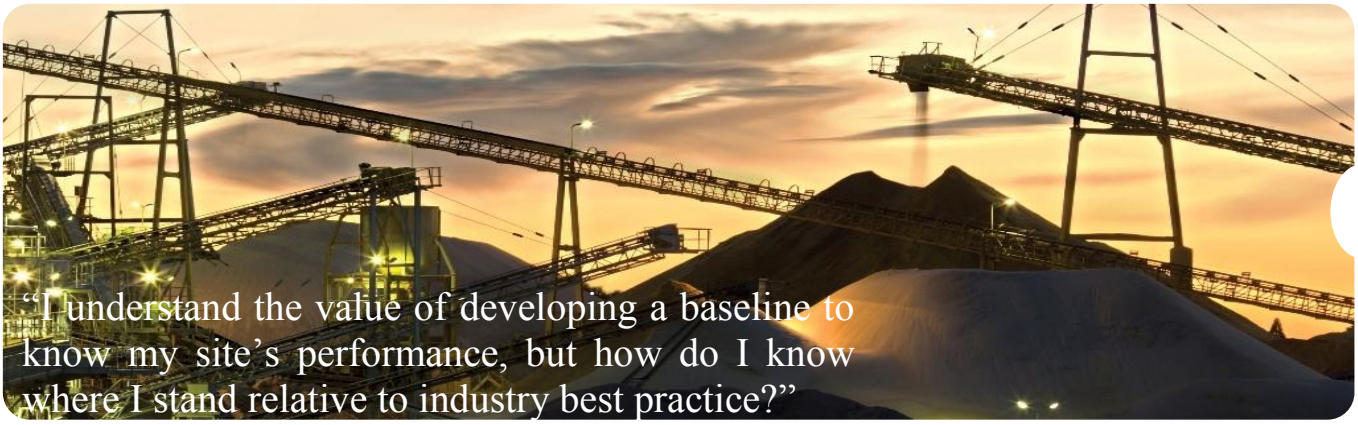
Energy Performance Benchmarking Reports for Coal Sites



Background and methodology

This benchmarking information is based on energy datasets which has been built up and refined over the 25 years that Energetics have been working with the industry. This sample report includes information from four Coal Handling and Preparation Plants (CHPPs) located in the Bowen and Hunter Valleys. A sample site has been mapped against the benchmark information to demonstrate what the benchmarking report looks like. The actual benchmarking report will draw on the information which we have collated across the Australian coal industry.

Reports are available for CHPPs, opencut and underground mines. The benchmark information presented is weighted average information presented on annual and monthly bases relative to the indicator being investigated. In this report we present the information set for a CHPP and its equipment.

A broader site-level report disaggregated to operating unit level (e.g. opencut, underground and CHPP) is also available.

Cost information is indicative. We can deliver a comprehensive energy benchmarking report; however price benchmarking is not the focus of this exercise.

Why benchmark your site?

The main reasons for benchmarking your site's performance are:

- Understanding how you are operating relative to like operations as well as industry best practise.
- Determining typical ranges of performance.
- Drilling down to target focus areas for improvement, even down to equipment or process level.

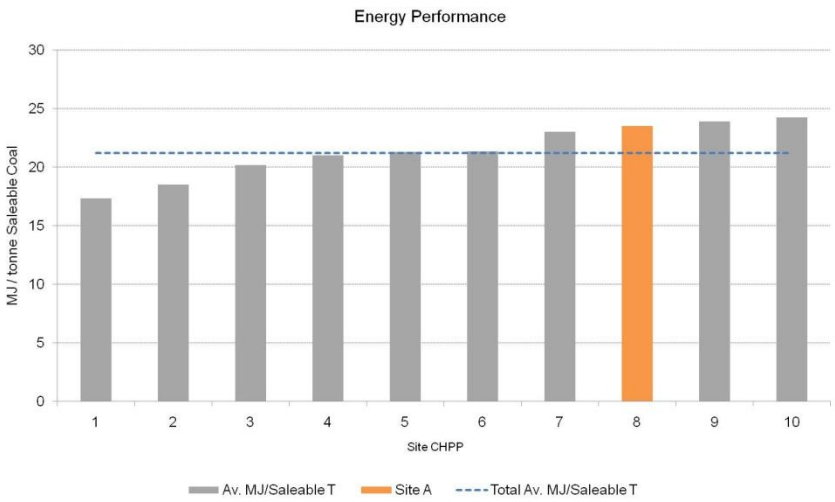


Figure 1 Energy Intensity of site operation

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Operating unit performance: CHPP

Energy intensity. Mapping your energy intensity relative to that of competitors allows management to assess how well you are performing and whether there is much room for improvement or not. These results can be mapped for each area of the site as well as the site as a whole.

Figure 1 illustrates how Site A's CHPP benchmarks against the performance of other CHPPs in the dataset. This indicates that the CHPP has a relatively high energy intensity, by comparison to industry average and, is the third most energy intensive CHPP in the dataset. This may highlight potential room for improvement.

Energy cost performance. *Figure 2* illustrates the value of mapping the information on a monthly basis, and using energy cost as an indicator. This information shows that the average energy spend per month from a CHPP has a fairly linear relationship to production.

Further analysis from here would suggest the energy spend per month ranges between 20c and 50c per tonne. Mapping the performance of Site A onto this information shows that, in the main, Site A pays more for energy per tonne of product than does the rest of the industry. However, in months where production is high, the cost of energy for the CHPP approaches, or improves on, industry average.

Investigating Site A's information for the months where production is less than 300,000 tonnes will highlight whether there is a high base load for the site, or whether there is uncontrolled equipment. Focussing attention on the extreme right hand side could allow the management team to target performance for optimum monthly production.

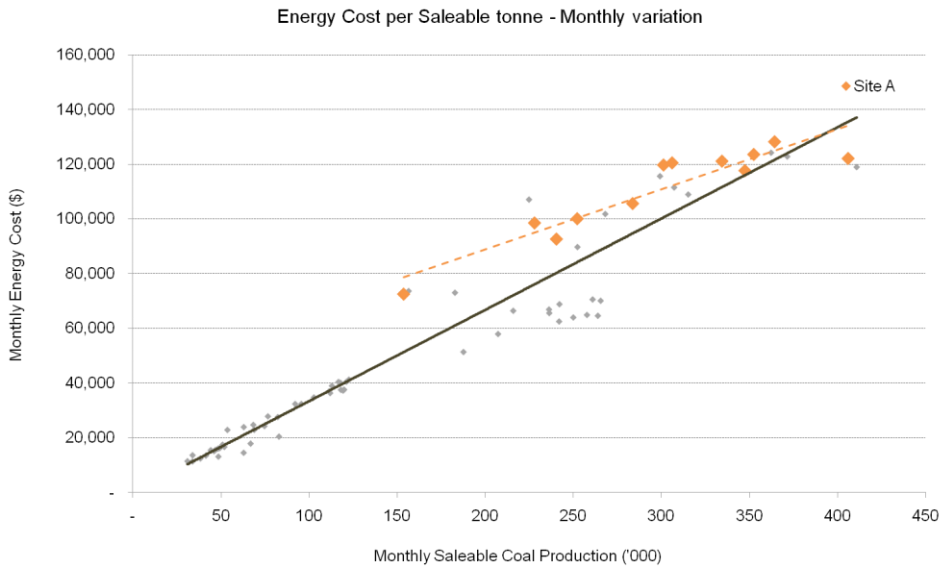

Figure 2 Energy cost relative to production

Performance ranges. Understanding how sites perform over the range of the information, and assessing how often different values present in the dataset gives management insight into how easy or difficult it will be for a site to move to a different operating paradigm to support optimal performance. *Figure 3* gives an indication of the range of operating performance for the entire dataset, as well as the largest and smallest ranges in the inventory. The wider the range of performances the more room there is to improve performance, particularly through process control and soft systems projects.

Figure 3 demonstrates that, while Site A operates close to industry average, the range of performance for the site is relatively large which suggests that improvement is possible. Opportunities should focus on improving stability and thus reducing $/tonne product.

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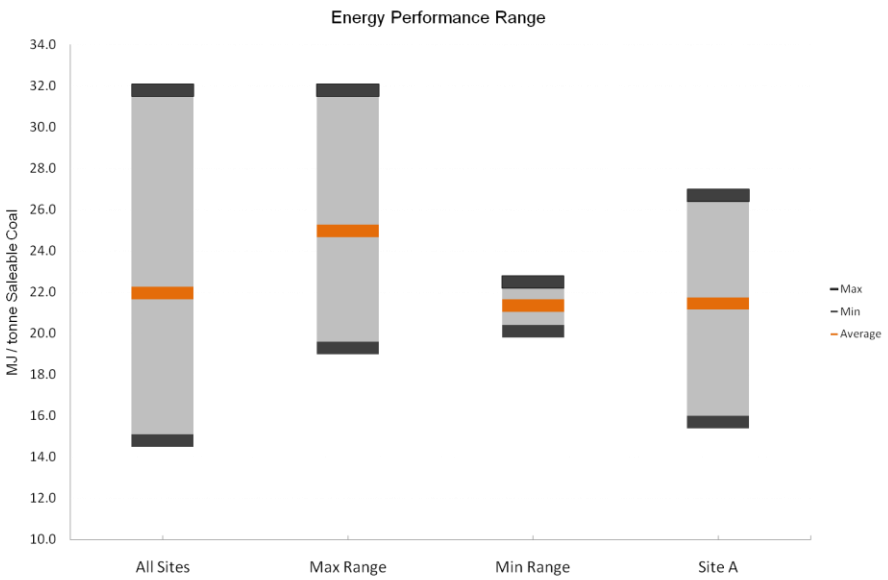

Figure 3 Energy intensity performance range

Figure 4 has been constructed to show how often each monthly value is recorded for the average dataset as well as Site A. The average dataset demonstrates that performance is not evenly distributed for the industry as a whole, though this is smoothed when more than the four sites are included in the industry average information.

For Site A this demonstrates that the site operates at its average for the majority of the time, with fewer high intensity outliers than low intensity outliers. This would suggest that the site needs to focus more on the areas where it under performs to address waste, than on the areas where it is performing well to optimise performance. This suggests that it is necessary to drill down to the next level of detail which is equipment level information.

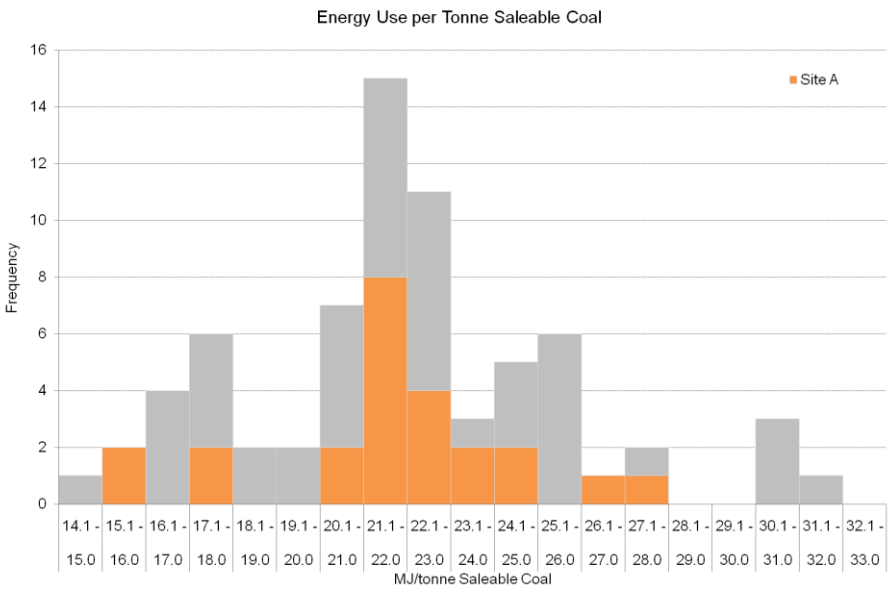

Figure 4 Frequency of reported values

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Equipment level performance

Figure 5 contains two important pieces of information:

- Industry average energy expended on different pieces of equipment per tonne of product; and
- Site A's equivalent energy breakdown.

The industry average information demonstrates that the CHPP equipment which uses the most energy in the industry is pumps, followed by "Other" and then crushers and conveyors. Site A tracks with industry average in this respect. This highlights the need to introduce additional metering to Site A (and the industry as a whole) so that the "Other" category can be better disaggregated and understood. It also indicates that the areas for focussing attention are pumps, crushers and conveyors. Typically pumping opportunities are not well enough understood and exploited. This represents a significant opportunity for Site A. For example, does high energy use by the pumps suggest that pumps aren't performing efficiently? Or is it that the site may use too much water?

Note that this is the electrical equipment breakdown only; a similar set of benchmarking information is available for diesel equipment used by the CHPP.

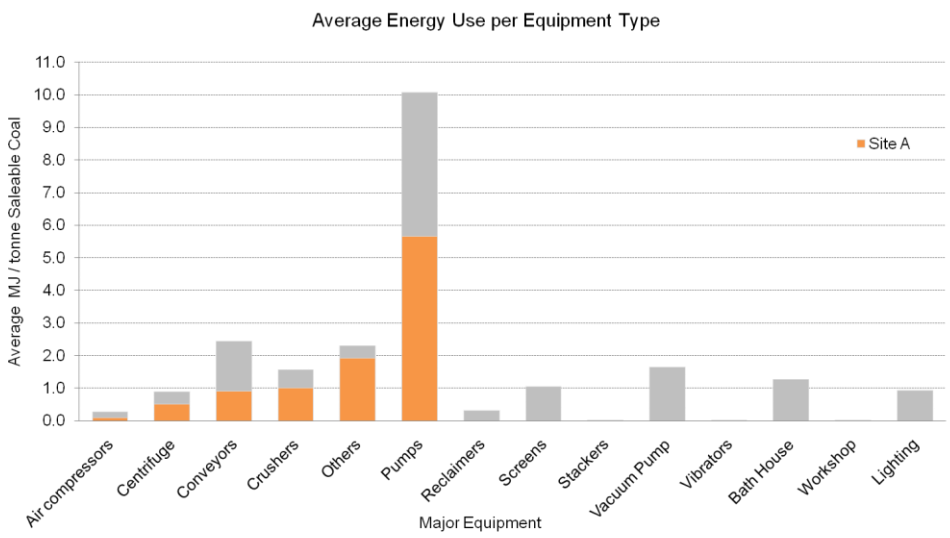

Figure 5 Benchmarked equipment level performance

How do we work with you?

When working with a single site our typical process is:

Gather baseline data for your site and add this to our dataset. Typically up to two days are required on your site for data collection subject to the number of site areas included as well as the level of detail on equipment level consumptions.

Extract your site data and map this against the dataset. Up to two weeks are required for a detailed benchmarking report.

Provide benchmarking report. Your report includes analysis / interpretations and recommendations for further investigation to support potential improvement and optimisation. We can tailor reports to include more than one site and to benchmark performance within a group as well as across the industry as a whole.

For further information contact

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