

Rare Earth Deposits Deck a Top Trumps-style game

About SoS RARE

SoS RARE, a project supported by the Natural Environmental Research Council UK (NERC) SoS MinEerals program, is a large interdisciplinary team carrying out research to better understand Rare Earth Element (REE) deposit types, and ensure REE are responsibly sourced. Research includes developing more efficient and environmentally-friendly ways to process REE deposits, and working on metrics to compare deposit characteristics.

Rare Earth Elements (REE)

The Rare Earth Elements (REE) are ubiquitous in modern technologies, including computers, low energy lighting, energy storage devices and large wind turbines, making their supply vital to our ever growing technological society and the development of a low carbon economy. The grade (low-high) of each REE element is indicated for each deposit.

La	Ce	Pr	Nd	Sm	Eu	Gd	Tb
high	Dy	Ho	Er	Tm	Yb	Lu	Y
low							

Notes

The values given for each category are estimates based on the simplification of relevant factors from available sources, and should not be taken as an economic assessment or comment on environmental performance of the deposits or companies. For Information on the allocation of values, please see the accompanying scoring sheet.



Rare Earth Deposits Deck - Instructions

Game Play

2 - 6 players

Deal all the cards face down between the players.

Each player holds their cards face up in a pile so that they can see the top one only.

The player to the left of the dealer selects a category and reads out the value of that category on their card.

In turn, each of the other players reads the same value from their top card. The card with the best value in the chosen category wins.

The winning player takes all of the cards and places them to the bottom of their pile, then re-starts the game by choosing a category from the new top card in their hand.

If two or more cards share the top value, all of the cards from that round are placed in the middle and the same player chooses again from the next card.

The winner of that round then takes the cards from the previous round in addition to those he/she has won.

The player with all the cards at the end of the game is the winner.

Variations

Players can look at all of their cards and select the best one from their hand to play each time.

Timed version – whoever has the most cards at the end wins.

Bonus points for collecting all sites from one country/continent.



Araxá - Brazil

La	Ce	Pr	Nd	Sm	Eu	Gd	Tb
high	Dy	Ho	Er	Tm	Yb	Lu	Y
low							



Deposit size	5
Accessibility	5
Radioactivity	3
Environmental score	5
Production stage	4
Political stability	4
Proportion of "rarest" rare earth elements	2










Bayan Obo - China

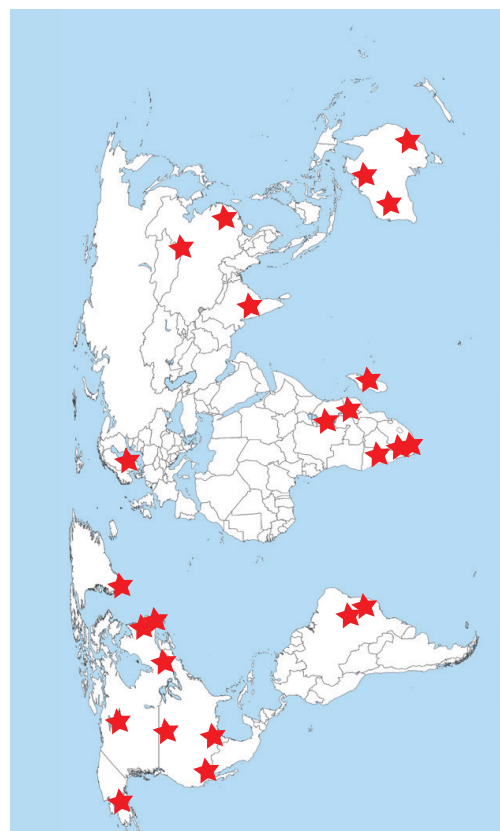
La	Ce	Pr	Nd	Sm	Eu	Gd	Tb
high	Dy	Ho	Er	Tm	Yb	Lu	Y
low							



Deposit size	9
Accessibility	5
Radioactivity	2
Environmental score	2
Production stage	4
Political stability	3
Proportion of "rarest" rare earth elements	2

Rare Earth Deposits Deck - Categories

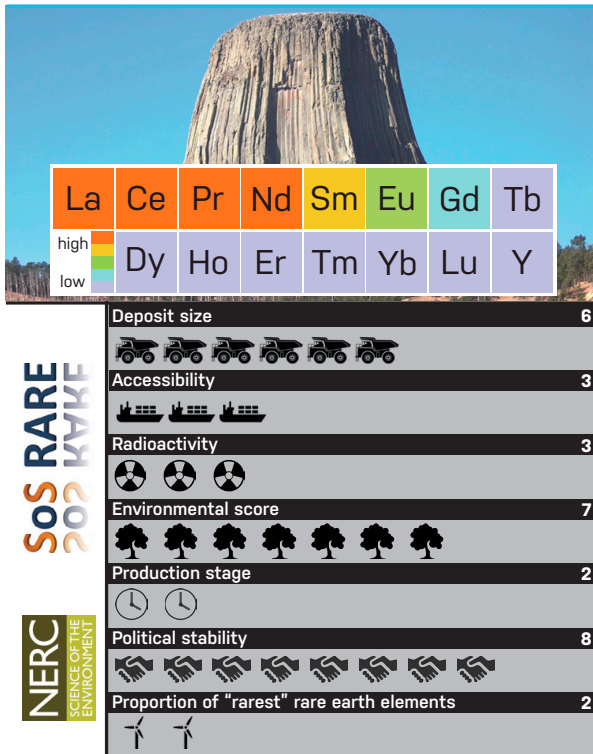
Deposit size	
Scored 1 - 10 (highest wins) based on published resource data (amount of estimated REE ore content in the deposit).	
Accessibility	
Scored 1 - 5 (highest wins) based on the proximity to road, rail, ports for transporting to market.	
Radioactivity	
Scored 1 - 10 (LOWEST wins) based on the radioactivity of main REE ore present.	
Environmental score	
Scored 1 - 10 (highest wins) based on environmental democracy index, grade, and implementation of environmental standards.	
Production stage	
Scored 1 - 4 (highest wins) to reflect the current (2017) progress. 1 = exploration stage; 2 = mine design and planning; 3 = in construction; 4 = in production	
Political stability	
Scored 1 - 10 (highest wins) based on the 2017 political climate of the country, including government/local attitudes to mining.	
Proportion of "rarest" rare earth elements	
Scored 1 - 10 (highest wins) to reflect the heavy REEs that are the least abundant in nature (e.g. Dy use in wind turbines).	



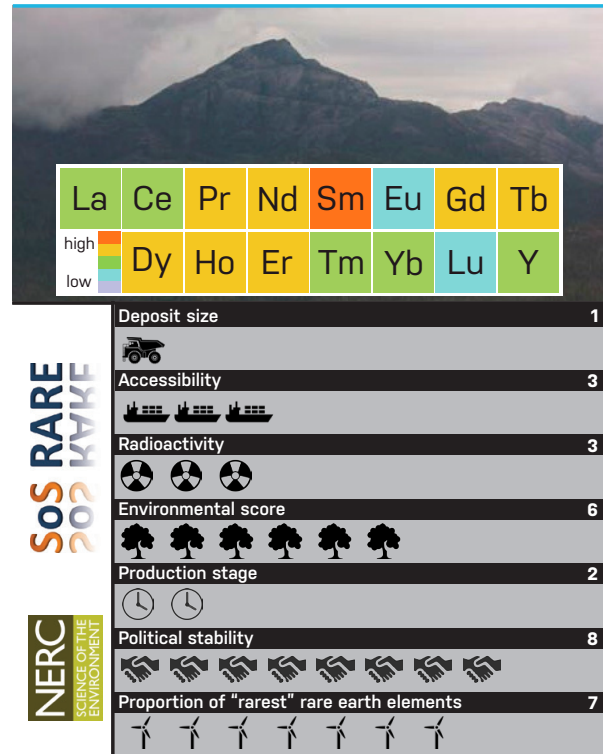
Rare Earth Deposits - locations



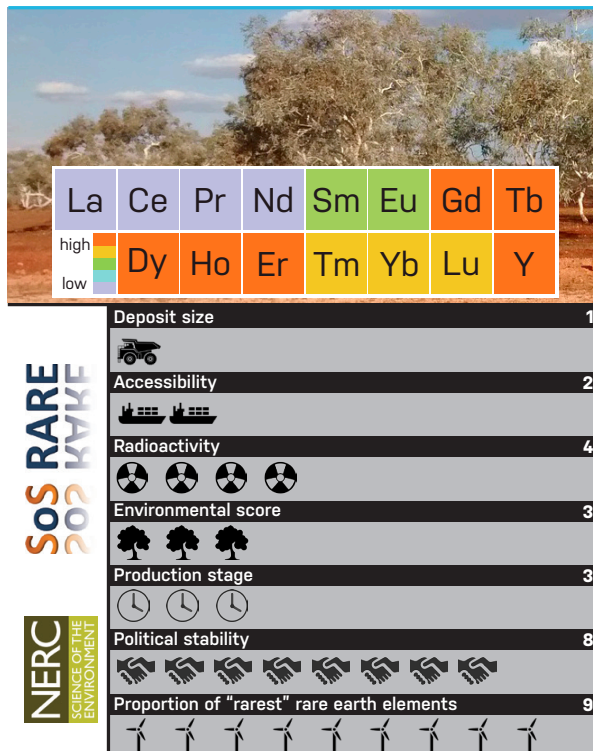
GeoBus Bear Lodge - USA



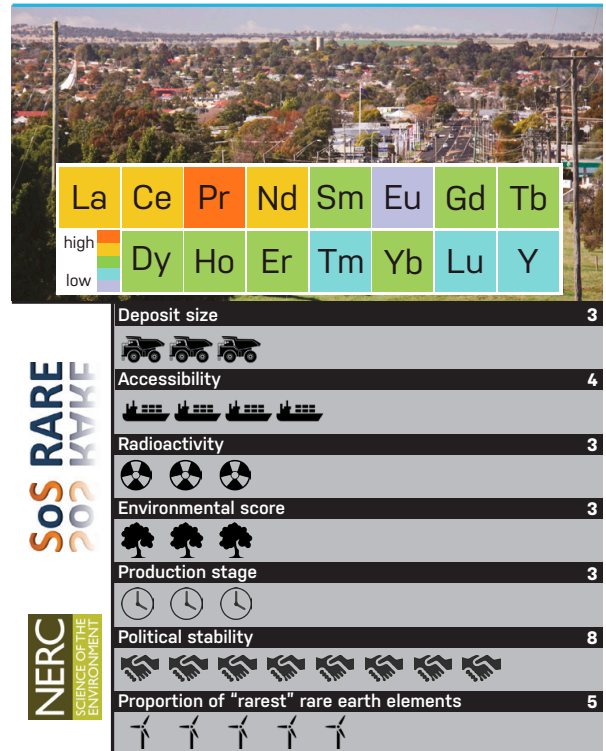
GeoBus Bokan Mountain - USA

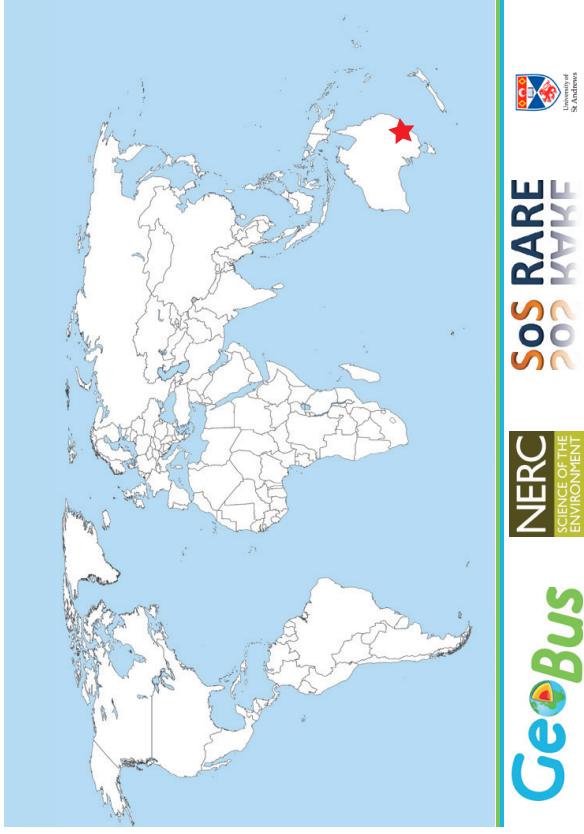


GeoBus Browns Range - Australia

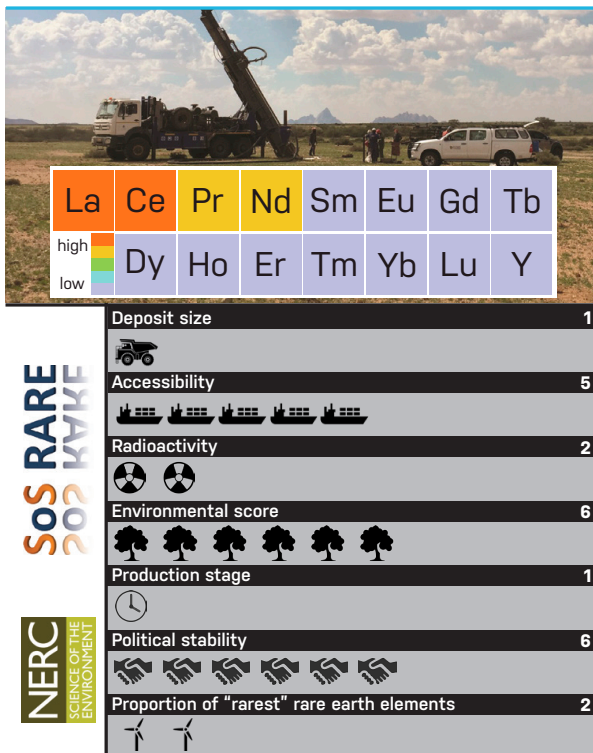


GeoBus Dubbo Zirconia - Australia

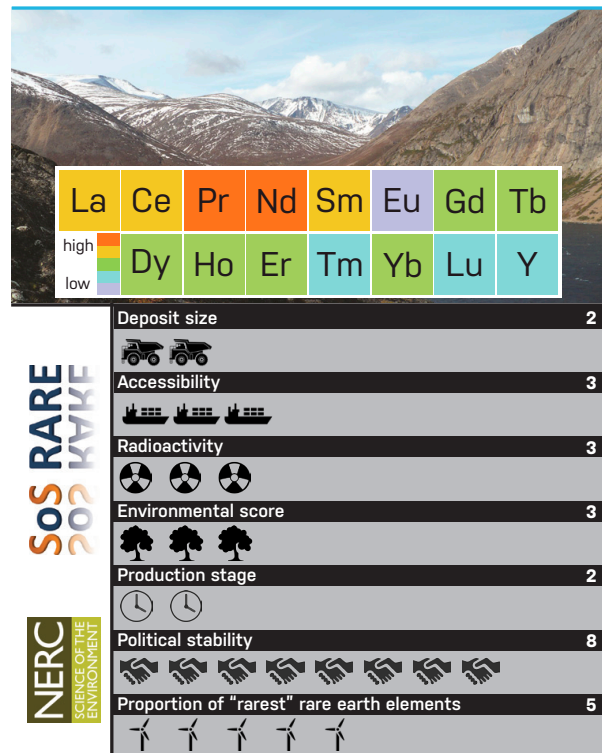




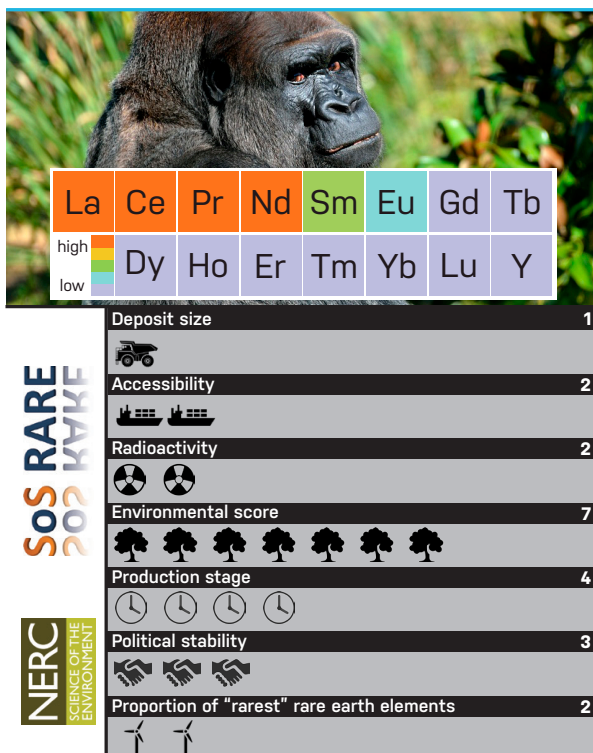
GeoBus Eureka - Namibia



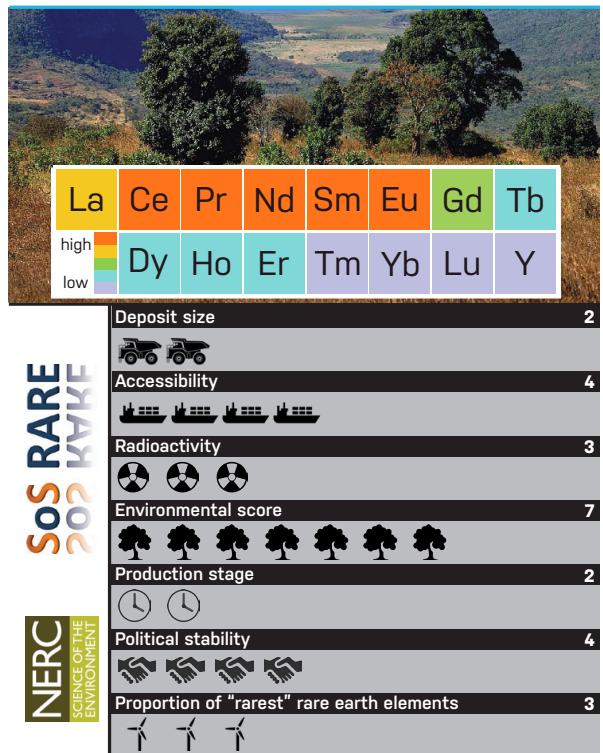
GeoBus Foxtrot - Canada



GeoBus Gakara - Burundi



GeoBus Glenover - South Africa





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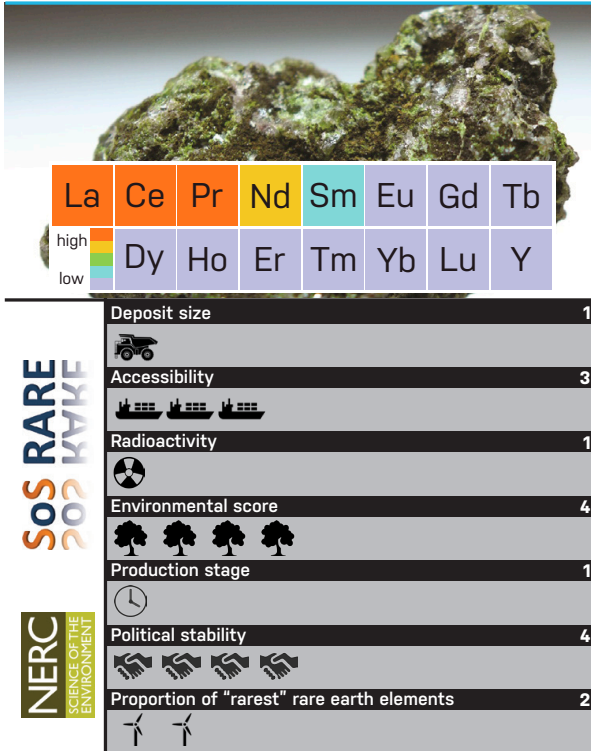
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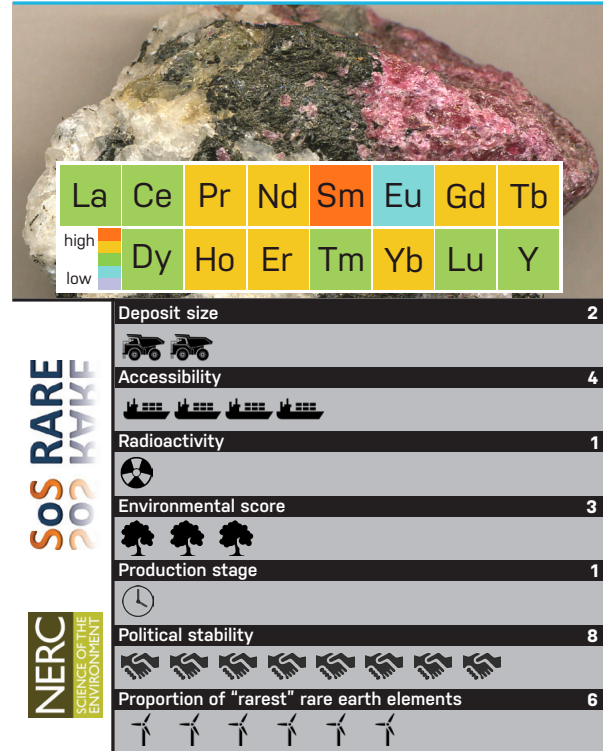
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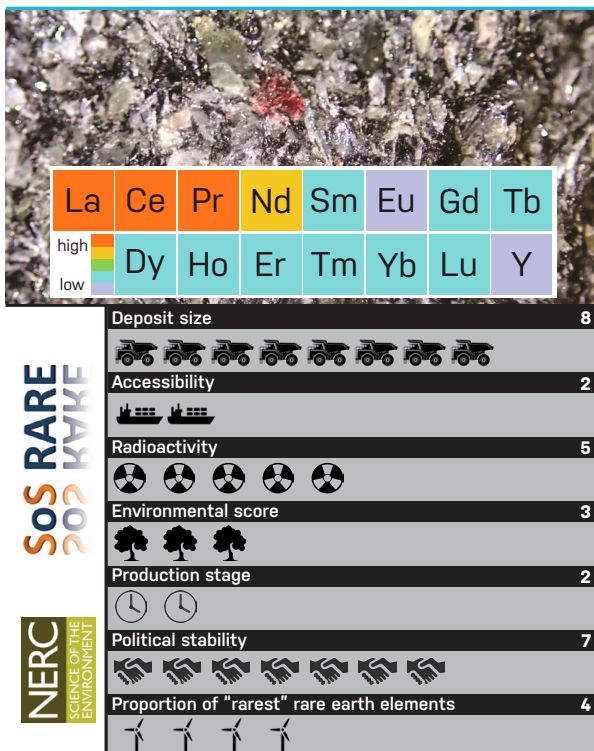
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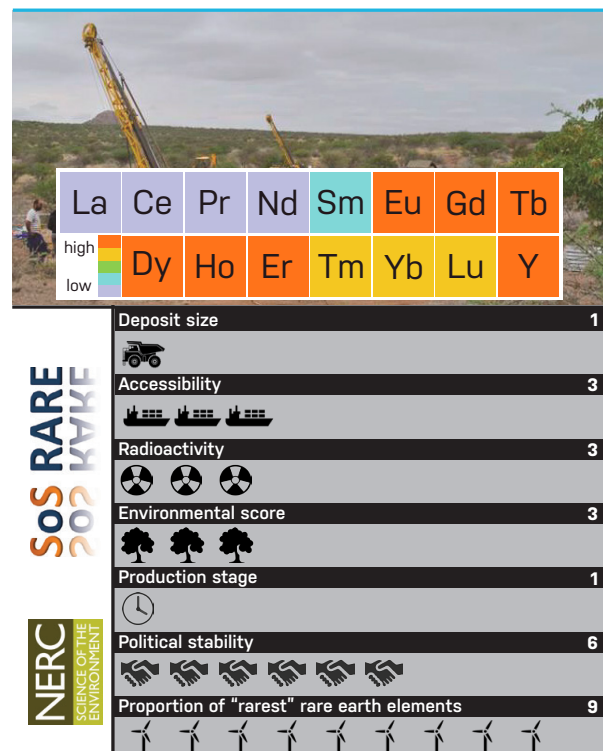
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GeoBus Kvanefjeld - Greenland

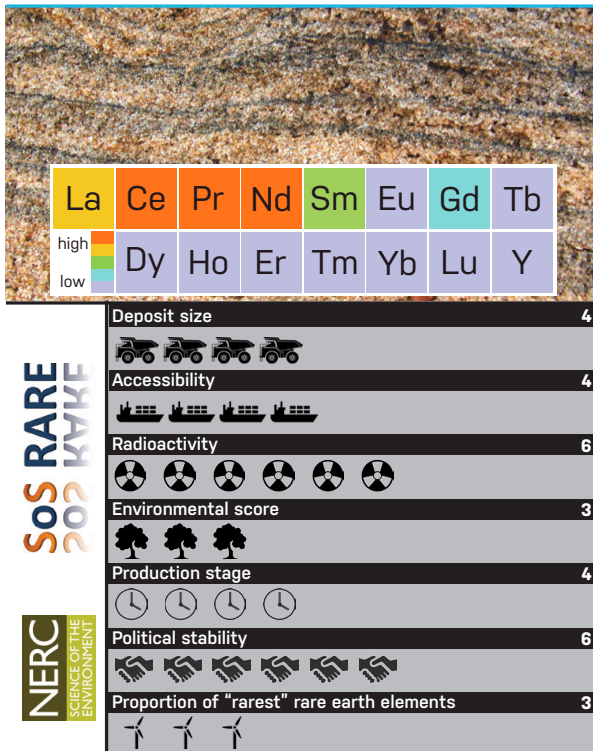


GeoBus Lofdal - Namibia

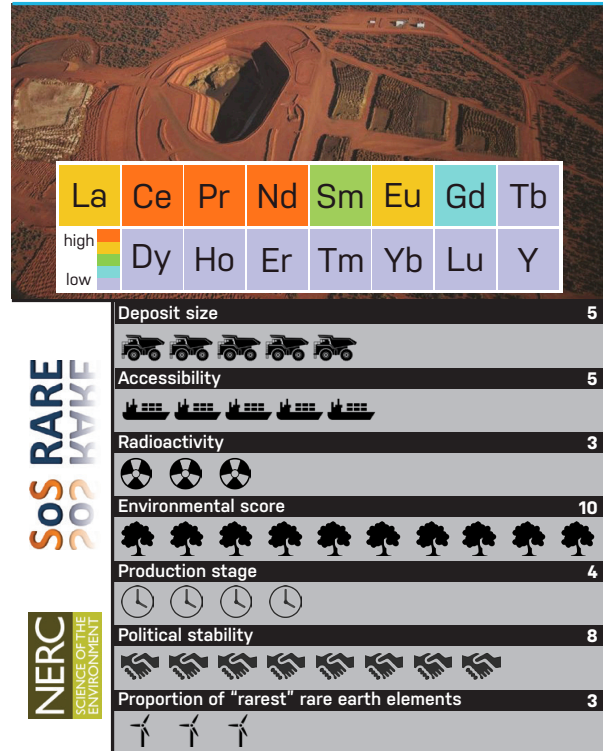




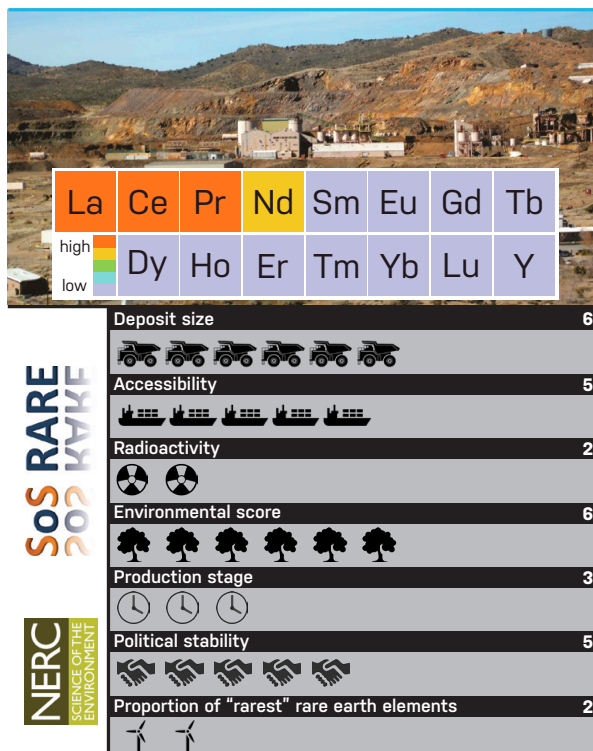
GeoBus Mineral Sands - India



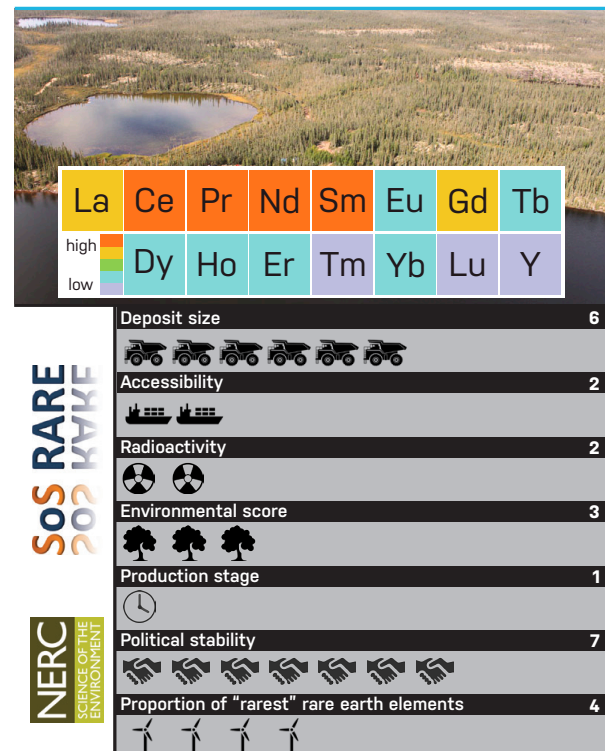
GeoBus Mount Weld - Australia



GeoBus Mountain Pass - USA



GeoBus Nechalacho - Canada





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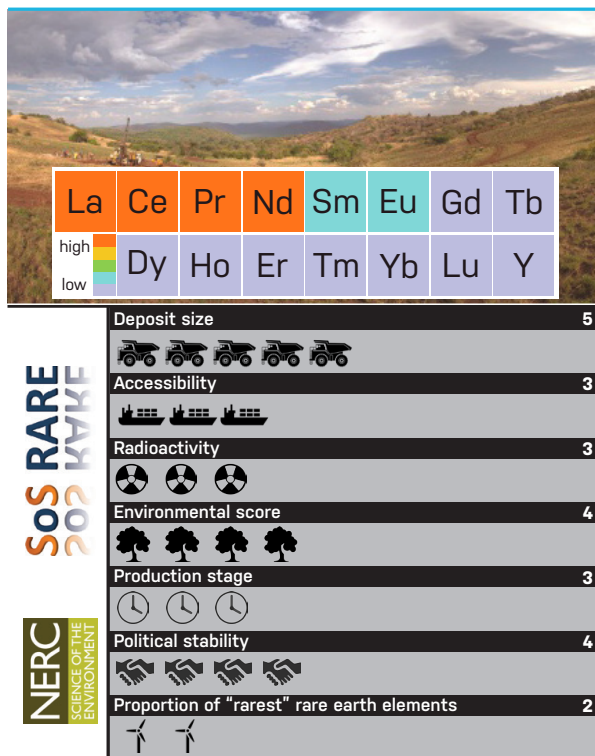
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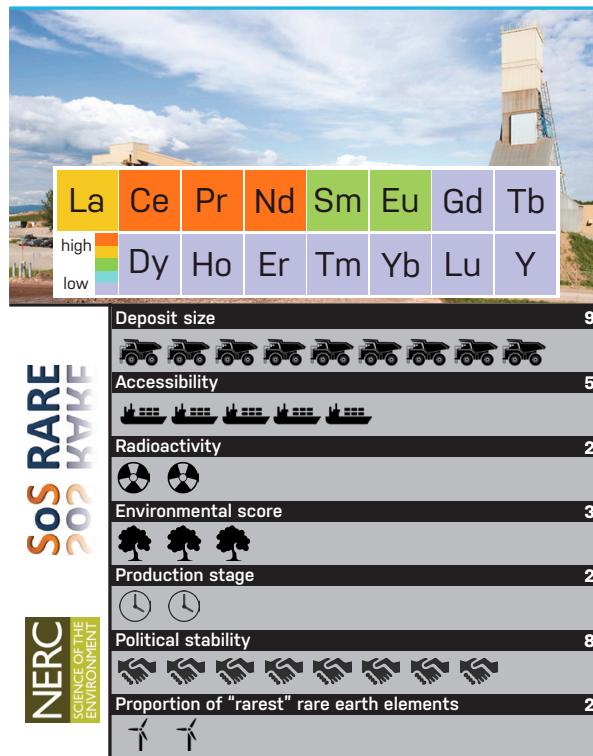
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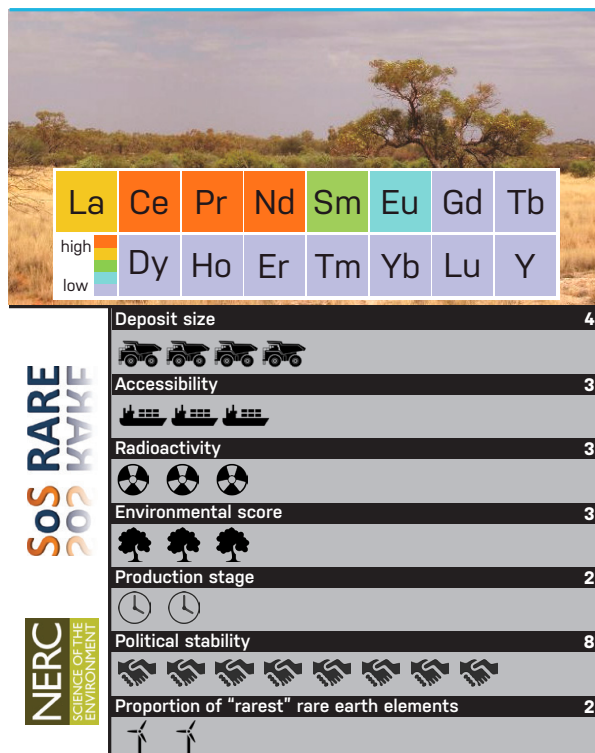
GeoBus Ngualla - Tanzania



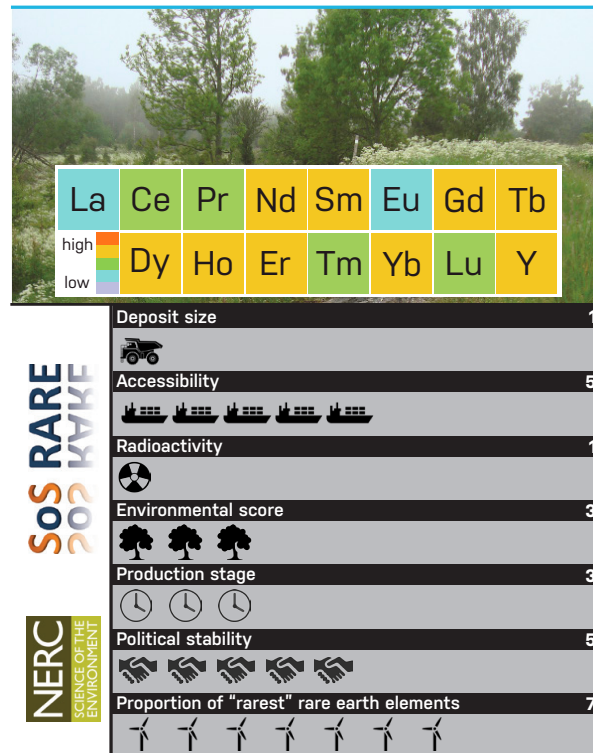
GeoBus St Honore - Canada



GeoBus Nolans Bore - Australia

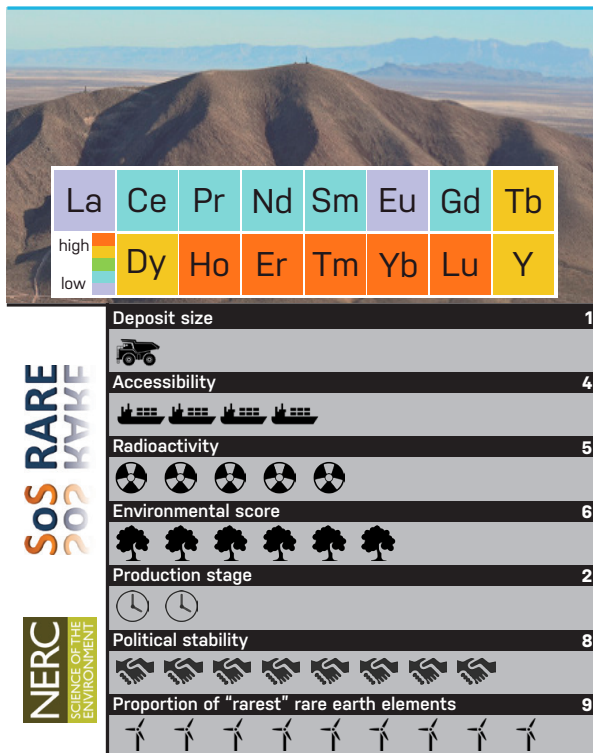


GeoBus Norra Kärr - Sweden

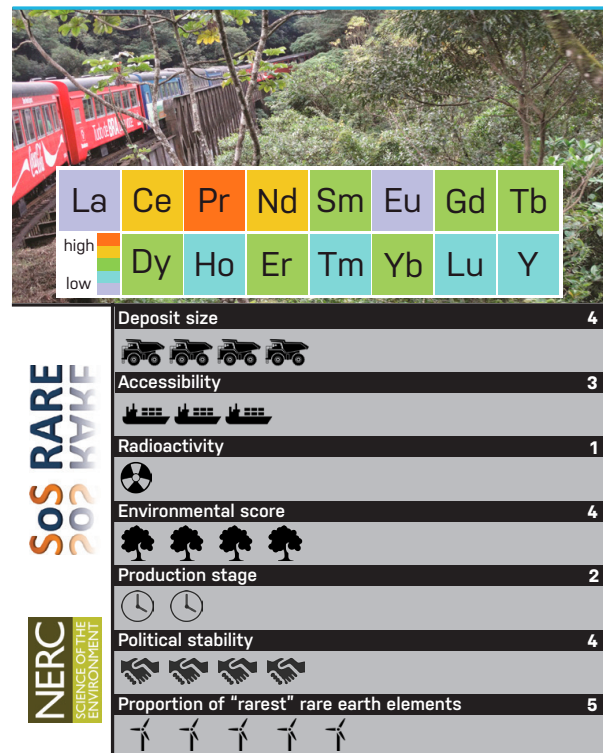




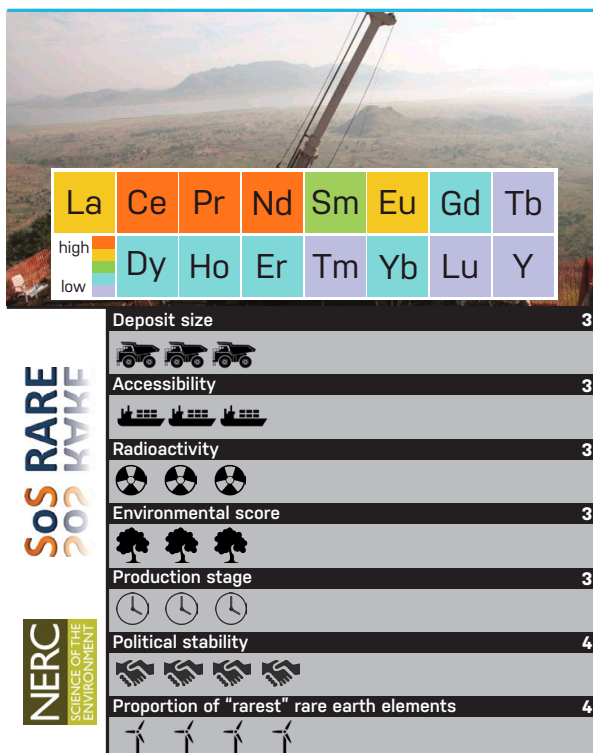
GeoBus Round Top - USA



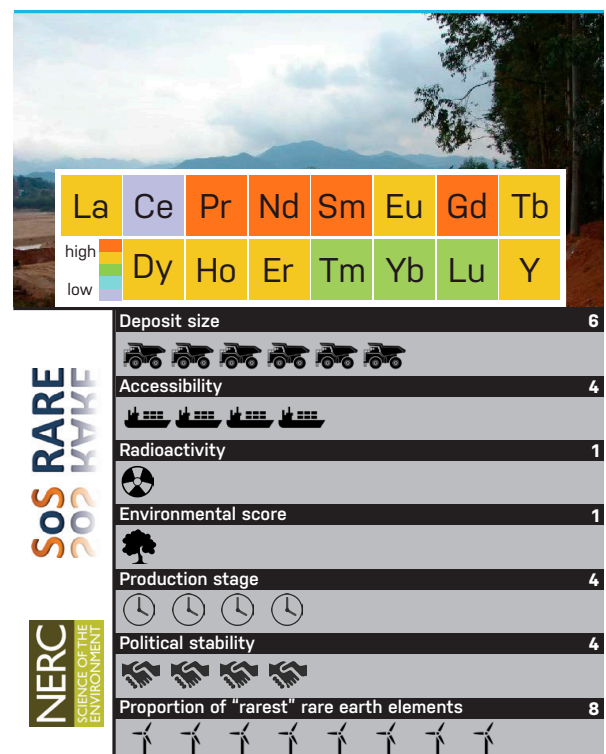
GeoBus Serra Verde - Brazil



GeoBus Songwe Hill - Malawi



GeoBus South China Clays - China





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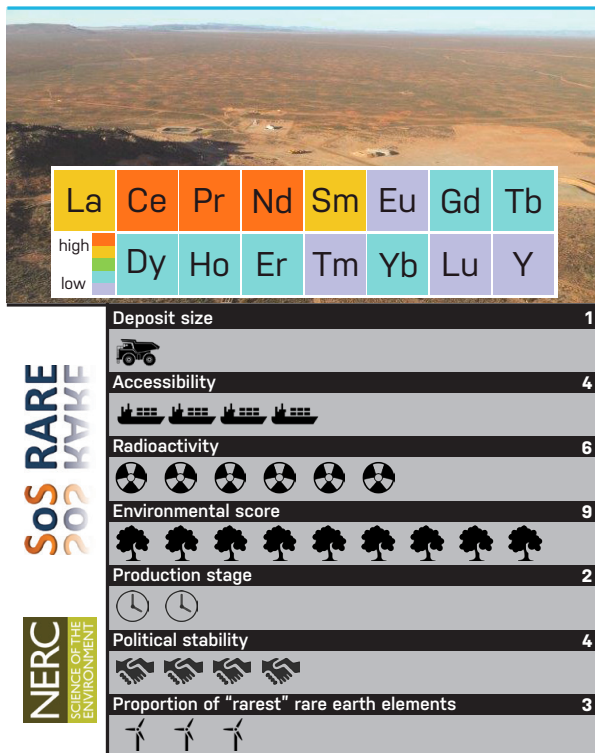
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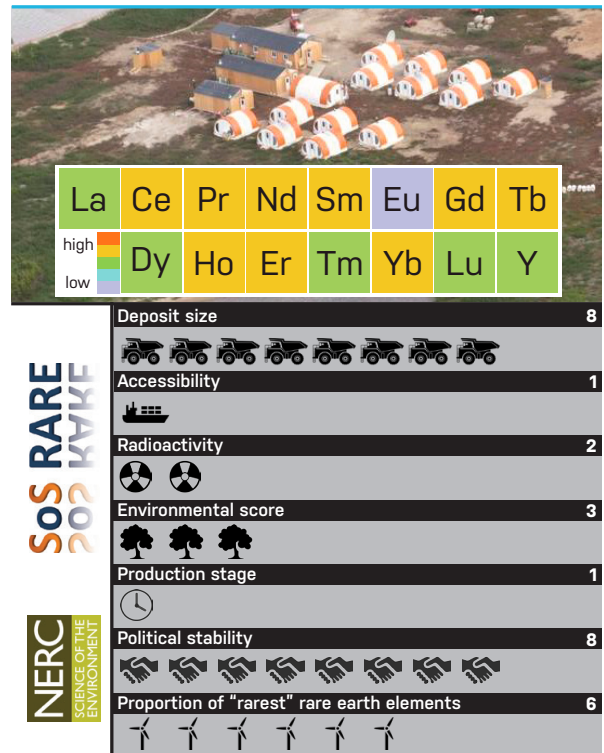
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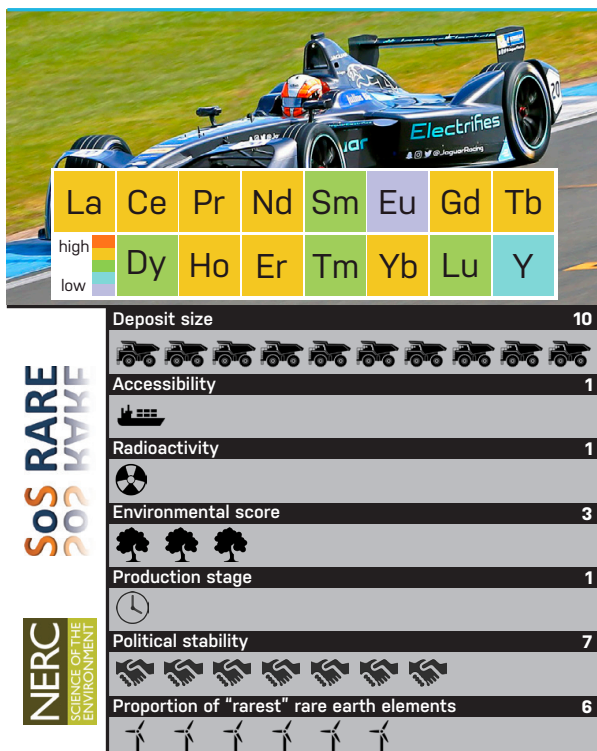
GeoBus Steenkampskraal - South Africa



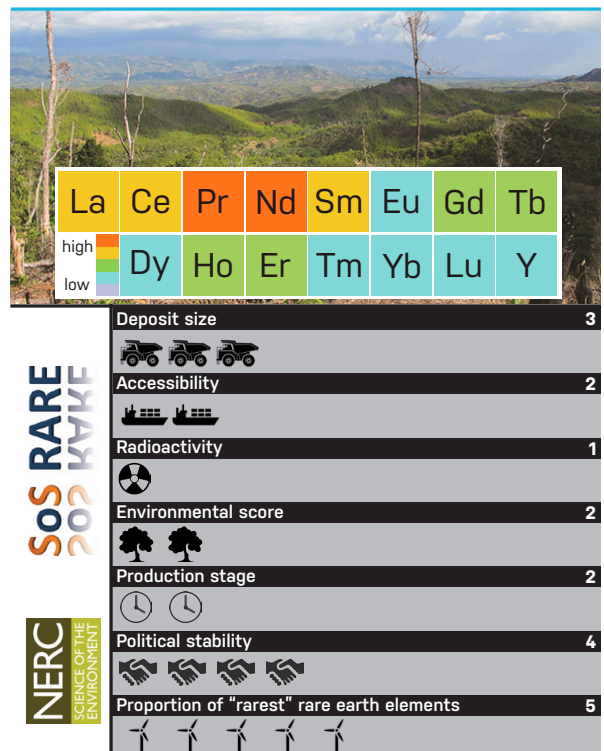
GeoBus Strange Lake - Canada



GeoBus Tanbreez - Greenland



GeoBus Tantalus - Madagascar





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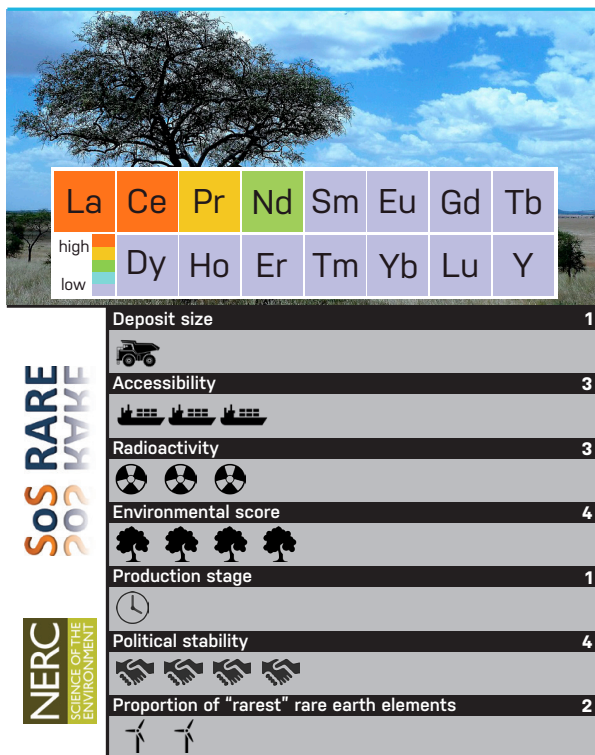
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GeoBus Yangibana - Australia

