

One of the world's richest rare earth deposits continues towards resolution of issues with Burundi partner

written by Investor News Writer | November 22, 2021

Rainbow Rare Earths' production in Africa to be expanded through extraction from South African mine tailings.

When it comes to rare earths it is important to identify the most valuable ones. Rare Earth permanent magnet production accounted for 91% of the total monetary value of rare earth consumption in 2019, and neodymium and praseodymium (NdPr) are the two key rare earth elements used in permanent magnets, particularly neodymium. This explains why most rare earth miners target NdPr. They are simply the most in demand and are highly valuable.

[Rainbow Rare Earths Limited](#) (LON: RBW) ("Rainbow") is a rare earths miner targeting NdPr production at their two African rare earth projects. Rainbow's strategy is to become a globally significant producer of magnet rare earths. Rainbow has two African-sited projects, each of which has a special attribute leading to potentially lower cost mining. Rainbow also has [exclusive rights](#), across the SADC region of Africa, to privately owned American specialty chemical engineering company's (K-Tech) rare earths continuous ion chromatography separation technology. The K-Tech process targets individual separation of rare earth from natural mixtures in fewer stages with more flexibility than

traditionally used solvent extraction thereby saving on upfront CapEx and ongoing OpEx and potentially producing a higher end-value separated oxide rather than a carbonate. Testing is [ongoing](#).

Rainbow's two rare earths projects are:

- The [Phalaborwa Project](#) in South Africa.
- The [Gakara Project](#) in Burundi, East Africa.

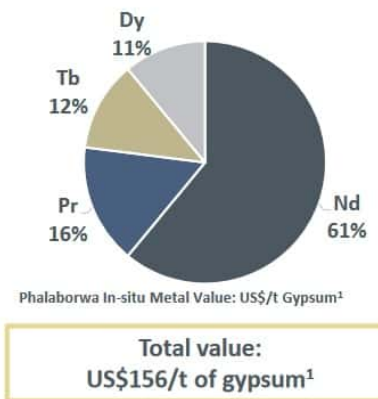
The Phalaborwa Project (70% earn-in agreement)

The Phalaborwa Project comprises an Inferred Mineral Resource estimate of 38.3Mt at 0.43% Total Rare Earth Oxides (TREO) contained within gypsum 'tailings' stacked in unconsolidated dumps derived from historic phosphate fertilizer hard rock mining. Being a tailings resource eliminates the need for hard rock mining, which is expected to lead to lower operational costs. The Resource has a high-value NdPr content representing 29.1% of the total contained rare earths, measured as oxides, with economic dysprosium and terbium, key rare earths for high temperature operation of permanent magnets, as valuable by-product credits. The Project has 5-10 times higher grade NdPr than a typical ionic clay style rare earth deposit (see table below). It also has low levels of radioactive elements which means easier processing and lower costs.

Being on the site of a past mining operation, the Phalaborwa Project has excellent infrastructure and transport logistics. The Project is largely permitted and positioned in an established mining region.

Rainbow Rare Earths' two projects have good grade NdPr, especially Gakara

Project	Style	Owner	TREO ⁴ %	NdPr ⁵ ppm	Uranium ⁶ ppm	Thorium ⁷ ppm
Phalaborwa ¹	Gypsum stacks	Rainbow Rare Earths	0.431%	1,257	2	48
Round Top ²	Ionic Clay	US Rare Earths/TMRC	0.063%	39	45	179
La Paz ²	Ionic Clay	American rare Earths	0.04%	80	1	7
Makuutu ²	Ionic Clay	Ionic Rare Earths	0.08%	232	10	30
Mount Weld ²	Hard rock	Lynas Rare Earths	7.90%	18,833	30	750
Bear Lodge ²	Hard rock	Rare Element Resources	3.08%	7,059	113	472
Longonjo ²	Hard rock	Pensana plc	1.43%	3,170	29	967
Nolan's Bore ²	Hard rock	Arafura Resources	2.60%	6,859	191	2,700
Norra Karr ²	Hard rock	Leading Edge Materials	0.55%	758	15	8
Lofdal ²	Hard rock	Namibia Critical Metals	0.32%	181	18	350
Gakara ³	Hard rock	Rainbow Rare Earths	13.50%	26,706	97	151



PHALABORWA BENEFITS FROM:

- Greater high-value NdPr grade than a typical low-cost ionic clay rare earth project – closer to grade of traditional hard rock style deposits, which typically have a much higher cost base for mining, crushing/grinding and metallurgical recovery
- Considerable high-value Dy and Tb credits
- Substantially lower levels of radioactive elements than most publicly disclosed rare earth projects

Source: [Rainbow Rare Earths company presentation](#)

The Gakara Project (90% interest)

Rainbow [states](#) that “the Gakara Rare Earth Project is one of the world’s richest rare earth deposits.” Rainbow has a 90% interest in the Gakara Project with a non-dilutable 10% owned by the Burundi State. The mining permit covers a large area of over 39km² and has a 25-year mining license that began in March 2015.

Gakara was placed on [care and maintenance](#) in June 2021 at the request of the Government of Burundi. Primary concerns of the Burundi Government are understood to relate to the pricing of the mineral concentrate currently sold under a long-term off-take agreement with a German company’s (ThyssenKrupp), trading arm. Rainbow [states](#): “Rainbow continues to engage constructively with stakeholders to resolve the issue and allow trial mining to recommence as soon as possible.”

Highlights of the Gakara Rare Earth Project

- ▶ Extremely high-grade ore
- ▶ Numerous and extensive veins containing nearly pure bastnaesite and monazite minerals
- ▶ 262-375,000 tonnes high grade veins at 7-12% TREO and 252-342,000 tonnes low grade Breccia at 1.0-1.5% TREO
- ▶ NdPr, the critical input materials in permanent magnets, represent approximately 80% of the overall basket value
- ▶ Veins extracted by selective mechanical mining of ore (no explosives required)
- ▶ Trial mining and processing since 2017 have demonstrated low risk, low opex mining and amenability for simple, low-cost gravity separation
- ▶ Simple, physical separation of minerals from waste rock produces high-value rare earth concentrate of 52-58% TREO, with low levels of radioactivity
- ▶ No complicated or hazardous chemistry required
- ▶ Intention to implement a modular commercial scale operation of 5,000 tpa concentrate, capable of scaling up to 10-20,000 tpa
- ▶ Distribution agreement in place with Thyssenkrupp Material Trading
- ▶ Co-operation agreement for downstream processing Definitive Feasibility Study signed with TechMet
- ▶ Board and management team have the expertise and in-country experience to meet production and exploration objectives
- ▶ Strong local and governmental support
- ▶ Fully permitted; 25 year mining licence

Source: [Rainbow Rare Earths website](#)

Closing remarks

Rainbow has two exciting African rare earth projects.

The Phalaborwa Project has several advantages including:

1. An ore tailings source, so no need for hard rock mining, crushing, or milling and hence lower production costs.
2. High-value Nd and Pr oxide content representing 29.1% of the total contained rare earth oxides, with low levels of radioactive elements, and
3. An existing mining site with great infrastructure and logistics available.

The Gakara Project has outstanding NdPr grades in visible “veins” and is amenable to simple physical separation of minerals from waste rock to produce a high value rare earth concentrate. This makes for a low OpEx project. The Project is currently on care and maintenance pending the expected resolution of certain legal issues with the government of Burundi.

Risks are typical of those for junior rare earths miners including funding risk and in this case, sovereign risk in Africa.

Rainbow Rare Earths Limited trades on a market cap of [£ 78 million](#) (~US\$105 million). One to follow with great interest.