

ABSTRAK

Pengelolaan sampah yang berkelanjutan merupakan tantangan strategis bagi wilayah perkotaan, terutama dalam upaya mengurangi beban *landfill* dan mendukung transisi menuju energi bersih. Salah satu pendekatan yang berkembang adalah pemanfaatan sampah sebagai bahan bakar alternatif dalam bentuk Bahan Bakar Jemputan Padat (BBJP). Penelitian ini bertujuan untuk mengetahui karakteristik sampah yang akan dikelola dan menganalisis kelayakan teknis dan kelayakan ekonomi pembangunan fasilitas BBJP di kawasan TPPAS Legok Nangka, Jawa Barat.

Berdasarkan proyeksi, timbulan sampah dari enam wilayah administratif yang akan dilayani mencapai 3.959,09 ton per hari pada tahun pertama operasional, dengan komposisi dominan berupa sisa makanan (40%). Berdasarkan analisis didapatkan nilai kalor bersih (LHV) sebesar 6,87 MJ/kg, masih di bawah standar minimum BBJP Kelas 3 menurut SNI 8966:2021 (≥ 10 MJ/kg). Berdasarkan hasil analisis permintaan pasar, fasilitas pengolahan akan dirancang dengan kapasitas 100 ton/hari dengan penerapan teknologi *Mechanical Biological Treatment* (MBT), dilengkapi *rotary dryer* dan sistem SCADA. Hasil analisis menunjukkan dengan asumsi nilai *discount rate* sebesar 8%, proyek layak secara ekonomi dengan nilai NPV positif sebesar Rp23,203 miliar, IRR 11,89%, BCR 1,39, dan periode pengembalian investasi selama 5 tahun.

Hasil penelitian ini mengindikasikan bahwa BBJP Plant Legok Nangka memiliki potensi signifikan dalam mendukung sistem pengelolaan sampah terintegrasi dan penyediaan energi alternatif rendah emisi di tingkat regional.

Kata kunci: BBJP, TPPAS Legok Nangka, nilai kalor bersih, MBT, kelayakan ekonomi, energi alternatif.

ABSTRACT

Sustainable waste management represents a strategic challenge for urban areas, particularly in efforts to reduce landfill burdens and support the transition toward clean energy. One emerging approach is the utilization of municipal solid waste as an alternative fuel in the form of Solid Recovered Fuel (SRF), locally known as Bahan Bakar Jemputan Padat (BBJP). This study aims to examine the characteristics of waste to be managed and to analyze both the technical and economic feasibility of establishing a BBJP facility at the Legok Nangka Integrated Waste Treatment and Final Disposal Facility (TPPAS), West Java.

Based on projections, the waste generation from six administrative regions to be served will reach 3,959.09 tons per day in the first year of operation, with food waste as the dominant fraction (40%). The analysis indicates a net calorific value (LHV) of 6.87 MJ/kg, which remains below the minimum standard for BBJP Class 3 as stipulated in SNI 8966:2021 (≥ 10 MJ/kg). Considering market demand, the processing facility is designed with a capacity of 100 tons/day, employing Mechanical Biological Treatment (MBT) technology, supported by a rotary dryer and a Supervisory Control and Data Acquisition (SCADA) system. The economic analysis reveals that, under an assumed discount rate of 8%, the project is financially feasible, with a positive Net Present Value (NPV) of IDR 23.203 billion, an Internal Rate of Return (IRR) of 11.89%, a Benefit-Cost Ratio (BCR) of 1.39, and a payback period of five years.

The findings indicate that the Legok Nangka BBJP Plant has significant potential to strengthen integrated waste management systems and to provide low-emission alternative energy at the regional level.

Keywords: BBJP, Legok Nangka Integrated Waste Management Facility (TPPAS), Lower Heating Value (LHV), Mechanical Biological Treatment (MBT), economic feasibility, alternative energy.