

Energy Efficient Design for Hotels in the Tropical Climate using Modelica

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For hotels located in the tropical climate, a significant amount of energy is attributed to the domestic hot water (DHW) usage and the space cooling. To improve the energy efficiency of hotels in the tropical climate, we proposed a heat recovery system that could utilize the waste heat from the space cooling to pre-heat the city water supplied to the DHW system (Figure 1). To support the system design, we selected Modelica to model the heat recovery system and its control, which is difficult to be simulated by conventional building simulation tools. The Modelica *Buildings* library (Wetter, et al. 2014) and the *Modelica_StateGraph2* library (Otter, et al. 2005) were employed to build the system model. A hotel in Miami, Florida, U.S., was selected for the case study. The simulation results showed that the proposed heat recovery system could save up to around 30% boiler energy use in the DHW system.

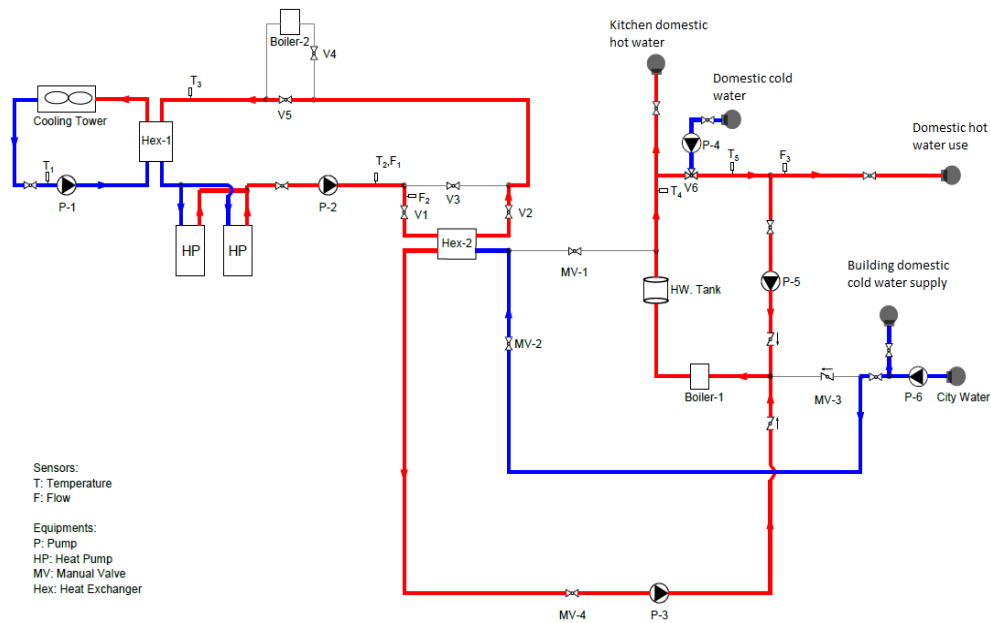


Figure 1. Heat recovery system

References

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- Wetter, M., et al. 2014. Modelica Buildings library. *Journal of Building Performance Simulation* 7(4): 253-270.