SUMMARY

Owing to environmental awareness, many tools and methods to measure and evaluate the environmental impact of building have been developed around the world. Building environment assessment methods are techniques developed to specially evaluate the performance of a building design or completed building across a broad range of environmental consideration. Singapore, famous for its “Garden City”, believes in the compatibility of the twin objectives of a robust economy and a healthy environment. There are 90% of its population lives in the Housing and Development Board’s (HDB) and spend at least 60% of their time in these apartments. It is an overwhelming need for a comprehensive yet simple procedure for assessing the environmental quality and energy conservation strategy for residential building. In Singapore, this kind of building environmental assessment method on the residential building has not been developed. Hence, there is a further need for us to evaluate the environmental performance of HDB apartments.

This dissertation serves as to develop a framework of building environmental assessment method for residential building based on the comparative study of several popular assessment systems and survey done by Somadasa (Somadasa 2000). It also evaluates the application of the assessment method and system model for residential buildings under tropical conditions. The dissertation aims to contribute to efforts towards the effort of enhancing the quality of residential environment in local context. It examines the study the technical issues dealt with under global, local and indoor environment and desire a
relationship between energy saving and design and management. It also explores the benchmark for more environmental friendly residential building in Singapore. A proposal environmental assessment method suitable for use in Singapore is also presented.

The dissertation undertakes a comprehensive literature review on residential building environmental assessment methods. Additional comparative study of several methods was carried out. This serves to develop a new method for the local context. Finally, case studies were carried out to assess the validity of the proposed method.

The author use HDB apartment case studies to test the performance of the proposed method. The case study one is built about twenty years ago and upgraded last year. It is located at Pandan Garden and is a low-density HDB development. The case study two is belong to Sembawang. It was completed two years ago. It is a model of new high-density HDB development with multi-floor car park. The case studies with BEAM show that the environment method can contribute the local environment assessment and help to understand the environmental issues of local residential building. Case study one and two scored 92% for global issues. Credits achieved for indoor and local issues show the variation between the two cases. The final score is a weighted percentage of the three divisions. It has indicated the overall performance of the buildings studied. Under local issues, case study two with good transportation and more materials for reused is scored 7% higher than case study one. However, in indoor issues, case two has poorer ventilation and acoustic environment as compared to that of case one. This may be due to the high density development approach of the entire township.
The BEAM for residential building can basically proceed to evaluate local residential HDB flat. However, the method still has some limitation and can be improve by absorbing life-cycle assessment and identify for further investigation suitable for local context.