

At the proposal of the Minister of Industry and Trade,

DECIDES:

Article 1.- To approve the Scheme on technology renewal and modernization in mining industry up to 2015 with a vision to 2025 with the following principal contents:

I. VIEWPOINTS, OBJECTIVES AND CONTENTS OF TECHNOLOGY RENEWAL AND MODERNIZATION

1. Viewpoints of technology renewal and modernization

a/ Technology renewal and modernization must be based on the practical conditions of each mine, make full use of existing capacity to meet the requirements of raising production efficiency, and pay due attention to the integrated and thorough use of mineral resources.

b/ Priority will be given to selecting new equipment and technologies toward clean production to satisfy the criteria of high productivity, conservation of raw materials, fuel and energy, and eco-environmental safety and friendliness. To attach importance to, and step up, the application of cleaner production solutions in order to raise production efficiency while minimizing environmental pollution.

c/ To apply right from the beginning modern technologies of high mechanization and automation to new large-sized mines; to maximize mechanization at production stages and apply

THE PRIME MINISTER

DECISION No. 159/2008/QĐ-TTg OF DECEMBER 4, 2008, APPROVING THE SCHEME ON TECHNOLOGY RENEWAL AND MODERNIZATION IN MINING INDUSTRY UP TO 2015 WITH A VISION TO 2025

THE PRIME MINISTER

Pursuant to the December 25, 2001 Law on Organization of the Government;

rational mining and processing systems in order to minimize natural resource waste and environmental pollution for new medium- and small-sized mines.

d/ For operating mines and sorting and processing factories, depending on their practical conditions, to improve and renew their technologies through gradually replacing old equipment with advanced one and rationally renewing technologies. To enhance the application of information technology and improve managerial capacity, professional qualifications and skills, to increase mechanization for reducing manual labor at production stages at small-sized mines and sorting workshops; to increase automation at mines and sorting factories.

e/ To associate the full promotion of internal resources with international cooperation for technology renewal and modernization.

2. Objectives of technology renewal and modernization

a/ General objectives

To strive to turn mining into an industry reaching the regional technological level by 2015 and international level by 2025. By 2015, Vietnam's mining industry will have professionally capable managers and technically skilled workers, ensure labor safety, satisfy environmental standards for post-mining environmental restoration, and be linked with deep processing to create high added value, and highly mechanized and automated production technologies. Science and technology will play an important role in raising production and

business efficiency and competitiveness of enterprises and ensuring labor safety and environmental protection.

b/ Specific objectives

- Open-pit mining technologies: To strive for the target that production stages will be mechanized up to the regional level by 2015 and international level by 2025; information technology will be widely applied to production, business and natural resource management at big mines. For medium- and small-sized mines, to strive to mechanize mining to a reasonable extent depending on the specific conditions of each mine, minimize manual labor and attached importance to environmental protection and full extraction and use of natural resources.

- Underground mining technologies: To strive to synchronously mechanize mining at mines with favorable conditions and mechanize mining to the utmost at mines with unfavorable conditions. To put an end to manual mining which fails to ensure labor safety, wastes natural resources and deteriorates the environment.

- Mineral sorting technologies: To apply world advanced technologies in large sorting factories; to mechanize sorting to the utmost when conditions permit, proceeding to no longer employ manual laborers at medium- and small-sized sorting workshops; to increase the recovery of principal useful minerals and full extraction of accompanied useful minerals for the integrated and economical use of natural resources and reduction of waste of natural resources in tailings; to restrict the use of hazardous and polluting collectors.

- Oil and gas extraction and processing technologies: To strive to reach the world advanced technological level in order to rationally, efficiently and economically extract and use domestic oil and gas resources; to actively expand overseas oil and gas activities and soon put into operation newly discovered oil and gas fields.

- To further develop scientific and technological potential for reaching the regional advanced level by 2015 and international level by 2025. To build the mining industry's staff and workers who are both qualitatively and quantitatively strong to administer the industry's activities for achieving the set objectives.

3. Contents of renewal and modernization of the mining industry

a/ Renewal and modernization of technological processes and equipment

- Up to 2015

+ Open-pit mining

- Spread mineral mining: To replace technologies of mining by shovels and transportation by automobiles in places with appropriate conditions with hydraulic mining in combination with shovels and transportation by sand pumps.

- Drilling-blasting-soil/rock loosening:

To apply advanced soil/rock-breaking technologies such as soil/rock loosening machines or heavy-duty shovels with bucket teeth for shoveling soil and rock at mines with appropriate conditions in order to minimize blasting and environmental pollution.

To apply new technologies for raising blasting efficiency: To quickly identify characteristics of mine rock blocks and automatically design drilling and blasting guidelines, blasting technologies applicable at submerged borcholes or large mining benches, vibration-reducing blasting technologies; to replace old rotary drilling equipment (of the former Soviet Union) with hydraulic rotary percussive drilling equipment.

To replace blasting technologies for breaking oversized rocks with technologies using hydraulic hammers in order to minimize environmental pollution.

- Excavation and transportation:

To get rid of manual mining and excavation technologies and replace trolley tramcars with automobiles of a tonnage suitable to mines' conditions.

To step by step replace old electric shovels and cable-pulled bucket-handle shovels with hydraulic shovels (shovels with front or rear loader buckets) with an appropriate capacity of bucket, flexible shoveling orbit and high selectivity.

To apply systems of endless conveyance by conveyor belts, pipelines, automobiles in combination with conveyor belts or automobiles in combination with hoists at mines with appropriate conditions.

- Excavation and pit wall stabilization:

To apply mining technologies with high working beaches together with using heavy-duty equipment in order to increase labor productivity and mining output and reduce product costs.

To apply mining technologies with high slope

of working walls in mine areas with appropriate conditions.

To apply appropriate solutions for increasing the stability of pit walls (using appropriate shapes of pit walls, de-pressurization drilling, smooth-wall blasting using small boreholes, rock block reinforcement by anchoring methods, etc.).

- To step by step replace and discard obsolete equipment and technologies; to invest in heavy-duty equipment at large-scale open-pit mines.

- To apply rational waste-discarding technologies in areas where there are underground minerals to be extracted.

+ Underground mining

- To improve and apply roadheading technologies by drilling and blasting methods through investing in synchronous drilling, excavation and transportation equipment, using rational blasting guidelines and organizing scientific working activities in order to speed up roadheading and develop pit propping by anchors, shotcrete or anchors in combination with shotcrete; to increase the use of hydraulic supports, mechanize and synchronize roadheading chains with the application of drilling and blasting methods with drilling, excavation and transportation equipment.

- To develop technologies of pit propping with reinforced anchors under different geo-technical conditions; to develop the application of technologies of rock-pit propping with anchors, anchors in combination with shotcrete or shotcrete at rock headings.

- To apply mine rock-block reinforcement

technologies for road-heading processes in areas with complicated geological conditions.

- To automate air ventilation, mine gas control, transportation and loading/unloading, water drainage, electricity supply, etc.

- Technologies of coal longwall mining: To mechanize coal stoping with stoping roadheaders, coal planers in association with hydraulic supports (hydraulic single props and hydraulic stands), and self-propelled support rigs at headings.

- To develop stoping mechanization technologies in shortwall faces, use self-propelled support rigs with coal roof-support structure, blasting in long boreholes and roadheading machines according to flat- and horizontal-inclined layering technological plans applicable to steep and thick seams.

- To replace obsolete and low-efficiency equipment at drilling, road-heading, excavation and transportation stages with advanced and more efficient equipment.

- To apply underground coal gasification technologies for mining coal in the Red River basin.

+ Screening and sorting technologies

- To renovate and improve technologies and add equipment to existing sorting chains through using high-performance, energy-efficient and easy-to-adjust equipment (new-generation magnetic sorters using rare earth magnet, buddles, multi-direction magnetic and gravity sorters, etc.); to use computers for monitoring and adjusting production processes.

- To renew and widely apply measurement,

controlling and automation equipment in sorting factories in order to improve and stabilize economic norms: equipment for identifying the weight of input ores; equipment for identifying the concentration of mud at the stages of flotation, condensation tanks; automatic sampling devices; automatic equipment for measuring and supplying collectors; equipment for chemical analysis; and equipment for measuring the humidity of refined ores.

- To furnish new, add or replace high-pressure filter, devolved vortex and water vortex equipment in sorting factories in order to raise the efficiency of systems for treating water mud and sorting fine particles, improve the use of re-cycled water and environmental treatment at sorting factories.

- To develop low-quality coal and ore sorting technologies and technologies using sorting factories' wastes for producing construction materials and thoroughly using natural resources.

- To renew and use at flotation factories new-generation flotation collectors which are highly active, selective and less polluting.

- To research and select appropriate technologies and collectors for sorting apatite base ores (of grades II and IV) in order to make full use of natural resources.

- To renovate and improve sorting technological processes for increasing the actual rate of recovery of principal useful minerals and the efficiency of sorting fine particles, the recovery of accompanied useful elements, and the integrated and economical use of natural resources.

- To improve loosening and desilting technologies for raising the rate of recovery of useful minerals and reducing losses of natural resources in sorting clay-containing mineral sand ores, such as tin, chromite, etc.

+ Oil and gas extraction and processing

- To select appropriate drilling and extraction technologies, paying attention to technologies of drilling small well bodies, lateral drilling and drilling under balanced pressure. To apply and develop mining technologies under complicated geological conditions such as cracked foundations, high pressure and temperature, CO₂-containing mines; to apply shaft and pithead technologies, suitable to Vietnamese paraffin-containing oil, CO₂-containing gas, etc., secondary and three-level extraction technologies for increasing oil recovery and maintaining well output.

- Collection, transportation, storage, disposal, use, processing and distribution of oil and gas products: To attach importance to crude oil processing, petro-chemistry, gas treatment and use, and waste treatment technologies, preventing incidents, ensuring safety and protecting the environment.

- After 2015

- + To expand the application of technologies for raising the blasting efficiency and smooth wall blasting technologies in order to protect pit walls.

- + To develop technologies of soil and rock breaking and stoping by mechanical methods; reduce the drilling and blasting volume (combine milling-cutting machines, crawler hoeing machines with front leveling blades and rear

hoeing parts, hydraulic rams for directly breaking soil and rock, etc.).

+ To apply deep extraction technologies and extraction technologies with high slope of working walls at mines with appropriate conditions.

+ To develop technologies for synchronously mechanizing the extraction chain through using roadheaders and conduct drilling and blasting operations with modern drilling-excavation-transportation equipment.

+ To widely apply systems of endless conveyance by conveyor belts, automobiles in combination with conveyor belts or automobiles in combination with hoists at open-pit mines.

+ To use heavy-duty and modern equipment; to replace cyclically operated equipment with continuously operated equipment, such as multiple-bucket shovels, conveyor belts, and continuous rock excavation equipment at mines with appropriate conditions.

+ To develop discharge and water drainage technologies for deep extraction; to rationally discharge waste in areas where there are minerals to be extracted.

+ To select appropriate technologies and collectors for sorting apatite base ores (of grades II and IV) in order to make full use of natural resources.

+ To maintain renovating and improving existing sorting technological processes for increasing the actual rate of recovery of principal useful minerals, especially those of fine particles, full recovery of accompanied useful elements, integrated and economical use of natural

resources.

+ To develop microbiological technologies for treating more efficiently hard-to-sort ores, and mixing-separation technologies in order to reduce production costs, process base ores and thoroughly and economically use natural resources.

+ To select and develop rational technologies for mining coal in the northern delta region with complicated mining-geological conditions.

+ To develop computerization and automation in prospecting, extraction, collection, transportation, processing, distribution and use of oil and gas products.

b/ Renewing, and raising the effectiveness of, production and business management and administration

- Up to 2015

+ To build and update database management systems for natural resource management and rational mining planning.

+ To promote the application of information technology achievements and the Geographical Information System (GIS) to production and business management and administration and natural resource management.

+ To improve and renovate organization and production management and administration modes toward streamlining, effectiveness, fewer management levels and increased autonomy and accountability of units.

+ To apply the quality management system according to ISO 9000.

+ All state mining companies will switch to

operate under the Enterprise Law. Enterprises in which the State needs not to hold 100% of their capital should be transformed into joint-stock companies to attract investor capital and apply appropriate management models.

+ To renew and formulate policies, regulatory documents and mechanisms equally applicable to mining enterprises towards modernization.

+ To provide training for improving skills of workers and technicians so that they can receive, grasp and master modern technologies, meeting the industry's demands.

- After 2015

+ To keep updating database management systems for natural resource management and rational mining planning.

+ To further apply information technology achievements and the GIS to production and business management and administration and natural resource management.

+ To organize training and retraining for managerial staff and laborers.

c/ Renewal of scientific and technological activities

- Up to 2015

+ To increase material foundations, research equipment and laboratories for the mining industry's science and technology institutions and consultancy organizations to carry out research, designing, technology development and manufacture of new products.

+ To maintain and efficiently use scientific and technological funds; to raise the capacity of

independent scientific and technological organizations and research and development sections in business groups, corporations and companies.

+ To increase investment in scientific and technological activities through state-, ministerial-, and business group/corporation-level key scientific and technological programs.

+ To intensify activities of researching, receiving and mastering new technologies; to research and develop schemes to renew and improve existing technologies.

+ To increase links between research institutes, universities and production enterprises in proposing, developing and applying research outcomes to production.

+ To utilize to the utmost domestic resources on the basis of intensifying cooperation with organizations and scientists in the areas of training, research, information exchange, application and transfer of new technologies.

+ To actively attract foreign investment and international cooperation in the areas of training, research, information exchange, application and transfer of new technologies for mineral extraction and processing.

- After 2015

+ To maintain and efficiently use scientific and technological funds of business groups, corporations and companies.

+ To further raise the capacity of scientific and technological organizations and research and development sections in business groups, corporations and companies.

+ To maintain links between research

institutes, universities and enterprises in scientific and technological activities for the mining industry development.

+ To research and manufacture technological equipment for mining operations, such as hydraulic supports, self-propelled support rigs, longwall mining scrapers, conveyor equipment and shovels, to substitute imported ones.

+ To further intensify international cooperation in the areas of training, research, information exchange, application and transfer of new technologies, especially in the research of technologies for mining and processing coal in the northern delta region, coal gasification and liquefaction, recovery and integrated use of natural resources.

d/ Promotion of environmental protection

- To enhance environmental management and protection at mineral extraction and processing establishments.

- To encourage and step up the application of clean and environmentally friendly technologies and cleaner production solutions to mineral extraction and processing.

- To encourage enterprises to apply the environmental management system according to ISO 14000.

- To successfully implement the program on environmental restoration in mining areas under the national environmental protection strategy up to 2010 with a vision toward 2020.

- To intensify training activities to raise public awareness about environmental protection.

- To enhance environmental status observation and reporting.

II. SOLUTIONS, ORGANIZATION OF IMPLEMENTATION

1. Solutions

a/ Group of solutions concerning investment in advanced equipment and technologies

- To formulate and implement programs and plans to replace, upgrade and renew technologies and equipment in business groups, corporations and companies engaged in mineral extraction and processing.

- To encourage and support enterprises, organizations and individuals of all economic sectors to transfer and apply technologies for technology renewal and modernization.

b/ Group of solutions to promote scientific and technological research, international cooperation and human resource training activities

- To raise the capacity and role of enterprises' technology management sections in planning consultancy, and technology application and renewal.

- To raise the research and development capacity of scientific and technological organizations, and create flexible mechanisms for technology transfer activities.

To strengthen links between research institutes, universities, financial institutions and enterprises, with the State's coordination and support of enterprises' technology renewal

activities.

- To formulate and implement scientific and technological programs specialized in mineral extraction and processing for technology renewal and modernization.

- To intensify international cooperation to attract external resources and science and technology from foreign countries.

- To provide training for improving managerial, scientific and technological qualifications and job skills for managers and laborers in enterprises.

- To form and develop a science and technology market in mineral extraction and processing; to improve the legal system necessary for the operation of the technology market.

c/ Group of solutions concerning mechanisms, policies and state management

- To formulate mechanisms and policies to support and encourage enterprises to raise their research and development and technology management capacity; to efficiently use scientific and technological development funds for technology research, development and application.

- To formulate mechanisms and policies to improve the coordination and combination of programs on renewal and modernization of the mining industry with programs and projects on manufacture of industrial equipment.

- To review, supplement and amend, and conduct propaganda for raising public awareness about, legal documents on management of mineral

activities.

- To consolidate and enhance the capacity of mineral state management bodies and inspectorates from the central to local level; to strictly manage licensing of the mining at local small mines.

- To review, amend, supplement or promulgate mechanisms and policies to encourage and support enterprises to invest in technology renewal.

- To formulate criteria and norms for the appraisal of technology renewal and modernization (regarding consumption of fuel, energy, supplies and raw materials) and mechanisms for the inspection, assessment and supervision of the compliance with those criteria and norms.

2. Funds for the Scheme implementation

a/ Funds for the Scheme implementation will come from the state budget and other sources of capital (own capital of enterprises, loans of credit institutions and international financial supports).

Funds for the implementation of state management-related activities, such as review and finalization of documents on state management; raising of scientific and technological research capacity; formulation of mechanisms and policies to promote and support technology transfer and renewal; training and public information for awareness raising and capacity building; formulation of criteria and norms for the assessment of the extent of technology renewal and modernization, and inspection and supervision of the compliance with those criteria and norms, will be allocated from the state budget

under annual plans and programs of ministries, branches and localities.

Funds for the implementation of specific programs and schemes on technology renewal and modernization at enterprises will come from enterprises' own capital, loans, foreign financial supports, and state budget supports for technology investment and renewal.

b/ Annually, the Ministry of Science and Technology, the Ministry of Finance, the Ministry of Planning and Investment and provincial-level People's Committees shall allocate budget funds for the performance of the Scheme's tasks.

3. Organization of implementation

a/ The Ministry of Industry and Trade, the Ministry of Construction and provincial-level Industry and Trade Services shall guide, direct, inspect and supervise the implementation of the Scheme on renewal and modernization of mining technologies up to 2015 with a vision to 2025 in their ministries and localities. Annually, the Ministry of Industry and Trade shall report on the Scheme implementation to the Prime Minister.

b/ The Ministry of Science and Technology shall assume the prime responsibility for, and coordinate with the Ministry of Industry and Trade and the Ministry of Construction in, formulating and implementing scientific and technological programs specialized in mineral extraction and processing for technology renewal and modernization; promulgating criteria and norms for the appraisal of

technology renewal and modernization (regarding consumption of fuel, energy, supplies and raw materials); reviewing, amending, inspecting and supervising the compliance with, operation norms, processes and regulations in mineral extraction and processing activities under their management.

c/ Enterprises, first of all state groups and corporations engaged in mineral extraction and processing, shall formulate and implement their roadmaps for technology renewal and modernization up to 2015 and orientations to 2025 in compliance with the Scheme's contents.

d/ Scientific and technological organizations operating in the area of mineral extraction and processing shall take the initiative in formulating projects on intensive investment and research capacity building; closely link their scientific and technological activities with enterprises' actual demands in the formulation and implementation of programs and schemes on research and development, consultancy, designing and equipment manufacture to assist enterprises in implementing their mineral extraction and processing investment plans and programs on technology renewal and modernization, master of imported technologies.

e/ The Ministry of Natural Resources and Environment shall assume the prime responsibility for, and coordinate with concerned ministries and branches in, reviewing according to their powers, or submitting to the Government for promulgation or amendment legal documents

on management of mineral activities; consolidating and raising the capacity of mineral state management bodies and inspectorates at the central level.

f/ Provincial-level People's Committees shall direct provincial-level Natural Resources and Environment Services and Industry and Trade Services in consolidating and enhancing the capacity of mineral state management sections and inspectorates in their localities; and strictly manage the licensing of mining at local small-sized mines.

g/ The Ministry of Finance shall assume the prime responsibility for, and coordinate with the Ministry of Science and Technology, the Ministry of Industry and Trade and the Ministry of Construction in, elaborating and submitting to the Government for promulgation appropriate mechanisms and policies to support and encourage enterprises to research, invest in technology renewal, receive advanced technologies transferred and develop the science and technology market.

Article 2.- This Decision takes effect 15 days after its publication in "CONG BAO."

Article 3.- Ministers, heads of ministerial-level agencies, heads of government-attached agencies and presidents of provincial-level People's Committees shall implement this Decision.

Prime Minister
NGUYEN TAN DUNG

Appendix

STATE BUDGET-FUNDED PROJECTS FOR THE SCHEME IMPLEMENTATION

(To the Prime Minister's Decision No. 159/
2008/QĐ-TTg of December 4, 2008)

Project 1: Key scientific and technological program on mineral extraction and processing technologies

- Responsible agency: Ministry of Industry and Trade.

- Coordinating agencies: Ministry of Science and Technology, Ministry of Construction and concerned ministries and branches.

- Implementation duration: 2008-2012.

Project 2: Intensive investment and raising the research capacity of scientific and technological organizations operating in the mineral extraction and processing industry

- Responsible agency: Ministry of Industry and Trade.

- Coordinating agencies: Ministry of Construction, Ministry of Science and Technology and concerned business groups, corporations and research institutes.

- Implementation duration: 2008-2012.

Project 3: Training human resources for sustainable development of the mining industry

- Responsible agency: Ministry of Industry and Trade.

- Coordinating agencies: Ministry of Education and Training, Ministry of Construction, business groups, corporations, and training schools specialized in mineral extraction and processing.

- Implementation duration: 2008-2012.

Project 4: Formulation and promulgation of criteria and norms for the assessment of the extent of technology renewal and modernization (regarding consumption of fuel, energy, supplies and raw materials); review, amendment, and inspection and supervision of the compliance with, operation norms, processes and regulations in mineral extraction and processing

- Responsible agency: Ministry of Science and Technology.

- Coordinating agencies: Ministry of Industry and Trade, Ministry of Construction and concerned ministries and branches.

- Implementation duration: 2008-2012.

Project 5: Review, amendment and elaboration of legal documents on management of mineral activities

- Responsible agency: Ministry of Natural Resources and Environment.

- Coordinating agencies: Ministry of Industry and Trade, Ministry of Construction, Vietnam Geology and Mineral Department, and provincial-level Natural Resources and Environment Services and Industry and Trade Services.

- Implementation duration: 2008-2010.

Project 6: Raising the capacity of mineral state management bodies at all levels

- Responsible agency: Ministry of Natural Resources and Environment.

- Coordinating agencies: Vietnam Geology and Mineral Department and provincial-level Natural Resources and Environment Services and Industry and Trade Services.

- Implementation duration: 2008-2010.

Project 7: Review, amendment and elaboration of legal documents on mechanisms

and policies to support and promote research, investment in technology renewal, receipt of advanced technologies transferred, and setting up of scientific and technological development funds

- Responsible agency: Ministry of Finance.

- Coordinating agencies: Ministry of Science and Technology, Ministry of Industry and Trade, Ministry of Construction and concerned ministries and branches.

- Implementation duration: 2008-2010.-