasarkan unit pengolahan, mengidentifikasi unit pengolahan dengan emisi tertinggi, membandingkan emisi dari IPA Dekeng dan IPA Cipaku dengan IPA lain berdasarkan kapasitas IPA, dan mengusulkan upaya reduksi emisi GRK untuk kedua IPA tersebut. Emisi GRK dari pengolahan air dapat dikuantifikasi berdasarkan komponen produksi bahan kimia, transportasi bahan kimia, reaksi bahan kimia, dan penggunaan listrik. Sementara untuk menghitung emisi GRK dapat menggunakan metode faktor emisi. Dari studi ini diperoleh hasil IPA Dekeng rata-rata mengemisikan 195.577 kg CO2eq/bulan dengan emisi spesifik 0,062 kg CO2eq/m3 air yang diproduksi dan IPA Cipaku rata-rata mengemisikan 52.897 kg CO2eq/bulan dengan emisi spesifik 0,079 kg CO2eq/m3 air yang diproduksi. Dari kedua IPA, emisi terbesar berasal dari unit koagulasi dengan persentase terhadap total emisi dari IPA mencapai 84% di IPA Dekeng dan 91% di IPA Cipaku. Kapasitas IPA tidak memiliki pengaruh terhadap emisi spesifik IPA. Yang mempengaruhi emisi spesifik IPA yaitu kualitas air baku, desain IPA, dan lokasi IPA. Apabila dibandingkan dengan IPA lain emisi dari IPA Dekeng dan IPA Cipaku termasuk paling kecil. Untuk mereduksi emisi di IPA Dekeng dan Cipaku, PDAM Tirta Pakuan dapat menerapkan Streaming Current Monitors (SCM) dan pemulihan koagulan yang masing-masing dapat mengontribusikan penurunan emisi sebesar 30% dan 24%

The phenomenon of climate change is driven by an increase in the concentration of greenhouse gases (GHGs) in the atmosphere. The increase was caused by increased GHG emissions by human activities. One of the human activities that emit GHG is water treatment. In the City of Bogor, there are several water treatment plants (WTP) including the Dekeng WTP and Cipaku WTP. The purpose of this study is to calculate GHG emissions from the Dekeng WTP and Cipaku WTP based on the treatment units, identify the treatment unit with highest emission, compare the emissions from the Dekeng WTP and Cipaku WTP with other WTPs based on the capacity of the WTPs, and propose efforts to reduce GHG emissions for the two WTPs . GHG emissions from water treatment can be quantified based on components of chemical production, chemical transportation, chemical reactions, and electricity usage. Meanwhile, to calculate GHG emissions, the emission factor method can be used. From this study it was obtained that the average Dekeng WTP emits 195,577 kg CO2eq/month with specific emissions of 0.062 kg CO2eq/m3 of water produced and Cipaku WTP emits 52,897 kg CO2eq/month with specific emissions of 0.079 kg CO2eq/m3 of water produced . Of the two WTPs, the largest emissions came from the coagulation unit with a percentage of the

total emissions from WTP reaching 84% in the Dekeng WTP and 91% in the Cipaku WTP. The capacity of the WTPs has no influence on the specific emissions from the WTPs. Those that affect the specific emissions of the WTPs are the quality of raw water, design of the WTPs and location of the WTPs. When compared with other WTPs the emissions from the Dekeng WTP and Cipaku WTP are among the smallest. To reduce emissions in the Dekeng and Cipaku WTP, PDAM Tirta Pakuan can apply Streaming Current Monitors (SCM) and coagulant recovery, each of which can contribute to a reduction in GHG emissions of 30% and 24%.