

Harnessing the Mineral Resources of the Philippines for Sustainable Economic Development

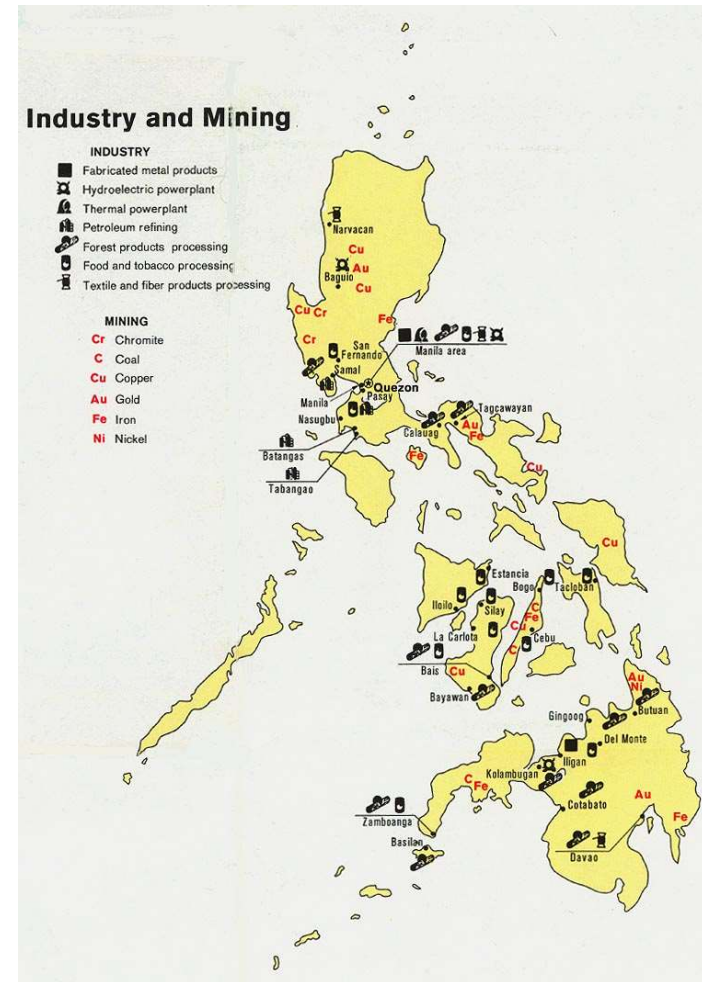
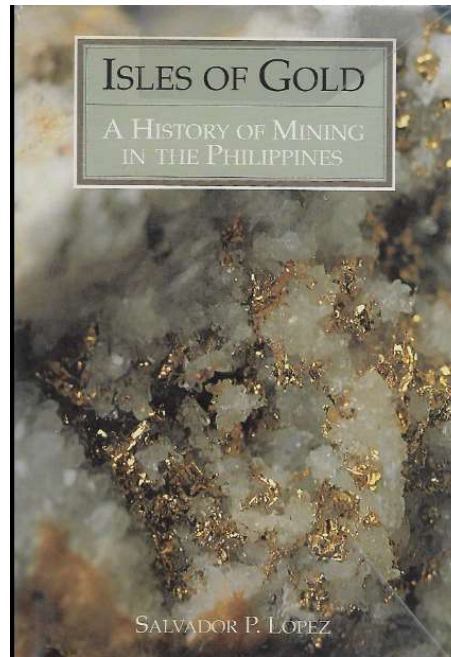
Manolo G. Mena, Ph. D.
UP DMMME



UP College of Engineering



The Philippines is endowed with vast mineral resources...



How to best harness or resources towards sustainable development?

- Sustainable Mining Practices



- Empowering Local Communities



How to best harness or resources towards sustainable development?

- Enhancing Downstream Industries



- Sustainable Trade Policies



How to best harness or resources towards sustainable development?

- Infrastructure Development
- Research and Development





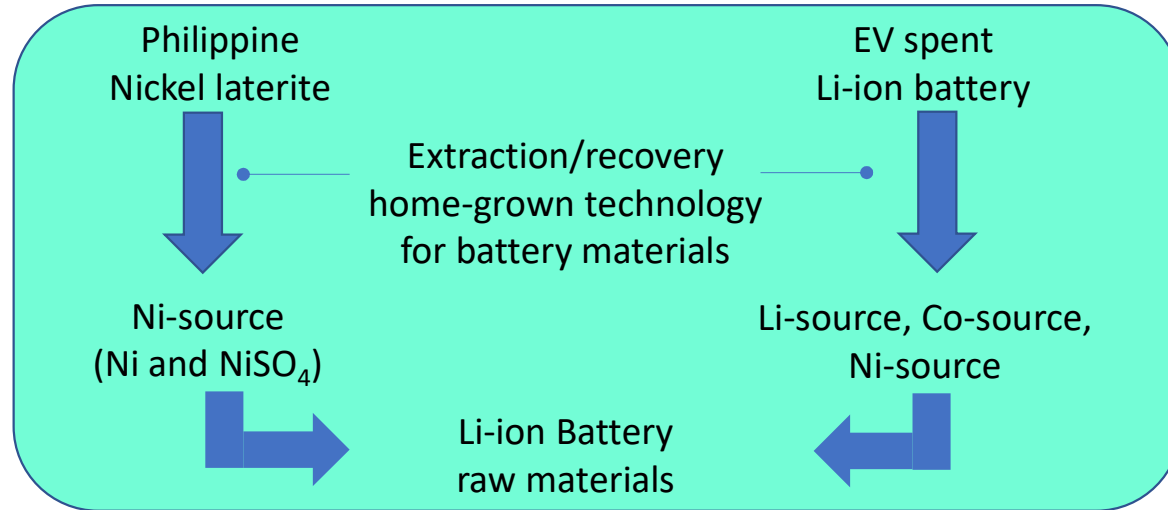
E-MINERALS PROGRAM Framework

Pacific Nickel Philippines Inc.
Nonoc Island, Surigao City

Project 1



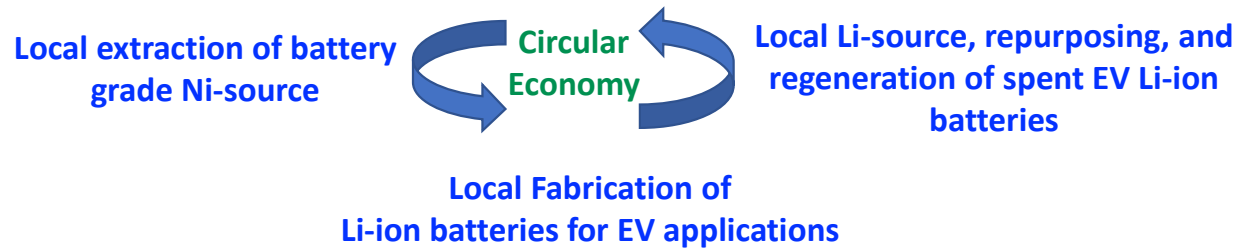
Project 2



Future Prospects and Impacts

Prof. Rinlee Butch Cervera

(Commercialization, socio-economic, environmental and energy impacts)



E-MINERALS: Nickel Extraction from Philippine Nickel Laterite Deposits for Battery Grade raw Materials



Dr. Eden May B. Dela Pena (Project Leader)
Department of Mining, Metallurgical, and Materials Engineering
UP Diliman



This research aims to develop a **nickel extraction technology** specifically **tailored for the Philippine lateritic ores** to produce battery-grade nickel.



Phase I: Philippine laterite will be taken for **ore characterization**.

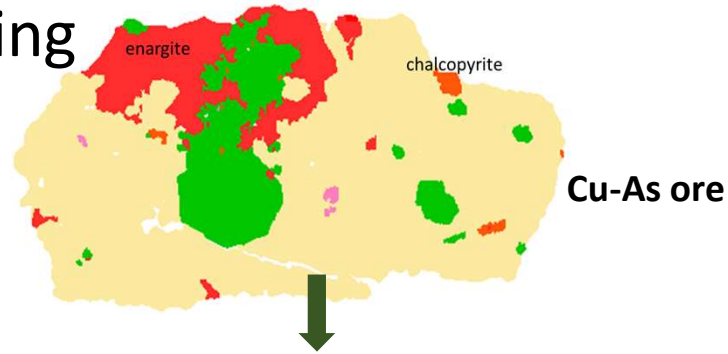


Phase II: Atmospheric leaching will be employed and consists of pre-treatment, leaching, precipitation, solvent extraction or ion exchange and Nickel stripping, and nickel crystallization and electrowinning.



This project is a **value-adding activity** that will shed light on the potential of nickel and other useful derivatives to be **produced locally**.

Copper Arsenide Processing



To undergo leaching using more energy-efficient and environment-friendly solvents

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Copper

Cu-HySolvEr: Copper Hydrometallurgical and Solvometallurgical Extraction from Sulfides and Oxides

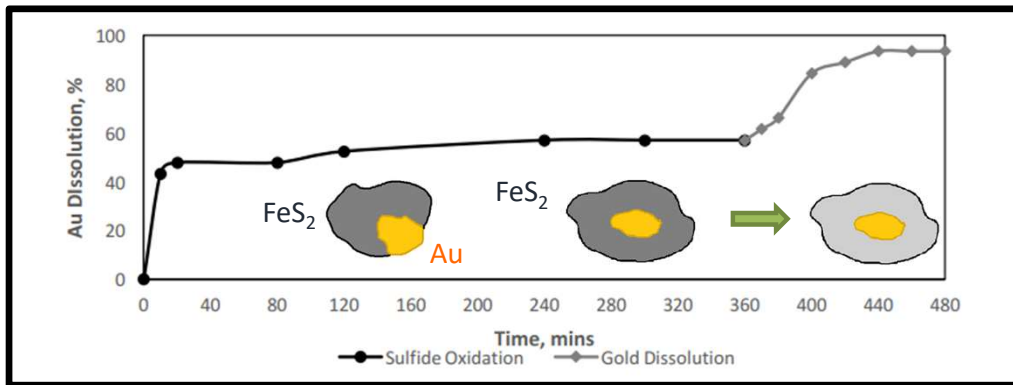
Electrorefining process development for the production of 6N copper cathodes (Cu-Refine)

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Arsenic

Removal and stabilization of arsenic in gold and copper ores using aqueous and non-aqueous solvents

**Prof. Kate Djoan Tungpalan
UP DMMME**

Non-cyanide Refractory Gold Extraction – CLINN GEM Process



How to best harness or resources towards sustainable development?

- Transparency and Governance
- International Cooperation



Why consider a career in Mining, Metallurgical & Materials Engineering?

- Engineers are required to build things, other careers are service providers...
- Engineers require materials in their building projects...
- All other engineers depend on Mining, Metallurgical & Materials Engineers for their starting materials...
- **If it cannot be grown, it has to be mined....**
- Industrialization of the country requires basic mining, metallurgical and materials industries in steel, copper and other building materials, while taking care of the environment...
- We need enough human resources in MMM...

Thank you....



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