Anglo American’s Kumba Sishen iron mine in South Africa has been operating since 1947. Its 42,000 employees run the site around the clock, twelve months a year produce up to 41.3 million tonnes of iron ore each year.

One of Anglo American’s three strategic focus areas is reducing energy consumption and greenhouse gases. Rising energy prices in South Africa led to the Kumba Sishen operation being selected as one of the sites selected to pilot Anglo American’s new energy and management tool, ECO2MAN. After the roll out of the tool, identified that the mine only had enough energy and carbon savings projects in the pipeline to achieve a 1.6% CO₂ saving on the 2020 Business As Usual (BAU) baseline.

However, the Sishen mine was faced with the situation that in order to keep the current production levels, it must double its waste stripping to expose the iron ore as the ore body is going deeper. This results will result in a steep increase in diesel consumption and diesel is the mine’s biggest source of energy. They decided to embark on a process to find more energy savings opportunities using the Industrial Energy Efficiency (IEE) programme.

“The operational improvement train of thought that ABB had, also triggered operational personnel to think differently about energy savings. Even though not all the opportunities identified by ABB will be feasible, they certainly did add value.”

Chris van Loggerenberg, Executive Head of Technical Services, Anglo American Kumba Iron Ore.
Solution

ABB's approach to IEE consists of a four phase methodology and accompanying tools and techniques. ABB understands the stages of the journey that companies must go through - from wanting to reduce energy, through finding out where / how to reduce energy, to finally delivering sustainable energy reductions.

An opportunity study was conducted by ABB Energy Consultants and Specialist Engineers, supported by the Sishen mine team and subject matter experts. The study aimed to identify new opportunities to improve energy efficiency and management whilst considering organisation practices, information and know-how. 44 opportunities were identified by the team, with savings ranging from US$ 9million to US $15 million.

ABB hosted workshops to look at each opportunity in more detail, to identify the most feasible ones and any 'quick wins'. From these workshops 31 initiatives for savings on carbon, electricity and diesel were taken forward. If all implemented the savings to Sishen would be US $7million - US$12 million. It could also give possible energy savings of 4.4%-7.5% on the 2009 baseline (2.3%-3.9% on a 2015 BAU) and carbon savings ranging from 5.3%-9% on 2009 base (2.9% - 5% on 2015 BAU). This was a vast improvement from what the mine had on the table before the study.

Quick win savings included optimising the quaternary crusher operation with a variation in feed stockpile levels, saving up to 8,920 tonnes of CO$_2$ per year and implementing a automated switch-off policy to reduce empty running time on jog crushers, saving up to 2,573 tonnes of CO$_2$ per year.

ABB's assessment was not constrained to the technology issue but also considered operational issues as areas for improvement. This led to operational personnel to think differently about energy savings and suggest additional savings ideas.

Because ABB understands technology they were able to identify opportunities where technology from other industries could be sensibly applied and also identified opportunities where future technology development could be targeted.

However, ABB were successful in maintaining a Chinese wall between the savings opportunities they identified and the technology solutions they could provide from their own suite of products.

Benefits
- Savings of up to US $12million identified
- 100,000 tonnes of carbon savings identified
- Adherence to corporate strategy for energy savings
- Change in operational personnel thinking on energy