

# RARE EARTH ELEMENTS (REE)

## INVESTMENT OPPORTUNITY SCORECARD

### MINING & METALS



## RARE EARTH ELEMENTS (REE)

**Opportunity Description:** Opportunity to develop a 10 ktpa REE Extraction plant to supply the regional and global market

### INVESTMENT OVERVIEW

#### INVESTMENT HIGHLIGHTS

- Expected investment size of USD 400 Mn
- Plant capacity: 10 ktpa
- The rare earth elements (rare earth metals) are group of 17 chemically similar metallic elements

#### FUTURE OPPORTUNITIES

- opportunity to develop supplementary deposits of Zirconium, Niobium and Tantalum mining resources with REEs deposit during the exploration stage.

#### VALUE PROPOSITION

- Presence of locally available raw material including high value heavy rare earth oxides (Lanthanum, Cerium, Neodymium, Dysprosium, Holmium...etc) and Yttrium.
- This state of the art REE complex will be an integrated mining setup which will start with upstream operations such as crushing, grinding and beneficiation followed by acid leaching and solvent extraction.
- In the KSA, this project will contribute indirectly to environmental safety by controlling emissions by REE used as catalysts for refining petroleum and automotive catalytic converters.
- REE are increasingly integrated in new technologies, especially within the clean energy, military, and consumer electronics sectors which will enhance new cluster developments in the KSA.

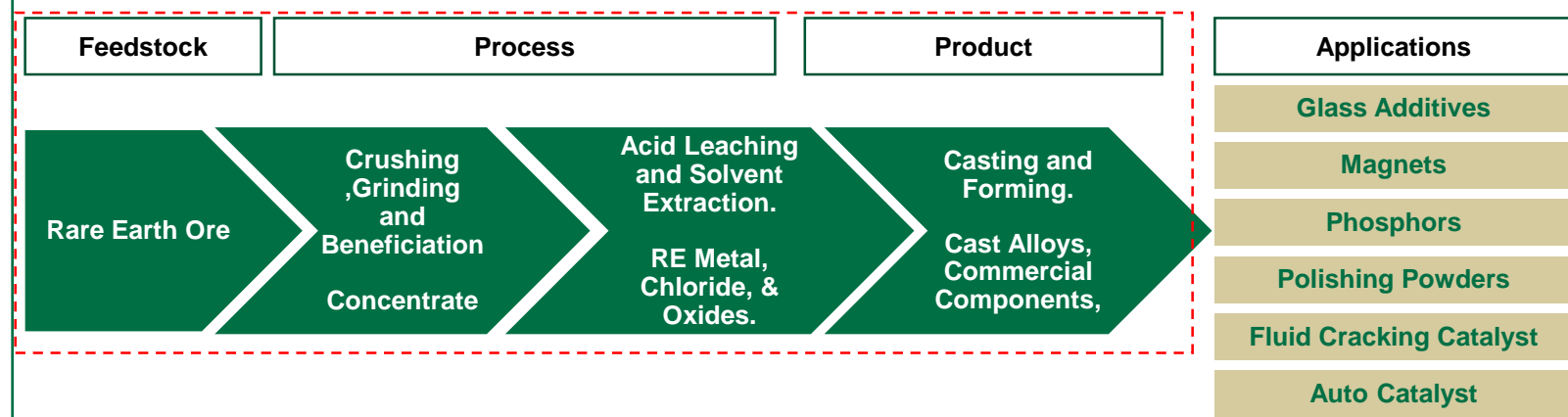
### MARKET OVERVIEW

#### GLOBAL TREND

- The global REEs market was estimated at 220 ktpa in 2020 and expected to reach 350 ktpa by 2027 registering a CAGR of 6-7%.
- Only 25% of globally mined REEs are refined into distinct pure REE's (cerium, europium, gadolinium, neodymium, samarium and terbium).
- Remaining 75% are used in the form of REE salts, mainly oxides and chloride.
- Globally Glass additives, Magnets and Phosphors are the key applications (70% share) that will drive demand for REEs. Other applications i.e. Catalyst LiNaH batteries, Polishing powders, FCC and Metal alloys (30% share) will grow in the long term.

#### VALUE CHAIN ANALYSIS

Opportunity Focus



#### KEY DEMAND DRIVERS

- The KSA's REE concentration meets the world benchmark for REE & high rare earth elements oxides/chlorides extraction from byproduct route from Zirconium, Niobium, Tantalum.
- In the KSA, all REE Minerals deposit are found in Jabal Tawlah and Ghurayyah.
- This project can leverage locally available resources and can target exports to the wider GCC and MENA region.
- Aluminum-Cerium (REE) is an emerging alloy used in foundry it adds to durability of cast metal.
- The KSA is aiming at increasing its investments in the electrical vehicles ecosystem and this will surge the future Lanthanum demand.

# DEFINITIONS

#	SCORECARD SECTION	DEFINITIONS
1	Market size	Size of market in value/volume in KSA and/or Region (MENA/GCC) covering future projections based on available estimates from published /government sources
2	Business drivers	A select number of factors that will influence future demand for the related product/service
3	Investment highlights	An overview of key financial metrics summarizing the investment opportunity along with the expected return based on the suggested investment size
4	Value proposition	Summary of key differentiators that position KSA as a strategic choice over other regional/global peers
5	Market readiness	An overview of KSA market structure, market maturity and level of participation by local and global players
6	Competitor analysis	List of the local & international players manufacturing the underlying product in Saudi Arabia and their market share
7	Global trends	Latest business developments within the sector/product category
8	Scalability and localization	Ease of scaling the business across the value chain or into new adjacent products or geographies that would maximize the opportunity's investment returns and the ability and potential to locally manufacture the product and its components
9	Import dependency	An overview of the countries from which Saudi Arabia is importing the product and their value/volume and share in total imports
10	Value chain analysis	The process or activities that would potentially need to be carried out to deliver the underlying product or service
11	Key stakeholders	Government institutions, organizations, and/or authorities that participate or influence the market for the underlying product/service
12	Enablers	Factors that enable investment in the underlying opportunity
13	Cost of doing business in KSA	Key factors that position KSA as a competitive destination for investment in the region. Productivity adjusted wages do not include cost of \$1.23/hour towards annual recurring charges including work permit, resident identity (iqama) and health insurance

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