

POWER PLANT EMISSIONS IN COLOMBO AS A TOOL FOR URBAN PLANNING

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Abstract

This research approaches to theoretically to identify the contribution of major Thermal Power Plants in Western Province to major city centres viz. Colombo Fort, Maradana and Meteorological Department at Colombo 07, using "AUSPLUME", Australian Plume Model.

Meteorological parameters taken during the Northeast monsoon periods of 1997 and 1998 in Colombo were used to develop a meteorological file in a manner suitable to run the "AUSPLUME". Power plant emissions were calculated and other data including air quality monitoring data were obtained. "AUSPLUME" Short Term Model was used along with the "US-EPA SCREEN-3" model as reference model to evaluate the power plants contribution to Colombo air pollution. In addition, ambient NO: NO₂ ratio and diurnal variations of air pollutants at Fort Railway Station and Colombo-07, Meteorological Department monitoring sites during 1998 and 2000 were also used for the identification of the pollution sources.

The model calculation predicts that during Northeast monsoon nearly 34%, 52% and 54% of NO_x as NO₂ at Fort, Maradana and Meteorological Department were contributed by thermal power plants when they were operated at their maximum operation conditions, compared to the air pollution values in year 2000 while the contribution of SO₂ was nearly 3%, 4% and 6%, respectively. Recently started Diesel powered AES Kelanitissa Power Plant would have increased the NO_x concentration at the above locations by 30, 37 and 26 µg m⁻³,

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respectively and SO₂ concentration nearly by 3, 4, and 3 µg m⁻³, respectively when operating at its medium capacity of 160 MW. Furthermore AUSPLUME model can be recommended for air pollution regulatory purposes in Sri Lanka over the currently use US EPA SCREEN-3 model, since AUSPLUME outputs are much more realistic.