

ABSTRAK

Transisi menuju energi bersih menuntut PT Pertamina Power Indonesia (Pertamina NRE) untuk mengintegrasikan prinsip keberlanjutan atau Green Supply Chain Management (GSCM) dalam pengadaan komponen Pembangkit Listrik Tenaga Surya (PLTS). Penelitian ini bertujuan untuk merancang model pemilihan green supplier modul surya menggunakan pendekatan hibrida Multi-Criteria Decision Making (MCDM) pada proyek PLTS KDKMP Batam. Mengingat penilaian kriteria keberlanjutan seringkali bersifat ambigu dan subjektif, metode Fuzzy Analytical Hierarchy Process (FAHP) digunakan untuk menyintesis bobot prioritas dari para pakar internal. Selanjutnya, metode Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) diaplikasikan untuk mengevaluasi dan memeringkat alternatif pemasok berdasarkan data penawaran riil. Hasil penelitian mengidentifikasi bahwa kriteria teknis, terutama degradasi daya dan efisiensi modul, serta aspek ekonomi berupa biaya investasi menjadi prioritas utama dalam pengambilan keputusan, yang kemudian diselaraskan dengan standar tata kelola dan perlindungan sosial. Berdasarkan model yang dirancang, penelitian ini berhasil mengidentifikasi pemasok terbaik yang memiliki profil kinerja paling mendekati kondisi ideal perusahaan, baik dari sisi keandalan teknis maupun kepatuhan terhadap standar keberlanjutan. Model hibrida ini direkomendasikan sebagai instrumen standardisasi evaluasi vendor masa depan untuk memastikan pengadaan strategis selaras dengan target Net Zero Emission.

Kata Kunci: *Pemilihan Supplier; GSCM; Modul Surya; FAHP; TOPSIS; Pertamina NRE.*

ABSTRACT

[Application of FAHP-TOPSIS Method for Green Supplier Selection of Photovoltaic Modules at Pertamina NRE] *The transition towards clean energy requires PT Pertamina Power Indonesia (Pertamina NRE) to integrate sustainability principles or Green Supply Chain Management (GSCM) in the procurement of Solar Power Plant (PLTS) components. This study aims to design a green supplier selection model for solar modules using a hybrid Multi-Criteria Decision Making (MCDM) approach for the KDKMP Batam PLTS project. Given that the assessment of sustainability criteria is often ambiguous and subjective, the Fuzzy Analytical Hierarchy Process (FAHP) method is utilized to synthesize priority weights from internal experts. Furthermore, the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) method is applied to evaluate and rank alternative suppliers based on actual bidding data. The results identify those technical criteria, particularly power degradation and module efficiency, as well as economic aspects such as investment costs, are the primary priorities in decision-making, which are then aligned with governance and social protection standards. Based on the designed model, this study successfully identifies the best supplier with a performance profile closest to the company's ideal conditions, in terms of both technical reliability and compliance with sustainability standards. This hybrid model is*