CHAMBE BASIN RARE EARTHS PROJECT

AKATSWIRI
RARE EARTHS

CORPORATE PRESENTATION | June 2020

Chambe Rare Earths Project

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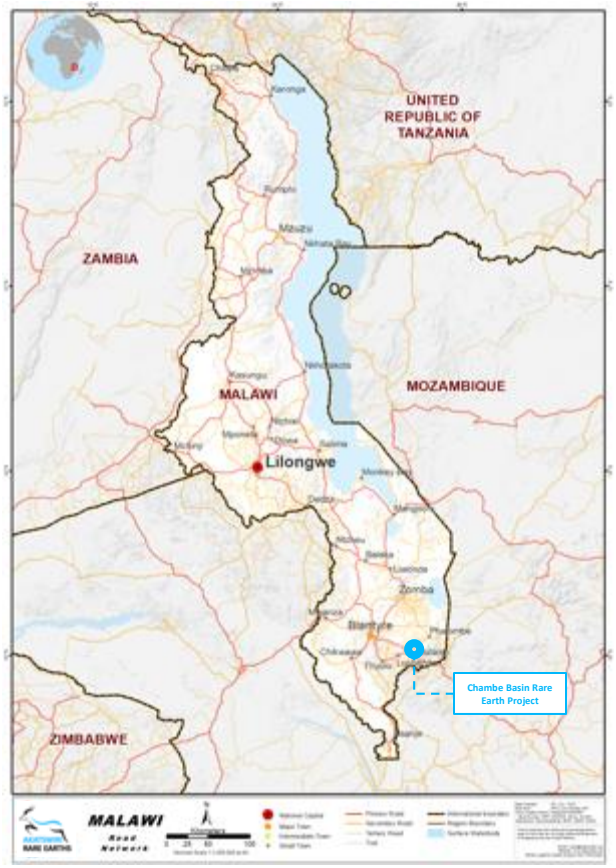
Strategic Rare Earth Acquisition

- Altona has a right to acquire a 75% interest in the Chambe Basin Rare Earth Elements (REE) Project in the mining-friendly country of Malawi
- Chambe is a large, ionic adsorption clay-hosted REE project bearing appreciable quantities of critical REE's, particularly neodymium and praseodymium
- Drilling by Japan Oil, Gas and Metals National Corporation's (JOGMEC) has confirmed the presence of mineralised Rare Earth Oxide (REO) clays
- Chambe is one of the few large ionic clay-hosted REE deposits outside of China, where currently a significant portion of global REE production is sourced
- Ionic clay deposits generally have several advantages over hard rock deposits, including lower operating and capital costs and shorter timelines for development

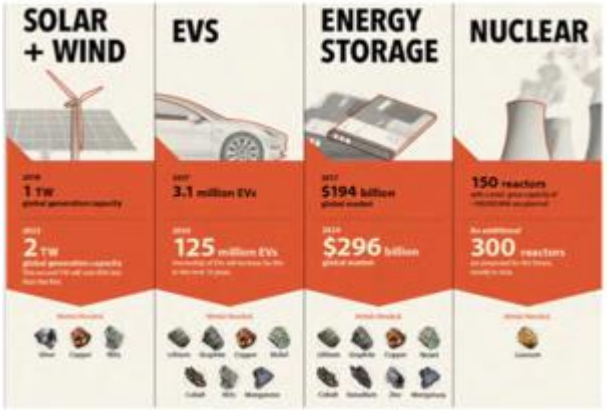
Project Ownership and Location

- Project previously held in joint venture between JOGMEC and TSV-listed Irving Resources
- Exploration, drilling and pre-feasibility study completed between 2010 and 2019
- Licence expired in February 2020
- Application for Exclusive Prospecting Licence lodged in February 2020 by Akatswiri Minera Resources
- Issue of license expected in June 2020
- License extends over an area of 128km^2
- Located in southeastern Malawi, on the western side of the Mulanje Massif and south of Lake Chilwa
- 4km south of AIM-listed Mkango Resources Songwe Hill
- Approx 70km from the former capital Zomba and approx 90km from Malawi's commercial centre of Blantyre
- Rail head and international airport 90 minutes from site



Rare Earths

- The expansion of new energy sectors and electric vehicles is boosting the demand for neodymium, praseodymium and other technology metals as permanent magnet motor technology has 100% market share of the EV motor market
- Concentration of refining capability in China is driving an international desire to implement alternative supply chains for REE in light of strong demand
- With less than 50% of total world reserves, China is the world leading refiner of technology metals and controls +80% of global Neodymium and Praseodymium supply
- China has become a net consumer and the supply chain is extremely sensitive to macro shocks and industrial consumers are demanding non-China based alternative sources of refined neodymium



Neodymium (Nd) is the most important raw material for permanent magnets, along with Dysprosium (Dy), they will be critical elements for clean technologies during the next decade.

Key Project Highlights

Strategic Project

- A pre-feasibility stage REE mining project focused on production of neodymium, praseodymium, dysprosium and terbium
- Mineralisation close to surface
- Confirmed ionic clay rare earth mineralisation, similar to Chinese ionic clay heavy rare earth element projects

Substantive work already completed by major partners

- 200 drill holes and additional exploration by Mitsui
- Metallurgical testwork and leaching work
- Resource definition work undertaken
- Mine development and environmental baseline

Project area well supported with infrastructure

- Ready road access
- Nearby power infrastructure and rail

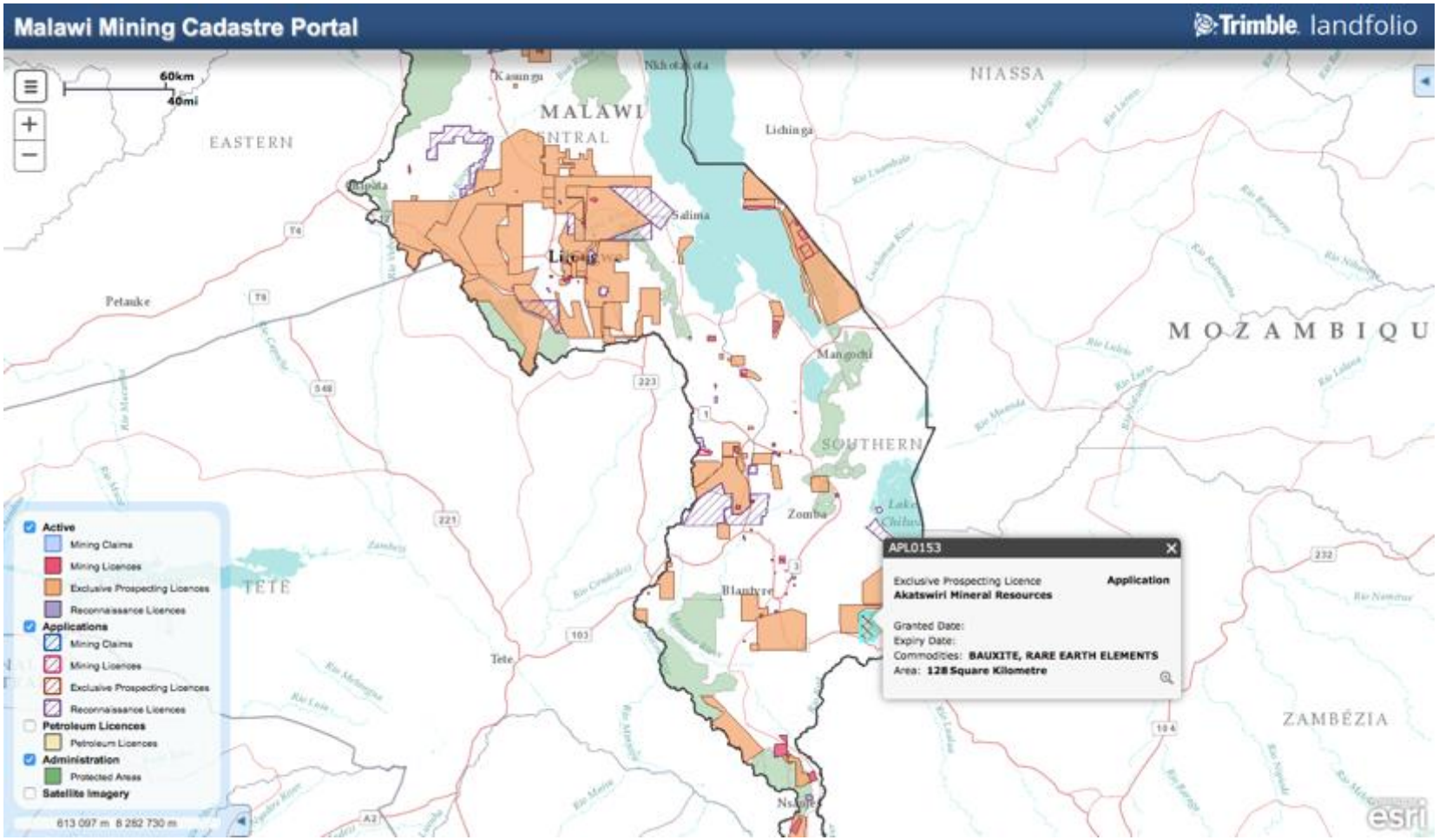
Ionic Clay REE vs Hard Rock REE

- Ionic clay rare earth mineralisation are globally the most readily accessible source of heavy Rare Earth Oxides that are extracted through straightforward mining and processing methods

- These projects are becoming strategically important to secure the supply of critical and heavy rare earths

MINING/PROCESSING STAGES	CLAY-HOSTED REE	HARD ROCK-HOSTED REE
MINERALISATION	✓Soft material, negligible (if any) blasting	✗Hard rock
MINING	Low operating costs: ✓Surface mining (0-20 m) ✓Minimal stripping of waste material ✓Progressive rehabilitation of mined areas	✗High operating costs: ✗Blasting required ✗Could have high strip ratios
PROCESSING – MINING SITE	✓No crushing or milling ✓Potential for static or in-situ leaching ✓Ambient temperature ✓Simple process plant	✗Comminution, followed by beneficiation that often requires expensive (flotation) reagents
MINE PRODUCT	✓Mixed high-grade rare earth precipitate (~50-95% depending on precipitant) for feedstock into rare earth separation plant	✗Mixed REE mineral concentrate (typically 20 – 40% TREO)
PROCESSING - ENVIRONMENTAL	✓ Non-radioactive tailings ✗ Solution treatment and reagent recovery requirements (somewhat off-set by advantageous supporting infrastructure)	✗Tailings often radioactive (complex and costly disposal)
PROCESSING – REFINERY (TYPICALLY NOT ON MINING SITE)	✓Simple acid solubilisation followed by conventional REE separation ✗Complex recycling of reagents and water	✗ High temperature mineral "cracking" using strong reagents ✗Complex plant (to withstand strong reagents and high temperatures)

Chambe Basin Licence Area



Chambe Basin Licence Application

AKATSWIRI RARE EARTHS

DEPARTMENT OF MINES
CASH OFFICE
PAID
P. O. BOX 251/LILONGWE

15th April 2020

APPLICATION FOR AN EXPLORATION LICENCE IN CHAMBE BASIN AND LICHENYA PLATEAU ON MULANJE MT AREA OF MULANJE DISTRICT FOR EXPLORATION OF RARE EARTHS ELEMENTS AND BAUXITE

TO: COMMISSIONER FOR MINES AND MINERALS
MINISTRY OFMINING
PRIVATE BAG 350,
LILONGWE.

Dear Sir,

Please find attached our application for an Exploration Licence over Chambe and Lichenya Plateau areas of Mulanje Mountain in Mulanje district and an enclosed application fee of MK50,000.00. This application follows a series of meetings with the last one held on 22nd February 2020 in Zomba with members of the Citizen for Protection of Mulanje Mountain (CPM) led by their Chairperson Mr I. Kaliati, previously referred to as Concerned Citizens during the operation by Spring Stone Limited. Executive Members of CPM have since endorsed this application and requested that thorough consultations be undertaken throughout the project period in phases. Also find attached the minutes of the Meeting with executive members of CPM in regard to this application.

Your favourable assistance will be greatly appreciated.

Yours faithfully,

Hilton Eneya Banda.

1

1.0.0 DETAILS OF APPLICATIONS

1.1.0 **COMPANY** : AKATSWIRI MINERAL RESOURCES PVT. LIMITED

1.2.0 **ADDRESS** : P.O BOX 1042,
ZOMBA,
MALAWI.
contact@akatswiri.com

1.3.0 Company Profile

AKATSWIRI MINERAL RESOURCES PVT. LIMITED is a registered company in Malawi with the aim of consulting and investing in the mineral resources of the country and for this reason the company would like to apply for an exploration licence over Chambe Basin and Lichenya Plateau on Mt Mulanje area for exploration of rare earths elements and bauxite minerals in accordance with section 117 of the Mines and Minerals Act, 2019.

The company has previously undertaken detailed reconnaissance and exploration work in other areas of the country and engaged a number of communities in respects to its exploration activities that culminated into a friendly working atmosphere due to community satisfaction on its consultations endeavours. The company has enough financial resources through its partnership with other foreign based companies and it has already available technical expertise as its employees based in Zomba at Pijo House that include professional geologists and environmentalists to conduct rare earth elements and bauxite exploration activities within the applied area and mitigate environmental degradation that may arise from this activity.

The company has in the past and continued to be consulted for exploration works for Surya Mining Company and also worked for SacOil Companies both prospecting for solid minerals and petroleum resources respectively among others.

Akatswiri Mineral Resources recently successfully conducted a comprehensive Environmental and Social Impact Assessment Studies for Block 4 and 5 of Rakgas on Oil and Gas sector.

1.4.0 PLACE OF REGISTRATION: Malawi with reg. number 1010227

3

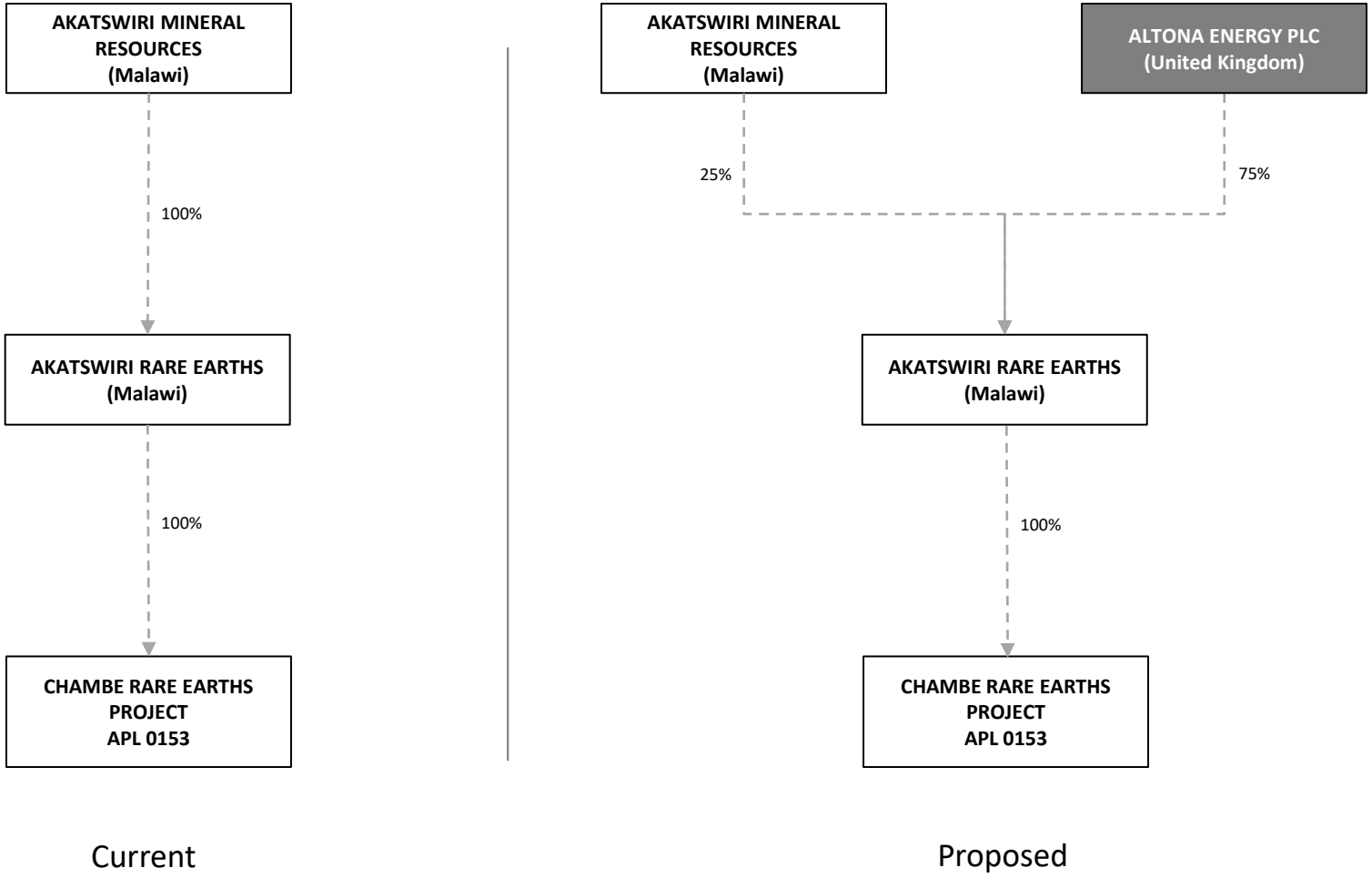
The entire area south is however found on Blantyre 1: 250 000 National Topographical Map and the coordinates of the area as below. The total area sought is around 128 square kilometres.

Figure 1: Map of the proposed area for rare earths elements and bauxite on Chambe and Lichenya Plateau areas on Mulanje Mt as indicted on Blantyre 1:250 **000 Map sheet.**

POINT	EASTINGS	NORTHINGS
A	776000	8226000
B	768000	8226000
C	768000	8242000
D	776000	8242000
	Total Area =128.0 Km²	

5

Corporate Structure



Company Strategy

Corporate Objective

- Advance the Chambe Rare Earth Project by:
  - validation of historic exploration and study work
  - strength of in-country expertise and project partner
  - Strategic partnership with REE offtake/end-user
- **Strategy**
- For success a REE project needs:
  - High grades and high-value heavy rare earths (HREEs) to yield high value-per-ton mineralisation and a cost-competitive project
  - Favorable metallurgical characteristics with sufficient REE recovery and development of low-cost processing route
  - Technical expertise to efficiently and effectively add project value
- **We believe the Chambe Rare Earth Project can achieve this**

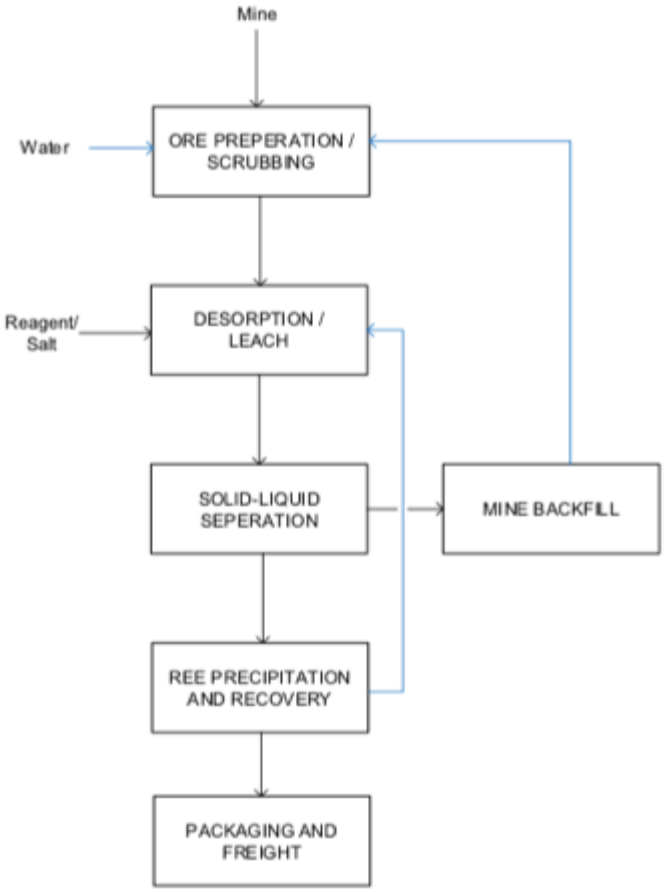
"REE market at inflexion point: We believe REE are set to be the next commodity beneficiary of the emerging electric vehicle revolution, ***Neodymium (Nd) and Praseodymium (Pr) being key ingredients in the manufacture of high-strength permanent magnets used in the motor drivetrains of EVs.***
Against the well-documented growth outlook for EVs which we believe will be a significant driver of demand for the 'magnet' REE over coming years, REE supply looks set to tighten as the world's dominant producer China continues to rationalise its domestic industry."

Geology and Exploration Completed

- REE exploration commenced in 2010 with Japan International Cooperation Agency
- Further sampling by JOGMEC and Geological Survey of Malawi completed in early 2011
- NI 43-101 Report completed in December 2011 by JOGMEC and Canadian listed company
- US$4 million two-phase drilling programme completed by JOGMEC and managed by Mitsui Mining
- Phase I comprised 24 holes and was completed in late 2011
- Phase II drilling was completed in early November 2012 and encompassed drilling of 176 shallow core holes on a staggered 200m grid
- Drilling identified a superficial horizon of rare-earths-bearing kaolinite/halloysite clay ranging from 3m to 26m in thickness.
- Independent analysis of core from these holes indicated that the clay contains comparable levels of total rare earths enrichment to its Chinese counterparts, as well as similar heavy rare earths enrichment
- Metallurgical analyses from these holes and determined high leachability of REE's and the quality and composition of resulting REE carbonate concentrates
- Resources work and mine planning and development studies were all completed
- **JOGMEC work has been requested from Geological Survey of Malawi (May 20)**

Mining and Metallurgy

- Rare earth recovery by simple mining and processing methods
- Thick intercepts near surface means simple low-cost conventional and free-dig open pit mining
- Simple processing route for ionic clay mineralisation
- Mining – scrubbing – leaching – precipitation
- Potential for static or in-situ leaching
- Leaching is a desorption process using salt solutions
  - Ammonium sulphate (fertilizer)
  - Sodium chloride (table salt)
  - Others
- Production of a high-grade product (+90% REO)
- **Sale of REO concentrate mine product to processing refinery reduces capital expenditure**
- **A high-grade concentrate attracts highly favorable off-take terms**



Investment in Malawi

- Malawi has been enjoying a stable and peaceful political environment for several decades
- In a 2017 Investment Climate Statements report from the Bureau Of Economic And Business Affairs of the US Department of State:
  - **On the political environment:** "Malawi has been largely free of political violence since gaining independence in 1964. Although divisions do exist, Malawi has no significant tribal, religious, regional, ethnic, or racial tensions that could be expected to lead to violent confrontation."
  - **On the foreign investment environment:** "Foreign and domestic private entities are generally free to establish and own business enterprises and engage in all forms of remunerative activity regardless of size of the investment, source of funds, or destination of the final product."
  - **On the legal environment:** "The legal, regulatory, and accounting systems are somewhat transparent and consistent with international norms. For example, to increase transparency in the mining sector, Malawi applied for and was granted EITI candidate status."
  - **On the infrastructure:** "the project location is easily accessible and located 60 minutes away from Blantyre, which itself is 2 hours away from Johannesburg. The Tete-Nycalla railway line ensure easy access to re-agents importation".
- According to the Sustainable Competitiveness Observatory, Malawi enjoys a "Political Stability and Absence of Violence" score of 67, higher than the African average of 52

Pathway to Development

▪ Validation of JOGMEC/Mitsui Mining historical data	**Aug 20 – Feb 21**
▪ Re-assay of selected historical samples to confirm REE	
▪ Metallurgical work to confirm presence of ionic-clay hosted REE	
▪ Confirmation drilling and review of historical resource work	
▪ Update of environmental baseline monitoring	**Sep 20 – Jun 21**
▪ Environmental and Social Impact Assessment	**Dec 20 – Sep 21**
▪ Detailed metallurgy and process engineering review	**Mar 21 – Dec 21**
▪ Updated JORC-compliant Mineral Resource Estimate	**Jun 21 – Dec 21**
▪ Mining, tailings and infrastructure assessments and studies	**Jun 21 – Mar 22**
▪ Bankable Feasibility Study	**Dec 21 – Jun 22**
▪ Strategic offtake funding and investment	**Dec 21 – Jun 22**
▪ Mine development	**Sep 22 -**