Technological Review of Switchable Thermal Insulation

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Overview | Switchable thermal insulation, an opaque panel capable of alternating between a thermally conductive and insulated state, is considered as an alternative route to regulate thermal environment by selectively harvesting heat from external environment. Extensive work has been undertaken by researchers to develop switchable insulation technologies for thermal regulation in automobile and aerospace applications, where conventional space heating and cooling technologies are either too bulky or too energy consuming to meet design requirements.

Outcomes and Impact | The purpose of this project is to understand the fundamental principles that govern the heat transfer across switchable insulation and investigate technologies for modulating the heat transfer process. Both of them will support the improvement and development of switchable insulation technologies in the future.

Work Involved | This PhD research aims to advance the understanding of switchable insulation in theory and application. It will consist of two stages:

- Test and develop a more effective opaque envelope with selective heat transfer capability, and
- Evaluate the building performance improvement by using such facade technologies in a changing environment with uncertainties.

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References: