



LONG TERM

Develop **advanced ore sorting** systems for processing of ore according to its size and/or ore properties.

Use instrumentation such as Smart Tag radio frequency identification to allow tracking of ore and selective treatment.

3 IMPLEMENT APPROPRIATE BUSINESS DRIVERS AND KPIs



Encourage **cross-team** engagement between mine, plant, production, and maintenance teams to implement energy-efficient outcomes



Encourage external **collaboration** between industry, R&D, and consulting organizations to foster innovation



Refine operating strategy and sustainability plan to include long-term planning in terms of government Energy Efficiency Opportunity initiatives



Develop and incorporate an **energy efficiency** metric with a focus on systems in the KPIs of senior management

4 COMMUNICATE THE BENEFITS, MOTIVATE, ENGAGE AND TRAIN



Motivate the implementation of eco-efficient comminution using case studies of quantified success



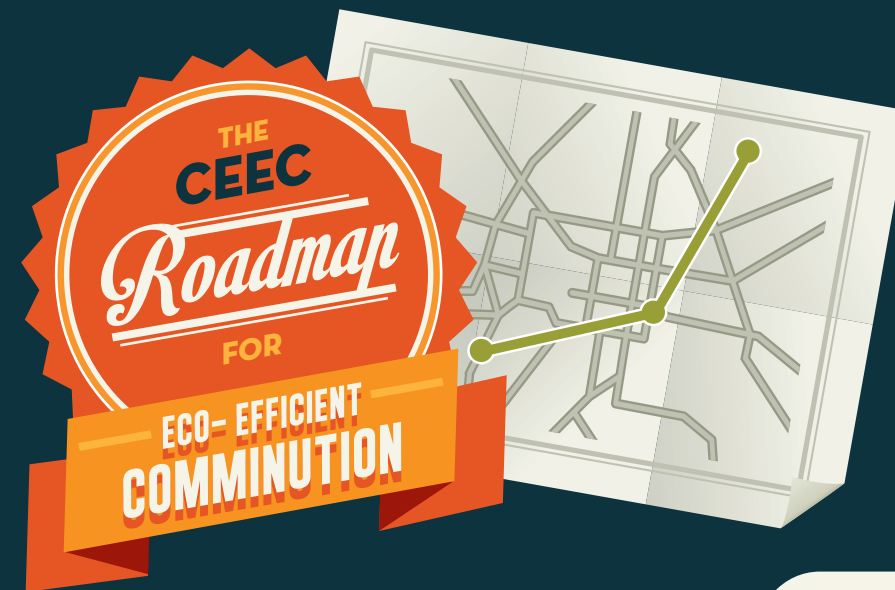
Spread message through forms, conferences, think tanks, and professional development courses



Ensure own organization and people are aware of 'the size of the prize'



Review skills and establish training at all levels so operators can monitor energy efficiency within their areas of influence



THE COALITION FOR ECO-EFFICIENT COMMINATION (CEEC) was established to encourage the implementation of eco-efficient comminution strategies through promotion of supporting data and industry benefits.

In 2012, CEEC collaborated with key industry leaders and thinkers to develop a **roadmap for the industry** to use when addressing this issue.



- 1 To define the issues relating to comminution energy efficiency
- 2 Recommend strategies for addressing the problem
- 3 Suggest mitigating actions



WORKSHOP PROCESS

DAY 1:

37 senior industry experts were divided into four groups based on their sector.



Mining Companies



Researchers and Consultants



Manufacturers and Vendors



Engineering Companies

Eight short presentations about comminution energy issues relevant to each sector were made to provide background and promote discussion.

DAY 2:

Participants were randomly assigned to four new groups (two focusing on short-term and two long-term) and asked to **form action plans** to enable eco-efficient comminution. These were combined to form the CEEC Roadmap.



TO LEARN MORE ABOUT THE ROADMAP FOR ECO-EFFICIENT COMMINATION, VISIT WWW.CEECTHEFUTURE.ORG/



THE BENEFITS

The benefits of increasing energy efficiency are diverse and it's estimated improvements of up to 50%/kWh/metal unit are feasible within 10 years, and more beyond that.

BENEFITS OF IMPROVING ENERGY EFFICIENCY IN PROCESSING OPERATIONS INCLUDE:



Immediate OPEX benefit through energy cost savings, leading to increased profitability.



Better community relations from reduced energy and water footprint, enhancing the license to operate.



Enhanced ability to manage more complex, lower grade or difficult ores thereby expanding potential ore resources.



Improved security of energy supply and reduced generation of fine waste.



Reduced carbon emissions, energy footprint and potential for reduced water usage.



Lower exposure to increased energy costs or reduced security of supply.

RISKS OF INACTION

- ✗ Exposure to rising processing costs
- ✗ Exposure to energy shock
- ✗ Reduced security of supply
- ✗ Potential loss of license to operate
- ✗ Environmental risk (carbon constraints)
- ✗ Threat of substitutes

REWARDS OF ACTION

- ✓ Game changing technology leadership
- ✓ Reduction of processing costs
- ✓ Improved business leadership
- ✓ Attract the best staff
- ✓ Secure the license to operate
- ✓ More effective utilization of finite ore resource



THE ACTIONS

One-off interventions to improve efficiency cannot be relied on to solve the problem. Substantial gains can be made by the cumulative effect of relatively small improvements.

THIS ROADMAP AIMS TO PROVIDE DIRECTION ON HOW TO ACHIEVE IMPROVED INDUSTRY PERFORMANCE. THE KEY ACTIONS ARE:

1 MEASURE PERFORMANCE

Companies should develop an energy rating system, which can be used to audit:



- Overall operational efficiency
- Planning systems
- Equipment efficiency
- Maintenance systems
- Control systems
- Technical support systems

- Cross-disciplinary study groups should be set up to establish base-line targets for energy use
- Targets should address: performance of individual units and systems, supporting work practices, control systems and planning strategies, and relate these to energy use in kWh/unit metal
- Regular reviews should be conducted to address changes in performance and set new targets



2 ADOPT BEST PRACTICE IN TECHNOLOGY

THERE IS A SUBSTANTIAL GAP BETWEEN CURRENT OPERATIONAL STANDARDS AND INDUSTRY BEST PRACTICE. MANY WELL UNDERSTOOD TECHNOLOGIES ARE NOT BEING USED.

Companies need to ensure they familiar with best practices in operation and design and take advantage of opportunities that can be implemented. For example,

SHORT TERM

- Review the use of 'Intelligent Blasting' to optimise plant feed size distribution.
- Identify key pieces of equipment, and review their efficiency of unit process performance.

