

Comparative Economic Analysis of Floating Photovoltaic Systems Using a Synthesis Approach

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Abstract : The floating photovoltaic (FPV) system highlights economic benefits and energy performance to carbon dioxide (CO₂) discharges. Due to land resource scarcity and many negligent water territories, such as reservoirs, dams, and lakes in Japan and Taiwan, both countries are actively developing FPV and responding to the pricing of the emissions trading systems (ETS). This paper performs a case study through a synthesis approach to compare the economic indicators between the FPVs of Taiwan's Agongdian Reservoir and Japan's Yamakura Dam. The research results show that the metrics of the system capacity, installation costs, bank interest rates, and ETS and Electricity Bills affect FPV operating gains. In the post-Feed-In-Tariff (FIT) phase, investing in FPV in Japan is more profitable than in Taiwan. The former's positive net present value (NPV), eminent internal rate of return (IRR) (11.6%), and benefit-cost ratio (BCR) above 1 (2.0) at the discount rate of 10% indicate that investing the FPV in Japan is more favorable than in Taiwan. In addition, the breakeven point is modest (about 61.3%). The presented methodology in the study helps investors evaluate schemes' pros and cons and determine whether a decision is beneficial while funding PV or FPV projects.

Keywords : carbon border adjustment mechanism, floating photovoltaic, emissions trading systems, net present value, internal rate of return, benefit-cost ratio

Conference Title : ICEAAS 2023 : International Conference on Economic and Administrative Sciences

Conference Location : Tokyo, Japan

Conference Dates : January 09-10, 2023