

Topic: Technology Assessment of Dedicated Outdoor Air Systems for Air-Conditioned Buildings in Tropical Climate

Name of Student: Mr. Nontivat Inklab **Student ID:** 56300700520

Name of Advisor: Asst. Dr. Pipat Chaiwiwatworakul

Name of Co-Advisor: Dr. Surawut Chuangchote

ABSTRACT

Ventilation is necessary for good indoor air quality (IAQ) in air-conditioned buildings. However, the ventilation causes a substantial load and the resulting energy consumption of the air-conditioning system, particularly for air-conditioned buildings in tropical region. To address this issue, this paper investigates the dedicated outdoor air system (DOAS) for the energy-efficient ventilation and also for the cost effectiveness. In the study, performance of various DOAS configurations is evaluated for a typical office building, hotel building and department store under the hot and humid climate of Thailand. The results from the simulations using TRNSYS software show that DOAS of the combination of a cooling coil, a run-around coil and an enthalpy wheel is the most energy efficient. It offers the smallest total air-conditioning loads in compliance with Thai's ventilation standard requirements and also provides the most cost effectiveness when the life time is 15 years with interest rate and escalation rate at 7% and 3%, respectively.

Keyword: Dedicated outdoor air system, heat recovery, energy simulation, ventilation, life cycle costing