



National Energy Efficiency Accord – AngloGold Ashanti's role and contribution

Against the background of power shortages, climate change and increased electricity demand, the need for improvements in energy efficiency is gathering momentum in both developed and emerging economies.

As signatories to the 1997 Kyoto Protocol (under the United Nations Framework Convention on Climate Change), developed and developing countries agreed to a reduction in greenhouse gas emissions of 5.2% below 1990 levels for the period 2008 to 2012. Although South Africa, which acceded to the Kyoto Protocol in 2002, qualifies as a developing country, it is rated as the world's 13th largest emitter of greenhouse gases (GHGs).

In late 2007 and early 2008, massive power shortages enforced by the national power utility, Eskom, caused significant interruptions to all of AngloGold Ashanti's South African operations. Following intensive discussions between the mining industry, Eskom and the government, power supply of around 90% of previously contracted levels was reinstated to operations. This will, however, result in a decrease in production in the short term as certain parts of the operations will be put on hold.

Thus there is a greater impetus to develop energy saving initiatives, amongst consumers, commerce and industry – and especially the mining industry, which one is of the country's largest consumers of electricity.

The concept of Demand Side Management (DSM), as initiated by the National Energy Regulator, was essentially a response to a white paper issued by the Department of Minerals and Energy (DME) part of which focused on the issue of energy efficiency. The DSM fund was intended to fund or partly fund projects aimed at reducing demand and improving energy efficiency. The national power utility was appointed to manage the process of project approval and fund management, with a levy on the tariff to contribute to the DSM fund. Through DSM, the customer influences the supply of electricity. The prime objective of DSM is to provide constant efficient use of electricity so that lesser amounts are consumed during peak times. DSM uses three methods to regulate energy usage:

- load shedding – where energy supply is shifted from one time to another in order to meet the peak morning and evening demand;
- energy efficiency – reducing the amount of energy used in a particular process so as to use energy only when necessary; and
- peak clipping – reducing the peak time usage without shifting the energy supply to another time.

The mining industry's participation in DSM gained momentum in 2005 when the National Business Initiative facilitated a voluntary Energy Efficiency Accord between business organisations and the DME to demonstrate its commitment to the department's energy efficiency strategy. AngloGold Ashanti was one of the first signatories to the accord when it was launched during Energy Efficiency month in May 2005. The accord commits industry, including the mining sector, to a 15% reduction in electricity consumption by 2015 through a number of sector-specific strategies linked to DSM. AngloGold Ashanti is applying all three DSM methods at its mines at its Vaal River and West Wits operations.

Optimised process scheduling is being implemented successfully for pumping operations using a software package that models the water system of the mine and then schedules the pumping and refrigeration accordingly. The total daily average reductions of all DSM projects completed and in construction amount to 108MW (26% of the total average demand). This is being achieved during the evening peak time of between 18:00 and 20:00 on weekdays. At AngloGold Ashanti's West Wits operations, Mponeng's recently installed ice storage system (*See case study: Energy recovery at Mponeng at www.aga-reports/07/energy-mponeng.htm*), is one of the projects that has been instrumental in bringing about significant reductions. A pumping project at Mponeng which traditionally uses 13MW during peak time, has been reduced by 12MW, 6MW more than was anticipated. This effectively means that only 1MW is being used for pumping during peak time. AngloGold Ashanti's South African operations generally pump during standard and off-peak periods – usually after 20:00 – when Eskom has spare generating capacity.

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"Because standard and off-peak tariffs are much lower, significant cost savings can be achieved when pumping operations are scheduled accordingly," says Keith Arnold, AngloGold Ashanti's energy engineer for Southern African operations. He cites Mponeng as having saved R61,000 in one particular winter month, which may be a small portion of the total electricity bill but more importantly reduces the need for running expensive peak generating plant on the supply side. Electricity rates are linked to customer type (commercial, residential, industrial, and rural) and to usage in designated time periods. AngloGold Ashanti has selected a tariff structure which provides it with the opportunity to manage the time of the use of electricity, which affects the overall average cost.

Energy rates are increased in winter when electricity demand is greater, which is another reason why it makes sense to keep costs to a minimum by operating as much as possible in standard and off-peak periods, adds Arnold. "If we didn't reduce our energy consumption, Eskom would have to supply our requirements either with an expensive gas turbine or through a power interrupt contract which allows the utility to interrupt electricity supply as per an agreement with willing companies."

AngloGold Ashanti is installing a number of peak clipping and energy efficiency projects to reduce the amount of energy consumed. For example, compact fluorescent light (CFL) bulbs are being used instead of traditional incandescent bulbs. Although CFLs cost more they last much longer than incandescent bulbs, creating an average saving of 10 times their cost. Movement and day/night switches are being utilised to conserve energy in the company's new corporate offices in Newtown, Johannesburg. The company has invested about R4 million in additional efficiency measures which include solar heating, high-tech lighting systems, more efficient air conditioning using water condensing coolers and a building management system that makes optimum use of ambient temperatures. "Because the DSM fund does not provide for 'greenfields' projects we haven't been able to recoup any of these costs," explains Arnold, who is in the process of comparing electricity consumption and savings per square metre against a building guideline and SABS standard.

AngloGold Ashanti is close to commissioning an energy efficient DSM-funded pumping project at its Moab Khotsonq mine at Vaal River. A three-chamber pipe feeder system is expected to result in an average annual cost saving of R12 million and to bring about efficiencies of 9MW. The company anticipates conducting feasibility studies for roll-out of the system, which runs at 98% efficiency, to Vaal River's Kopanang mine, where the current turbine's pump efficiency is only about 70%.

"Each mine has an energy business plan, a budget and a target into the future," says Arnold, explaining that energy management is an ongoing exercise. The challenge, in his opinion, is agreeing on the method of measuring energy efficiency improvement. AngloGold Ashanti works closely with other signatories to establish these methodologies and will continue to support the DME's energy efficiency strategy, the success of which is crucial to the social and economic stability of the country, particularly in the light of South Africa's recent energy crisis.