# George Bennett Bets on Low-Cost Rare Earths at Rainbow's Phalaborwa Project

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September 29, 2025 – The rare earth industry is littered with failed promises and overhyped projects, but George Bennett, CEO and Director of Rainbow Rare Earths Limited (LSE: RBW), insists his company is carving out a path defined by low costs, chemical ingenuity, and near-term production. "We are very low capital intensity for a typical rare earth development project," Bennett said in a recent conversation. "We are circa $300 million of capex to build a plant that's going to separate NdPr (neodymium-praseodymium) to 99.5% purity, and we're going to produce the SEG+* group which will have our heavies in that—dysprosium (Dy) and terbium (Tb)."

Rainbow Rare Earths has positioned itself not as a traditional miner but as a pioneer in chemical processing, extracting rare earths from phosphogypsum waste—residues that have already undergone the "cracking" step that many competitors struggle with. "**We're not your typical rare earth so-called miner**. We're more of a chemical processing plant with IP and tech at our fingertips," Bennett explained. At the Phalaborwa project in South Africa, 35 million tons of phosphogypsum grading 0.44% TREO sit above ground, chemically cracked and ready for processing. "Two-thirds of our flow sheet in Rainbow comes at zero cost to us before we start separating the rare earths," Bennett emphasized, framing this as a decisive economic advantage.

That economic edge is beginning to show tangible progress. Rainbow recently announced the successful completion of its

cerium (Ce) depletion step, a milestone in optimizing its flowsheet. “We’ve been able to achieve 65% depletion of our cerium content in our feed stream, which means we have to treat about 27% less metal in the final separation circuit,” Bennett said. The advancement, confirmed in a September 22 news release, reduces both capex and opex. As he put it, “We’ll be separating our rare earths at an equivalent value of below $13/kg. In fact, we will be less than that when we publicize our optimized numbers.”

The Phalaborwa basket itself is unusually rich: 29.1% NdPr, among the highest globally, with economic levels of dysprosium and terbium in the SEG+ group. Bennett noted that this model mirrors the early career strategy of Lynas Rare Earths (ASX: LYC), which for years sold its SEG+ production to China. But Rainbow plans to go further, leveraging offtake contracts and possibly building a heavy rare earth separation plant in the U.S., Europe, or Japan with external funding. “Since the REA conference in Montreal a couple of months ago, we had a significant increase in offtake discussions,” he said. He pointed to the U.S. Department of Defense’s contract with MP Materials (NYSE: MP) as setting a precedent: “$110 per kg for NdPr has set a benchmark. We saw the Chinese, since that deal was announced, move the price up to about $82–$84/kg today.”

South Africa, Bennett argued, provides a natural advantage: a brownfield site with established infrastructure, access to reagents, and low labor costs. “We’ve still got amazing engineering and technology available to us with the skills in South Africa, and this is on our doorstep at a very low cost for Rainbow,” he said. He added that the Rainbow team has designed and built over 80 process plants worldwide—experience that positions them to deliver on timelines.

Those timelines are now in sharp focus. Rainbow plans to

finalize its separation circuit design within months, and optimization results are expected to further strengthen project economics. “There’s a lot of good news coming out over the next three to four months,” Bennett noted, highlighting a parallel development in Brazil. The Uberaba project, a joint venture with Mosaic, could eclipse Phalaborwa with higher grades and longer life. “It’ll be larger and will make Rainbow the only company in the world that I’m aware of that’s got country diversification and project diversification,” he said.

Bennett’s conviction is grounded in market shifts as well as technical progress. “We have seen a bifurcation of the pricing between China and Europe,” he observed, pointing to dysprosium and terbium trading two to three times higher in Europe than in China. For Rainbow, the economics look compelling: “At $110 for NdPr we would make circa $190 million of EBITDA per annum on a $300 million capex build. So you can see it’s a very attractive project.” With a $50 million equity commitment from the U.S. International Development Finance Corporation already secured, Rainbow is targeting construction in 2027 and production by 2028.

For Bennett, who joined Rainbow in 2019 after a career that included selling MDM Engineering and conducting feasibility studies on African rare earth projects, the move into critical minerals was both strategic and timely. “It was something that I realized even then was going to be a critical mineral going forward,” he recalled. “So when I saw the opportunity, I took it with both hands.”

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*(*SEG+ refers to a bundled product of middle rare earths—samarium, europium, and gadolinium—together with heavy rare earths like dysprosium and terbium, which are essential for*

*high-temperature performance in permanent magnets.*)

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# About Rainbow Rare Earths Limited:

Rainbow Rare Earths aims to be a forerunner in the establishment of an independent and ethical supply chain of the rare earth elements that are driving the green energy transition. It is doing this successfully via pioneering the first commercial recovery of rare earth elements from phosphogypsum that occurs as the by-product of phosphoric acid production. These projects eliminate the cost and risk of typical rare earth projects, which involve mining and the production of a rare earth concentrate that must be chemically cracked to form a mixed rare earth carbonate before further downstream processing. As such, Rainbow’s projects can be brought into production quicker and at a lower cost than traditional hard rock mining projects.

The Company is focused on the development of the Phalaborwa Project in South Africa and the earlier stage Uberaba Project in Brazil. Rainbow’s process will deliver separated rare earth oxides through a single hydrometallurgical plant on site, with a focus on the recovery of neodymium, praseodymium, dysprosium and terbium. These are critical components of the high-performance permanent magnets used in electric vehicles, wind turbines, defence and exciting new markets such as robotics and advanced air mobility.

The Phalaborwa updated interim economic study released in December 2024 has confirmed strong base line economics for the project, which has a base case $NPV_{10}$ of US$611 million. Given

Phalaborwa is a chemical processing operation, with its resource sitting at surface in a chemically cracked form, it has a much lower operating cost than traditional rare earth mining projects, and it is therefore estimated to be the highest margin rare earth project in development today outside of China.

To learn more about Rainbow Rare Earths Limited, click here

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