Unearthing the Power of Geological Survey Organizations: Leveraging Critical Raw Materials for the Energy Transition
The Critical Raw Material Challenge:

As the world moves toward technology based solutions for decarbonising energy and transport there is an intense focus on mineral resources needed for technology and batteries.

Many of these minerals are mined in small volumes or are by-products of other commodities.

There are often limited facilities for processing ores and hence there are concerns about security of supply for some jurisdictions.

Many countries want the global energy transition to proceed against high environmental, social and governance standards.

These issues are driving a need for increased global awareness of resource issues, improved data to understand resources better and better data management to help improve governance as well as advances in mineral exploration and ore processing.

Many of these issues fall into the responsibility of Geological Survey Organisations globally.
The role of Geological Survey organisations:

The activities of GSOs in the mineral resource sector vary depending on their governance model, national priorities and foreign policy but typically incorporate aspects of the entire mineral resource lifecycle:

- Gathering and managing baseline geological information in support of their domestic exploration sector and informing government on mineral resource issues
- Providing intelligence on global mineral resources, production, stocks and supply chains
- Carrying out fundamental research into ore genesis, exploration and ore processing and recycling, and supporting the circular economy
- Carrying out research and development and providing advice on aspects of new energy technologies
- Undertaking capacity strengthening, particularly with GSOs in LMICs and around energy technologies in carbon producing countries
- Supporting transparency and helping to develop and deploy ESG strategies
An example from the British Geological Survey:

In the UK mining of metalliferous minerals is largely historic, however, the growing demand for Critical Raw Materials is driving growth in a domestic exploration and processing technology sector.

Because of this, the UK does not have a central licensing authority for mineral exploration and mining, this is managed through local land use planning arrangements.

However, the BGS has a long history in providing information and advice on the distribution and type and aspects relevant to planning decisions around minerals in the UK and globally.

Indeed the original geological mapping of the UK was driven by a strategic need to understand the CRM for the energy transition of the early 19th Century –Coal.

In response to the growing need for information and advice on current CRMs, the UK Government has established a Critical Minerals Intelligence Centre at the BGS to advise on domestic and global CRM issues.
UK Critical Minerals Intelligence Centre

Support the UK in securing adequate and timely supplies of the critical minerals it requires to ensure the success of the net zero transition, mitigate risks to national security, deliver economic prosperity, and create opportunities for UK businesses in critical mineral supply chains domestically and internationally.

Provide authoritative, impartial and independent up to date data, information and analysis on stocks and flows of critical minerals that are essential to the UK economy across whole value chains, to guide decision-making by government and industry, and make recommendations for targeted interventions.
UK mineral resources advice

Mineral science: understanding CRM-bearing mineral systems in terrestrial and marine environments. Understanding the changing use of minerals (e.g. in low-carbon cement).

Raw materials statistics and analysis: maintaining accurate, high-resolution time-series data relevant to understanding material cycles and their footprints to underpin minerals intelligence, including security of supply, and decision making.

A whole-systems approach to raw materials supply chains: working with partners to map primary and secondary material flows and stocks, and analysing interactions between the economy, environment and society to quantify trade-offs.

Advice and support: to governments and stakeholders globally.
UK baseline geological information
BGS global reach:

Like many mature GSOs the BGS works globally in the mineral sector, amongst other geoscience disciplines.

We see this as helping support UK foreign and trade policies.

BGS has a powerful brand/reputation based on more than 100 years of International collaboration.

BGS geologists are able to develop peer to peer relations with other Geological Survey Organisations and Ministries across the globe.

We undertake capacity strengthening in LMICs as a mainstay of our global identity.

We carry our fundamental research into ore genesis.

BGS also advises UK and foreign governments on mineral resource issues.
Global Minerals Intelligence and advice at BGS

- Cobalt
- Graphite resources, and their potential to support battery supply chains, in Africa
- Global material flows of lithium for the lithium-ion and lithium iron phosphate battery markets
Capacity Strengthening in Baseline Data/Geological Mapping

For many emerging economies, understanding mineral endowment is a key element in the good governance necessary for sustainable economic development.

This role is typically delegated to a geological survey organisation (GSO) tasked with geological mapping at a national scale, increasingly focussing on prospective regions, as well as managing and disseminating geological data and information from these surveys.

BGS has an enduring role in undertaking national and more focussed surveys, but increasingly helping strengthen capacity in GSOs around the world through training and mentoring activities, technical assistance and development of data management systems.

The principal benefits are strengthened institutions and governance in mineral exporting nations, increased security of supply and opportunity for businesses.
Global capacity strengthening in data management: What do investors look for?

Attracting investment in mineral exploration and development by establishing stable governance, law, regulation, tax/royalties, infrastructure, workforce/skills, security

Demonstrating mineral potential

A GeoData Centre represents the long-term national geoscience knowledge base – essential for demonstrating mineral potential
Geodatamanagement

Geological data are the heart of any GSO

Many GSOs will have physical collections of legacy data that represent an irreplaceable knowledge base

Digital capture of such data is vital

Staff must have the skills and knowledge to acquire, manage and interpret such data

New data must then be integrated with the legacy datasets in a continuous process

Centralised digital Geodata centres allow wider access for data & information, addition of new data & analysis of datasets

Well-managed digital geodata represent a vital baseline for de-risking extractives investment, infrastructure & environmental management
Nigeria GeoData Centre - 2019 to 2023

Nigerian Geological Survey Agency (NGSA)

National Steel Raw Materials Exploration Agency (NSRMEA)
Nigeria GeoData Centre - Digital data stores

Asset register database of NGSA & NSRMEA held data and information – 1033 records

Mineral Occurrence Database – 1272 records

Geochemistry Database – 5176 records (analyte determination of 9609 samples)

Borehole / Core Logs Database – 1206 records

Carbonate Map Sample Database – 821 records
Nigeria GeoData Centre - Metadata searchable on-line

About

Welcome to the web page of the GeoData Centre (GDC) for Nigeria, the authoritative repository of Nigerian geoscientific data. The GDC is the responsibility of the Ministry of Mines and Steel Development and administered by the Nigerian Geological Survey Agency (NGSA) and the National Steel Raw Materials Exploration Agency (NSRMEA).

Located at the NGSA office in Abuja, and digitally accessible from the NGSA and NSRMEA offices in Abuja and Kaduna, the GDC hosts geoscientific data and information for the country. The GDC is the means by which the Ministry is organizing and safeguarding its documents and digital data in a systematic and accessible manner.

You can search our data holdings on GeoNetwork.
Summary

The global demand for Critical Raw Materials for the energy transition is driving a renaissance in the mineral resource sector.

Geological Survey organisations are highly experienced in the areas of mineral resource assessments and have a critical role to play in underpinning global intelligence, resource understanding, transparency and equitable development.

Good acquisition, management & dissemination of geological data, coupled with knowledge & skills, provides the fundamental baseline for natural resource management in all countries.
THANK YOU