

Multi-Linear Regression Modelling for Prediction of Net Energy Consumption of a HVAC System

Dr. Arvind A R¹, Nagamanikkam N², Priyadharshan S M³, Gaytheswar P R⁴, Vishal S⁵

Deputy General Manager, Project Planning, Ashok Leyland, India¹

Manager, Project Planning, Ashok Leyland, India²

Department of Mechanical Engineering, PSG College of Technology, India^{3,4,5}

ara.arvind@gmail.com, nagamanikkam.n@hotmail.com

priyadharshansm@gmail.com, reach.gaytheswar.pr@gmail.com, vishalsankar115@gmail.com

Abstract: Prediction of cooling load requirements is an important step [1], [2], [6] in designing HVAC (Heating, Ventilation & Air Conditioning) systems for maintaining correct set-point temperatures and humidity levels. Our study aims to predict the net energy for a HVAC system in an industrial unit using sensitivity analysis data from DesignBuilder. Two HVAC systems — Unitary Heat Cool and VAV Reheat DX Cooling with Dehumidification — were compared for cooling performance and energy consumption across seven Indian cities. With the data, a multi – linear regression model is built in Microsoft Excel with variables like plant area, cooling set-point temperature, internal gains, and climate factors to estimate the net energy consumption of the HVAC system. This simple model has potential to be built into a more extensive model which can predict the net energy consumption of whole infrastructures with minimal input requirements.

Keywords: HVAC, Prediction modelling, Design builder, Simulation

