

Diesel particulate matter reduction project = Proyek pengurangan bahan partikulat diesel

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Abstrak

Rapor ini dibuat untuk menunjukkan hasil studi dari proyek pengurangan bahan diesel yang dimulai oleh BHP Mitsubishi Alliance (BMA). Tujuan dari proyek ini untuk menyelidiki apakah Battery Electric Vehicle (BEV) secara finansial bisa digunakan di area pertambangan Broadmeadow. Hasil dari studi ini akan menunjukkan apa proyek beneficial untuk BMA. Terlebih lagi, jika armada di Broadmeadow akan sepenuhnya menggunakan BEV, sistem ventilasi di dalam pertambangan harus di pertimbangkan. Selain itu, riset untuk aplikasi dari BEV di dalam pertambangan dan analisis metodologi untuk proyek juga dipertimbangkan. Hasil riset awal menunjukkan bahwa BEV akan memiliki jangka waktu penggunaan lebih lama dibanding menggunakan kendaraan diesel. Untuk membantu dalam investigasi, dua jenis analisis digunakan, Cost-Benefit Analysis (CBA) dan Strengths, Weaknesses, Opportunities, and Threats (SWOT). Analisis SWOT mengindikasikan bahwa kendaraan diesel memiliki kelebihan fleksibilitas dalam operasionalnya dan downtime yang lebih cepat dibanding BEV. Tetapi, kendaraan diesel menghasilkan DPM yang berbaya jika dihirup dalam kuota tertentu. Sedangkan, BEV memiliki kelebihan harga operasional yang lebih rendah dibandingkan dengan kendaraan diesel. Dari analisis CBA, diketahui bahwa expektasi total biaya operasional selama 13 tahun kedepan BEV lebih rendah 23% dibandingkan kendaraan diesel. Walaupun di dalam perhitungan data ada beberapa masalah seperti pembuatan asumsi untuk model data Life-cycle cost. Riset lanjutan dibutuhkan dikedepannya untuk proyek ini agar model data lebih akurat.

.....This report has been made to show study results of Diesel Particulate Matter (DPM) Reduction Project initiated by BHP Mitsubishi Alliance (BMA). The aim of the project is to investigate the viability of battery electric vehicle (BEV) in Broadmeadow Mine. BMA requires a fleet replacement study for Broadmeadow mines to determine if the project will be beneficial or not. Furthermore, a cost saving study needs to be done for the ventilation system if a complete battery electric fleet is in use instead of diesel machines.

Additional research regarding the application of Battery Electric Vehicle (BEV) in underground mining areas was done. Additional analysis on methodology of the project was planned. Preliminary investigation shows that in underground mining areas, BEV will have greater life cycle expectancy when compared to diesel vehicles. Two analyses were done for the study, Cost-Benefit Analysis (CBA) and Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis were done to help with the study.

SWOT analysis shows that diesel vehicles have an advantage in operational flexibility and lower downtime, at the cost of creating more DPM particles in the area. Electric vehicles have the advantage of lower operational cost and maintenance. Moreover, Electric battery does not produce DPM particles. Having less DPM particles in the workers area may increase the satisfaction and well-being of the workers.

From the results gathered using Cost-Beneficial Analysis (CBA) it was shown that Electric vehicles have lower operational cost for the expected 13 years life span of Broadmeadow Mines. Although there were some calculation issues that stems from the assumptions made for the LCC model inputs, which

reduces the accuracy of the model. Further studies are required, and missing data needs to be collected to improve the accuracy of the model.