



Integrating sustainability in coal mining operations

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Introduction and Framework

- Sustainability in minerals industry is a growing concern
- Coal mining companies have been increasing focus on sustainability
- Mining and resource extraction does not fit common understandings of sustainability



Sustainability and Mining

- Economic base for community
- Development of infrastructure
- Restored and enhanced environments through reclamation
- Next steps: inclusion of sustainability in mine design and optimization of entire system



Current Issues

- Coal production and use will continue to grow
 - 44% increase in global use by 2025
- Use of coal for electricity will also grow
 - 57% of U.S. generation by 2030
 - 72% of China's generation by 2030



Corporate Policy and Sustainability

- Global Reporting Initiative
- World Coal Institute initiatives
- Mining, Minerals and Sustainable Development project
- SDIMI 2003



MMSD Main Points

- Long-term industry viability
- Land management
- Minerals for economic development
- Positive community impact
- Managing environmental impacts
- Reducing waste and inefficiency



MMSD (cont.)

- Information to stakeholders
- Managing multi-scale relationships
 - Large companies v. small operations
- Sector governance
 - Roles
 - Responsibilities
 - Opportunities for change



Traditional Mine Design Considerations

- Geology
- Quality of deposit
- Hydrology
- Topography
- Land ownership
- Geography
- Infrastructure
- Etc.



Optimization

- New approaches
 - Multi-criteria mathematical modeling of resource management
 - Simultaneous consideration of traditional mining engineering issues AND environmental and sustainability issues



Public Policy and Legal Framework

- Current framework not designed to promote sustainability, but merely compliance
- Institutionalized distrust
- Public participation is often less-than-meaningful
- Poorly configured regulatory agencies



Suggested Approach

- Identify parameters
 - e.g., ecological quality
- Identify relationships
 - e.g., cost in relation to ecological quality
- Identify desired outcomes
 - e.g., profit and preserved ecological quality



Conclusions

- All pertinent factors must be simultaneously evaluated
- Optimization may rely on new multi-criteria mathematical approaches
- Parameters of concern, interrelationships, and desired outcomes must be identified from the beginning