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Techno-Economical Aspects of Encapsulated Ice Thermal Energy Storage Applications for Air-Conditioning System

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Abstract

Thermal Energy Storage (TES) for air-conditioning application has grown significantly in Malaysia in recent years. For encapsulated ice method, the difference in the amount of ice supplied to supplement the chilled water generated during peak hours plays a major role in ascertaining the result of electricity bill savings and therefore, payback period. Based on actual implementation, a simple simulation program of TES integrated system is created to study its impact on the electricity bill savings, electricity consumption and power shift as compared to the conventional system. Varying the percentage of ice supply, application to cooling capacity of 1000RT with and without base load, this study finds that electricity bills are saved with the penalty of higher energy consumption for chillers' efficiency of 0.8 and 1.1 input kW per refrigerant tonnage (kW/RT), respectively. However, reduction in maximum demand up to 30% is possible.

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