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GREEN FACADE FOR SUSTAINABLE BUILDING DEVELOPMENT AGAINST CLIMATE CHANGE

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Green facade with passive and active solar design integration is an evolving low-carbon-building technology against climate change. Two new features for green walling applications will be discussed in this paper, namely the water-flow glazing system and the hybrid photovoltaic/heat-pipe walling system. The solar-absorbing glazing serves as the see-through component and the hybrid solar walling the opaque component. Both can behave as building-integrated solar thermal collectors, for example to support domestic hot-water preheating. With the solar cell integration, direct electricity generation with effective photovoltaic cooling is also possible. The electrical efficiency is then improved. On the other hand, the useful energy conversion reduces the solar transmission through the building envelop and hence reduces the space cooling load. The air-conditioning provisions can be downsized. Better thermal comfort can be achieved with the reduction in radiation asymmetry. All these together contribute to substantial energy saving and carbon emission reduction. The thermal comfort environment is also improved. A case study of Hong Kong will be introduced as an illustrating example.

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