MINING AND MINERALS SECTOR **R&D Roadmap for the Value-adding of Non-metallic Minetals**

Overall Strategies

Human Resource

- Capacitated researchers on advance extraction technology for critical elements (REE, Trace Elements and valuable metals) for emerging technology application
- Trained researchers on developing innovative products for industrial application

Facilities and Services

- Establishment of the Niche Center for Marble, Limestone and Clay/Ceramics Researches
- Upgraded a laboratory to offer service on ore characterization using Laser Induced Breakdown Spectroscopy
- Put-up a laboratory for the extraction of Critical Elements

R&D Technologies

 Armor plates for armed personnel

Bauxite

- Improvement of silica content Coal
- REE estimation and extraction from CFA

Marble/Clay/Limestone

- Resource Estimation and Grading of deposits
- Advance/Innovative technology for the valueaddition of marble, clay and limestone

Perlite

Light weight aggregates for construction

Silica

Resource estimation, extraction of critical elements and technology for the valueaddition of silica

Blacksand/Lahar

- REE estimation and extraction Basalt
- Resource estimation, extraction of critical elements and technology for the valueaddition of silica

Value-adding technology for

< Php 30 M>

marble

2025

Resource

estimation of

marble

Innovative

product from

marble for

industrial

application

Technology on

the extraction of

critical elements

from marble

Capacitated

technical

personnel on

developing

innovative

products and

extraction of

critical elements

from marble

2026

< Php 10 M>

Value-adding

technology for

silica, lahar and

blacksand

Resource estimation of silica sand in the country

> Innovative product from silica for industrial application

Technology on the extraction of critical elements from silica. blacksand and lahar

Capacitated technical personnel on developing innovative products from silica and extraction of critical elements from silica. blacksand and lahar

estimation of limestone in the country

< Php 10 M>

Development

of value-

adding

technology

for basalt

industrial

Technology on of critical

VISION:

Ongoing

Not yet

Available

Innovative technologies for non-metallic minerals to produce competitive products for industrial applications

Resource

2027

< Php 30 M>

Value-addina

technology for

limestone

Innovative product from limestone for application

the extraction elements from limestone

> Capacitated technical personnel on developing innovative products and extraction of critical elements from limestone

Resource estimation of basalt

2028

Done

Innovative product from basalt for industrial application

Technology on the extraction of critical elements from basalt

Capacitated technical personnel on developing innovative products and extraction of critical elements from basalt

Overall Outcomes

Human Recourse

- 10 Experts on the extraction of REE
- 10 experts on developing products from non-metallic minerals for industrial technology application

R&D Technologies

10 Technologies available for the value-addition and extraction of critical elements of clay, perlite, CFA, bauxite, limestone, marble, silica, blacksand, lahar and basalt

Facilities / Services

- Laboratories for the extraction of critical elements from non-metallic minerals
- Niche Center for Marble, Limestone and Ceramics/clay Technology
- LIBs for the determination of REE and other valuable minerals

Policy recommendation on the value-addition of non-metallic minerals

2021

Capacitated

Geologists on

LIBS on the

geological

characterization

of Co and REEs

< Php 20 M>

Value-adding

technology for

perlite

Value-adding

technology for

bauxite

Estimation of critical elements in feldspar, bauxite, blacksand and lahar

< Php 5 M>

2022

Technology on perlite as light weight aggregates

> Technology on purification of bauxite for industrial application

< Php 10 M>

Value-adding

technology for

CFA

Value-adding

technology for

clay

Capacitated technical personnel on perlite as light weight aggregates and purification of bauxite

Technology on the extraction of REE from CFA

2023

< Php 30M>

Value adding

technology for

clay/ceramics

technology on clay as armor plates for armed personnel

Capacitated technical personnel on and

Innovative

REE extraction development of armor plates Technology on the extraction of critical

Resource

estimation of

clay

Innovative/

Advance

ceramics

technology for

industrial

application

2024

elements from clay Capacitated technical personnel on

developing innovative and advance ceramics technology and extraction of critical elements from clay