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Match performance analysis for a solar-driven energy system in net zero energy building

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Abstract

Match performance is a critical consideration on the design of energy system for zero energy building/community. A case study regarding an residential building of net zero energy (NZEB) is presented in this article. In addition to the passive design of energy efficient, indoor terminal units and renewable energy power system, an emphasis is placed on solar-driven energy system which employed LiBr and CO_2 as working fluids for a hybrid cycle of vapor compression and absorption. The performance of NZEB was evaluated in terms of the indoor comfort, energy balance and match.

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Keywords: Net zero energy, Energy system, Renewable energy, Solar energy

1. Introduction

Using net zero energy building (NZEB) as an approaching goal of building development, problems on energy and environment can be addressed in an aggressive and integration way. Regarding the NZEB cases, a literature search suggests that most of projects summarized in the introduction section of former publication are focused on a balance research. The case which covers the integration design, the real operation and the match performance analysis of NZEB are both rare. In this article, a case study about a net zero energy building is present. The simulation is conducted for two typical weather conditions in

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China based on the existing test. The performance results of NZEB are evaluated in terms of indoor comfort, energy match performance [1], etc.

2. NZEB Description

2.1. Passive Design

The research object is a 90 m^2 house which is a typical architecture design in China for a residential living of 2 adults and 1 kid (fig.1). The real test space with the high performance envelopment is used as a test and demonstration platform for building energy efficiency technologies. The passive design parameters are shown in Table.1.

Table 1. Passive Design Parameters

Component	Surface [m²]	Column A (*t*)	Column B (*T*)
Floor	93	0.30	-
Facade. S	45.9	0.31	-
Facade. N	45.9	0.31	-
Facade. E	32.6	0.31	-
Facade. W	32.6	0.31	-
Roof	93	0.21	-
Window. S	7.92	2.5	0.62
Window. N	10.32	2.5	0.62
Window. E	6.96	2.5	0.62
Window. W	0	-	-
Other features		Two skins facade	

2.2 Energy System

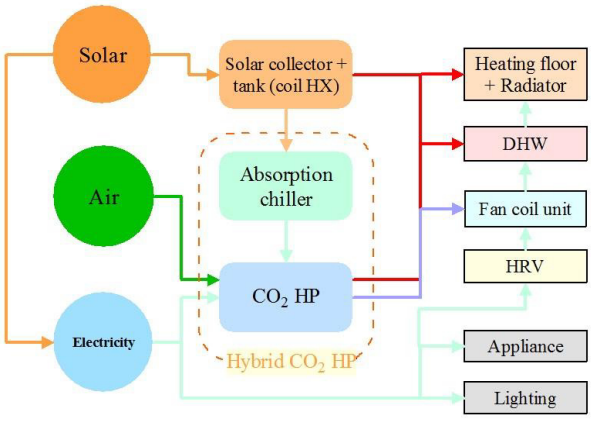

Fig. 1. System configuration(source, supply, demand sides)