

# Breaking Ground on the World's First Rare Earth Processing Hub

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**Saltend Chemicals Park  
Humber Freeport, UK**

BMO Rare Earths Supply Chain | June 2022

**PENSANA** Plc



# EV AND OFFSHORE WIND WILL DRIVE RARE EARTH DEMAND SEVEN-FOLD BY 2050

NdPr oxide is key to the manufacture of permanent magnets used in Electric Vehicles and Offshore Wind turbines.

Adamas Intelligence warns that post 2030:



*“The rapid demand growth of the 2020s will soon be dwarfed by the demand growth of the 2030s.”*



Adamas Intelligence has doubled its NdPr oxide price forecast and **8.3% CAGR to 2035**

# CHINA SUPPLIES 95% OF WORLD'S RARE EARTH MAGNETS

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*“China has no obligation to be the rare earth supplier to the world.”*

Lin Boqiang, Director of the China Center for Energy Economics

*War in Ukraine Update May 2022: New Export Control Law will give Beijing control over the sale of RE Magnets to the US and other countries based on security and foreign policy.*

Source: <https://chinabigidea.substack.com/p/gep-innovation-in-china-2025-carbon>

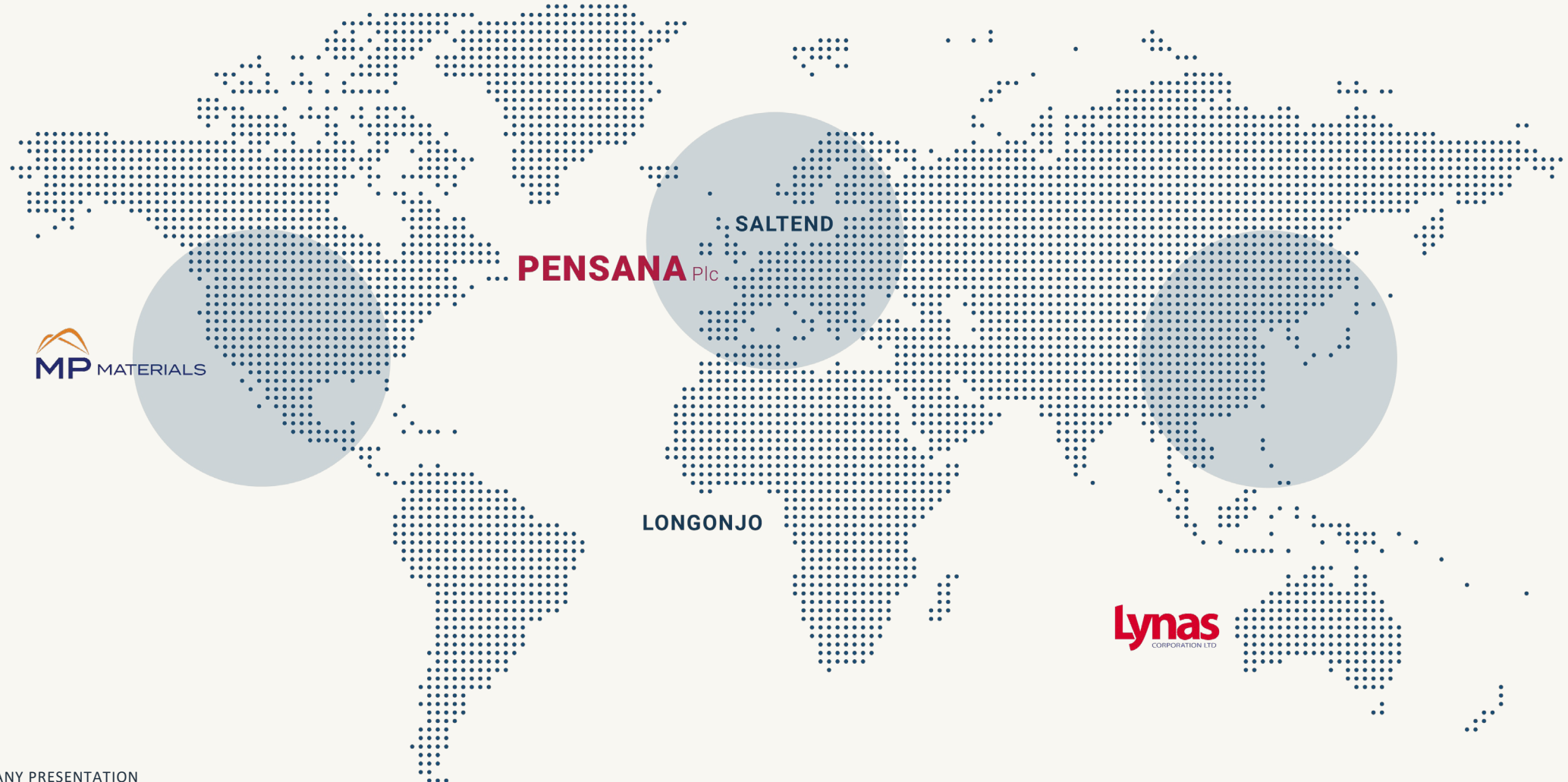


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CARBON NEUTRAL  
2060 PLAN

# LYNAS CORPORATION (LYC.ASX) CURRENTLY THE ONLY MAJOR RARE EARTH PRODUCER OUTSIDE CHINA

PENSANA Plc



**Lynas**  
CORPORATION LTD

LYC:ASX

**MP** MATERIALS

MP:NYSE

**PENSANA** Plc

PRE:L

**MARKET  
CAP US\$**



**US\$6bn**



**US\$7bn**



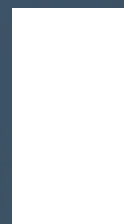
**<US\$300m**

**NdPr PRODUCTION  
tonnes per year**



**5,500  
tonnes**

**IN PRODUCTION  
SINCE 2013**



**6,500  
tonnes  
by 2024**

**IN DEVELOPMENT**



**4,500  
tonnes  
by 2024**

**IN DEVELOPMENT**

**CAPEX US\$**

**c. US\$1.5 billion**

**>US\$2 billion**

**<US\$500 million**



# BREAKING GROUND AT “PLUG AND PLAY” SALTEND CHEMICALS PARK JULY 2022

One of the first major rare earth separation facilities to be established in over a decade.

First to be established in a Freeport. Will create 450 jobs during construction and 125 high value full time jobs.

Recruitment of Chemicals team well underway. Wood group EPCM contractor.

Facility will produce 12,500 tpa of TREO including 4,500 tpa of NdPr oxides ~5% of 2025 world demand.



# FREEPORT STATUS TO ESTABLISH SALTEND AS INTERNATIONAL PROCESSING HUB

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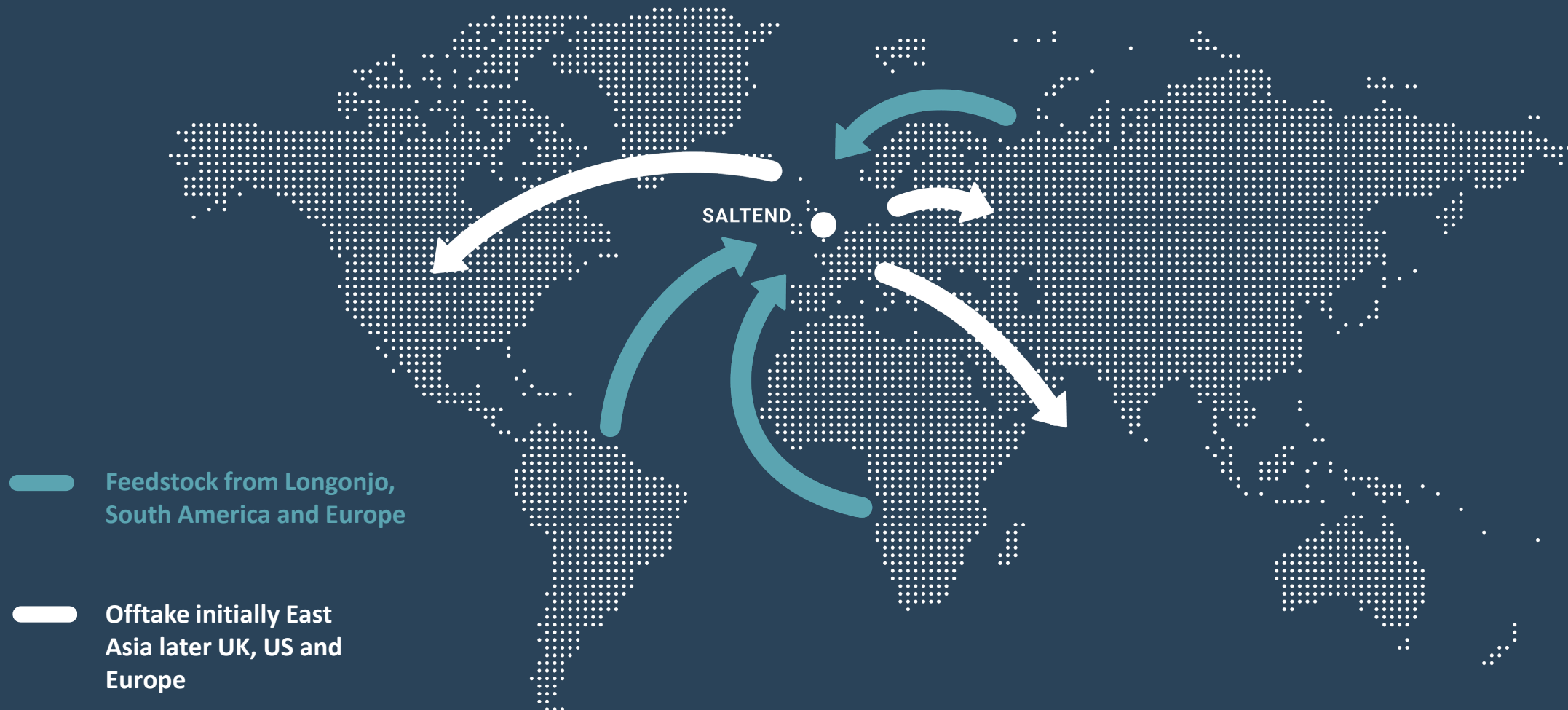
Pensana was part of the team behind the highly successful Treasury approved Humber Freeport bid led by Associated British Ports. The range of benefits is expected to include:

- Business rates relief for five years of operation
- National insurance relief for new employees
- Discounts on land tax and stamp duty
- 130% deduction for main pool assets
- 100% deduction for special pool assets

Awaiting Customs Zone approval

# SALTEND HUMBER UK INDEPENDENT RARE EARTH PROCESSING HUB

PENSANA<sup>PLC</sup>



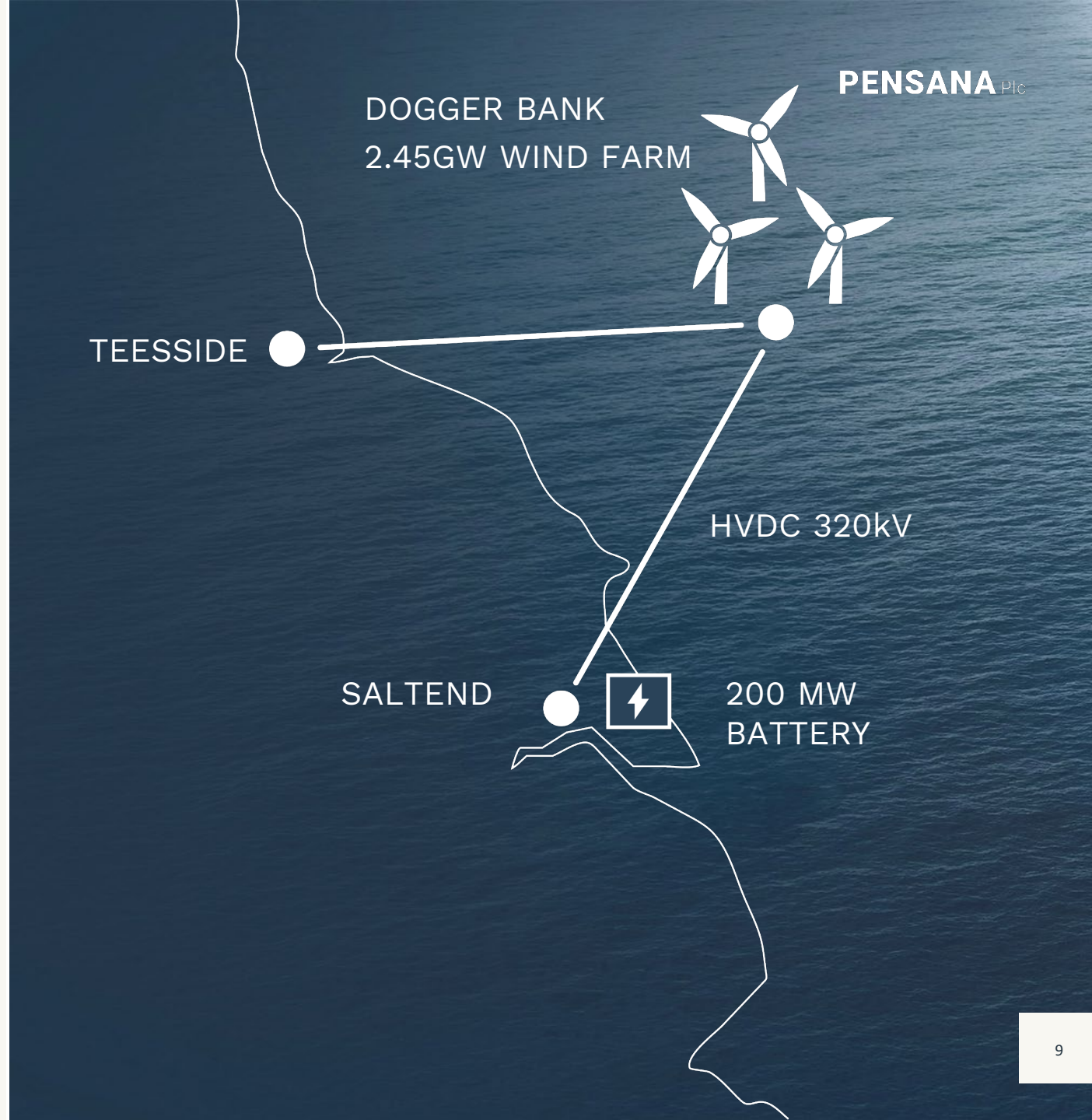


# PRIVATE WIRE CONNECTION TO THE WORLD'S LARGEST OFFSHORE WIND FARM FOR NdPr METAL PRODUCTION

Hitachi installing 320kV HVDC cable, connecting Dogger Bank, the world's largest offshore wind farm, to Harmony Energy's 200MW battery storage facility. Fully operational 2024.

As Offshore Wind expands, Negative Electricity pricing will become increasingly common in the UK as operators will have to pay to dispatch electricity during periods of high wind and low demand.

Studies underway into establishing at Saltend 3,000 tpa NdPr metal production using electric arc furnaces.





# LOW CAPITAL COST STATE-OF-THE-ART MINE

Longonjo is one of the world's largest rare earth deposits with an initial 20 year mine life.

Near surface mining, 1.5 mtpa flotation concentrator, mineral sands type roaster to produce 45,000 tpa of clean, high value mixed rare earths sulphate.

Wood Group plc has designed mine to ICMM guidelines featuring solar, hydroelectric power and ~70% reagent recycling.

PENSANA<sup>PLC</sup>

## LOW CAPEX (AND OPEX) DUE TO EXCELLENT INFRASTRUCTURE

Recently upgraded US\$2bn Benguela rail line provides direct link to Atlantic port of Lobito.

*Hydro Electricity @ US2c per KWh for  
10 year contract.*

PORTO LOBITO

LONGONJO

HYDRO POWER





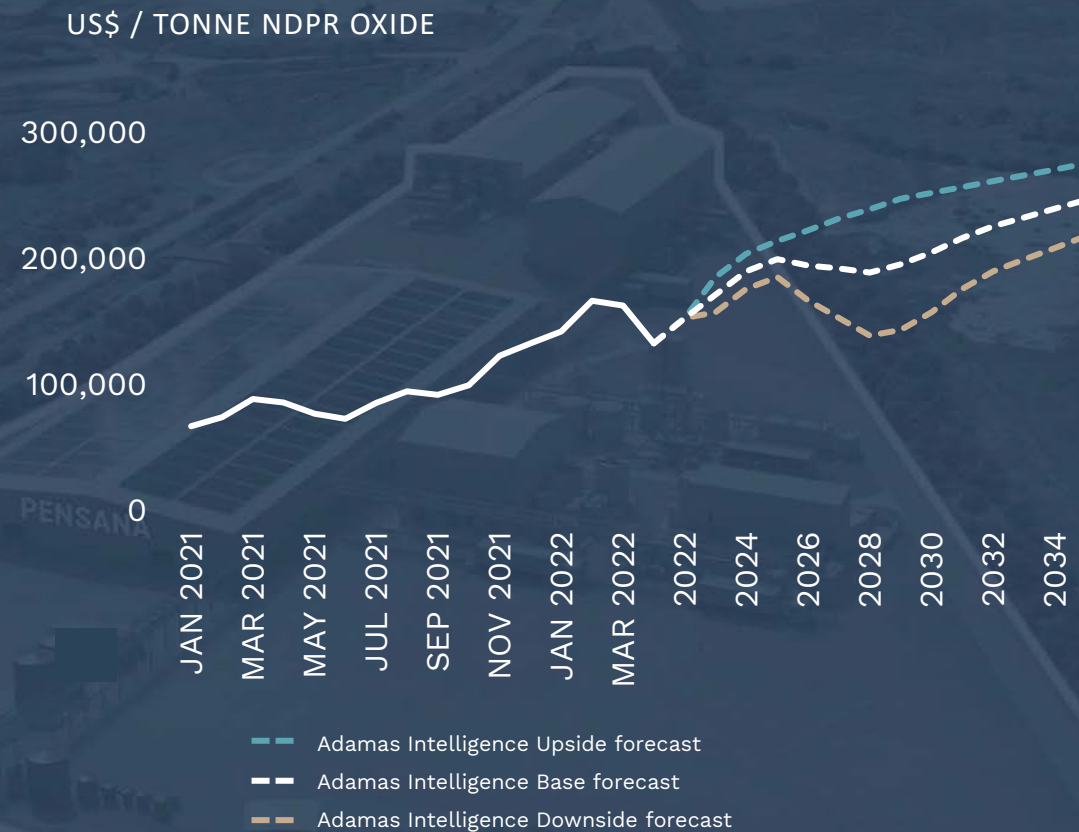
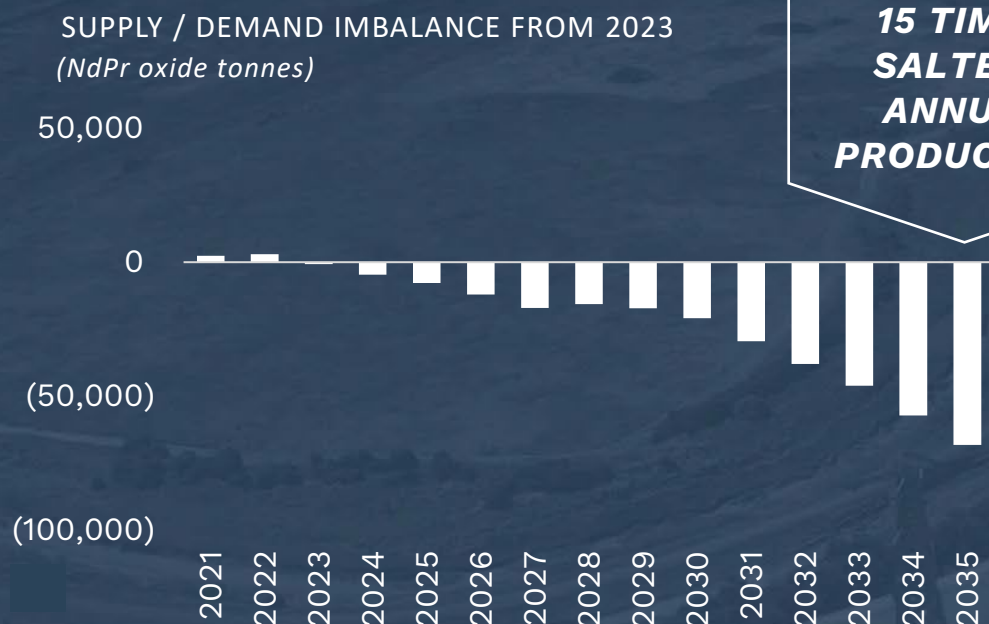
PORT OF LOBITO US\$2 BILLION UPGRADE 2014



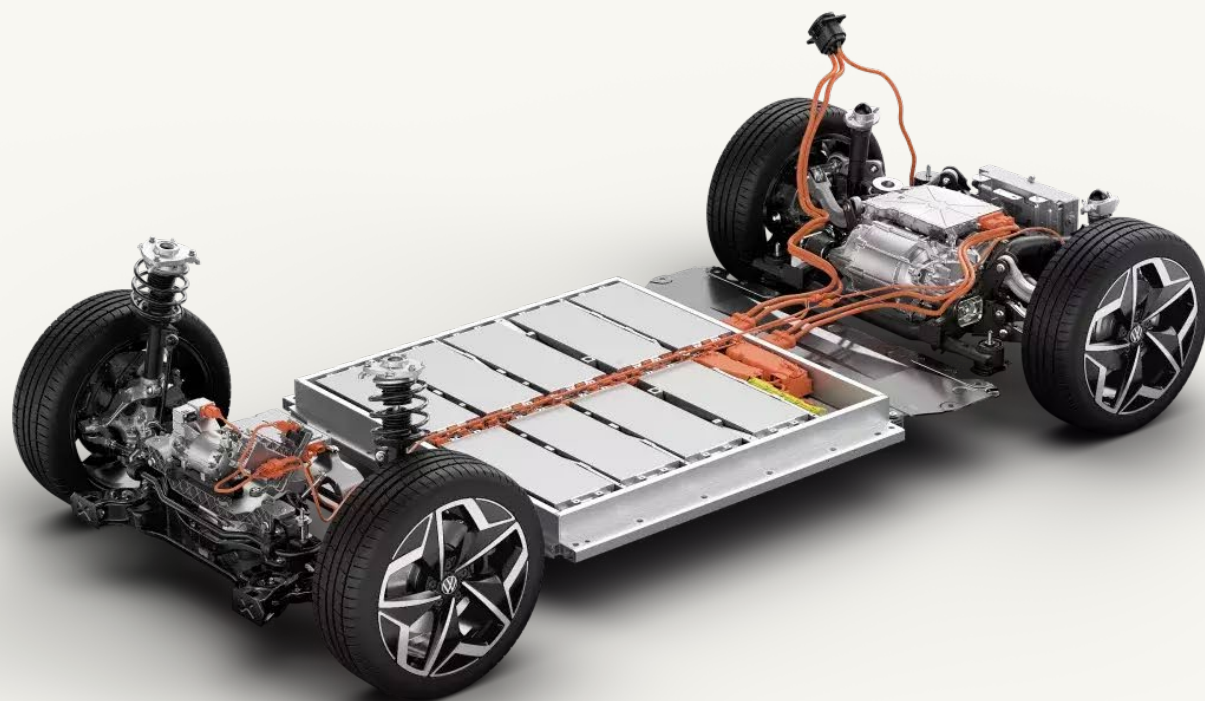
# GROWING SUPPLY DEFICIT

## ADAMAS INTELLIGENCE PRICE FORECASTS

**2035 DEFICIT  
15 TIMES  
SALTEND  
ANNUAL  
PRODUCTION**



Automotive OEMs are concerned about *transparency* and *low embedded carbon*



VW's ID.3 range of EVs will consume the equivalent of Saltend's entire production for over a decade.



# INDUSTRIAL ROBOT DEMAND

Robots are becoming increasingly popular with rising labour costs, policy support and a strong push for modernisation.

High-performance NdFeB magnets are the key component of industrial robot servo motors.

Forecast CAGR of 22% from 2025



	2020	2021	2022E	2023E	2024E	2025E
China industrial robot production	237,100	336,000	475,900	571,000	685,200	822,300
Global industrial robot production (units)	384,000	522,900	634,500	713,800	856,500	1,027,900
Global industrial robot NdFeB demand (kg/unit)	20	20	20	20	20	20
Global total demand (tonnes)	7,680	10,456	12,690	14,276	17,131	20,557

# FINANCIAL SUMMARY

## ADAMAS NdPr Oxide Forecast Base Case

ANNUAL PRODUCTION	12,500 TREO / 4,500 NdPr oxide	
CAPEX	SALTEND REFINERY	US\$ 195M
	LONGONJO MRES REFINERY	US\$ 127M
	LONGONJO CONCENTRATOR	US\$ 123M
	LONGONJO MINE AND INFRASTRUCTURE	US\$ 49M
OPEX	US\$ 15 / kg total rare earth oxide	
REVENUE (Average steady state)	US\$ 893 MILLION (Average per annum based on first five years)	
EBITDA (Average steady state)	US\$ 615 MILLION (Average per annum based on first five years)	
NPV8** (UN-LEVERAGED, POST TAX)	US\$ 3.6 BILLION	
IRR	77%	
PAYBACK FROM FIRST PRODUCTION	1.3 YEARS	

Source: Company information. Management estimates, inclusive of Longonjo and Saltend operations, are based on underlying independent studies undertaken by consultants listed in Appendix 1. NPV is calculated at an operational level pre-financing which is anticipated to be a blend of equity and long term debt financing. Revenue is based on NdPr oxide prices according to Adamas Intelligence base forecast (Q2 2022). NdPr oxide prices starting at \$153/kg in 2022, escalating at CAGR of 3.7% p.a. to 2035, flat real thereafter.



# WORLD CLASS MANAGEMENT TEAM



**PAUL ATHERLEY**  
CHAIRMAN

Mr. Atherley has extensive experience as a senior executive. Previously Executive Director of the investment banking arm of HSBC. He has completed numerous successful acquisitions and financings of resource projects in Europe, China, Australia and Asia.

**TIM GEORGE**  
EXEC DIRECTOR/  
CEO

A Minerals Engineer, Mr. George leverages over 30 years of experience in the mining and engineering sectors, with a broad experience in mining project development throughout Sub-Saharan Africa.

**ROCKY SMITH**  
COO

Mr Smith is a highly experienced Chemical Engineer with 35 years' rare earths experience. He is one of the few western mining executives with in-depth knowledge of the rare earth industry and running complex chemical processes. He was Managing Director of MP Materials Mountain Pass rare earth project in the US and was responsible for building the project and it's operational readiness.

**ROBERT KAPLAN**  
FINANCE DIRECTOR

Mr Kaplan is a Chartered Accountant with over 20 years operating experience in the African mining sector. He brings a broad skill set in both the UK and sub-Saharan corporate finance together with experience in mining operations in Angola, South Africa and Tanzania.

**JEREMY BEETON**  
NON-EXEC DIRECTOR

Former Director General of the 2012 London Olympic and Paralympic Games, Principal Vice President of Bechtel, Advisory Board of PWC, and Non-Exec of SSE Plc. Currently also a Non-executive Director of John Laing.

**RT HON BARONESS  
NORTHOVER**  
NON-EXEC DIRECTOR

Baroness Northover was the Prime Minister's Trade Envoy to Angola (2016-2020), Zambia (2017-2020) and Minister in the Department for International Development ("DFID") 2011-15, including serving as Parliamentary Under Secretary and Africa Minister, 2014-15.

**STEVE SHARPE**  
NON-EXEC DIRECTOR

Mr Sharpe is a highly experienced natural resources financier. He is an Executive Board Member of EIT Raw Materials. Previously, he was Chair of AME Group, Managing Director at Canaccord Genuity, Managing Director at Endeavour Financial and held senior positions at Standard Bank and NM Rothschild.



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# MARKET AND TECHNICAL ADVISERS

## MARKET INTELLIGENCE

### **Adamas Intelligence**

Market forecasts

### **Roskill**

Market forecasts

## SALTEND TECHNICAL

### **Wood Group**

Technical engineering and design

### **Px Group**

Saltend owner operator

### **Oakdene Hollins**

Circular economy

### **On Line Design**

Planning application

### **SLR consulting**

Air quality assessments

### **EEG**

Geotechnical design

### **Ivy House**

Environmental design

## LONGONJO TECHNICAL

**Wood Group** - technical engineering and design

**Paradigm Project Management** - Longonjo site infrastructure and bulk services technical engineering, design and cost estimates

**Auralia Metallurgy** - specialist metallurgical and processing laboratory

**Nagrom** - geochemistry testing and analysis

**ALS / Eriez** - pilot plant test work

**HCV Africa** - ESIA, EMP, RAP and hydrology

**ANSTO** - Australia nuclear science and technology association

**Grupo Simples** - Longonjo ESIA

**Snowden** - Mine plan schedule and pit optimisation

**SRK** - Mineral resource estimates & geotechnical