INTISARI

Sistem Heating, Ventilation, and Air-Conditioning (HVAC) menyumbang 40–50 % konsumsi listrik bangunan non-residensial. Pemasangan sub-meter pada tiap komponen HVAC mahal dan invasif, sehingga penelitian ini mengusulkan pendekatan Non-Intrusive Load Monitoring (NILM) berbasis Heating Degree Hours (HDH) untuk mendisagregasi beban HVAC hanya dari satu meter utama dan data suhu luar per jam. Fitur HDH, jam, hari, dan bulan dilatih menggunakan algoritma *Random Forest Regressor*. Model mencapai relative RMSE 10,07 %. Kerangka ini bersifat murah, skalabel, dan dapat diadaptasi untuk iklim tropis Indonesia dengan mengganti HDH menjadi *Cooling Degree Hours* (CDH).

Kata kunci : HVAC, NILM, Heating Degree Hour, Random Forest.

ABSTRACT

Heating, Ventilation, and Air Conditioning (HVAC) systems typically account for 40–50 % of electricity use in commercial buildings. Installing sub-meters on every HVAC component is costly and intrusive. This thesis proposes a non-intrusive load-monitoring (NILM) framework that combines Heating Degree Hours (HDH) with a Random Forest Regressor to disaggregate HVAC load using only a single main meter and hourly outdoor-temperature data. Features comprising HDH and temporal variables (hour, weekday, month) are tuned via five-fold grid search, achieving a relative RMSE of 10.07 % without ground-truth sub-meter labels. The proposed approach is cost-effective, scalable, and readily adaptable to tropical climates by substituting HDH with Cooling Degree Hours (CDH).

Keywords : HVAC, NILM, Random Forest, Heating Degree Hour.