

Chapter



**Mineral
&
Energy Resources**

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INTRODUCTION

The very existence of human society particularly in the context of its economic activity is to some extent, related to the use of natural resources including mineral and energy resources. These natural resources however, are exhaustible meaning that they are reduced in quantity by their use. More importantly, they are non-renewable such that their regeneration is not possible or may require time of about several centuries. The economic extraction of these mineral and energy resources is associated with radical obstruction in natural environmental structures and may lead to extinction of these resources. Such environmental changes are basically irreversible. Thus, it is imperative that measures to ensure the sustainable use of these natural resources be established. Likewise, it is important that a system of information be made available to take stock of the existing situation and the other factors relating to it.

In this report, the framework for the development of statistics on mineral and energy resources is presented. Section 1 outlines the conceptual and statistical framework while Section 2 presents the situational analysis of mineral resources in the country. Also, the general issues and developments related to mineral and energy sector are presented in this chapter.

Minerals are substances occurring in nature, usually comprising inorganic elements or compounds of definite chemical composition. Mineral resources include both metallic and non-metallic minerals. Among the metallic minerals are gold, copper, iron, chromite, nickel, manganese, cobalt, lead, zinc, molybdenum, mercury and aluminum. Non-metallic minerals, on the other hand, include phosphate rock, magnetite, sulfur, guano, barite, bentonite, clay, diatomite, feldspar, gypsum, perlite, silica, gravel and sand, basalt, marble, limestone, shale, diorite, jade, opal, quartz, rhodonite, obsidian, agate and serpentinite.

Minerals are used as important inputs in the manufacturing of a wide array of products. They are also a source of foreign exchange earnings for the country. The Philippines, despite its relatively small area, is among the world's most richly endowed countries in terms of mineral resources. Among the mineral types, gold and copper are the most significant in the country in terms of their economic contribution.

As previously mentioned, mineral resources are non-renewable. Once extracted, the ore is lost and it will take a very long time to replenish it. With the continued extraction of mineral resources therefore, the issue of sustainability of mining activity arises. But as alarming as the problem of sustainability is the threat that the mining activity poses to the environment. Mining can cause sedimentation due to mine tailings. Spillage of mine tailings to water bodies will result to deterioration of water quality and the killing of marine life. Leakage of tailings to agricultural lands may cause clogging and destroying

of irrigation systems resulting to reduction in productivity of agricultural crops. Underground mining operation can also result to loss of water from waters and springs. Lastly, mining activity also poses risks to human health.

A number of interventions are being implemented to protect our mineral resources. The government, as steward of our natural resource and environment, has the Mines and Geosciences Bureau (MGB) to administer and manage the country's mineral wealth. MGB is mandated to regulate mining operations and to undertake research works on geology, mining, metallurgy and mineral exploration.

In its effort to integrate environmental protection measures in all stages of mining operation, the MGB under its present administration is institutionalizing the principles of sustainable mining taking into account societal needs and community expectation as the means of pro-environment and pro-people mining industry. To carry out its mission, the MGB is engaged in several activities for environment protection such as mine rehabilitation, water quality audit, environmental study of closed/abandoned mines, development and promotion of environmental impact assessment system (EIA) on mining operation, and "Adopt a Tree, Adopt a Mining Forest Movement".

In their effort to enhance and protect the environment, most mining companies have likewise undertaken environment protection measures as integral part of their operation. Some of these measures are the construction of tailings disposal system, slope stabilization, and backfilling of subsidence area and reforestation of mined out areas. Small-scale miners are also required by law to undertake similar environmental protection measures but oftentimes, they violate the provision due to their migratory nature, lack of technical capability and the added cost that such environment protection measures or enhancement would entail.

In the case of energy resources, the ones covered under this resource are the non-renewable energy resources, coal and crude oil.

Coal is a black or brownish black solid combustible rock containing less than 40 percent non-combustible inorganic components, formed by the accumulation, decomposition and compaction of plant materials under long acting geological processes. Coals differ in kinds and manners of preservation, of plant materials (type) and in degree of carbon concentration (rank). Coals also vary in the amount of inorganic impurities they contain (grade).

Crude oil is the liquid member that constitutes petroleum, a naturally occurring complex of hydrocarbons widely distributed in the sedimentary rocks of the earth.

Security of energy, being one of the major inputs in various economic activities, is a major concern of the country. As the economy progresses, the demand for energy likewise increases, thus, the Philippines is facing difficult challenges in the energy sector. The government has already issued a number of policy measures and implementation

strategies to find effective ways of hurdling these challenges. While it addresses the issues, adherence to the commitment of protecting the environment is likewise being constantly pursued.

1. Framework

In this chapter, the conceptual and statistical framework on the development of environment statistics on mineral and energy resources are presented. The framework shall serve as a guide in facilitating the organization and development of environment statistics relating to these resources.

1.1. Conceptual Framework

Table A presents the conceptual framework on the development of environment statistics on mineral and energy resources. In the framework, mineral and energy resources are related to four information categories namely 1) social and economic activities and natural events, 2) environmental impacts of activities and events, 3) responses to environmental impacts, and 3) stocks, inventories and background conditions. The information categories suggest that environmental problems emanate either from human activities or natural occurrences. These activities and natural events create impacts on the environment such as depletion of the natural resources. In response to these, the government, the people or other organizations themselves mitigate the negative impacts or strengthen positive ones. The last information category relates to existing stock or inventory and background condition of the resource at the end of a particular period after the events, impacts and responses have taken place.

Table A: Conceptual Framework on MINERAL AND ENERGY RESOURCES

Social and Economic Activities, and Natural Events	Environmental Impacts of Activities/Events	Responses to Environmental Impacts	Stocks, Inventories and Background Conditions
<p>I. Mineral Resources</p> <p>1. Extraction of mineral resources</p> <p>1.1 Surface</p> <p>1.1.a Non-metallic mineral production by type</p> <p>1.1.b. Non-metallic mineral exploration by type</p> <p>1.2 Subsurface</p> <p>1.2.a Metallic mineral exploration by type</p> <p>1.2.b Metallic mineral production by type</p> <p>2. Political, economic, and natural events</p> <p>2.1 Political</p> <p>Closure of mining sites due to peace and order problems</p> <p>2.2 Economic</p> <p>Closure of mining sites due to economic reasons (price too low)</p> <p>2.3 Nature</p> <p>Closure of mining sites due to natural calamities like volcanic eruptions</p>	<p>1. Mineral resources depletion</p> <p>1.1 Depletion of non-metallic mineral resources by type</p> <p>1.2 Depletion of metallic mineral resources by type</p> <p>2. Discharges of residue</p> <p>3. Human health impacts</p>	<p>1. Mineral resource management and conservation</p> <p>1.1 Issuance of mining licenses vis-a-vis environmental compliance certificate</p> <p>1.2 Closure of mining sites due to negative effects on the environment</p> <p>2. Rehabilitation of mining areas</p> <p>2.1 Rehabilitation of abandoned mine sites</p> <p>2.2 Protection works for on-going mining operations</p>	<p>1. Non-renewable mineral resources (opening and closing stocks)</p> <p>1.1 Non-metallic mineral reserves by type</p> <p>1.2 Mining infrastructure</p> <p>1.3 Metallic mineral reserves by type</p> <p>2. Mineral reserves</p>

Table A: Conceptual Framework on MINERAL AND ENERGY RESOURCES (continued...)

Social and Economic Activities, and Natural Events	Environmental Impacts of Activities/Events	Responses to Environmental Impacts	Stocks, Inventories and Background Conditions
<p>II. Energy Resources</p> <ol style="list-style-type: none"> 1. Production and consumption of mineral <ol style="list-style-type: none"> 1.1 Energy resources production (discovery, development, and extraction) by type 1.2 Energy conversion by type 1.3 Energy consumption by type of user 2. Natural events <ol style="list-style-type: none"> 2.1 Closure of mining sites due to natural calamities like volcanic eruptions 	<ol style="list-style-type: none"> 1. Mineral resource depletion <ol style="list-style-type: none"> 1.1 Depletion of energy resources 	<ol style="list-style-type: none"> 1. Mineral resource management and conservation <ol style="list-style-type: none"> 1.1 Regulation via permit and licensing system to conduct mining activities 1.2 Private sector response on energy conservation 1.3 Economic policies regulating the energy sector 	<ol style="list-style-type: none"> 1. Non-renewable mineral <ol style="list-style-type: none"> 1.1 Stock of Energy resources by type

The *social and economic activities and natural events* information category covers those that have direct impact on mineral and energy resources. For instance, production and consumption of these resources produce environmental impacts through the direct use of these resources and through generation of wastes during these processes. Political, economic and natural events are also included in this category as they may also have impacts on the resources.

Under the *environmental impacts of activities/events* category, the impacts of the activities and events in the first category are shown. For instance, extraction of minerals results to its depletion. Furthermore, mining also discharges residues which may affect the natural environment. Finally, it will also have health impacts in the form of morbidity associated with the activity.

The *responses to environmental impacts* category comprises the action of the society, government and non-government organizations to the impacts earlier stated. These responses are meant to avoid, mitigate, or reverse the negative impacts and reinforce the positive ones, if there are any. Included in this category are the related policies and programs adopted by the bodies concerned.

Finally, the *stocks, inventories and background conditions* category is meant to provide information on the amount of available resources at a specific period.

1.2 Statistical Framework

The statistical framework as shown in Table B details the specific variables and measurements needed to quantify the concepts discussed earlier. But while there are many variables identified in this table, not all of them are necessarily available.

Table B: Statistical Framework on MINERAL AND ENERGY RESOURCES

Information Category: Social and Economic Activities and Natural Events

Topic/Item	Variables	Measurement
I. Mineral Resources 1. Extraction of mineral resources	1. Mineral production a. Metallic b. Non-metallic 2. Mineral exploration a. Metallic b. Non-metallic	Volume (thousand metric tons) Volume (thousand metric tons)
2. Political, economic, and natural events	Closure of mining sites/firms due to: a. peace and order problem b. natural calamities c. public clamor d. economic reasons	Number of mining sites/firms
II. Energy Resources 1. Production and consumption of energy resources	1. Energy resources production a. By sector b. By utility 2. Energy conversion a. By plant type b. By utility 3. Energy consumption a. By sector b. By source	By capacity (gwh) By capacity (gwh) By capacity (gwh)
2. Natural events	Closure of sites due to natural calamities	Number of sites/firms

Table B: Statistical Framework on MINERAL AND ENERGY RESOURCES (continued...)

Information Category: Environmental Impacts of Activities and Events

Topic/Item	Variables	Measurement
I. Mineral Resources 1. Mineral resources depletion	Depletion of mineral resources a. Metallic b. Non-metallic	Percentage
2. Discharges of residue	1. Mine tailing production a. Metallic b. Non-metallic	Area affected (Cubic meters per year)
	2. Siltation	Areas affected (hectare)
	3. Production of hazardous chemical residue	Area affected (Cubic meters per year)
3. Human health impacts	1. Morbidity associated to exposure to hazardous mine wastes	Number of reported cases
II. Energy Resources Energy resource depletion	2. Accidents associated to mining activities Depletion of energy resources	Number of reported cases Volume (thousand metric tonnes)

Table B: Statistical Framework on MINERAL AND ENERGY RESOURCES (continued...)

Information Category: Responses to Environmental Impacts

Topic/Item	Variables	Measurement
<p>I. Mineral Resources</p> <p>1. Mineral resource management and conservation</p>	<ol style="list-style-type: none"> 1. Mining licenses issued vis-à-vis ECCs issued 2. Mining operations closed due to adverse effects on environment 3. Amount of tax collected on mine tailings 4. Amount of environment guarantee fund for mining operations 	<p>Number of licenses and ECC issued</p> <p>Number of sectors</p> <p>Value in pesos per year</p> <p>Annual and cumulative amount (pesos)</p>
<p>2. Rehabilitation of mining areas</p>	<ol style="list-style-type: none"> 1. Rehabilitation of abandoned mine sites 2. Protection works for on-going mining operations 	<p>Number of sites, area covered</p> <p>Number of sites</p>
<p>II. Energy Resources</p> <p>Mineral (energy) resource management and conservation</p>	<ol style="list-style-type: none"> 1. Regulation via permit and licensing system to conduct mining activities 2. Private sector response on energy conservation 3. Economic policies regulating the energy sector 	<p>As the need arises</p>

Table B: Statistical Framework on MINERAL AND ENERGY RESOURCES (continued...)

Information Category: Stocks and Inventory

Topic/Item	Variables	Measurement
<p>I. Mineral Resources</p> <p>1. Opening and closing stocks over the accounting period</p> <p>2. Mineral reserves</p> <p>3. Inventory of active firms engaged in mining operations</p>	<p>1. Metallic</p> <p>2. Non-metallic</p> <p>3. Milling capacity for mineral resources</p> <p>1. Metallic</p> <p>2. Non-metallic</p> <p>Number of active mining operations</p>	<p>Accounts of stocks and flows (tons or cubic meter)</p> <p>Volume capacity (thousand metric tons)</p> <p>Volume capacity (thousand metric tons)</p>
<p>II. Energy Resources</p> <p>1. Opening and closing stocks over the accounting period</p>	<p>Non-renewable mineral resources</p>	<p>Volume capacity (thousand metric tons)</p>

1.3 Data Assessment

Table B thus gives an assessment of the availability of the required variables, their disaggregation, periodicity, manner of collection and source of information.

1.3.1. Social and Economic Activities and Natural Events

To monitor economic activities and natural events relating to mineral and energy resources, data on production and consumption of these resources, as well as closure of mining sites due to various problems are needed. Data on metallic and non-metallic mineral production are available in volume terms with regional disaggregation every year from the Mines and Geosciences Bureau. The data are taken from administrative reports submitted by mining firms to MGB. On the other hand, the Department of Energy consolidates reports from companies to come up with a monthly, national data on energy production, conversion and consumption. Closure of mining sites due to political, economic and natural events can be taken from MGB. However, these data were not yet available as of the time this report was being made.

1.3.2 Environmental Impacts of Activities/Events

Depletion of mineral and energy resources is one of the most important indicators in measuring impacts of the activities or events. Other indicators are the amount of mine tailings created during the production activity of mining companies, as well as the production of hazardous chemical residue. The data are gathered from administrative reports by the MGB and are available on an annual basis in volume terms. In terms of human health impacts, the variables required are the morbidity associated with exposure to hazardous mine wastes, and accidents associated with mining activities. The former can be taken from the Department of Health while the latter is sourced from MGB.

1.3.3 Responses to Environmental Impacts

This topic consists of the various ways of managing and conserving mineral and energy resources. The variables include among others, the number of mining licenses issued, the number of mining companies closed due to adverse environmental effects of their operation, the amount of tax collected on mine tailings and economic policies relating to the energy sector. Most of the data come from MGB and the Department of Energy (DOE).

1.3.4 Stocks, Inventories and Background Conditions

This information category aims to provide a picture of the existing quantity of mineral and energy resources available for the country. The most important variables covered are stock of metallic and non-metallic mineral resources, metallic and non-metallic mineral reserves, and milling capacity for mineral resources. The data come from administrative reports gathered by MGB. In the case of inventory of non-renewable energy resources, the possible data source is the DOE. However, the desired data is not readily available,

Table C: Data Assessment ON MINERAL AND ENERGY RESOURCES
 Information Category: Social and Economic Activities and Natural Events

Topic/Item	Variables	Assessment				
		Variable/Component variable	Geographic disaggregation	Periodicity	Manner of collection	Source
I. Mineral Resources 1. Extraction of mineral resources 2. Political, economic, and natural events	1. Mineral production a. Metallic b. Non-metallic	Volume (000 mt)	National, regional	Annual	Administrative report	MGB
	2. Mineral exploration a. Metallic b. Non-metallic	Volume (000 mt)	National, regional	Annual	Administrative report	MGB
	Closure of mining sites/-firms due to: a. peace and order problem b. natural calamities c. public clamor d. economic reasons	Number of mining sites/firms	By location	Annual	Administrative report	MGB
II. Energy Resources 1. Production and consumption of energy resources 2. Natural events	1. Energy resources production a. By plant type b. By utility	By capacity (gwh)	National	Annual, monthly	Consolidate reports from companies	DOE
	2. Energy conversion a. By sector b. By utility	By capacity (gwh)	National	Annual, monthly	Consolidate reports from companies	DOE
	3. Energy consumption a. By sector b. By source	By capacity (gwh)	National	Annual, monthly	Consolidate reports from companies	DOE
	Closure of sites due to natural calamities	Number of sites/firms	By location			Unknown

Table C: Data Assessment ON MINERAL AND ENERGY RESOURCES (continued...)

Information Category: Environmental Impacts of Activities and Events

Topic/Item	Variables	Assessment				
		Variable/Component variable	Geographic disaggregation	Periodicity	Manner of collection	Source
I. Mineral Resources 1. Mineral resources depletion	Depletion mineral resources a. metallic b. non-metallic	Percentage	By location			
	2. Discharges of residue	Area affected (Cubic meters per year) Area affected (Hectare) Area affected (Cubic meters per year)	National, regional National, regional National, regional	Annual Annual Annual	Administrative report Administrative report Administrative report	MGB MGB/DENR MGB DOH
	3. Human health impacts	Morbidity associated to exposure to hazardous mine wastes	Number of reported case			
II. Energy Resources Energy resource depletion	Depletion of energy resources	Volume (mt)	By location	Annual	Partially available	MGB

Table C: Data Assessment ON MINERAL AND ENERGY RESOURCES (continued...)
 Information Category: Responses to Environmental Impacts

Topic/Item	Variables	Assessment				
		Variable/Component variable	Geographic disaggregation	Periodicity	Manner of collection	Source
I. Mineral Resources 1. Mineral resource management and conservation	1. Mining licenses issued vis-à-vis ECCs issued	Number of licenses and ECC issued By type Number of sectors	National, regional	Annual	Administrative report	MGB
	2. Mining operations closed due to adverse effects on environment	Value (peso)	National, regional, provincial	Annual	Administrative report	MGB
	3. Amount of tax collected on mine tailings	Value (peso)	National, regional, provincial	Annual	Administrative report	MGB
	4. Amount of environment guarantee fund for mining operations	Value (peso)	National, regional, provincial	Annual	Administrative report	MGB
2. Rehabilitation of mining areas	1. Rehabilitation of abandoned mine sites	Number of sites Area covered	National, regional, provincial	Annual	Administrative report	MGB
	2. Protection works for on-going mining operations	Number of sites	National, regional, provincial	Annual	Administrative report	MGB
II. Energy Resources Mineral (energy) resource management and conservation	1. Regulation via permit and licensing system to conduct mining activities 2. Private sector response on energy conservation 3. Economic policies regulating the energy sector		National	As the need arises		DOE

Table C: Data Assessment ON MINERAL AND ENERGY RESOURCES (continued...)

Information Category: Stocks and Inventory

Topic/Item	Variables	Assessment				
		Variable/Component variable	Geographic disaggregation	Periodicity	Manner of collection	Source
I. Mineral Resources 1. Opening and closing stocks over the accounting period	1. Metallic	Accounts of stocks and flows (tons or cubic meter)	National	Annual	Administrative report	ENRA/NSCB
	2. Non-metallic	Volume capacity (000 mt)	National, regional	Annual	Administrative report	MGB
	3. Milling capacity for mineral resources	Number	National, regional	Annual	Administrative report	MGB
	4. Inventory of active firms engaged in mining operations					
II. Energy Resources 1. Opening and closing stocks over the accounting period	Non-renewable mineral resources	Volume (mt)	National	Annual	Administrative report	DOE

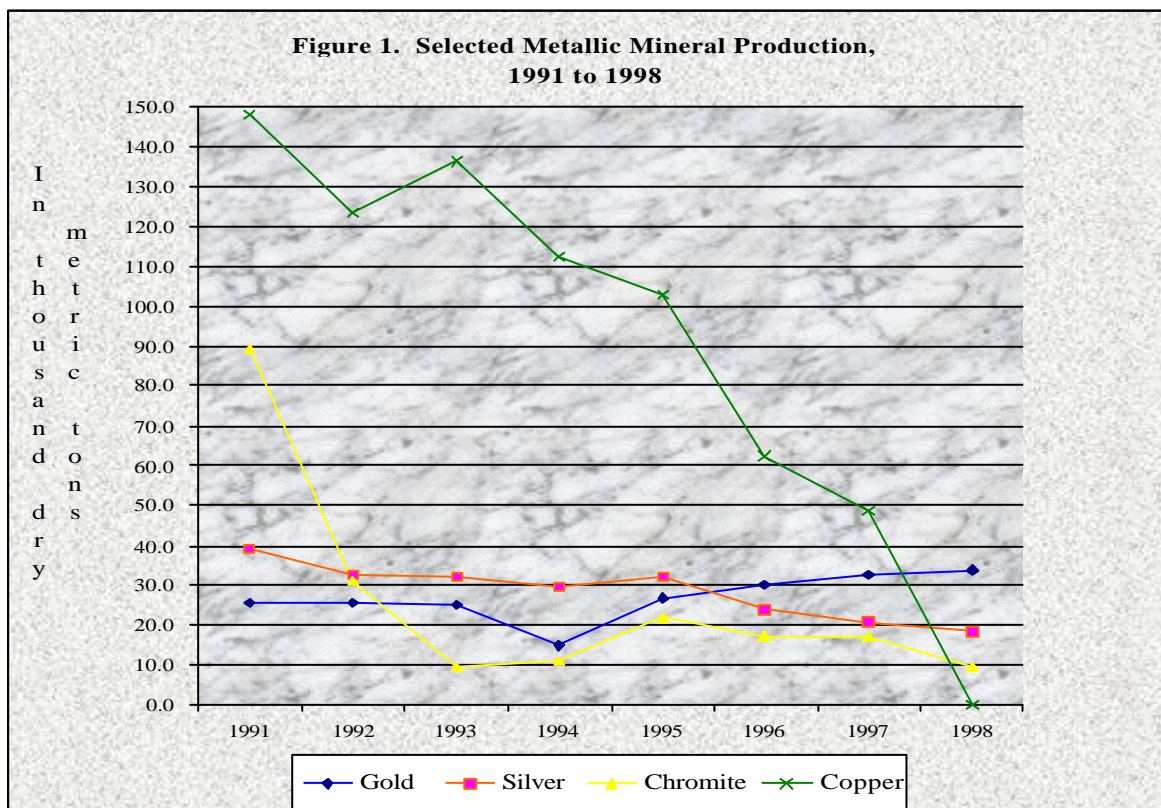
2. SITUATIONAL ANALYSIS

It is a fact that the existence of these non-renewable resources is declining. Products and by-products that are generated from these resources cater to all sectors/industries that are of great importance in our everyday needs. The continuous decrease in supply in one location of a particular mineral resource results in the continuous exploration of other sites thus affecting habitat. Sources of these resources are decreasing but demand is increasing tremendously.

2.1. Highlights of Results

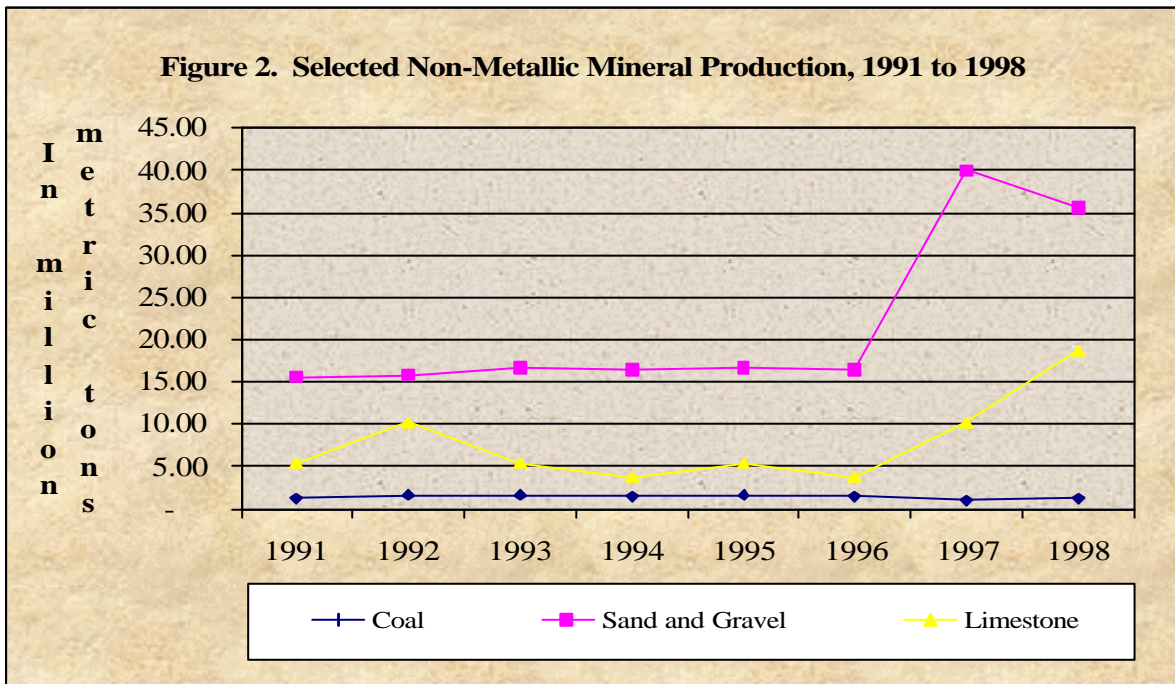
a. Social and Economic Activities and Natural Events

Mining as an industry is vital to both the national and regional economy. However, the influx of environmental activism such as NGOs and other interest groups whose sole objective is to “banish mining from the face of the earth” poses a threat to the industry. Mineral produce provides the basic materials for manufacturing metallic and non-metallic good, and is a source of foreign exchange earnings. Thus, the struggle to survive poses a challenge to MGB.



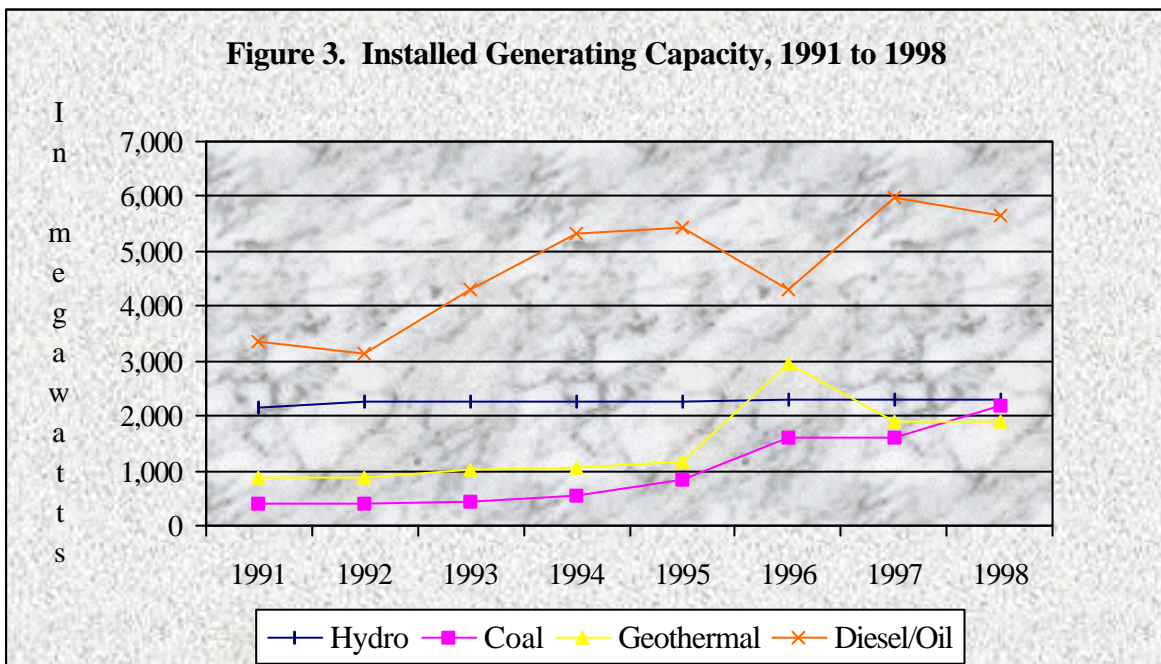
On the metallic mineral resources, it has been observed that generally, production in minerals has declined in the past five years. While some mineral resources do not maintain a definite trend in (Figure 1), below, Table 6.1 shows that other minerals posed a no-production at all for the past eight years. The imposition of a firm stand by various environmental sectors on mining as well as decreasing supply of resources in a particular area are just some of the major issues that brought this kind of scenario.

On the non-metallic mineral resources, most of its production has increased over the past 5 years. This type of resource is an essential commodity in the construction sector since it provides the materials required by the various projects both the government and private sector. Unlike the metallic mineral, its sources are not as rigid and difficult to find. Over the years, gigantic amount of these resources has been generated, however, this does not pose a threat since there is an ample supply in our country as seen in its topographical and geological features.



Energy sector as well follows the same condition as the mining sector; although the former is treated differently. Energy resources are still scarce in the country. Local supply could not even satisfy the nation’s energy requirement, but still the opportunity to develop other energy resource is yet to be achieved.

On the energy resources, it has also been observed that the diesel/oil power plants posted the highest generated capacity while other plant types such as hydro, coal, and geothermal contributed only half of the total capacity generated by diesel/oil as shown in Figure 3. The local supply of diesel and oil plants extracted from our soils does not meet the country's demand for power, thus mostly is imported and continuous exploration is conducted on the countryside. Referring to table 6.10, wherein energy from various sources is presented, total conventional indigenous energy (oil, coal, hydro, geothermal) contributes only a small portion to the total energy consumption.

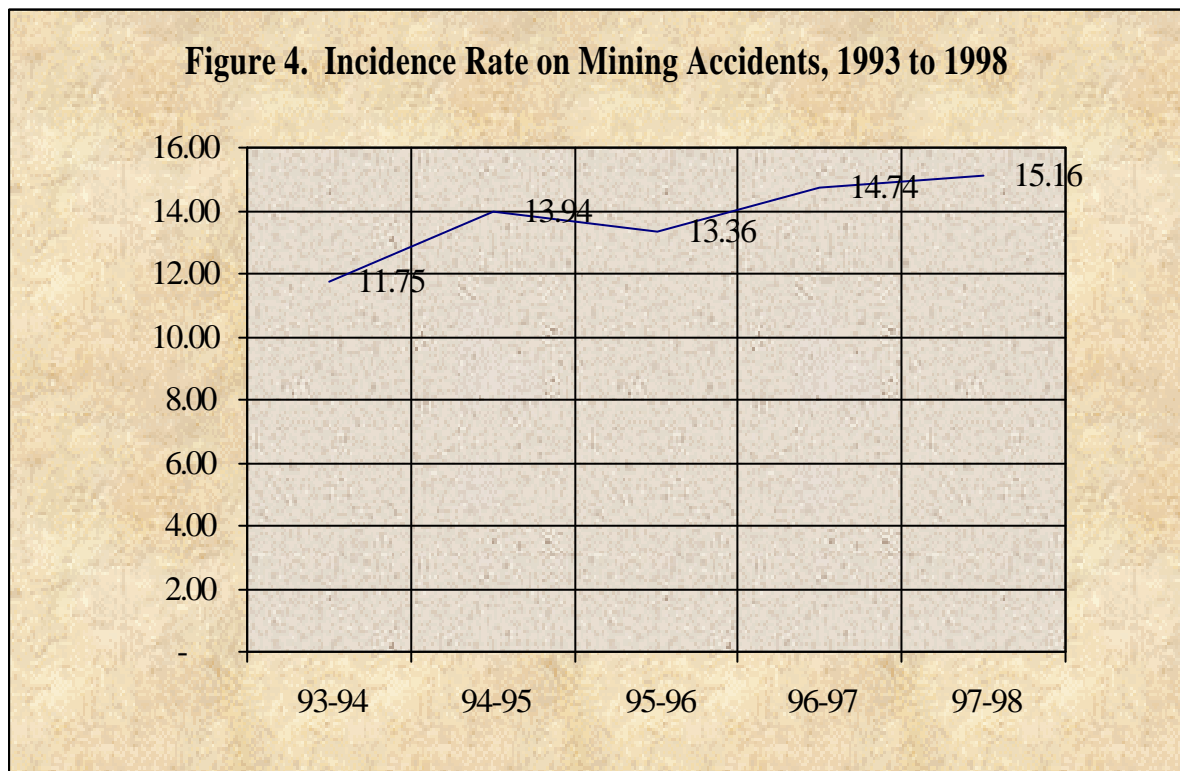


On the other resources, coal exploration maintained an increasing growth for the past five years, small-scale mining program augment to the positive trend. Hydro power plants maintained a trend of slightly higher than two gigawatts of power for the last seven years.

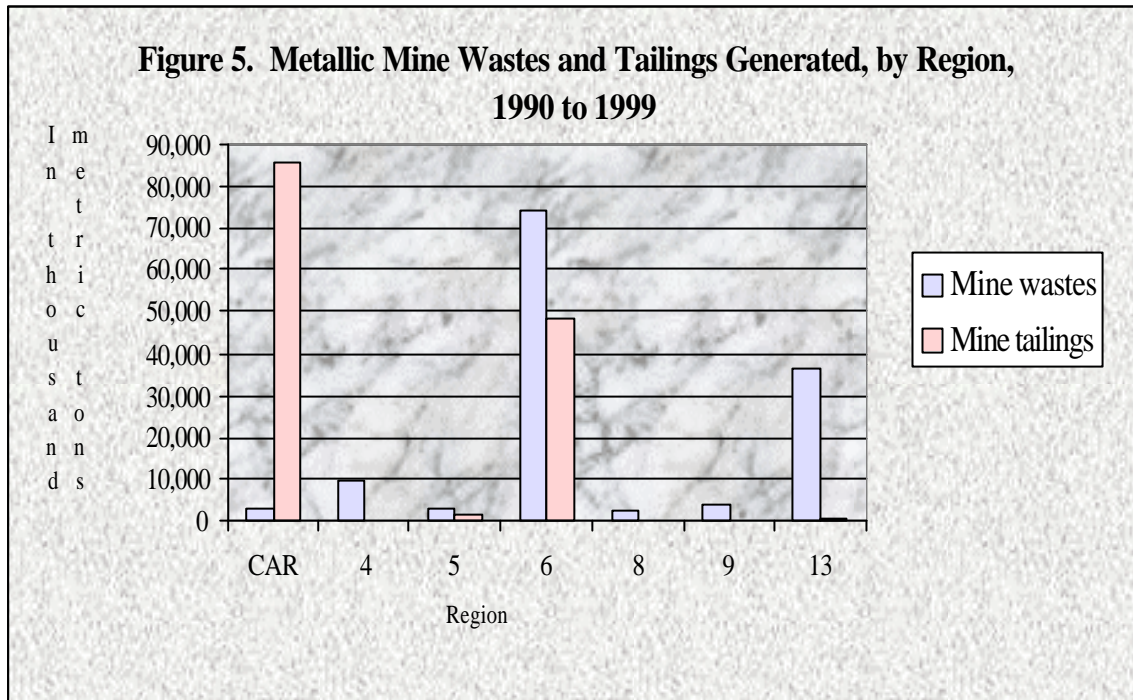
b. Environmental Impacts of Activities and Events

Both mineral and energy resources require a puncture on the terrain, the exploration activities affect the underground mounting of the sub-soil, resulting in the movement and sometimes misplacement in the normal formation and consistency of the sub soil. These resources are deemed impossible to recover because of its nature as a non-renewable resource, hence, in a site where resource is nil, exploration in other locations are conducted and drilling of the sub soil is continuous.

In polishing off raw materials for commercial use, further processing is required. This procedure entails toxic wastes. These chemical wastes create adverse effect on the environment such as: siltation, chemical pollution, land degradation, contamination of domestic water supply, ground subsidence, and encroachment of ancestral lands and domains.

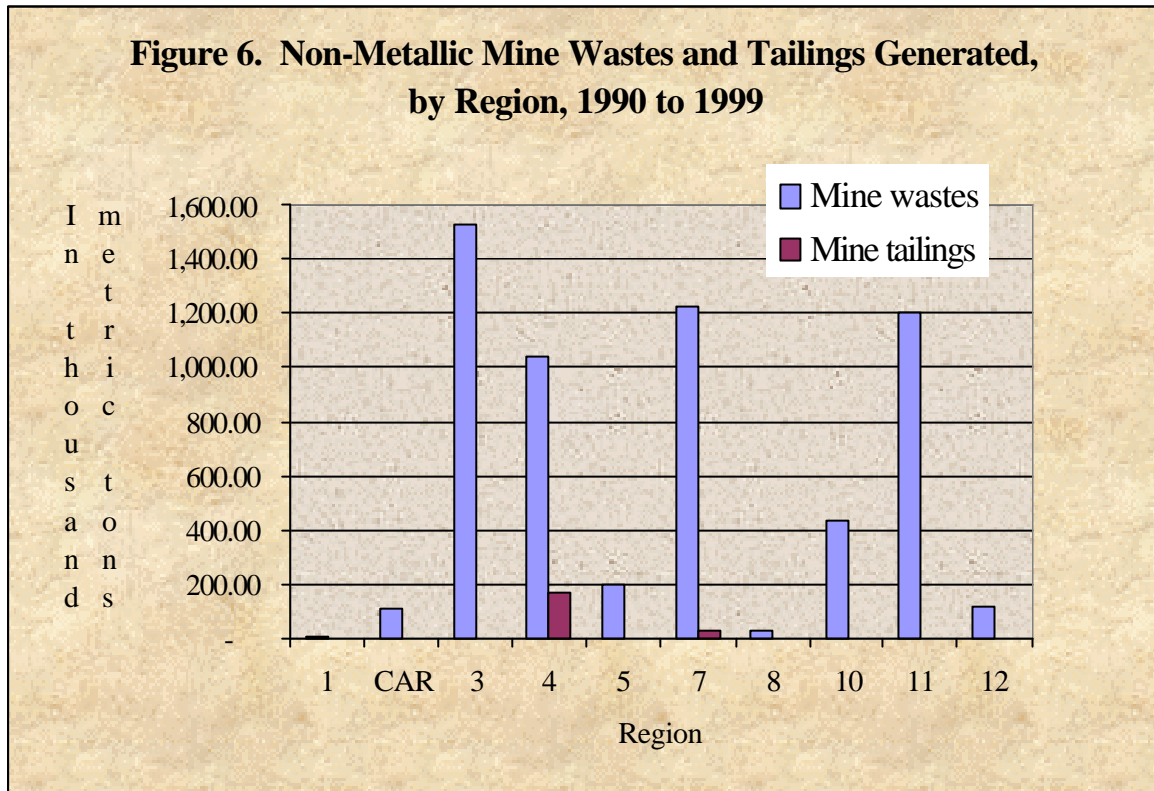


Exploration activity for both mineral and energy resources demand highly skilled manpower vis-a-vis hazards brought by the type of job. The risks that accompany the nature of work result to unavoidable situation such as: injuries, deaths, contaminations, and alike. As shown in Figure 4, incidence rate on mining accidents posed a very slight increase in the last five years.



On the metallic mineral resources, Region 6 (Western Visayas) produced the most mine waste over a period of ten years, while CAR (Cordillera Administrative Region) produced the highest mine tailings also for the same period. Only seven regions are engaged in metallic mineral mining while ten regions are into non-metallic mining.

On the non-metallic mineral resources, Region 3 (Central Luzon) produced the most mine wastes over a period of ten years, while Region 4 (Southern Tagalog) produced the highest mine tailings also for the same period.



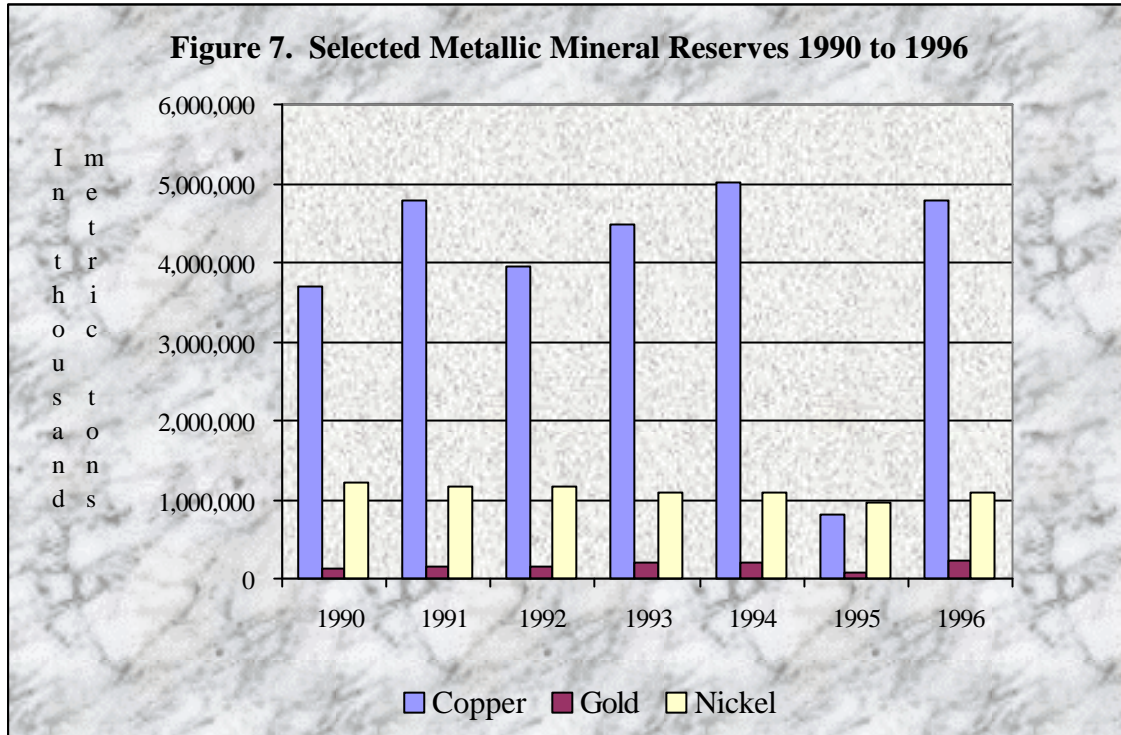
c. Responses to Environmental Impacts

Corporations engaged in mining and exploration activities have to reposition their focus to parry the onslaught of resistance, and ensure themselves a place in the overall economic development agenda in the government. They have to consider the following: a) reflect on environmental protection as part of corporate commitment; b) blend economic interests with societal demands; c) develop own mechanisms on self-regulation; and d) being proactive.

Sustainable mining is one option to survive the issue aired by the growing environmentalists and oppositionists of this sector. The following terms are to be highly considered: a) mining is for creation of wealth and not an instrument to destroy other forms of natural and environmental resources; b) wealth created should lead to other wealth-generating opportunities for people and other environment-friendly projects; c) economic considerations should not take precedence to environmental, health, and safety concerns; and d) conservation of minerals is effected thru technological efficiency of mining operations and recycling of mineral based products to effectively lengthen the usable life of these commodities.

This sector recognizes even before the concept of reliable energy availability in terms of ecological balance and sustainable development. This entails for the “reduction of the environmental effects of energy production and use by promoting conversion and end-use efficiency and by shifting to renewable environment-friendly energy forms”. Policies, thrusts, and programs have been formulated to conform to this idea. Refer to framework (responses to environment) for details.

d. Stocks and Inventory



Referring to the data on mineral reserves (Table 5.1.4.1.1 and 2), it shows that total mineral reserves increased from 5344.3 million metric tonnes in 1990 to 6682.3 million metric tonnes in 1996. The biggest was the copper reserve with a total level of 4789.5 million metric tonnes in 1996 followed by our mickle reserves wherein it was reported at 1088.9 million metric tonnes in 1996.

Figure 7 shows that Copper posted a huge amount of reserves consistently for the past seven years, while Gold reported a slight increase in reserves from 1990 to 1994 which dropped significantly in 1995 but again regained its position the next year. On the non-metallic minerals, Limestone and related type dominated the reserves as well as marble and shale.

STATISTICAL TABLES

Table 6.1 (continued...)
METALLIC MINERAL PRODUCTION
1991 to 1998
(Quantity in thousands; value in thousand pesos)

Mineral/Mineral Product	1994		1995		1996		1997		1998	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
TOTAL	..	#REF!	..	#REF!	..	#REF!	..	#REF!	..	#REF!
METALLICS	-	#####	-	#####	-	#####	-	#####	-	#####
Precious Metals	-	4,944,959	-	8,556,697	-	9,888,115	-	#####	-	#####
Gold	14.7	4,821,844	26.9	8,442,113	30.0	9,784,384	32.7	9,909,028	34.0	#####
Silver	29.6	123,115	32.0	114,584	24.0	103,731	20.7	91,192	18.2	124,801
Base Metals		5,848,801	-	5,853,598	-	3,459,602	-	3,405,323	-	3,438,745
Chromite:										
Chemical Grade	-	-	-	-	-	-	-	-	-	-
Metallurgical Concentrate	1.0	2,252	13.3	22,465	31.5	52,530	26.9	49,805	12.2	29,434
Metallurgical Ore	10.9	35,230	22.0	44,751	17.2	42,784	17.0	48,870	9.5	32,390
Cobalt Metal	-	-	-	-	-	-	-	-	-	-
Copper:										
Concentrate	435.3	5,521,403	399.0	#####	256.5	3,364,288	187.6	2,792,220	177.8	2,753,486
Metal	112.1	-	102.6	5,786,382	62.3	-	48.6	-	-	-
Iron Ore	-	-	-	-	-	-	11.8	347	-	-
Manganese	-	-	-	-	-	-	-	-	-	-
Nickel										
Beneficiated Ore	431.0	289,916	-	-	-	-	814.3	514,081	959.9	623,435
Metal	9.9	-	-	-	-	-	-	-	-	-
Zinc:										
Concentrate	-	-	-	-	-	-	-	-	-	-
Metal	-	-	-	-	-	-	-	-	-	-
Molybdenum										
Concentrate	-	-	-	-	-	-	-	-	-	-
Metal	-	-	-	-	-	-	-	-	-	-

Preliminary Data
 () Cement in the National Account is classified under the manufacturing sector. Value for cement shall be excluded in the total mineral production values. Instead, value for cement

Table 6.2
NON-METALLIC MINERAL PRODUCTION
1990 to 1998
(Quantity in thousands; value in thousand pesos)

Mineral/Mineral Product	Unit Used	1990		1991		1992		1993	
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
TOTAL		-	5,977,115	-	7,022,293	-	9,991,853	-	8,682,460
Coal	MT	1,246.8	1,059,760	1,307.0	1,420,754	1,665.2	1,828,390	1,581.8	1,581,873
Salt	MT	490.4	1,802,736	492.9	2,178,437	495.8	2,193,986	535.4	3,128,136
Silica Sand	MT	256.1	18,486	275.0	28,829	744.5	57,065	102.9	17,016
Sand and Gravel	Cu. M	15,672.7	2,194,174	15,676.6	2,257,429	15,786.6	2,399,562	16,692.7	3,389,094
Others		-	683,505	-	838,595	-	2,580,492	-	244,616
Cement Raw Materials									
Limestone	MT	3,818.1	139,244	5,384.3	215,247	10,225.1	750,907	5,355.7	267,642
Shale Clay	MT	758.2	27,602	808.1	31,707	1,496.8	78,756	647.5	23,294
Silica Sand	MT	305.6	27,608	257.5	28,895	1,142.0	102,695	225.7	30,789
Gypsum	MT	30.0	24,000	28.0	22,400	-	-	-	-
Cement	Bags	160,941.8	(11,060,843)	172,285.4	(14,730,405)	166,673.6	(17,500,728)	199,035.2	(12,539,215)

Table 6.2 (continued...)

NON-METALLIC MINERAL PRODUCTION

1990 to 1998

(Quantity in thousands; value in thousand pesos)

Mineral/Mineral Product	1994		1995		1996		1997		1998	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
TOTAL	-	7,863,937	-	8,682,460	-	9,390,337	-	19,486,028	-	20,405,713
Coal	1,458.0	1,458,071	1,581.8	1,581,873	1,458.0	1,458,071	1,078.7	1,186,519	1,157	1,157,204
Salt	492.1	1,043,395	535.4	3,128,136	492.1	1,043,395	686.5	7,250,251	728	7,685,788
Silica Sand	63.0	6,001	102.9	17,016	63.0	6,001	20.5	2,754	15.5	1,616
Sand and Gravel	16,393.0	6,111,117	16,692.7	3,389,094	16,393.0	6,111,117	40,030.1	10,061,713	35,626.8	8,945,316
Others	600,091.0	592,260	-	244,616	600,091.0	592,260	40,030	175,298	-	240,493
Cement Raw Materials										
Limestone	3,803.0	143,053	5,355.7	267,642	3,803.0	143,053	10,216.3	705,619	18,690.5	2,295,754
Shale Clay	638.0	25,597	647.5	23,294	638.0	25,597	1,126.0	66,644	780.4	35,175
Silica Sand	71.0	10,843	225.7	30,789	71.0	10,843	212.3	37,230	317.6	44,367
Gypsum	-	-	-	-	-	-	-	-	-	-
Cement	239,270	(21,055,757)	199,035	(12,539,215)	239,270	(21,055,757)	367,019	(33,031,702)	322,196	(22,553,751)

Preliminary Data

() Cement in the National Account is classified under the manufacturing sector. Value for cement shall be excluded in the total mineral production values. Instead, value for cement raw materials shall be considered.

Source: Mines and Geo-Sciences Bureau.

Table 6.3
ACCIDENT STATISTICS
FY 1993 to 1998

Category	NLTA	LTA		Days Lost	Manhours Worked	Frequency Rate	Severity Rate	Combined FR & SR	Incidence Rate
		Non-Fatal	Fatal						
FY 1997-1998 (45 Companies Considered)	478	319	10	68158	53,215,694.94	6.18	1,280.78	3,959.12	15.16
Underground Operations	178	73	5	35,159	17,261,266.50	4.52	2,036.87	4,602.10	14.83
Surface Operations	29	37	0	666	10,458,272.30	3.54	63.68	112.65	6.31
Combined Operations	49	1	1	6,031	2,648,185.00	0.76	2,277.41	859.99	19.26
Quarry Operations	10	1	0	64	2,133,508.09	0.47	30.00	7.03	5.16
Cement Plant	212	207	4	26,238	20,714,463.05	10.19	1,266.63	6,450.94	20.42
FY 1996-1997 (41 Companies Considered)	410	417	14	94,547	57,051,443.00	7.55	1,657.22	6,259.82	14.74
Underground Operations	186	148	9	58,595	19,377,965.45	8.10	3,023.80	12,249.37	17.70
Surface Operations	68	37	0	2,156	11,348,880.85	3.26	189.97	309.68	9.25
Combined Operations	36	2	0	297	2,334,114.00	0.86	127.24	54.51	16.28
Quarry Operations	11	5	1	6,137	2,324,147.70	2.58	2,640.54	3,408.40	7.31
Cement Plant	109	225	4	27,362	21,666,335.00	10.57	1,262.88	6,673.94	15.60
FY 1995-1996 (42 Companies Considered)	323	437	15	100,995	58,007,385.05	7.79	1,741.07	6,783.31	13.36
Underground Operations	107	135	7	49,312	20,522,993.64	6.92	2,402.77	8,312.46	12.13
Surface Operations	32	44	5	30,529	14,492,853.30	3.38	2,106.49	3,560.99	5.59
Combined Operations	22	4	1	6,038	1,487,457.00	3.36	4,059.28	6,822.51	18.15
Quarry Operations	20	7	0	180	1,806,122.36	3.88	99.66	193.13	14.95
Cement Plant	142	247	2	14,936	19,697,958.75	12.64	758.25	1,492.49	19.85

Table 6.3 (continued)
ACCIDENT STATISTICS
FY 1993 to 1998

Category	NLTA	LTA		Days Lost	Manhours Worked	Frequency Rate	Severity Rate	Combined FR & SR	Incidence Rate
		Non-Fatal	Fatal						
FY 1994-1995 (40 Companies Considered)	332	495	15	99,145	60,412,230.60	8.44	1,641.14	9,627.26	13.94
Underground Operations	102	105	12	78,562	21,557,140.50	5.43	3,644.36	9,889.77	10.16
Surface Operations	127	165	1	6,685	18,328,417.50	9.06	364.73	1,651.69	15.99
Combined Operations	No Operating Company								
Quarry Operations	35	12	0	206	1,637,271.07	7.33	125.82	461.08	28.71
Cement Plant	68	213	2	13,692	18,889,401.53	11.38	724.85	4,125.14	14.98
FY 1993-1994 (40 Companies Considered)	441	354	14	90,444	68,832,683.23	6.35	1,313.97	3,512.42	11.75
Underground Operations	32	93	7	43,386	19,866,558.06	5.03	2,183.86	5,496.32	6.64
Surface Operations	102	54	1	7,178	15,738,047.00	3.49	456.09	796.96	9.98
Combined Operations	196	28	4	25,857	15,661,591.50	2.04	1,650.98	1,686.66	14.56
Quarry Operations	24	10	0	96	1,480,773.24	6.75	64.83	218.91	22.96
Cement Plant	87	169	2	13,927	16,085,713.43	10.63	865.80	4,601.96	16.04
FY 1993-1998 (All Operations)	1,984	2,022	68	453,289	297,519,735.82	7.02	1,523.56	5,351.31	13.69
1997 - 1998	478	319	10	68,158	53,215,994.94	6.18	1,280.78	3,959.12	15.16
1996 - 1997	410	417	14	94,547	57,051,442.00	7.55	1,657.22	6,259.82	14.74
1995 - 1996	323	437	15	100,995	58,007,385.05	7.79	1,741.07	6,783.31	13.36
1994 - 1995	332	495	15	99,145	60,412,230.60	8.44	1,641.14	6,927.26	13.94
1993 - 1994	441	354	14	90,444	68,832,683.23	5.35	1,313.97	3,512.43	11.75

NLTA - non-life tailings accident
LTA - life tailings accident
Source: Mines and Geo-Sciences Bureau.

Table 6.4
METALLIC MINE WASTE AND TAILINGS GENERATED, UTILIZED AND CONTAINED
1970 to 1999
(Quantity in thousand metric tonnes; value in thousand pesos)

PERIOD COVERED	MINE WASTE					TAILINGS					Total Fees Paid
	Produced	Utilized	Contained	Fees Payable	Fees Paid	Produced	Utilized	Contained	Fees Payable	Fees Paid	
1970-1979	0	0	0	0	0	0	0	0	0	0	0
1980-1989	52,505	43,748	8,757	0	0	62,488	3,093	59,333	2,830	6,689	7,007
1990-1999	131,228	69,396	59,146	2,630	1,283	136,352	131,228	131,228	131,228	9,115	11,497

Source: Mines and Geosciences Bureau.

Table 6.5
METALLIC MINE WASTE AND TAILINGS GENERATED
1990 to 1999
(Quantity in thousand metric tonnes; value in thousand pesos)

REGION	MINE WASTE					TAILINGS					Total Fees Paid
	Produced	Utilized	Contained	Fees Payable	Fees Paid	Produced	Utilized	Contained	Fees Payable	Fees Paid	
CAR	2,799	1,666	1,133	24	7	85,534	3,417	82,117	6,849	5,997	6,489
4	9,331	1,967	6,324	74	101	0	0	0	0	0	101
5	2,998	2,998	0	0	0	1,506	2,998	2,998	2,998	102	123
6	73,917	50,847	23,070	1,154	1,049	48,531	0	48,531	4,545	2,847	4,443
8	2,021	154	868	43	43	128	0	128	13	45	89
9	3,912	3,912	0	0	0	199	0	199	16	0	0
13	36,248	7,851	27,751	1,335	83	454	147	307	34	123	251
TOTAL	131,228	69,396	59,146	2,630	1,283	136,352	6,562	134,281	14,454	9,115	11,497

CAR ITOGUN - SUYOC MINES, LEPANTO CONSOLIDATED MINING COMPANY, PHILEX MINING CORPORATION
4 RIO - TUBA NICKEL MINING CORPORATION
5 UNITED PARAGON MINING CORPORATION (LONGOS GOLD OPERATION)
6 MARICALUM MINING CORPORATION, PHILEX GOLD PHILS., INC.
8 HERITAGE MINING CORPORATION, HINATUAN MINING CORPORATION
9 APEX MINING CO., INC.
13 KROMINCO, INC., HINATUAN MINING CORP., MANILA MINING CORP.,
SURICON RESOURCES CORP., TAGANITO MINING CORP., VELORE MINING CORP.

Note: Data for 1999 is from January to June only.

Source: Mines and Geosciences Bureau.

Table 6.6
NON-METALLIC MINE WASTE AND TAILINGS GENERATED, UTILIZED AND CONTAINED
1970 to 1999
 (Quantity in thousand metric tonnes; value in thousand pesos)

PERIOD COVERED	MINE WASTE					TAILINGS					Total Fees Paid
	Produced	Utilized	Contained	Fees Payable	Fees Paid	Produced	Utilized	Contained	Fees Payable	Fees Paid	
1970 - 1979	1.08	1.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1980 - 1989	1,214.74	1,047.65	145.43	7.16	0.55	5.66	0.00	5.66	0.57	0.57	1.21
1990 - 1999	5,881.71	3,937.12	1,975.03	107.74	84.56	188.32	84.09	104.23	10.42	9.49	93.78

Source: Mines and Geosciences Bureau.

Table 6.7
NON-METALLIC MINE WASTE AND TAILINGS GENERATED
1990 to 1999
(Quantity in thousand metric tonnes; value in thousand pesos)

REGION	MINE WASTE					TAILINGS					Total Fees Paid
	Produced	Utilized	Contained	Fees Payable	Fees Paid	Produced	Utilized	Contained	Fees Payable	Fees Paid	
1	4.64	4.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CAR	110.41	109.87	0.92	0.05	0.05	2.22	0.00	2.22	0.22	0.07	0.24
3	1,522.23	719.50	802.73	40.14	40.14	0.00	0.00	0.00	0.00	0.00	40.14
4	1,048.55	795.57	252.97	12.36	0.00	163.98	84.09	79.89	7.99	7.20	7.20
5	199.21	23.45	175.76	8.79	8.82	0.00	0.00	0.00	0.00	0.00	8.82
7	1,226.21	526.72	699.49	34.97	34.30	22.12	0.00	22.12	2.21	2.22	36.08
8	26.21	26.21	26.21	1.31	1.30	0.00	0.00	0.00	0.00	0.00	1.30
10	427.93	414.83	16.96	10.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	1,204.13	1,204.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	112.21	112.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	5,877.07	3,932.49	1,975.03	107.74	84.60	188.32	84.09	104.23	10.42	9.49	93.78

Note: Data for 1999 is from January to June only.
Source: Mines and Geosciences Bureau.

Table 6.8
METALLIC MINERAL RESERVES
1990 to 1996
(In thousand metric tonnes)

Kind of Mineral	Estimated reserves as of December 31						
	1990	1991	1992	1993	1994	1995	1996
TOTAL	5,344,348	6,377,460	5,846,256	6,420,621	7,368,795	2,093,952	6,682,303
Cadmium	-	-	-	-	-	-	-
Chromite							
Chemical	2,800	1,352	1,323	2,876	2,876	2,876	2,791
Metallurgical (Lumpy)	16,883	17,739	17,563	16,479	19,263	12,987	13,581
Metallurgical (Sandy)	5,794	6,228	9,854	9,925	11,880	11,880	11,850
Refractory	10,460	9,965	10,220	8,180	9,294	5,809	8,445
Copper	3,705,434	4,776,983	3,951,945	4,481,417	5,017,239	817,432	4,789,519
Gold ¹	133,993	155,574	150,682	200,269	202,730	64,087	226,852
Iron	-	-	-	-	485,197	168,425	484,696
Aluminum Laterite	-	-	-	-	-	-	-
Laterite	-	-	180	-	-	-	-
Lumpy	97,130	80,910	79,077	159,496	83,077	-	-
Sandy	101,620	101,620	397,836	402,017	401,620	-	-
Lead	6,313	6,313	6,313	6,313	6,313	6,313	6,313
Manganese	1,951	1,955	2,231	2,212	2,517	2,003	2,551
Mercury	16,243	16,243	15,425	16,243	16,243	15,425	16,243
Molybdenum	30,608	30,608	30,608	30,608	30,608	30,608	30,608
Nickel	1,215,119	1,171,970	1,172,999	1,084,586	1,079,938	956,107	1,088,854
Platinum	-	-	-	-	-	-	-
Uranium	-	-	-	-	-	-	-
Zinc	-	-	-	-	-	-	-

1 - Data from 1990 to 1996 are for primary gold only.
a - in thousand cubic meters.
Source: Mines and Geo-Sciences Bureau.

Table 6.9
NON-METALLIC MINERAL RESERVES
1990 to 1996
(In thousand metric tonnes)

Kind of Mineral	Estimated reserves as of December 31						
	1990	1991	1992	1993	1994	1995	1996
Non-Metallic							
Asbestos	-	1,944	1,944	1,944	5,811	-	5,816
Barite	-	163	163	163	163	-	163
Bauxite	374,660	408,241	408,241	408,241	408,241	408,241	408,241
Bentonite	1,334	-	-	-	-	-	-
Clay	-	-	-	-	-	-	-
Ball clay	27,153	27,152	181,152	63,526	83,175	35,864	64,800
Bentonitic	5,736	7,753	7,617	9,611	7,544	6,473	7,718
Feldspathic	32	7,846	3,127	3,131	3,176	3,099	11,592
Fire clay	3,296	3,296	260,501	252,309	269,113	263,829	269,113
Kaolinitic	10,000	23,219	17,839	20,515	21,777	9,729	21,777
Siliceous	2,125	2,125	7,293	10,043	120,827	120,074	120,827
Diatomaceous Earth	2,952	2,952	3,711	3,711	4,725	4,573	4,725
Feldspar	20,952	21,571	28,845	41,137	34,412	22,706	34,412
Guano			120	123	298	298	298
Gypsum	1,883	1,883	1,985	1,985	2,438	2,054	2,438
Limestone	3,423,033	15,111,168	17,392,354	27,792,711	28,044,415	-	-
Cement raw materials	2,515,955	6,613,832	6,748,707	16,343,548	19,361,674	16,978,082	18,905,021
Dolomitic	227,045	515,572	515,572	634,902	650,070	549,873	466,306
Lime raw materials	7,089,307	6,529,360	6,543,825	7,426,017	8,032,671	1,072,944	3,899,598
Marbleized	19,606 ^a	1,452,404 ^a	3,584,250 ^a	3,388,244 ^a	3,574,829 ^a	444,113	3,574,661
Magnesite	26,534	26,534	78,315	78,315	78,715	52,196	78,795
Marble	3,919,570 ^a	89,938 ^a	11,166,032 ^a	4,358,114 ^a	14,390,704 ^a	10,815,008	10,873,230

Table 6.9 (continued...)
NON-METALLIC MINERAL RESERVES
1990 to 1996
(In thousand metric tonnes)

Kind of Mineral	Estimated reserves as of December 31						
	1990	1991	1992	1993	1994	1995	1996
Pebbles	6,409 ^a	6,409 ^a	26,409 ^a	22,557 ^a	22,557 ^a	22,557	33,103
Peat							
Perlite	14,518	27,607	46,878	24,349	24,298	13,767	13,922
Pumice and Pumicite	21,878	21,982	23,760	23,760	23,760	21,981	23,760
Pyrite	983,400	986,933	985,097	14,155	14,195	13,798	13,195
Rock Aggregates	676,540 ^a	300,496 ^a	367,926 ^a	437,834 ^a	1,683,757	1,447,703	1,689,848
Rock phosphate	-	-	89	106	513	513	513
Sand and Gravel	4,471 ^a	1,303 ^a	14,629 ^a	28,963 ^a	84,167 ^a	82,863 ^a	84,167 ^a
Shale	1,928,805	2,142,260	2,818,361	2,796,057	2,947,545	1,204,215	2,456,154
Silica	1,487,303	1,121,069	1,279,952	1,516,971	2,766,257	-	-
Quartz-Boulder	37	37	37	37	-	-	68,925
Quartz-Massive	60,643	60,643	62,075	62,425	67,098 ^a	60,089	-
Sand	328,526	126,226	163,462	201,152	649,626 ^a	296,844	573,689
Siliceous rock/Mass	1,098,097	934,163	1,054,378	1,253,357	1,471,166 ^a	1,425,201	1,482,634
Sulphur	48,781	48,781	48,781	48,831	48,877	19,534	48,872
Talc	503	512	512	512	512	9	512
Tuff	1,875	35,481	45,038	118,538	152,407	149,624	152,208

a - in thousand cubic meters.

Source: Mines and Geo-Sciences Bureau.

Table 6.10
ENERGY CONSUMPTION BY SOURCE
1990 to 1997
(In million barrels of fuel-oil equivalent, MMBFOE)

Energy Source	1990	1991	1992	1993	1994	1995	1996	1997 p
Total	120.6	122.5	129.7	136.8	146.8	209.8	222.9	228.6
I. Indigenous Energy	41.3	40.6	38.0	39.3	42.5	92.2	97.1	96.0
a. Conventional	25.2	25.1	22.7	25.5	28.1	27.4	29.0	26.9
Oil	1.5	1.1	0.5	1.2	0.5	0.0	0.5	0.1
Coal	3.8	5.2	5.0	5.9	6.6	6.1	5.1	4.0
Hydro	10.5	8.9	7.3	8.7	10.1	10.7	12.2	10.4
Geothermal	9.4	9.9	9.8	9.8	10.9	10.6	11.3	12.5
b. Non-Conventional	16.1	15.5	15.3	13.8	14.0	64.8	68.1	69.1
Bagasse	5.4	6.1	6.1	4.9	5.2	4.2	7.9	5.3
Agriwaste	10.4	9.0	8.8	8.4	8.3	...	60.01	63.34
Coconut Husks/Sh	...	...	...	...	...	15.1	13.9	15.2
Rice Husk	...	...	...	...	...	4.1	4.1	4.3
Wood/Woodwaste	...	...	...	...	...	39.3	39.8	39.9
Charcoal	...	...	...	...	...	2.1	2.1	3.9
Others	0.3	0.4	0.4	0.5	0.5	0.1	0.2	0.4
II. Imported Energy	79.3	81.9	91.7	97.5	104.3	117.5	125.7	132.6
Oil	76.2	78.6	89.0	94.8	102.2	114.0	117.4	120.8
Coal	3.1	3.3	2.7	2.8	2.2	3.5	8.3	11.8

p - Data are preliminary as of 30 May 1998.

Notes: 1. Details may not add up to totals due to rounding.

2. Data on non-conventional energy were based on actual production plus the household consumption.

3. 1996 data of coconut consumption was revised based on the submission of PCA dated 30 March 1998.

Source: Department of Energy.

Table 6.10
ENERGY CONSUMPTION BY SOURCE
1990 to 1997
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I. Indigenous Energy	41.3	40.6	38.0	39.3	42.5	92.2	97.1	96.0
a. Conventional	25.2	25.1	22.7	25.5	28.1	27.4	29.0	26.9
Oil	1.5	1.1	0.5	1.2	0.5	0.0	0.5	0.1
Coal	3.8	5.2	5.0	5.9	6.6	6.1	5.1	4.0
Hydro	10.5	8.9	7.3	8.7	10.1	10.7	12.2	10.4
Geothermal	9.4	9.9	9.8	9.8	10.9	10.6	11.3	12.5
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Bagasse	5.4	6.1	6.1	4.9	5.2	4.2	7.9	5.3
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Coconut Husks/Sh	15.1	13.9	15.2
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Wood/Woodwaste	39.3	39.8	39.9
Charcoal	2.1	2.1	3.9
Others	0.3	0.4	0.4	0.5	0.5	0.1	0.2	0.4
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p - Data are preliminary as of 30 May 1998.

Notes: 1. Details may not add up to totals due to rounding.

2. Data on non-conventional energy were based on actual production plus the household consumption.

3. 1996 data of coconut consumption was revised based on the submission of PCA dated 30 March 1998.

Source: Department of Energy.

Table 6.11
ELECTRIC ENERGY CONSUMPTION BY SECTOR
1990 to 1998
(In million kilowatt hours)

Year	Total	Residenti al	Commercia l	Industri al	Others	Utilities Own Use	Power Losses
1990	26,327	5,609	4,695	9,943	966	1,134	3,980
1991	25,649	6,249	4,847	9,339	952	1,086	3,176
1992	25,870	5,988	4,931	8,646	1,080	1,133	4,091
1993	26,579	6,368	4,725	9,395	721	1,132	4,238
1994	30,459	7,282	5,865	10,684	762	1,132	4,734
1995	33,554	8,223	6,353	10,950	1,067	1,226	5,735
1996	36,708	9,150	7,072	11,851	1,167	1,340	6,128
1997	39,797	10,477	7,984	12,531	1,296	1,471	6,037
1998	41,207	11,467	8,555	11,386	1,412	1,592	6,796

Note: Details may not add up to totals due to rounding.
Source: Department of Energy.

Table 6.12
INSTALLED GENERATING CAPACITY
1990 to 1998
(In megawatts)

Plant Type	1990	1991	1992	1993	1994	1995	1996	1997	1998
TOTAL	6,869	6,789	6,695	8,014	9,212	9,696	11,190	11,752	12,068
Hydro	2,153	2,155	2,257	2,259	2,254	2,258	2,300	2,300	2,304
Coal	525	405	405	441	550	850	1,600	1,600	2,200
Geothermal	888	888	888	1,018	1,073	1,163	2,971	1,886	1,907
Diesel/Oil	3,136	3,341	3,145	4,296	5,335	5,425	4,319	5,966	5,654
Non-Conventional	167	-	-	-	-	-	-	-	-
Natural gas	-	-	-	-	-	-	-	-	3

Source: Department of Energy.

Table 6.13
POWER GENERATION BY UTILITY
1990 to 1997
(In million kilowatt hours)

Year	Total	National Power Corporation	Manila Electric Company	National Electrification Cooperatives	Private Utilities	Self-Generating Industries	Independent Power Producers
1990	25,215	24,769	283	32	131	-	-
1991	25,654	25,451	-	35	168	-	-
1992	25,870	25,538	-	43	289	-	-
1993	26,579	26,421	-	40	118	-	-
1994	30,465	25,092	-	32	70	-	5,270
1995	33,529	22,138	-	48	53	-	11,291
1996	36,708	23,816	-	93	60	-	12,739
1997	39,815	23,167	-	62	44	-	16,542

Note: Details may not add up to totals due to rounding.
Source: Department of Energy