

Status and Achievement of the Green Mine in China

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Abstract: The concept of Green Mine was first introduced in China in 2006. In 2010, the Ministry of Land and Resources, P. R. China announced the General Condition of Green Mine. Up to now, the MLR mandated the development of green mines, totaled to 220, for two times in 28 provinces. Currently, Green Mine is a new concept of the mineral resources management in China. It has been so far the best way of the mining enterprises to attain sustainable development and commit to their social obligations that required by the country resolved to improve the quality of the mining economy.

Keywords: Green Mine, Standard, Mining Enterprise, Experiment Unit, China

1. Introduction

Mining, with its history of thousands of years, has brought fabulous wealth to mankind. According to MLR, the mining enterprises in the country reached 112.5 thousand, in 2011, sprawling in more than 300 mineral cities with more than 21 million staff workers.

In the past ten years, the consumption of energy increased 118%, raw steel 300%, Copper 394%, and kali salt 50%. Nowadays, the nation's 30% industrial gross product and 33% additions come from mining industry on average [1]. Thus, more mineral resources are in need to maintain a healthy development of the national economy. The demands for mineral resources are growing rapidly and consequently result in increased exploration that has caused a slew of environmental problems, such as debris flow, landslide, blowing dust, cave-in, soil-water pollution and land deterioration [2].

In 2006, the concept of Green Mine was introduced to China, and subsequently applied by several cities, including, the cities in Zhejiang and Shanxi provinces, for experiments. In 2007, the MLR announced that Green Mine is the trend of China's mining industry, concerning the country's guideline of sustainable development. In September of 2009, China Mining Circular Economy Forum kicked off on the topic of Green Mine Construction. On that Forum, participators exchanged experiences in the development of green mines.

The Green Mine requires scientific and comprehensive mining and selecting of resources in accordance with laws and regulations, in an effort to guarantee low energy consumption, few environmental damage and sustainable development. In August, 2010, MLR issued the Guide of Carrying out the National Program of Mineral Resources, Developing the Green Mining and Constructing the Green Mine (MLR Publication [2010] No. 119).

2. Present Standard of the Green Mine in China

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On August, 13, 2010, MLR announced the General Condition of Green Mine in line with the foundation of the Green Mining Convention. The General Condition aims to implement scientific outlook on development, regulate corporate behaviour and strengthen self-discipline in the mining industry as well as encourage mining enterprises to fulfil their social obligations, promote green mining, and construct a resource-saving and environment-friendly society. The nine conditions are as follows [3]:

1. Legal Mining. Mining enterprises should acquire and protect mining rights in accordance with laws, state guidelines and policies, like, "mineral resource exploitation and usage", "geological environmental protection and administration", and "mining land reclamation". They should strictly abide by the national industrial policies and are licensed. Their qualification is maintained only when they keep a zero record of related administrative penalty and severe misfeasance in the recent three years.

2. Management Standardization. Mining enterprises should have access to the Green Mining Convention and actively comply with it, formulate overall planning for reasonable exploitation and usage of mineral resources and improve the safeguard measures from survey, exploitation, selecting and smelting, land reclamation and bio-environment restoration. At the same time, mining enterprises should establish the management system, and carry out quality system certification of healthy, safety, environmental protection and products.

3. Comprehensive Utilization. Mining enterprises should emphasize and implement clean production: their energy-saving and emission-reduction should reach the advanced level of state; they should redouble their efforts to realize comprehensive recycling of associated resources and other low-quality resources for comprehensive utilization. Carry out the measures of energy saving and keep the "three rates", exploitation recovery rate, ore dilution rate, and ore dressing recovery rate, below the level regulated by the nation.

4. Technological Advancement. Mining enterprises should fund more than 1% of the gross product in scientific and technological improvement, upgrading obsolete equipments, adopting advanced technologies and promoting resource recycling.

5. Energy Saving and Waste Reduction. The energy-saving and emission-reduction of mining enterprises should reach national criteria; "the three wastes", namely, waste gas, waste water and industrial residue disposal ought to be reduced for the standards concerned. And the rate of mineral processing wastewater reuse should be up to 90%, if not zero waste residues. The mine solid waste comprehensive utilization rate is encouraged to keep abreast with the highest standard achieved by domestic mines.

6. Environmental Protection. Mining enterprises should carry out the environmental restoration margin system, strict implementation of the "system of three simultaneously", namely, simultaneous design, construction and operation. The mining geological environmental recovery situation should be significantly higher than the regional level on average. Pay attention to the prevention of geological disasters in mine areas and make sure the impossibility of serious geological disasters in the recent three there years. More than 80% of the mining area should be afforested for a better environment.

7. Land Reclamation. Mining enterprises should formulate reasonable land reclamation and utilization plans according to local conditions. Adhere to extraction and reclamation at the same time; using advanced technology and warranting sufficient capital flows; Plowland or agricultural land enjoy the priorities of reclamation.

8. Harmonious Community. Great importance should be attached to fulfill the social obligations of mining enterprises, striving to build harmonious communities, and building up the favourable enterprise images.

9. Enterprise Culture. Mining enterprises should highlight corporate culture construction during the process of corporate building. It is composed of a united, positive, practical leadership and talented and qualified staff. The enterprises should guarantee their employees with material and spiritual benefits by setting up systems with relevant measures concerned.

The abovementioned nine items, preconditioned by "Legal Mining"; stimulated with "Technological Advancement"; achieved via "Energy Saving" and "Environmental Protection", and ultimately set for "Harmonious Community" is the assurance frames the Green Mine Construction.

3. Achievement of the Green Mine in China

According to the "Guide of Carrying out the National Program of Mineral Resources, Developing the Green Mining and Constructing the Green Mine made by the Ministry of Land and Resources" MLR Publication ([2010] No. 119), after the application of mining enterprises, commendation of the provinces and the assessment of experts, in March of 2011, MLR published the first batch of 37 green mines. The second batch of the rest 183 green mines was approved a year later.

Those 220 green mines in total, categorized into six kinds of mineral resources: Energy, Gold, Ferrous Metal, Nonferrous Metal, Chemical Industry as well as Non Metal and Building Materials, belong to 28 provinces and autonomous regions. Figure 1 shows the distribution of green mines in China, with the different colors and shapes indicating different mining resources. Shandong Province, featuring 21 green mines, constitute the largest proportion of the green mines in China. Hebei, Shanxi, Inner Mongolia, Hubei, Henan, Gansu, Zhejiang and Hunan take the second place, which has more than ten green mines. Most energy green mines are located in Shanxi, Shandong and Heilongjiang Provinces; gold and chemical industry green mines mostly found in the middle or south of China. Generally, green mines are generally the leading mineral enterprises of the corresponding provinces.

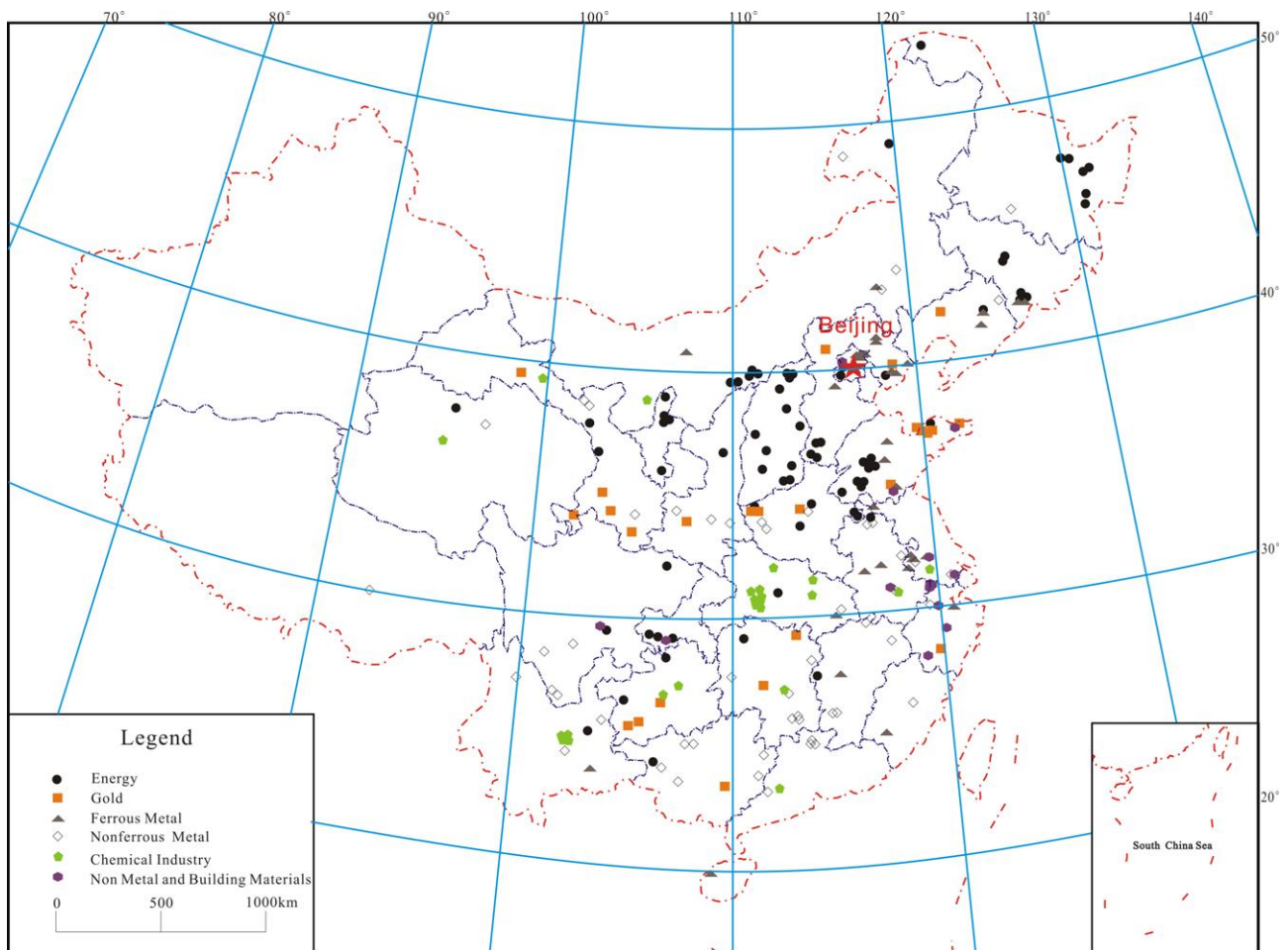


Fig. 1 Distribution of the Present 220 Green Mines in China

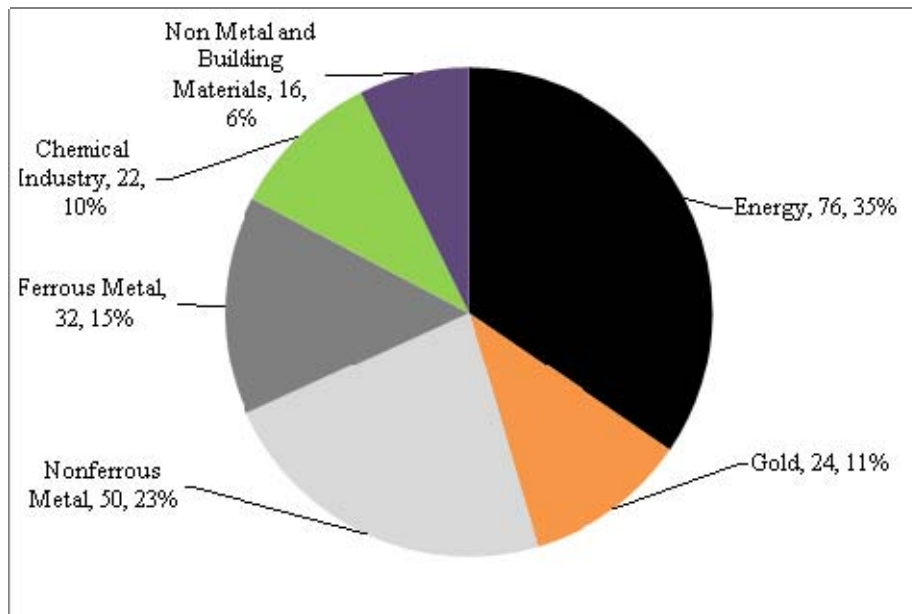


Fig. 2 Gross and Percentage of the Green Mines in China of Categorized Mineral Resources

Figure 2 indicates the gross and percentage of different mineral resources. Seventy-six energy green mines occupy more than one third of the total, while the nonferrous metal green mines take the other one fourth.

According to the Chinese Mineral Resources Report of 2011, Green Mine experimental units ought grow over 300 by 2013. By 2020, middle and large-scale mining enterprises should reach the Green Mine standard and the small corporations should be stick to the standard too. As long as the Green Mine structure come into effect, the mineral environment will be greatly improved and the mining enterprises would be in harmony with the local society [4].

4. Conclusion and Expectation

In present, the negative aftermath of mining activities on environment have become the barrier of the sustainable economic blossom. Therefore, the Green Mine becomes an inevitable option as a new driving force of the mineral industry to achieve the mining mode evolution, to make mining enterprises self-discipline and in good operation.

The mining enterprises have made huge progress in the Green Mine construction since 2009, despite a number of problems remaining to be solved in practice. The environmental protection program will inevitably lead to a rise in costs, which is detrimental to the competitiveness of the enterprises. Therefore, the government is supposed to help [5].

4.1. Special Financial Support

Government funds are in need to support the old state-owned corporations or other mining enterprises which are scheduled for Green Mine programs, The financial support is set up to help solve the problems like mining environment degeneration or land desolation.

4.2. Innovation Policy for Mining Area

Concerning the common interest of local government, mining companies and the peasants, the land used for mining is different from other kinds of land for construction. Therefore, innovation are in need in developing new models of land-supply-mining- reclamation-circulation to improve the mining industries under the guidelines of Green Mine construction.

4.3. Taking Charge of the Green Mine Process

The inspections of new green mines should be conducted in accordance with the standards on the construction, from exploration, exploitation to environmental protection of mining areas. At the same time,

guidance and examines should be conducted prudently and regularly at the green mines to ensure that they are in good relationship with the communities; otherwise, their licence of Green Mines should be confiscated [6].

4.4. Giving Priority to Mining Management

Green Mine enterprises, in line with the country's laws, are entitled to the priorities to obtain mining licences, land confiscation procedure, special program examine, financial credit and tax. All of those measures ought to make the Green Mine in a better condition for their sustainable development.

4.5. Improving the Theoretic Study

Summarize and generalize the experience of the Green Mine experimental units. Gradually improve the Green Mines construction standard and management measures of different regions, scale and different mineral resources [7].

Nowadays, Green Mine is a new concept of mineral resources management in China. It is the only way to promote progress of mining economy. Advanced technologies and equipment should be adopted; strict and scientific management should be implemented so as to realize the objective of developing and using mineral resources. The mining enterprise should be built into a modernized enterprise committed to social obligations and sustainable development.

5. Acknowledgments

In conclusion, the authors would like to express the deepest gratitude to all those, whose kindness and advice have made this work possible. We would like to thank Jin Wu and Prof. Xueyan Wei for the language improving; sincere appreciation also goes to Mr. Deming Zhang from China Mining Association, who participated in this study with great cooperation.

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