

EneSolve Case Study

Mining Sites

In 2007-08 the EneSolve team performed a review of underground fleet operations at three lead-zinc-silver mines in Broken Hill for the purposes of satisfying the company's obligations under the Commonwealth Energy Efficiency Opportunities Act (EEO).

In FY06/07 the fleet consumed 4.2 ML of diesel at a cost of approximately \$4.5 million.

The mines were operated as remnant mines with a 5 year rolling window production forecast. Consequently, measures considered for implementation were to have a very short payback time.

The maintenance budget for the mobile operations was approximately \$25 million per annum.

The greater than 5:1 ratio of maintenance to energy costs suggested that support for new initiatives also relied on strong non-energy drivers in the form of reduced maintenance costs.

Initiatives were therefore optimised across both savings parameters rather than simply focusing on energy consumption in isolation.



ENERGY & MAINTENANCE EFFICIENCY OPPORTUNITIES IDENTIFIED

Key issues identified during the investigation and subsequently implemented were:

1. Fuel Management System

The fuel management system at the site was not adequately tracking consumption end uses. Due to a problem in the programming of fuel cards, the biggest end use at the site was the “unallocated” transaction category. Furthermore there was significant double counting in the consumption of the fuel truck used to fill the underground depots. The client upgraded their fuel management software and attached RFID fuel tags to each vehicle.

This measure provided more accurate tracking of fuel usage as well as effective misuse mitigation.

2. Fuel Consumption & Maintenance Cost Reductions

- **Synthetic rather than mineral lubricants.**
Whilst costing double the amount of equivalent mineral lubricants, synthetic lubricants reduced fuel consumption by ~ \$80K/year and reduced maintenance costs. The annual cost of this initiative was of the order of \$100K.
- **Reduced taxiing.**
75 % of the 40 tonne truck fleet was being used to travel to and from tea rooms (half hour each way) twice a day. It was recommended that the company hire full time taxi drivers to collect personnel and ferry workers back and forth from work areas to each tea room. Whilst this measure cost between \$700-900K/yr, it provided dramatic savings in both fuel and maintenance costs.
- **Reduced idle time for the trucks.**
Engines were typically kept running to support cabin air-conditioners. To mitigate this cost in both fuel and operating hours, auxiliary air-conditioners were installed in some trucks with back-up batteries whilst others were provided with increased battery capacity allowing the engine management system to switch-off the engine during idle times without compromising worker comfort. This initiative cost ~ \$90K/yr
- Pursuant to the measures above, re-fuel frequency was reduced to every 24 hours rather than every 12 hours.

- **Remote re-fuel of heavy fleet**
Replaced 1hr round trip to the depot for the heavy fleet to re-fuel, with the delivery of fuel to the work site. Whilst this initiative cost ~ \$100K/year, the savings in fuel and operating hours delivered a substantial return. For example, the increase in heavy fleet productivity enabled the site to eliminate the hiring of an external heavy loader at a saving of \$1million/year.
- A tyre pressure maintenance program was introduced for light vehicles
- The net effect of the above initiatives was to extend the maintenance cycle to 20 days (from 10 days) based on reduced operating loads per vehicle. We were also able to bring all sub-contracted maintenance back in house to realize the financial savings.

RESULTS

Substantial savings in fuel consumption and maintenance costs were achieved as set out below. Savings for increased utility of vehicles were difficult to quantify however it was established that at least one third party heavy loader vehicle was no longer required yielding an annual saving of \$1 million/yr.

Given that this was the first mining site visited by the EneSolve team, both the team and the client were very happy with the results which delivered at least \$2million per annum to the client's bottom line.

The final project financial metrics were:

Increased Operational Costs:	~ \$2million/annum
Annual Fuel Savings:	~ \$560,000
Annual Maintenance Savings:	~ \$2.5million
Annual reduction in heavy fleet hiring:	~ \$1million
Net Annual Benefit	~ \$2million