

### البحث رقم (3)

عنوان البحث التقييم الفني والاقتصادي لمحطات طاقة الكتلة الحيوية التي يتم تغذيتها بقش الأرز: تحليل الحساسية للأداء والتكلفة المستوية للطاقة

**Techno-economic assessment of biomass power plant fed with rice straw:  
Sensitivity and parametric analysis of the performance and the LCOE**

المؤلفون سوزان عبد الهادي، دومينيكو بوريللو، أحمد شعبان

Suzan Abdelhady, Domenico Borello, and **Ahmed Shaban**

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This study aims at analyzing the techno-economic feasibility of electric power generation from rice straw in Egypt. In particular, we attempt to estimate the energy production and the levelized cost of electricity (LCOE) at some selected provinces with high potential availability of rice straw. Accordingly, a proposed configuration of biomass Rankine cycle power plant fed with rice straw is modeled and simulated using System Advisor Model (SAM). The simulation shows that the average nominal and the average real LCOE for the proposed power plants are 10.55 and 6.33 ¢/kWh (respectively), which is very competitive, compared with LCOE of other renewable energy technologies in Egypt. Furthermore, a sensitivity analysis is conducted to investigate the effect of the main technical and economic variables of the power plant on the energy output and LCOE. The results reveal that flue gas temperature, rice straw moisture content and excesses fed air significantly affect the energy output. Furthermore, the results indicate that LCOE is highly sensitive to feedstock price and discount rate. Policy makers and stakeholders could use these results for developing strategic capacity plans based on biomass power plants possibly integrated with other electricity sources and the utility grid.