

INTISARI

ANALISIS SUMBER EMISI UDARA DAN TRACING MATERIAL INPUT DALAM INDUSTRI POWER PLANT SERTA OIL & GAS DISTRIBUTION PADA PERUSAHAAN AILESH MENGGUNAKAN METODE K-MEANS CLUSTERING

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Ailesh merupakan perusahaan konsultan dan pengembangan proyek yang berkomitmen membantu individu dan organisasi menerapkan praktik berkelanjutan melalui pengumpulan dan analisis data. Tantangan utama yang dihadapi adalah tingginya emisi udara pada industri *Power Plant dan Oil & Gas Distribution* akibat penggunaan material seperti bahan bakar, gas buang, dan bahan kimia yang menghasilkan gas emisi CO₂, NO₂, CH₄, dan VOC, yang berdampak terhadap lingkungan. Penelitian ini bertujuan mengidentifikasi penyumbang utama emisi, menentukan material prioritas, dan mengelompokkan pola emisi sebagai dasar strategi keberlanjutan perusahaan. Hasil penelitian menunjukkan bahwa industri *oil & gas distribution*, khususnya *Injection Terminal* dan proses *Use Stage*, merupakan penyumbang terbesar dengan dominasi CO₂, sedangkan pada *power plant*, emisi utama berasal dari proses HRSG dengan dominasi NO₂. Material penyumbang emisi utama *industri oil & gas distribution* meliputi *Fuel, Diesel, Electricity* dan pada *industri power plant* meliputi *Exhaust Gas, Condensate ST, Chemical*. Analisis menghasilkan tiga kelompok (*Cluster*) emisi tinggi, sedang, dan rendah, yang menjadi dasar strategi pengurangan emisi dan peningkatan efisiensi operasional.

Kata Kunci : Ailesh, Industri ,Emisi Udara, Material, K-Means Clustering.

ABSTRACT

ANALYSIS AIR EMISSION SOURCES AND TRACING INPUT MATERIALS IN THE POWER PLANT INDUSTRY AND OIL & GAS DISTRIBUTION AT AILESH COMPANY USING K-MEANS CLUSTERING METHOD

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Ailesh is a consulting and project development company committed to helping individuals and organizations implement sustainable practices through data collection and analysis. The main challenge faced is high air emissions in the Power Plant and Oil & Gas Distribution industries due to the use of materials such as fuel, exhaust gas, and chemicals that produce CO₂, NO₂, CH₄, and VOC emissions, which have an impact on the environment. This research aims to identify the main contributors to emissions, determine priority materials, and categorize emission patterns as a basis for the company's sustainability strategy. The results show that the oil & gas distribution industry, especially the Injection Terminal and Use Stage processes, is the largest contributor with the dominance of CO₂, while in power plants, the main emissions come from the HRSG process with the dominance of NO₂. The main emission contributing materials in the oil & gas distribution industry include Fuel, Diesel, Electricity and in the power plant industry include Exhaust Gas, Condensate ST, Chemical. The analysis resulted in three groups (Cluster) of high, medium, and low emissions, which became the basis for emission reduction strategies and increased operational efficiency.

Keywords: Ailesh, Industry, Air Emission, Material, K-Means Clustering