

البحث الثامن

بيانات البحث رقم (8)

بحث مشترك

نوع البحث :

(مشترك مع آخرين في نفس التخصص)

1- بيانات البحث رقم (8):

Experimental study on enhancing performance of hydrokinetic hybrid Darrieus-Savonius rotor in open water-channel resource	عنوان البحث باللغة الانجليزية
دراسة تجريبية حول تحسين أداء دوار Darrieus-Savonius الهجين الهيدروحرك في مورد القنوات المائية المفتوحة	عنوان البحث باللغة العربية

3. ملخص البحث باللغة الانجليزية:

Experimental study on enhancing performance of hydrokinetic hybrid Darrieus-Savonius rotor in open water-channel resource

The kinetic energy stored in water streams could be used to generate electricity via hydrokinetic rotors, due to the availability of kinetic energy from flowing water. Darrieus and Savonius are vertical axis kinetic rotors, they are promising for generating power in low speed flows. The integrated Darrieus- Savonius hydrokinetic rotor works on the principles of integrated forces including lift and drag forces. An experimental investigation has been conducted to get the optimum configuration for Darrieus-Savonius integrated rotor in order to attain improved self-starting and high-power-factor in open channel water flow, under different inflow conditions. This study investigated

the effects of the radius ratio, add-on angle, water heights, and flow velocity on performance of hydrokinetic integrated Darrieus-Savonius rotor with three standard NACA 020 airfoil shape as Darrieus rotor and single/double stage semi-circular blades as Savonius rotor on the power factor. Three radius ratios (R.R) namely (0.8, 0.6 and 0.4) and add-on angles of (0°, 30°, 45°, 60° and 90°) were studied. The experimental channel was (26 m) long water flume with a (1m wide ×1.2 m depth). The horizontal walls of the flume were made of glass with a strengthened frame, to permit visual examination. The flume entrance consisted of a receiving tank (3 m long, 1.5 m wide, and 0.75 m depth), a honeycomb pattern pipe box, and a screen box field with a large stone to dissipate the water turbulence and energy at the entrance. Two centrifugal pumps were used to supply water to the channel. Darrieus-Savonius integrated rotor was placed at distance equal to ten times width of the experimental channel, to avoid any turbulence and to make sure that the flow was steady. Based on the experimental results, it was observed that the optimum C_p values at λ (1.84), add-on angle of (45°) and R.R (0.4, 0.6 and 0.8) were (0.335, 0.29 and 0.299) respectively. The maximum hybrid performance was attained at R.R (0.4), add-on angle (45°) and tip-speed ratio (1.8) and Re (240×10^6) with value of (0.339). Decrease in the Re values by 25 % enhanced the performance by 1.19 %. Accordingly, it is not necessary to rely on Re values in calculating the power-factor values compared to the influence of the rest of the variables.

4-بيانات نشر البحث رقم (8):

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Renewable Energy	اسم المجلة العلمية
https://doi.org/10.1016/j.renene.2024.121443 https://www.sciencedirect.com/science/article/abs/pii/S0960148124015118?via%3Dihub	الموقع الإلكتروني
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