

제로에너지 솔라하우스(KIER ZeSH)의 에너지 자립도 및 경제성 분석

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The Study on the Energy self-sufficiency and Economic Analysis of KIER Zero Energy Solar House

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In this study, the energy and economic analysis of KIER Zero Energy Solar House (KIER ZeSH) was carried out. KIER ZeSH was designed and constructed in the end of 2009 for the purpose of more than 70% energy self-sufficiency in total load as well as less than 20% of additional construction cost. The several building energy conservation technologies like as super insulation, high performance window, waste heat recovery system, etc and renewable energy system. The renewable heating and cooling system is a kind of solar thermal system combined with geo-source heat pump as a back-up device. The capacity of 3.15kW solar BIPV system was also installed on the roof. The measurement by monitoring system of ZeSH was conducted for one year from November 2009 to October 2010. The energy self-sufficiency and economic analysis were conducted based on the this monitoring result. As a result, the energy self sufficiency is about 83% which is higher than that of the target and the payback period is 11 years.

Key words : Zero Energy House(제로에너지하우스), Solar Thermal System(태양열시스템), Solar PV System(태양광 시스템), Ground Source Heat Pump(지열히트펌프), Renewable Hybrid heating & cooling (신재생 하이브리드 냉난방), PV system, Building Energy(건물에너지), Economic Analysis(경제성 분석)

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The study on the comparison of the operation performance of different type of solar collectors

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The objective of this study is to make a comparative study of the operation performance of different type of solar collectors. A flat-plate collector, a single-glazed evacuated collector and a double-glazed evacuated collector are used in this study. These 3 type of collectors are connected in series in the order of a flat-plate collector, a single-glazed evacuated collector and a double-glazed evacuated collector. This experimental facility is a kind of a solar system with a controller, a heat exchanger, a storage tank and a circulation pump. Each collector has a different collection area(flat-plate collector-6.00m² total area/5.61m² aperture area, double-glazed evacuated collector-6.04m² total area/4.92m² aperture area, single-glazed evacuated collector-7.65m² total area/5.61m² aperture area) and its performance characteristic respectively. The experiments have been demonstrated at around 70°C operating temperature(flat-plate collector inlet temperature). The thermal collecting efficiencies of each collector are obtained under the different insolation and operation condition as a result.

Key words : Solar Collector(태양열 집열기), Collector Efficiency(집열기 효율), Solar Thermal System(태양열 시스템)

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