



Republic of the Philippines  
**Philippine Statistics Authority**

# Philippine Experience: MINERAL ASSET ACCOUNTS

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Closing Regional Workshop for the 9<sup>th</sup> Tranche Development Account Project  
“Supporting Member States in developing and strengthening environment statistics and ENRA  
for improved monitoring of sustainable development”

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Alila Hotel, Jakarta Indonesia





# Outline

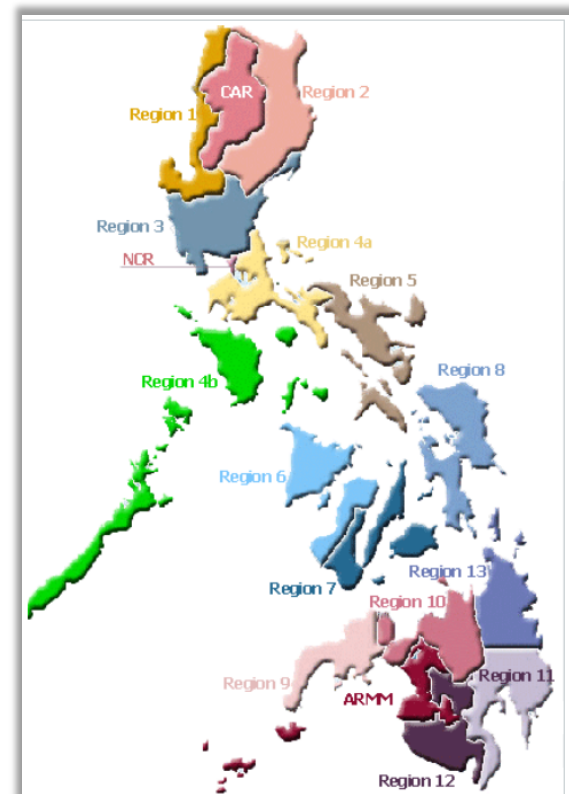
- I. Overview: The Mining Industry**
- II. Mineral Resources**
- III. Data Sources and Methods**
- IV. Key Findings**
- V. Ways Forward**



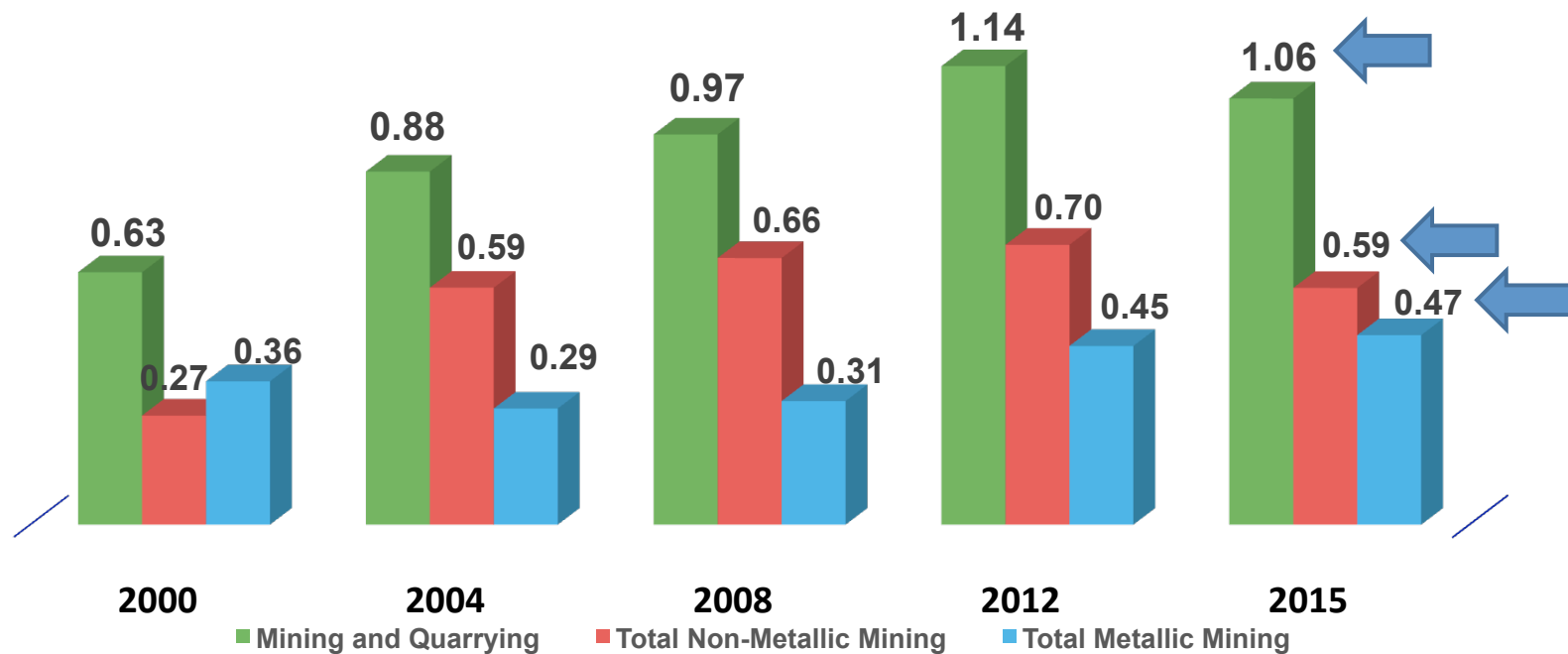


## The Philippines:

- \* is an archipelago country;
- \* **composed of 7,641 islands** (NAMRIA, Mar 2017);
- \* its population is **100.98 million** (as of CPH 2015);
- \* it has **17 regions & 81 provinces**



### Mining & Quarrying Contribution to GDP (GVA at constant 2000 prices)

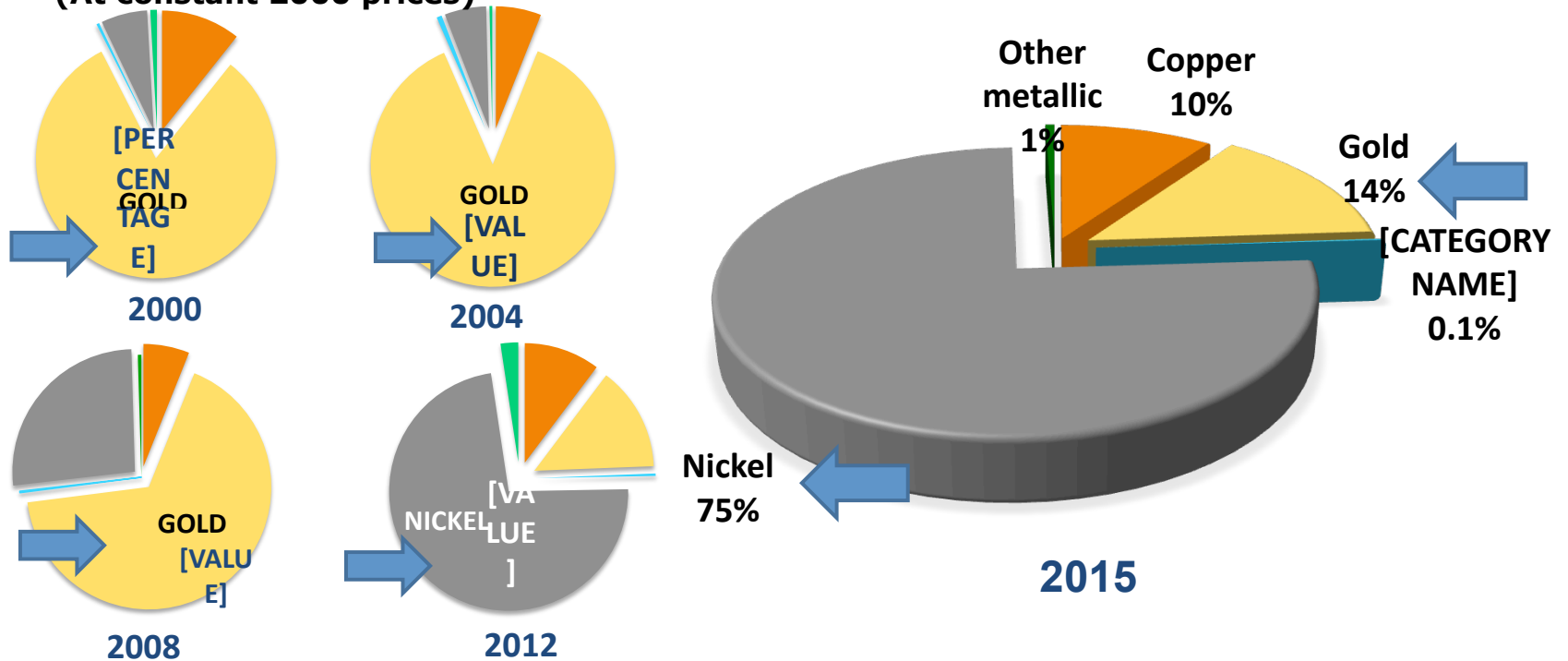


Source: Philippine Statistics Authority

## I. Mining Industry

### GROSS VALUE ADDED

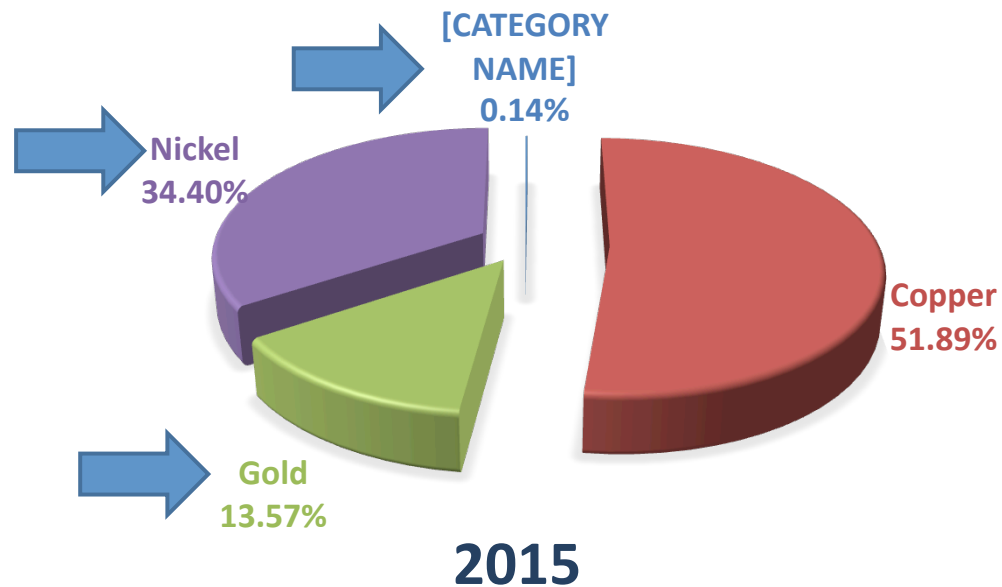
(At constant 2000 prices)



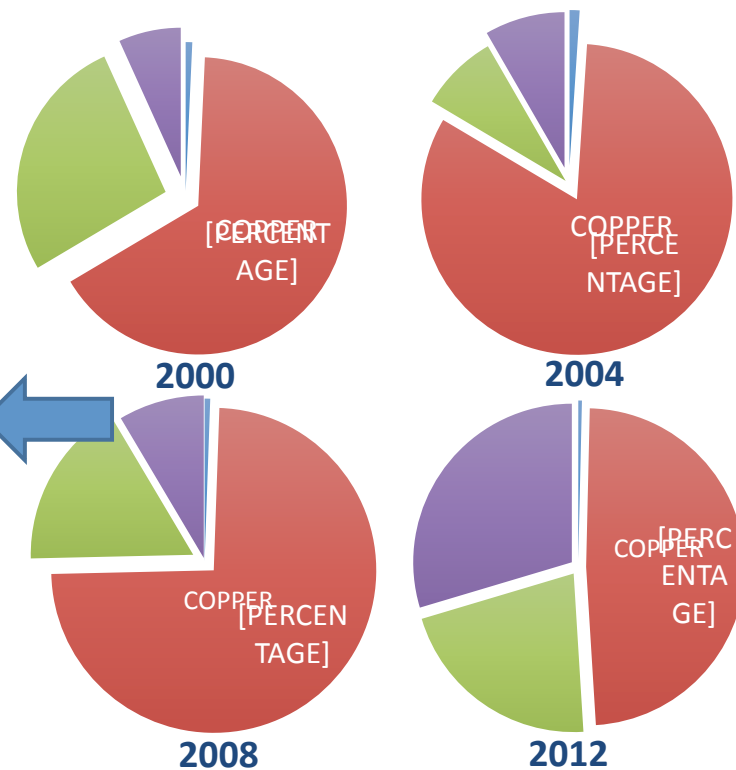
Source: Philippine Statistics Authority

## EXPORT REVENUES

In Percent

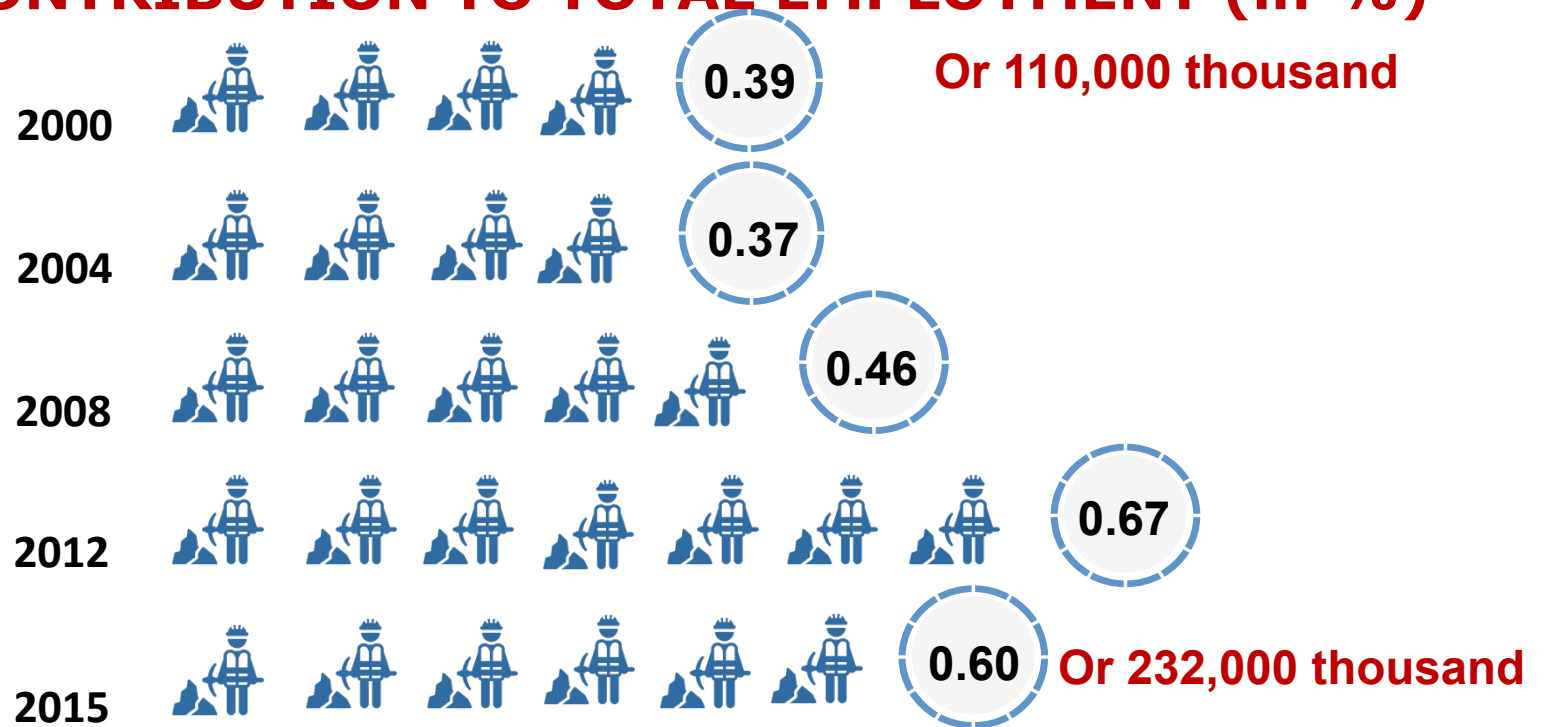


Source: Philippine Statistics Authority



## I. Mining Industry

### CONTRIBUTION TO TOTAL EMPLOYMENT (in %)



Source: Philippine Statistics Authority



### Mineral Resource as an Asset:

is a **non-produced, non-renewable** asset which includes non-metallic minerals and metallic minerals. (commonly referred as sub-soil assets)

**Non-produced Assets:** They are assets that have come into existence in ways other than through processes of production.

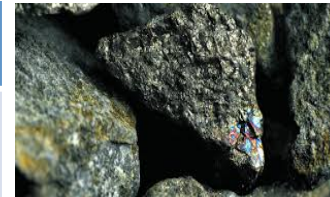
**Non-renewable Resources:** are resources that cannot regenerate on human time-scales.

Source: SEEA 2012



### Mineral Asset Accounts: Scope & Coverage

Metallic Minerals		
Philippines' Rank in the World (production)		Others
<u>Gold</u>	- 3 <sup>rd</sup> Worldwide	Silver Iron-Nickel Mercury Manganese Molybdenum Zinc
<u>Copper</u>	- 4 <sup>th</sup> Worldwide	
<u>Chromite</u>		
<u>Nickel</u>	- 5 <sup>th</sup> Worldwide	
Iron		
Cobalt		
Platinum		
Source: Mine and Geosciences Bureau (MGB), DENR		



**Nickel**



**Chromite**

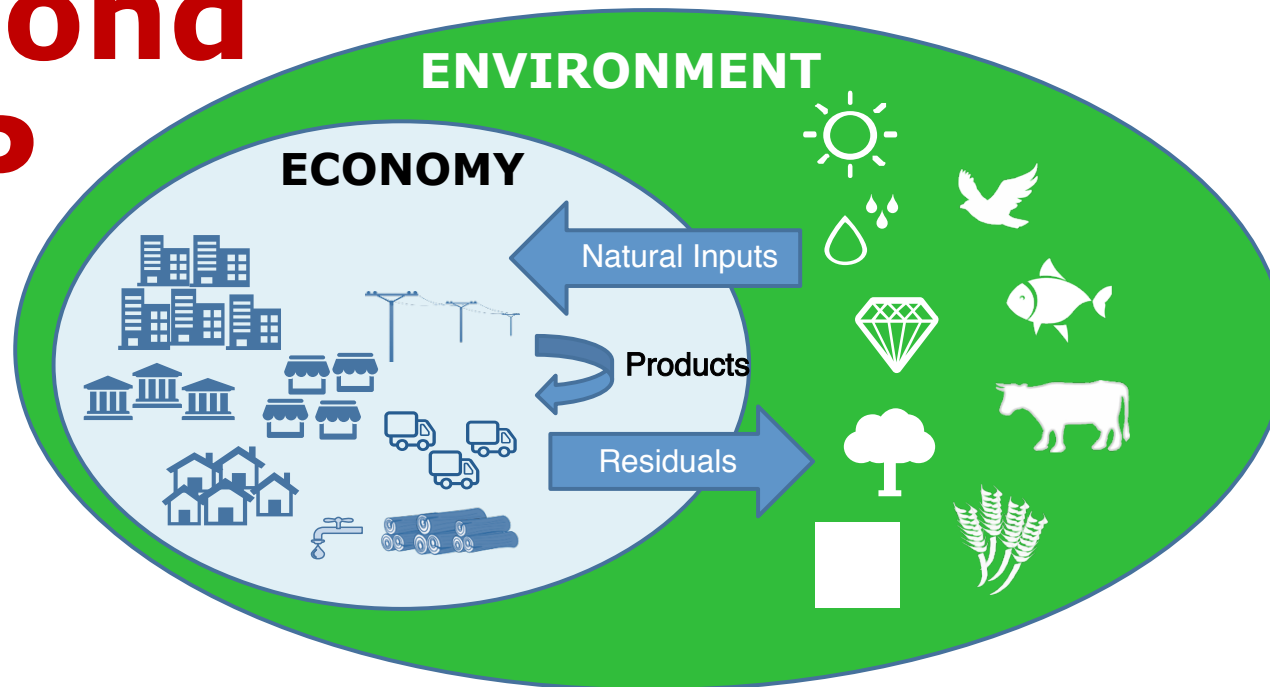


**Gold**



**Copper**

# Beyond GDP

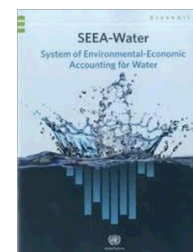




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### III. Sources & Methods

## Guided by the 2012 System of Environmental- Economic Accounting (SEEA)



## MINERAL ASSET ACCOUNTS

### Physical Accounts

Components	Metallic Mineral ('000 tonnes)
<b>Opening Stocks</b>	
<b>Additions to Stock</b>	
Discoveries	
Upward reappraisals	
Reclassifications	
<b>Total additions to stock</b>	
<b>Reductions in stock</b>	
Extractions	
Catastrophic losses	
Downward reappraisals	
Reclassifications	
<b>Total reductions in stock</b>	
<b>Closing Stocks</b>	

### Monetary Accounts

Components	In Pesos
<b>Opening Stocks</b>	
<b>Additions to Stock</b>	
Discoveries	
Upward reappraisals	
Reclassifications	
<b>Total additions to stock</b>	
<b>Reductions in stock</b>	
Extractions	
Catastrophic losses	
Downward reappraisals	
Reclassifications	
<b>Total reductions in stock</b>	
<b>Revaluation of the stock</b>	
<b>Closing Stocks</b>	

### III. Sources & Methods

#### MINERAL ASSET ACCOUNTS



**PHYSICAL**



**MONETARY**



**2002 to 2012**

#### FOUR METALLIC MINERALS

**GOLD**



**COPPER**



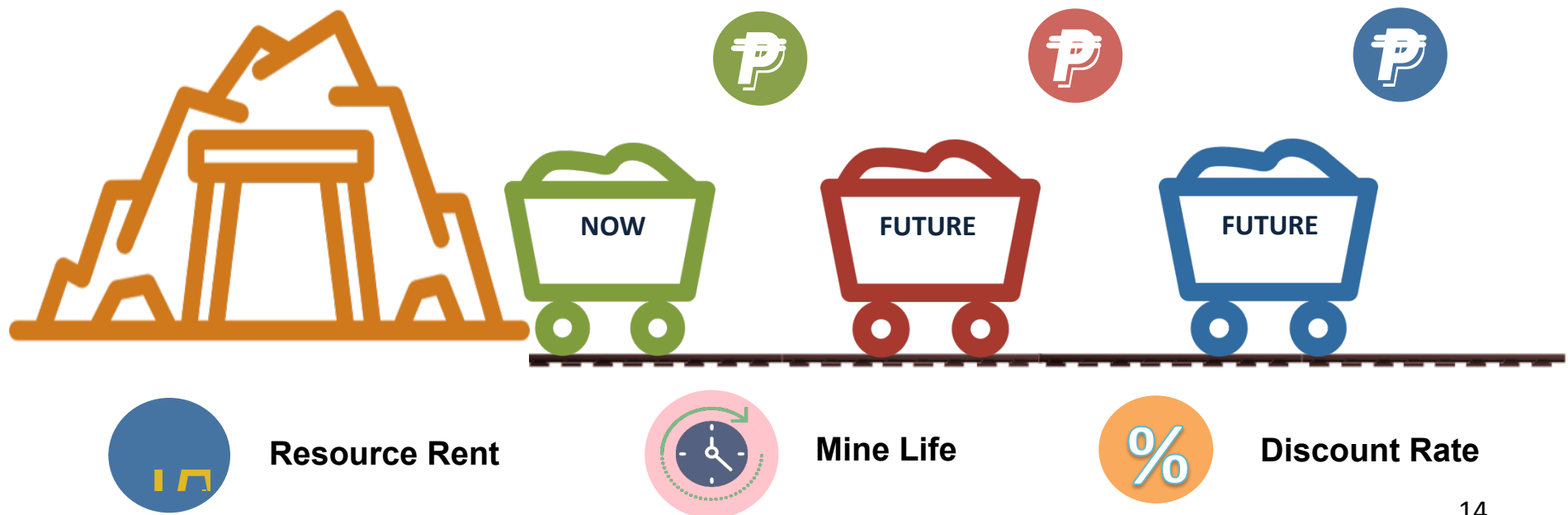
**NICKEL**



**CHROMIUM**



### Net Present Value (NPV) Approach





### Data Sources



#### Mines and Geosciences Bureau

- Declaration of Mining Project Feasibility (DMPF)
- Mining Project Feasibility Study
- MGB Form 29-19
- Exploration Report
- Philippine Mineral Production



#### Philippine Statistics Authority

- Gross Value Added in Mining and Quarrying
- 2006 Input-Output Table
- Annual Survey on Philippine Business and Industry (ASPBI)
- Census on Philippine Business and Industry (CPBI)



#### Bangko Sentral ng Pilipinas

- Parameters on financial investments



#### National Economic and Development Authority

- Discount Rate



## **Mineral Asset Accounts Data Requirements**

<b>Parameter/Data Required</b>	<b>Data Disaggregation</b>	<b>Source of Data</b>	<b>Specific Use of Data Required</b>
<b>1. Estimation of Opening/Closing Stocks and Discoveries</b>			
<b>1.1 Volume of Ore Resource/Reserve</b>	<b>by tenement/mining project area, province, region and by type of mineral</b>	<b>MGB - Feasibility Studies (results of exploration)</b>	<b>Estimation of opening/closing stocks and recovery</b>
<b>1.2 Grade (metallic or non-metallic)</b>	<b>by tenement area or mining project</b>	<b>MGB - Feasibility Studies (results of exploration)</b>	<b>Estimation of metallic content</b>
<b>1.3 Recovery Rate</b>	<b>by tenement or mining project</b>	<b>MGB - Feasibility Studies (results of exploration)</b>	<b>Estimation of extractable or recoverable minerals</b>





## **Mineral Asset Accounts Data Requirements**

<b>Parameter/Data Required</b>	<b>Data Disaggregation</b>	<b>Source of Data</b>	<b>Specific Use of Data Required</b>
<b>1.4 Date of DMPF submission</b>	<b>by tenement or mining project</b>	<b>MGB - DMPF</b>	<b>Estimation of discovery entry</b>
<b>1.5 Volume of Ore/minerals under prospects</b>	<b>by tenement</b>	<b>MGB - results of explorations undertaken by MGB and other institutions</b>	<b>Estimation of opening/closing stocks and recovery under Class C</b>
<b>2. Estimation of Reclassification</b>			
<b>2.1 Date of DMPF approval</b>	<b>by tenement or mining project</b>	<b>MGB - DMPF (approved)</b>	<b>Estimation of 1 type of reclassification entry under Class A</b>



#### Mineral Asset Accounts Data Requirements

Parameter/Data Required	Data	Source of Data	Specific Use of Data Required
2.2 Date of project permit suspension or projects under care and maintenance	Disaggregation by tenement or mining project	MGB - notice of suspension or notice of voluntary suspension (by company)	Estimation of reclassification
2.3 Date of project permit / agreement / contract termination	by tenement or mining project	MGB - notice of termination	Estimation of reclassification
2.4 Date of lifting of suspension	by mining project	MGB - notice of lifting of suspension	Estimation of reclassification
2.5 Date of assignment (of terminated contracts or open mine areas)	by tenement or mining project	MGB - approval of new contracts	Estimation of reclassification



## **Mineral Asset Accounts Data Requirements**

<b>Parameter/Data Required</b>	<b>Data Disaggregation</b>	<b>Source of Data</b>	<b>Specific Use of Data Required</b>
<b>3. Estimation of reappraisals</b>			
<b>3.1 Change in (updated) Grade Estimates</b>	<b>by tenement or mining project</b>	<b>MGB - MGB Form 29-19</b>	<b>Estimation of reappraisal</b>
<b>3.2 Change in (updated) Recovery Rate Estimates</b>	<b>by tenement or mining project (by type of technology used)</b>	<b>Company data</b>	<b>Estimation of reappraisal</b>
<b>4. Estimation of Catastrophic losses</b>	<b>by tenement or mining project</b>	<b>MGB</b>	<b>Estimation of reduction due to catastrophic losses</b>



### **III. Mineral Asset Accounts Data Requirements**

<b>Parameter/Data Required</b>	<b>Data Disaggregation</b>	<b>Source of Data</b>	<b>Specific Use of Data Required</b>
<b>5. Estimation of Monetary Accounts</b>			
<b>5.1 Financial Feasibility report</b>	<b>by mining project</b>	<b>MGB - Feasibility Studies</b>	<b>Estimation of monetary accounts</b>
<b>5.2 Financial Report</b>	<b>by tenement or mining project (quarterly and annual)</b>	<b>MGB - Forms</b>	<b>Estimation of monetary accounts</b>
<b>5.3 Industry financial data</b>	<b>by commodity</b>	<b>Input-Output Table 2006, QSPBI and ASPBI</b>	<b>Estimation of monetary accounts</b>



## **Step-by-Step Methods**

- Step 1**      Developed a localized criteria for the classification based on the United Nations Fossil Classification, 2009
- Step 2**      Conducted data validation existing administrative data including the collecting forms vis-à-vis the data requirements
- Step 3**      Processed data from administrative, censuses and surveys to develop the database for mineral statistics and accounts
- Step 4**      Addressing data gaps and established the historical data
- Step 5**      Estimation of Physical and Monetary Accounts following the 2012 SEEA

## Step 1 - Classification

Existing Classification System used in the Philippines: Standards and Codes developed by members of the Committee for Mineral Reserves International Reporting Standards (**CRIRSCO**)

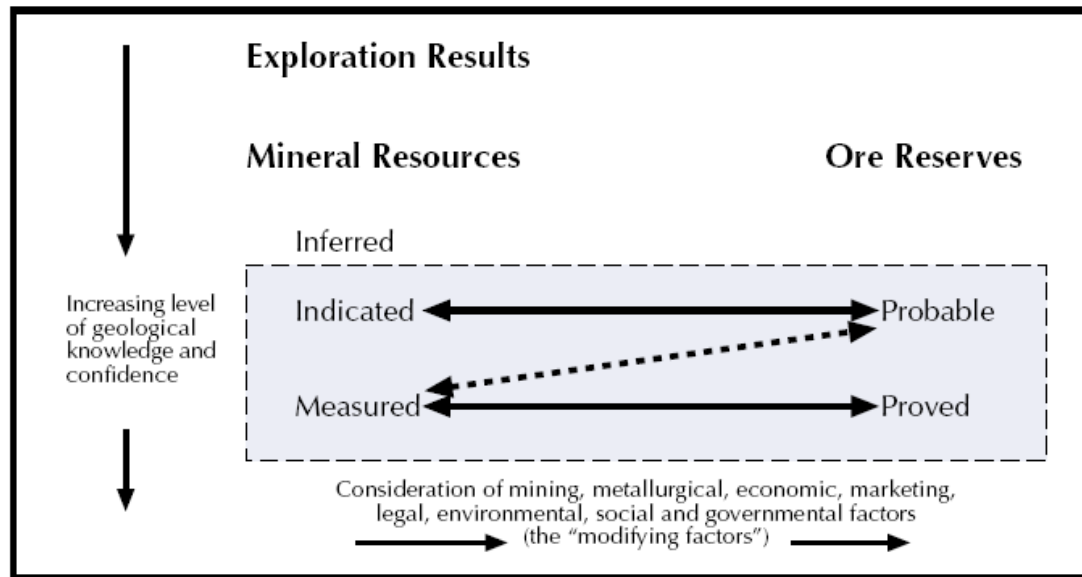


Figure 1. General relationship between Exploration Results, Mineral Resources and Ore Reserves



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SEEA Classes

**Recommended Classification**

Corresponding UNFC-2009

## III. Sources & Methods

Classification of Deposits	Classification of Minerals	E Economic and social viability	F Field project status and feasibility	G Geological knowledge
Known deposits	Class A: Commercially Recoverable Resources <sup>1</sup>	E1. Extraction and sale has been confirmed to be economically viable	F1. Feasibility of extraction by a defined development project or mining operation has been confirmed	Quantities associated with a known deposit that can be estimated with a high (G1), moderate, (G2) or low (G3) level of confidence
	Class B: Potentially Commercially Recoverable Resources <sup>2</sup>	E2. Extraction and sale is expected to become economically viable in the foreseeable future <sup>3</sup>	F2.1 Project activities are ongoing to justify development in the foreseeable future Or F2.2 Project activities are on hold and/or where justification as a commercial development may be subject to significant delay	
	Class C: Non-Commercial and Other Known Deposits <sup>4</sup>	E3. Extraction and sale is not expected to become economically viable in foreseeable future or evaluation is at too early a stage to determine economic viability	F2.2 Project activities are on hold and/or where justification as a commercial development may be subject to significant delay Or F4. No development project or mining operation has been identified	
	Exploration Projects	E3. Extraction and sale is not expected to become economically viable in foreseeable future or evaluation is at too early a stage to determine economic viability	F3. Feasibility of extraction by a defined development project or mining operation cannot be evaluated due to limited technical data Or F4. No development project or mining operation has been identified	
Potential deposits (not included in SEEA)	Additional quantities in place	E3. Extraction and sale is not expected to become economically viable in foreseeable future or evaluation is at too early a stage to determine economic viability	F3. Feasibility of extraction by a defined development project or mining operation cannot be evaluated due to limited technical data Or F4. No development project or mining operation has been identified	Estimated quantities associated with a potential deposit, based primarily on indirect evidence (G4)



### **Step 2. Data Audit/Validation vis-à-vis Data Requirements**

#### **Data audit:**

- a) MGB Mineral Resource/Reserve Inventory (MRI)
- b) MGB Forms e.g. Form 29-19
- c) Mineral Resource/Reserve Inventory
- d) Declaration of Mining Project Feasibility (DMPF)
- e) Exploration Reports
- f) Suspension and termination orders
- g) Production reports
- h) Financial Statements (company Integrated Annual Report IAR)

#### **Validation procedures:**

- a) Validation with the Philippine Standard Geographic Classification (PSGC)
- b) Validation with the original Mineral Resource/Reserve Inventory
- c) Validation with approved maps of tenement, exploration areas etc.
- d) Validation with Input-Output, Annual/Quarterly Survey of Establishments





### **Step 3      Development of Database**

<b>MGB's MRI DATABASE</b>	<b>NEW DATABASE Components</b>
<b>Region</b> <b>Province</b> <b>Municipality</b> <b>Barangay</b>	<b>Region</b> <b>Province</b> <b>Municipality</b> <b>Barangay</b> <b>Area (Has.)</b> <b>Contractor</b> <b>Project Name</b> <b>Previous Operator/Contractor</b> <b>Commodity (including associated mineral)</b> <b>Date Approved of MPSA</b> <b>Date of Expiry of MPSA</b> <b>Status based from MPSA</b>
<b>Permit Type/No.</b>	<b>MPSA No.</b>



MGB's MRI DATABASE	NEW DATABASE
Code Update	ID No. Original Item No.
Status of DMPF	Status of Admin Form
Based on MGB Form 29-19 - Status	Date of Status of Operation Status of Operation Reason
Status of DMPF	Status of Admin Form
Commodity	Commodity Source (Primary/Associated) Commodity Name Commodity Type Commodity Classification



### III. Sources & Methods

MGB's MRI DATABASE	NEW DATABASE
<b>Source</b>	<b>Data Source (Admin Form)</b>
<b>Based on Approved DMPF - As of (Year)</b>	<b>Admin Form Date of Submission Admin Form Date of Approval</b>
<b>Based on MGB Form 29-19 - As of (Year)</b>	<b>Admin Form Date Received (Regional) Admin Form Date Received (Central)</b>
<b>Reporting Date</b>	<b>Report Year Inventory Year</b>
<b>Based on MGB Form 29-19 - Unit Based on Approved DMPF - Unit Based on MGB Form 29-19 - Tonnage Based on Approved DMPF – Reserve</b>	<b>Commodity Volume (In DMT) Commodity Volume (In WMT) Commodity Volume (In MT)</b>



### III. Sources & Methods

MGB's MRI DATABASE	NEW DATABASE
	Mine Life Type of Specific Gravity Specific Gravity Unit of Specific Gravity Commodity Mining RR Commodity Milling RR % Mining Losses % Mining Voids Type % Mining Voids Mining Method Processing Method Reason



### **Step 4      Addressing data gaps and established the historical data**

Parameter	Issues and Concerns
1. Discovery Year	Inventory data under Mineral Resource Inventory (MRI) database with no indicated reference years; only the following: a) Report Year b) Date of Approval (MGB Form 29-19) c) Date of Submission (MGB Form 29-1)
2. Reappraisal and Reclassification	MRI only reports total inventories and no distinction between “reappraisal” from “reclassification”. This was addressed through reprocessing and disaggregating inventory data by type of reserve.
3. Metallic Content and Recoverable Metals	MRI only reported “Ore Grade”. Reprocessing of MGB administrative data included “Recoverable Rate” adjust metal content estimates.



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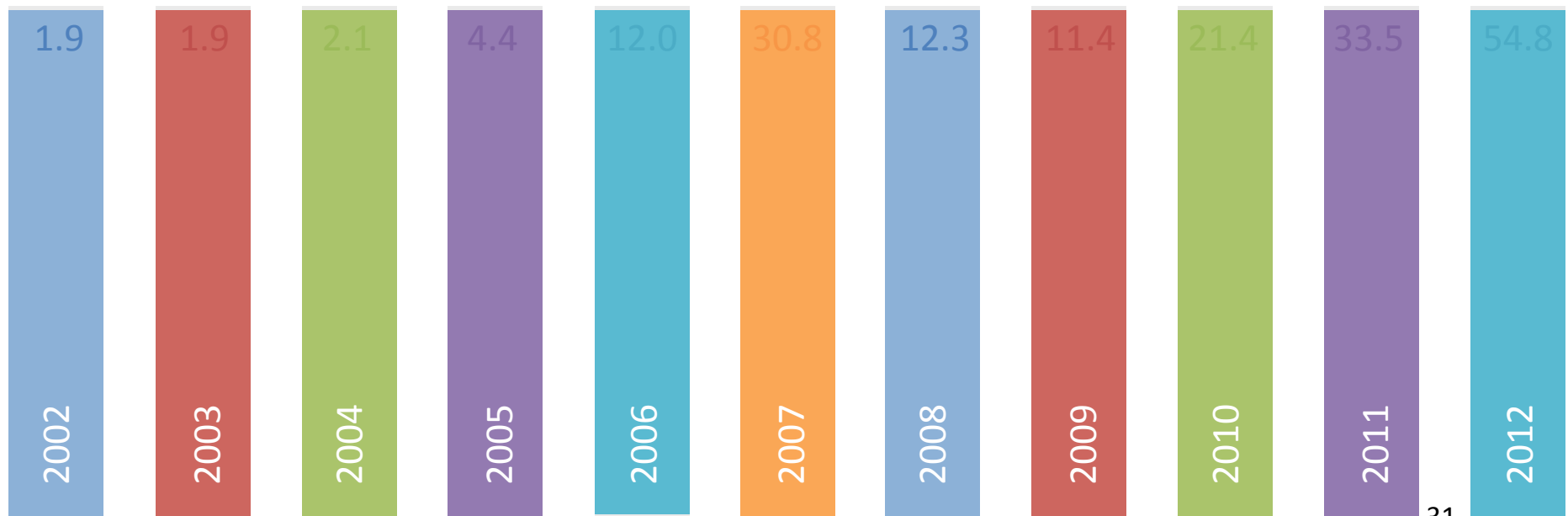
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## **NICKEL RESERVES**

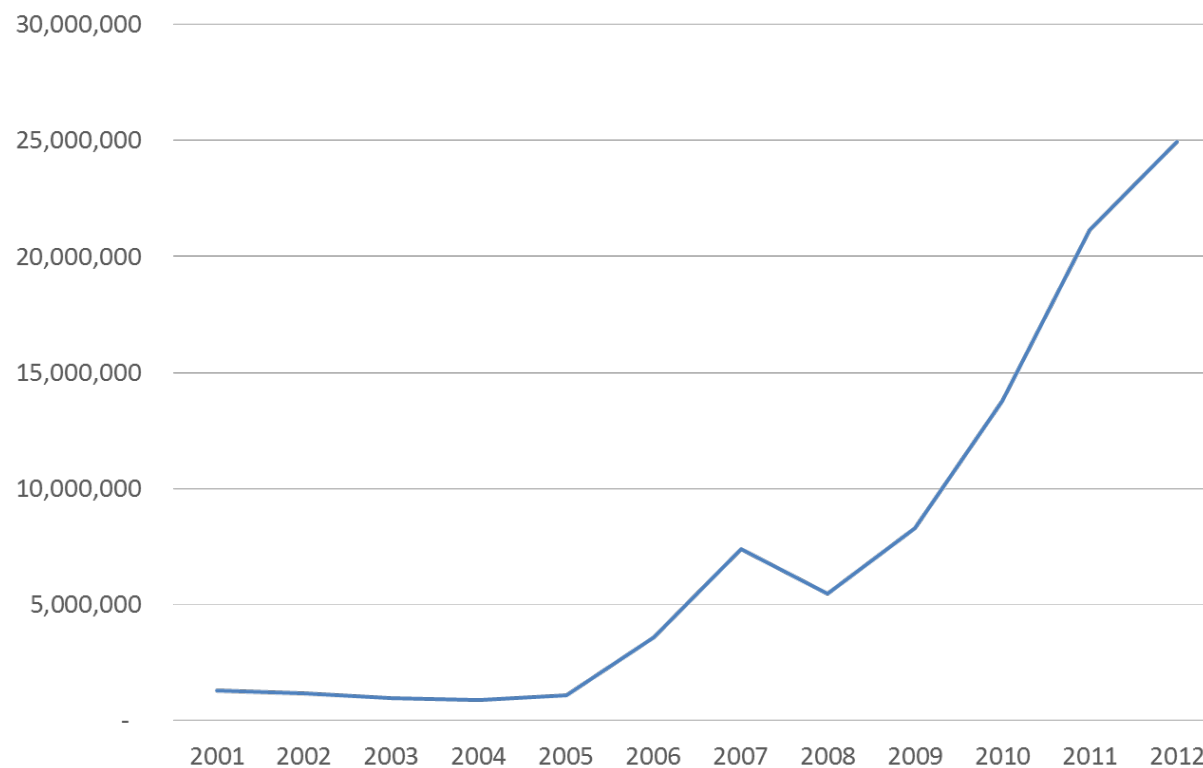
Monetary Accounts  
Unit: In Billion Pesos





## **Nickel Physical Accounts**

Nickel Levels of Extraction, In MT, 2001-2012







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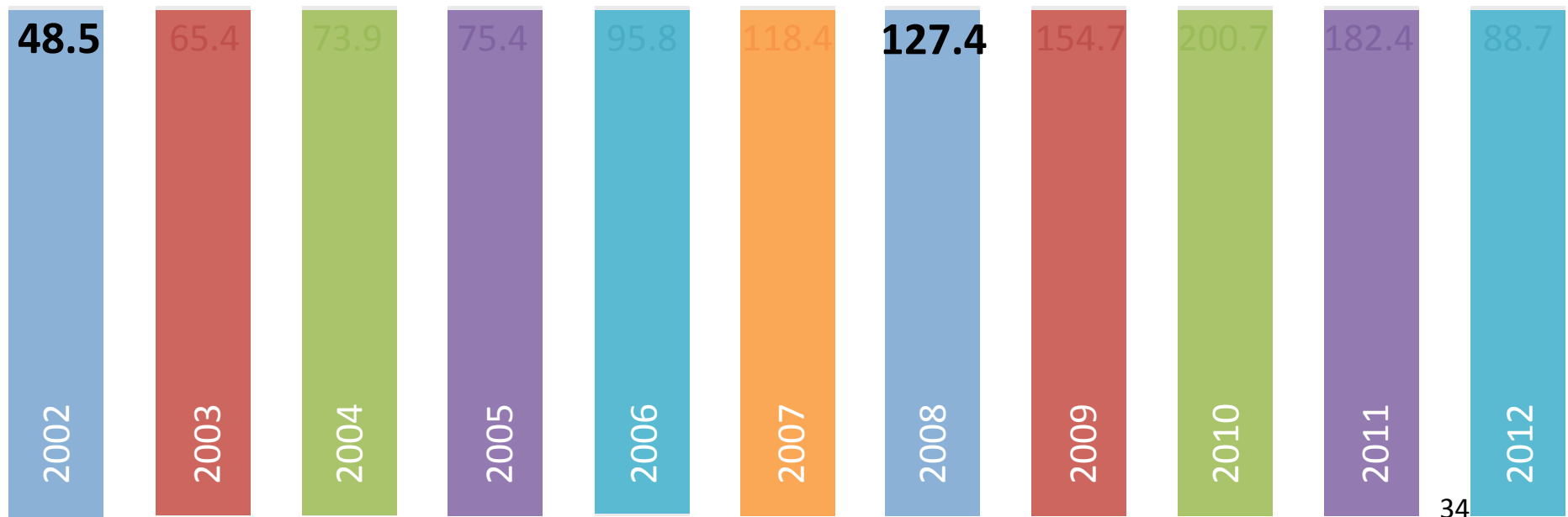
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## **GOLD RESERVES**

Monetary Accounts  
Unit: In Billion Pesos





## Gold Physical Accounts





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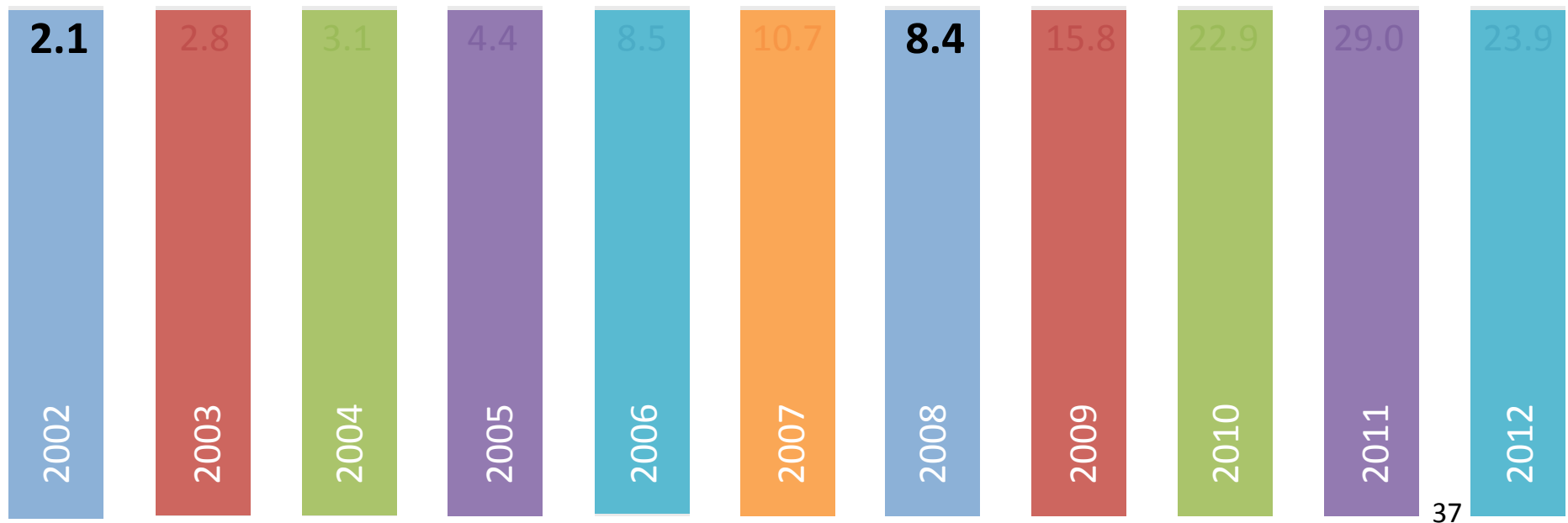
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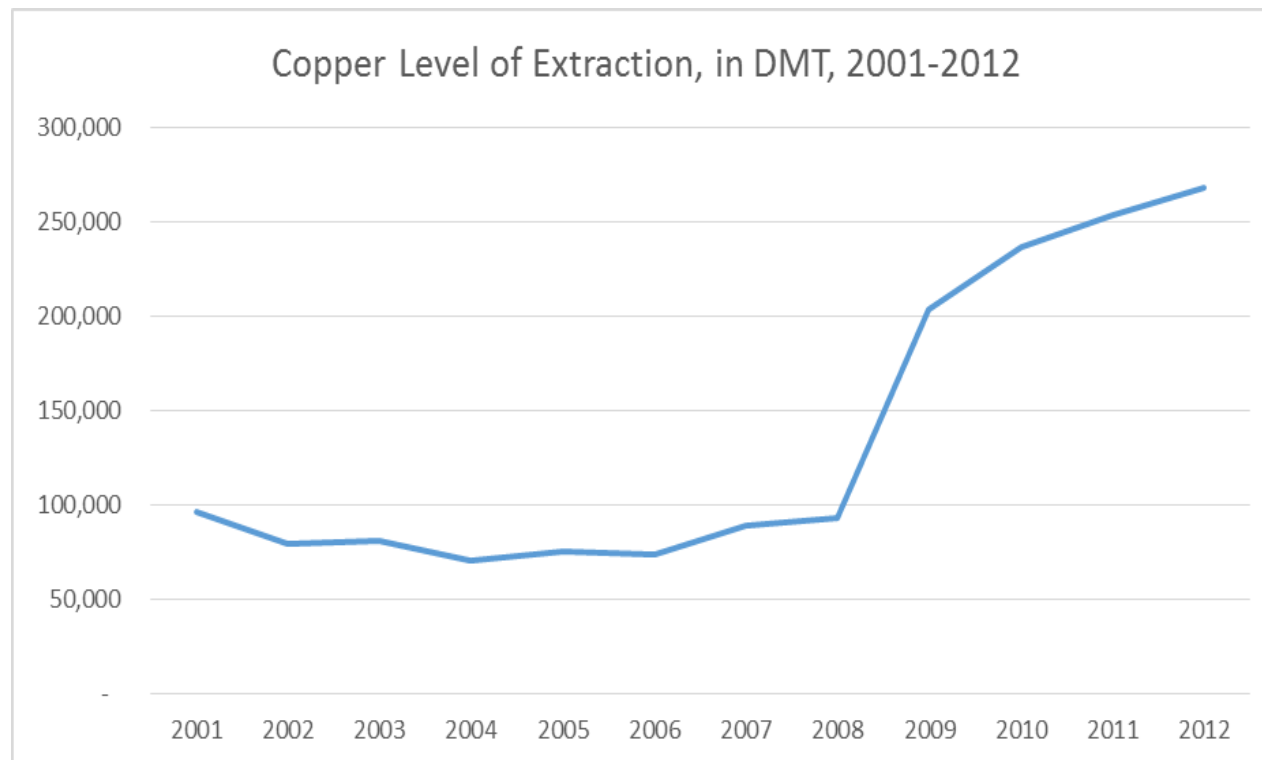
## **COPPER RESERVES**

Monetary Accounts  
Unit: In Billion Pesos





## Copper Physical Accounts





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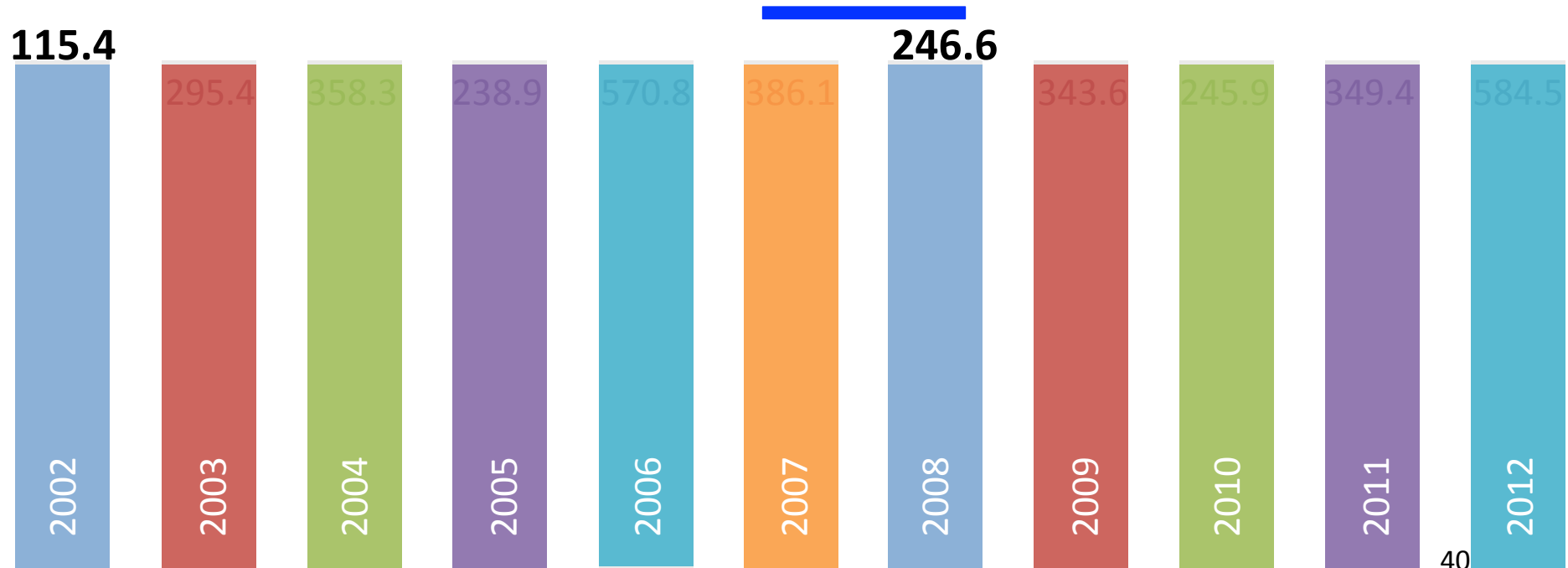
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## CHROMITE RESERVES

Monetary Accounts  
Unit: In Million Pesos







## **Immediate Work (2017-2020)**

1. **Address data requirements particularly on data on stocks of mineral reserves;**
2. **Firm up UNFC classification for adoption in the Philippines;**
3. **Enhance the reporting system of mining companies through the Integrated Annual Report including the documentation of the DMPF;**
4. **Address the cost of generating the asset accounts for mineral resources through training of data producers, compilers and users of mineral resources; and**
5. **Institutionalize the generation of asset accounts in the PSA including the regular generation of data by data producers through surveys or administrative based records.**



### **Future Work (2017-2025)**

- **Improvement of the generation of the administrative data**
- **Expansion of the coverage of mineral asset accounts**
- **Compilation of mineral accounts at the regional or provincial level**



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