

## Cost Challenges in Ghana



Mark Morcombe, Senior Vice-President, Anglo-Gold Ashanti

It took little more than a minute for Anglo-Gold's Mark Morcombe to explain why reducing the energy required for comminution has become key to mining profitability.

Morecombe - Senior Vice President responsible for revitalising Anglo Gold-Ashanti's century-old Obuasi mine in Ghana - was CEEC's guest at the

organisation's reception in Brisbane and he needed only two salient points to explain why CEEC's cause is so vital.

- Processing consumes 42 per cent of Obuasi's total power use with comminution the biggest component of that.
- Power costs have risen in seven years from 5 cents a Kw/H to 17 cents - with more rises forecast.

There are so many individual components of the production process requiring Anglo's renowned focus on efficiency that a systemic approach to energy consumption in comminution is essential.

That, he told the audience, was the value of CEEC: Maintaining a focus on systemic efficiency; communicating to the industry that this is an important objective in its own right.

Morcombe explained that Obuasi has been a prolific producer for more than a century, with output of more than a million ounces a year at its peak. Although it is still a significant producer, rising costs now threatened its viability.

### VIABILITY

Making Obuasi viable is Morcombe's challenge. It was in illustrating the myriad individual components of the review he is conducting - 1500 instruments needed

recalibrating; an entire timber concession, a legacy from the time when timber was an essential component, had to be sold off; that he revealed the challenges of simultaneously conducting a review of energy use in comminution; something he is only now able to address.

It might perhaps be no more than the age old management challenge of immediacy versus importance, but Morcombe suggested that the rapid escalation of energy prices since 2006 has added a far greater element of urgency, particularly as further increases in energy prices seem likely as Ghana strives to increase its energy output.

### COST-CRITICAL

It was in this context, he said, that the CEEC meeting in Brisbane had special relevance: Obuasi is a cost-critical operation and CEEC plays an important role in highlighting and addressing one of the key cost challenges for miners.

To underscore his point, CEEC Chair Elizabeth Lewis-Gray reminded the audience that world-wide, grades of minerals were falling, requiring greater volumes of ore to be processed for the same output. Significantly there is also a trend to finer grinding which again increases energy use (energy requirement increases exponentially with reduction in particle size).

Not just a challenge in Ghana, a challenge globally.



Newmont's Wayne McFaul, CEEC Chair Elizabeth Lewis-Gray and Anglo-Gold Ashanti Senior Vice-President Mark Morcombe



# Huckleberry Energy Reduction Study Takes Out 2013 CEEC Medal



Above left, The Hon Dave Nikolejsin, Deputy Minister for Energy and Mines BC, Canada congratulates Fisher Wang, Copper Mountain Mining Corp; above centre, The CEEC Medal; above right, CEEC Chair Elizabeth Lewis-Gray

The 2013 CEEC Medallists were awarded their Medals in October 2013 in Vancouver Canada. Hosted by CEEC, the invited guests assembled at Ausenco's offices for the event.

Over 60 guests represented the industry, including operators, engineering companies, equipment manufacturers, research organisations and the British Columbia Hydro company BC Hydro, a co-sponsor of the award winning paper.

The Honorable Dave Nikolejsin, British Columbia Deputy Minister for Energy and Mines addressed the assembly, stressing the importance of industry and utility working together for future energy optimisation, before presenting the Medals.

Fisher (C) Wang, Stefan Nadolski, Olav Mejia, Jeff

Drozdiak and Bern Klein co-authored the paper titled "Energy and Cost Comparisons of HPGR based circuits with the SABC circuit installed at the Huckleberry Mine".

This paper presents a comprehensive energy and cost study comparing an existing SAG mill based circuit at Huckleberry Mine with two proposed circuits featuring comminution energy efficiency technologies : high pressure grinding rolls (HPGR) and high speed stirred mills. The paper showed the energy reduction achieved by the alternate flowsheet designs significantly improved the economics of the Huckleberry comminution circuit. The paper can be downloaded from the CEEC website.

Application for the 2014 Medal close on March 15, 2014.



Top left, Greg Lane (Ausenco); top right, Ed Wipf (Weir Minerals) with Elizabeth Lewis-Gray CEEC; bottom left, Greg Rasmussen (Xstrata Technology), Prof Bern Klein UBC, Laurie Reemeyer (AMEC); bottom right Kija Chiteta (Hatch) Sarah Boucaut (CEEC) and Sandy Gray (Gekko Systems)

## Message from the CEEC Chair

Dear friends and sponsors of CEEC,

2013 has been a really exciting year, full of achievements and progress on the important matter of energy efficiency in comminution. Once again our Executive Officer Sarah Boucaut has done an outstanding job of delivering a significant global program on a small budget. I would also like to make a special mention of our Directors Joe Pease, Prof Tim Napier-Munn, Zeljka Pokrajcic, Mike Daniel and Michael Battersby who have all provided exceptional support and passion in this field. It is important to note that these directors volunteer to provide their time and resources at their own cost to facilitate the transfer of knowledge and technology in energy-efficient comminution.

Most pleasing however has been the nomination and election to the CEEC board of outstanding industry leaders in this area. We are delighted to introduce you to our new board members Mary Stewart, General Manager Consulting, Energetics; Maryse Belanger SVP Technical Services Goldcorp and Ivan Mullany SVP Capital Projects Barrick Gold. More details on these industry leaders in our next newsletter.

Mike Daniel has been with CEEC from its inception and has played a critical role as the Chair of Technical Research committee. Mike was instrumental in defining the best in class critical and relevant papers on this topic globally. Mike continues to work in the field of eco-efficient comminution, and we thank him for his service to CEEC's Board for three years.

I am delighted having led the drive to found this important organisation and pleased to hand it over to such a passionate and capable team of directors. It has been a delight to work with such a capable, diverse and committed group of volunteers and I commend them all for their contribution of late hours and deep wisdom.

Cheers,

**Elizabeth Lewis-Gray**

*Editor's note: Elizabeth Lewis-Gray has accepted a role as a Patron of CEEC.*



The winning team: Klein (UBC), Connaughton (Huckleberry Mines) Wang (CuMtn), Zeller (BC Hydro), Drozdiak (Hatch), Nadolski (UBC), Thompson (Huckleberry Mines) (Absent O Mejia)

Contact CEEC: [www.ceecthefuture.org](http://www.ceecthefuture.org) or [sarah.boucaut@gmail.com](mailto:sarah.boucaut@gmail.com)



# Why Fine Grind: Does a Coarse Grind Work Better by Any Measure?

Some interesting and insightful discussion has taken place over the past few months via the CEECtheFuture LinkedIn group. The topic: the ever prevalent but at times difficult to achieve - target grind size. The discussion spanned a few weeks and brought valued input from specialists around the globe.

Typically, for a new plant target grind size is selected during the design stages of a project. In the test work phase ore samples are reduced to different target grind sizes and downstream recovery process assessed for each size sample. This leads to a Grind Optimisation Study, where capital and operating costs are estimated for each grind size and offset against potential recovery increases as the grind size decreases. The results of this grind optimisation exercise are used to determine which grind size represents the most cost effective plant flowsheet design.

Often the target grind size closely reflects the valuable mineral grain size. However, we are urged to look beyond the capital and operating costs and the associated grade and recovery analysis, rather to view the project and the orebody from a geometallurgical stand point: where geology, mining and metallurgy merge to equally contribute to the flowsheet design and operation.

A deeper understanding of geometallurgy can lead

to concepts like Grade Engineering where:

- Ore processing streams are designed to be size specific
- Pre-concentration at coarse size is introduced to remove waste prior to further size reduction
- Blasting techniques are optimised for improved throughput or waste segregation

These grade engineering concepts can deliver a step change in energy consumption and lead to a higher throughput plant for less capital outlay.

The standard approach in evaluating the economic viability of a project is NPV analysis. However, the outcomes of NPV analysis are heavily dependent on one variable: the discount rate. If this value is not carefully selected then results may be skewed. Perhaps more advanced economics analysis is required particularly as processing options become more ore specific as a result of concepts like geometallurgy and grade engineering.

For the full discussion visit LinkedIn and search for CEEC Coalition for Eco Efficient Comminution.

## Explore CEEC Online

Visit the [ceecthefuture.org](http://ceecthefuture.org) website to see what we offer:

- Tap into the knowledge of leading comminution experts
- Search leading technical papers and presentations on one website
- Access the most current and accurate data on alternative comminution strategies
- Nominate outstanding papers for consideration for the CEEC Medal.
- Contribute! Join discussions on CEEC's LinkedIn group. Search for: 'Coalition for Eco Efficient Comminution'

## In Brief

### APPLICATIONS

Applications for the 2014 Medal opened in November 2013 - visit CEEC's website for all the details.

### HALL OF FAME

Breaking News: Prof A Lynch is the inaugural 2013 Comminution inductee to the "International Mining Technology Hall of Fame."

## CEEC thanks its sponsors:



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