

도서지역의 신재생에너지복합발전 전력계통 운영방안에 관한 정책연구

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The policy study on the power grid operation strategy of new and renewable energy combined generation system

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KEPCO was operating power plants with diesel generators in 49 islands including Baekryeong-Do, and the generation capacity was about 66 MW in 2008. The cost of fuel is increasing by the international oil price inflation and continuous rise of oil price is predicted. For the stabilizing of electric power supply to the separate islands, renewable energy and fuel cell systems were considered. Hydrogen is made using renewable energy such as wind power and solar energy, and then a fuel cell system generates electricity with the stored hydrogen. Though the system efficiency is low, it is treated as the only way to secure the stable electric supply using renewable energy at this present. The analytic hierarchy process was used to select suitable candidate island for the system installation and 5 islands including Ulleung-Do were selected. Economic evaluation for the system composed of a kerosene generator, a wind power, an electrolysis, and a fuel cell system was conducted with levelized generation cost based on present value method. As the result, the necessity of renewable energy combined generation system and micro grid composition in the candidated islands was confirmed. Henceforth, the development of an integration technology which connects micro grid to the total power grid will be needed.

Key words : Renewable energy (신재생에너지), Levelized generation cost(균등화발전원가), Fuel cell (연료전지), Wind power (풍력)

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Improvement of generation capacity per unit site area by the optimization of photovoltaic array

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A photovoltaic system is getting the spotlight for a environment-friendly energy source. But its location is limited because a lot of land is necessary for photovoltaic arrays. Nevertheless, its dissemination is rapidly increasing more than 40 % every year and exceeded about 400 MW in 2009. The radical growth of a photovoltaic system aggravated a lack of sites, so that forests and farmland were destroyed. It is demanded to make use of a vacant lot or little piece of land for the way to solve the lack of sites and improve the location requirements for a photovoltaic system. General photovoltaic arrays are consist of a single layer structure and needs enough separation distances to maximize the amount of solar radiation and to eliminate influences by the shadow of other arrays. So that a large amount of land is required for the site. The solar cell arrays with long separation distances can not be placed in a small vacant lot and its site application efficiency is low. This study optimized photovoltaic arrays as multilayered structure with movable sleeves for the efficient photovoltaic in a small site. The existing photovoltaic arrays with a single layer structure were fixed or tracking systems. In this experimental equipment, photovoltaic arrays attached to the multilayers have rectilinear movement and rotary motion using sleeves. Therefore, shadow influences were removed and the generation capacity was improved. On the simulation result, generation increased by about 30% in the same site considering shadow influences and so on.

Key words : Photovoltaic system(태양광발전시스템), photovoltaic array(태양광어레이), Single layer structure (단층구조), Solar cell module(태양전지모듈)

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