

**PENSANA** Plc

# Building an Independent and Sustainable supply of rare earths

BMO 32nd Global Metals,  
Mining & Critical Minerals  
Conference February 2023

**LSE: PRE**



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# The electrification of motive power will be the biggest energy transition in history

- Two of its biggest components are Electric Vehicles and Offshore Wind... both of which are heavily dependent on powerful rare earth permanent magnets.
- China currently supplies circa 90% of the world's rare earth permanent magnets.
- *“China has no obligation to be the rare earth supplier to the world.”* Lin Boqiang, Director of the China Center for Energy Economics



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



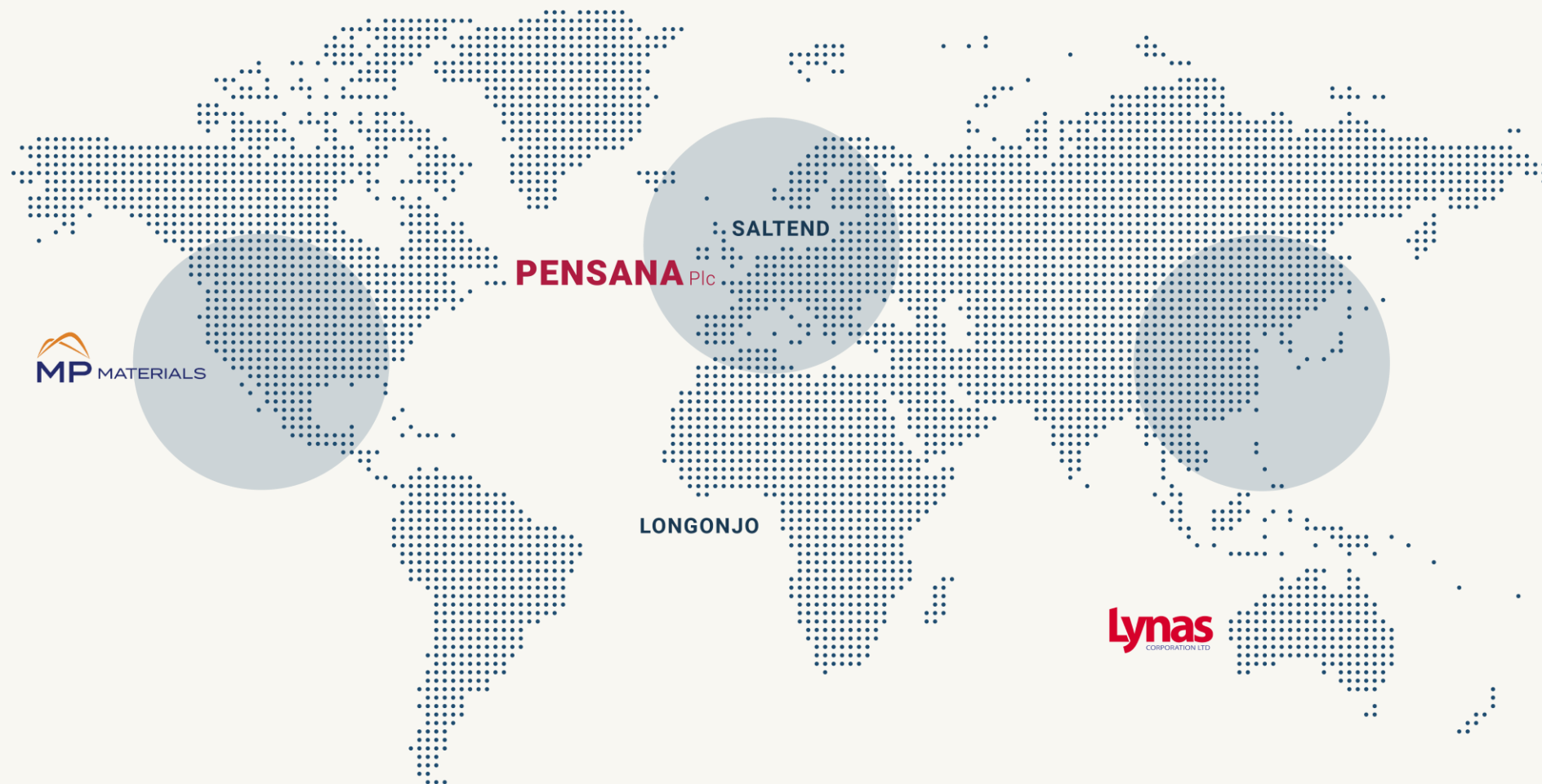
# NdPr oxide is key to the manufacture of permanent magnets used in Electric Vehicles and Offshore Wind turbines.

- The burgeoning demand from Electric vehicles and Offshore Wind will drive NdPr oxide demand seven fold by 2050.
- Adamas Intelligence warns: *“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 to **8.3% CAGR to 2035**

**Lynas Corporation (LYC.ASX) is currently the only major producer of NdPr Oxide outside China**



# NdPr Oxide Supply outside China

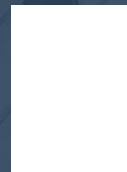
**Lynas**  
CORPORATION LTD

LYC:ASX

**MARKET  
CAP US\$**

**US\$5.1bn**

**NdPr oxide  
PRODUCTION  
tonnes per year**



5,900  
tonnes

**IN PRODUCTION  
SINCE 2013**

**CAPEX US\$**

**c. US\$1.5 billion**

**MP** MATERIALS

MP:NYSE

**US\$5.6bn**



6,500  
tonnes  
by 2024

**IN CONSTRUCTION  
(Exporting Concentrate)**

**>US\$2 billion**

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PRE:LSE

**<US\$200m**



4,500-5,000  
tonnes  
by 2025

**IN DEVELOPMENT**

**~US\$500 million**

# Saltend UK Rare Earth Processing Hub

*Providing a secure supply for European Electric Vehicle and Offshore Wind OEMs.*



- 12,500 tpa of rare earth (TREO) oxides
- Including 4,500 tpa of NdPr oxides equivalent to ~5% of world demand.
- Expansion plans for heavy rare earth separation and metal conversion.



# Breaking ground on the world's first Rare Earth processing hub

**Secretary of State for Business, Energy and Industrial Strategy Rt Hon Kwasi Kwarteng MP launched the UK's Critical Minerals Strategy at the ceremony and commented:**

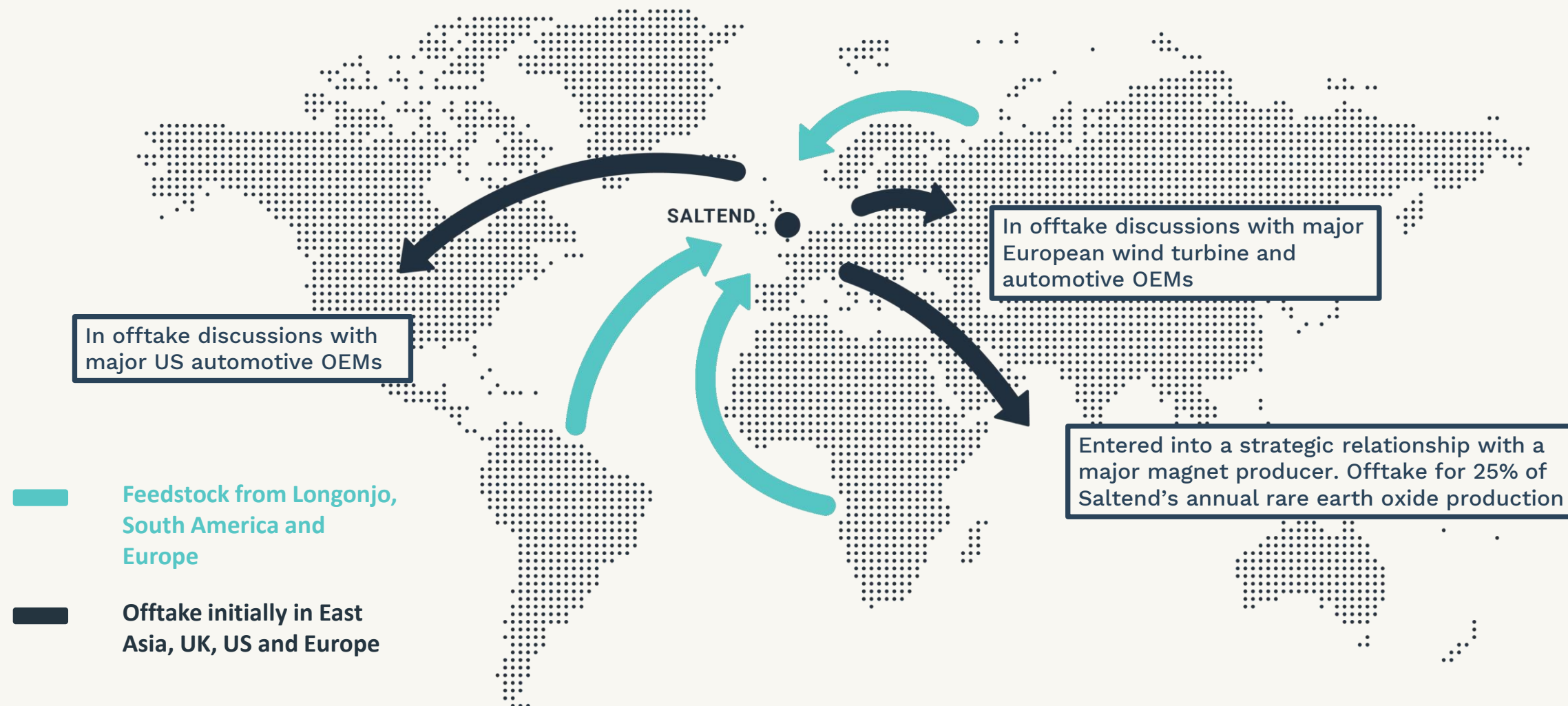
*"It is a great privilege to have broken ground on the world's first independent and sustainable rare earths separation plant. This incredible facility will be the only one of its kind in Europe and will help secure the resilience of Britain's supplies into the future."*

*Pensana is set to play a vital role in transforming the UK's electric vehicle and offshore wind industries by producing low-embedded carbon magnet metals and creating high-value jobs."*





# Independent Rare Earth Processing Hub



# The Longonjo Mine

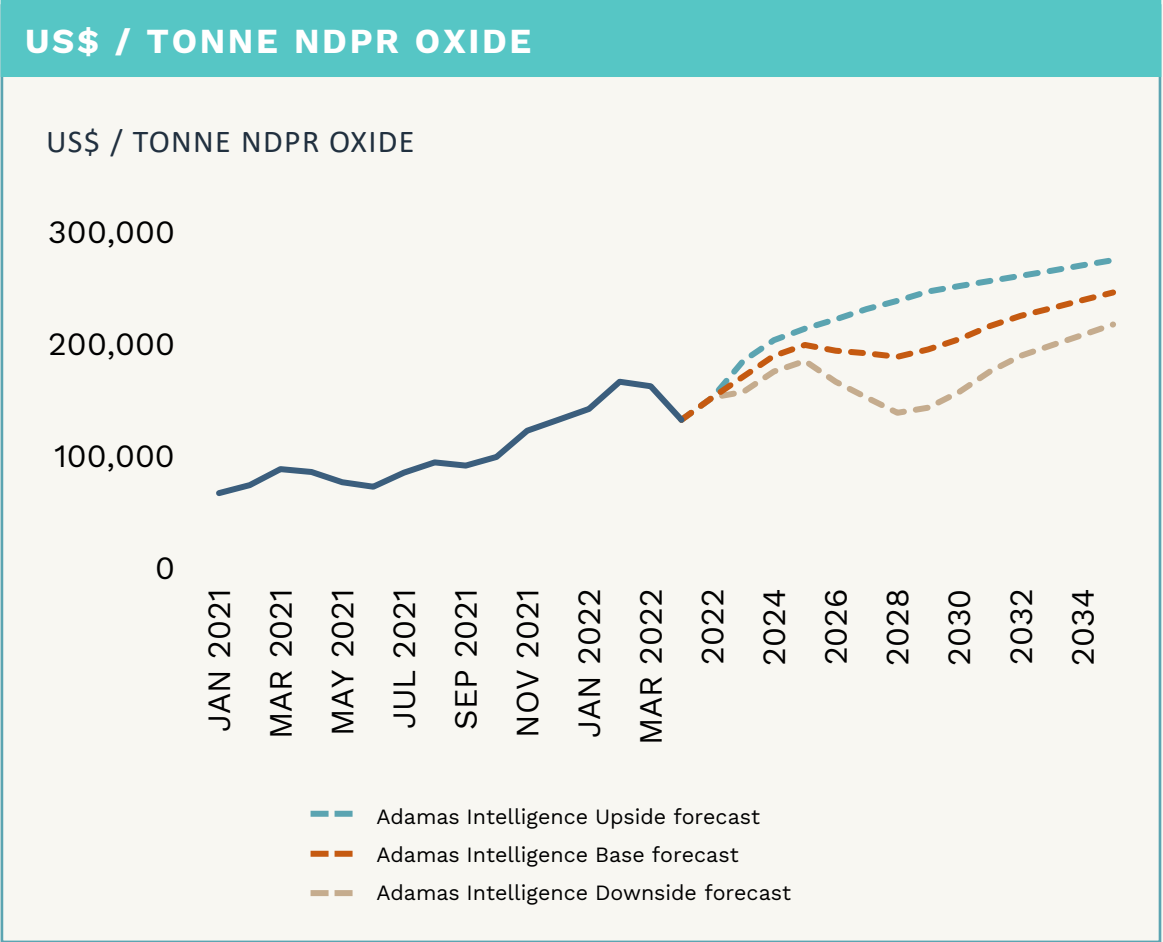
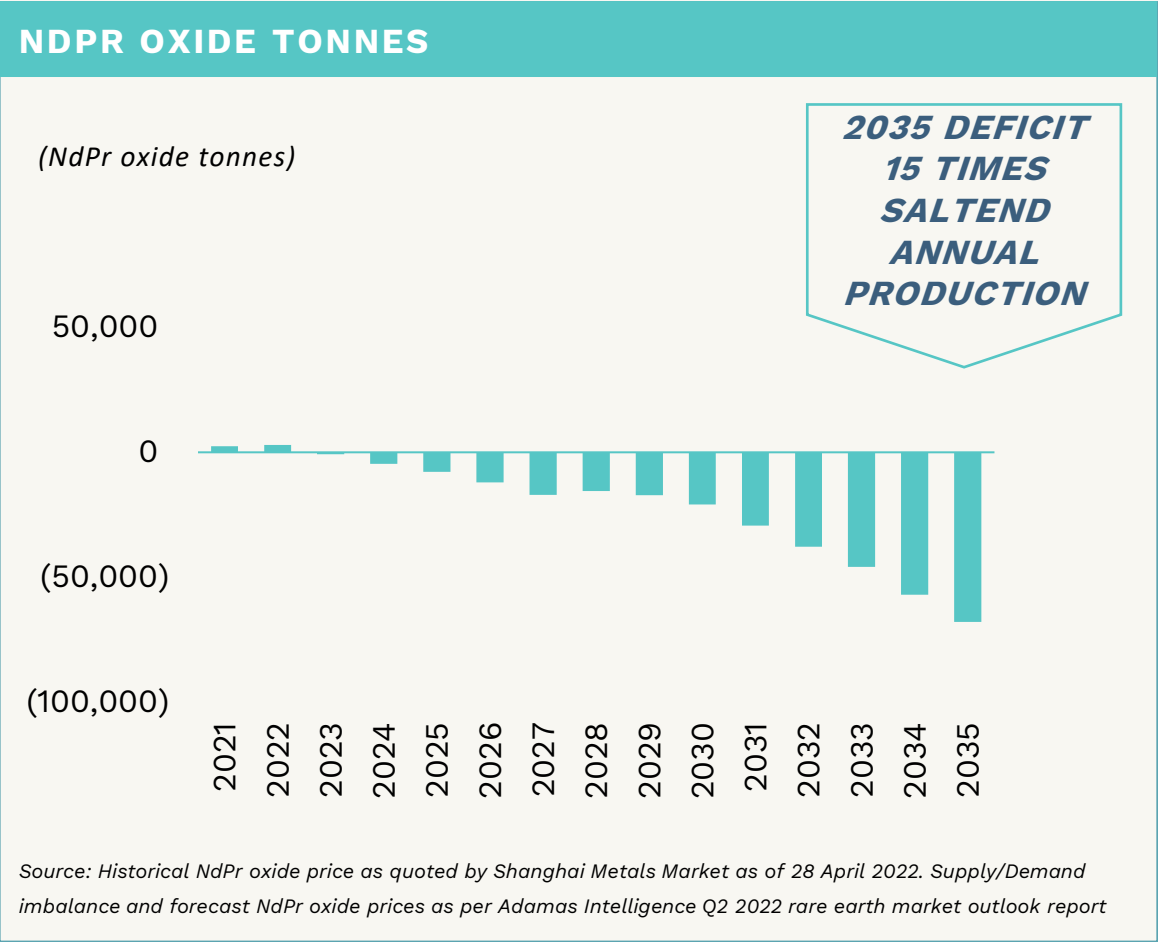
- Longonjo is one of the world's largest undeveloped rare earth deposits with an initial 20-year mine life.
- Ultra-low CAPEX of US\$300million due to ~US\$5billion of Rail, Hydro and Port infrastructure.
- Will export 40,000 tpa of high value mixed rare earth sulphate (MRES) to Saltend.



*Low Capex ultra-modern mine  
powered by hydro and connected  
by rail to world class port*

# Growing Supply Deficit in NdPr Oxides

## Adamas Intelligence Price Forecasts





# A new demand shock – this time from industrial robots?

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- Robots are increasingly popular due to rising labour costs, policy support and a major push for modernisation.
- High-performance NdFeB magnets are the key component of industrial robot servo motors.
- Forecast CAGR 20% by 2025.

# Financial Summary

## Adamas Intelligence NdPr Oxide Forecast Base Case

ANNUAL PRODUCTION	11,600 – 12,900 tonnes of TREO, including 4,500 – 5,000 tonnes of NdPr oxide		
CAPEX	SALTEND REFINERY		US\$ 195M
	LONGONJO MRES REFINERY		US\$ 127M
	LONGONJO CONCENTRATOR		US\$ 123M
	LONGONJO MINE AND INFRASTRUCTURE		US\$ 49M
OPEX	US\$ 20 / kg TREO (Average per annum based on first five years at steady state)		
REVENUE	US\$ 984 MILLION (Average per annum based on first five years at steady state)		
EBITDA	US\$ 628 MILLION (Average per annum based on first five years at steady state)		
NPV8** (UN-LEVERAGED, POST TAX)	US\$ 3.4 BILLION		
IRR	60%		
PAYBACK FROM FIRST PRODUCTION	1.5 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.

# Strong Independent Board and Experienced Executive Management Team

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**PAUL ATHERLEY**  
**CHAIRMAN**

Mr. Atherley is an experienced mining executive and is the founder of the Company. Previously Executive Director of the investment banking arm of HSBC. He has completed numerous successful acquisitions and financings of resource projects in Europe, China, and Australasia.



**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.



**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.



**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.



**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.



**ROCKY SMITH**  
**CHIEF OPERATIONS OFFICER**

Rocky Smith is a highly experienced Chemical Engineer with 35 years' rare earths experience. He was Managing Director of Molycorp's Mountain Pass rare earth project in California, US, which is now owned by New York Stock Exchange listed MP Materials.



**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.



**ALISON SAXBY**  
**NON-EXEC DIRECTOR**

Alison is an industry-leading expert with over 35 years of experience in industrial minerals and metals. She was previously a Managing Director at metals consultancy Roskill. Alison is the author of numerous publications on critical and other minerals and was originally trained as a mineral engineer.



**WILLIAM IZOD**  
**CHIEF COMMERCIAL OFFICER**

William Izod has extensive experience in managing and developing rare earth supply chains, including 10 years working with large multi-national companies, including managing a Motor and Powertrain supply chain controlling £1bn of annualised spend.



# Highly Experienced Project Delivery Team

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**HAMISH WESTWATER**  
**PROJECT DIRECTOR, SALTEND**

Hamish has over 30 years' experience delivering complex projects in the chemical engineering sector for both contractor and client. He specialises in fast-track delivery and leading all project phases from FEED studies through to final commissioning and start-up.



**MIKE HAMER**  
**COMMERCIAL & COST MANAGEMENT, SALTEND**

Mike is a Chartered Surveyor with over 35 years' experience in strategising and leading the whole life cycle delivery of capital projects worldwide.



**MIGUEL DOS SANTOS**  
**OPERATIONAL READINESS & LOGISTICS MANAGER**

Miguel is a ECSA registered Chemical Engineer with 25 years' experience in the chemical, mining and minerals, and energy industries. After starting his career within the Unilever group in the late 1990's, he spent the first 10 years in various senior operational management and project roles.



**KEVIN BOTHA**  
**PROJECT DIRECTOR, LONGONJO**

Kevin is a qualified Electrical Engineer and Project Management Professional with over 45 years' experience in the global mining industry. He has worked for blue-chip international companies and as a Director and Owner of companies providing engineering and project management services to the sector.



**RICHARD DEWHIRST**  
**PROCESS ENGINEERING, SALTEND / LONGONJO**

Since graduating in Metallurgy with Mining from Nottingham University, Richard's long career in the mining industry has seen him work around the globe for major mining companies such as Anglo American, de Beers, BHP, Rio Tinto and Vale as well as a number of engineering companies including Fluor, Jacobs, Ausenco, SKM, SMEC and Behre Dolbear.



**NIGEL HUDSON**  
**INFRASTRUCTURE & SERVICES ENGINEER, SALTEND**

Nigel has over 30 years' experience in business leadership, project management, engineering and operations support, gained in the oil and gas, petrochemical, conventional power, nuclear power, water and infrastructure industries.



**JEREMY CLARKE**  
**PROJECT SPONSOR, LONGONJO**

Having trained with Anglo American, Jeremy has 20 years' of experience in gold, uranium, copper, and diamonds. He was previously Consulting Metallurgist for De Beers where he was responsible for metallurgical excellence at their plants globally



**DAVE PORTER**  
**BULK POWER INFRASTRUCTURE, LONGONJO**

Since graduating with a B.Sc. Electrical Engineering (Cum Laude) in 1981, Dave has managed portfolios of mining projects throughout Africa and has directed project delivery for mining clients in various commodity sectors including rare earth metals, diamonds, gold, manganese, iron, copper, cobalt and zinc.

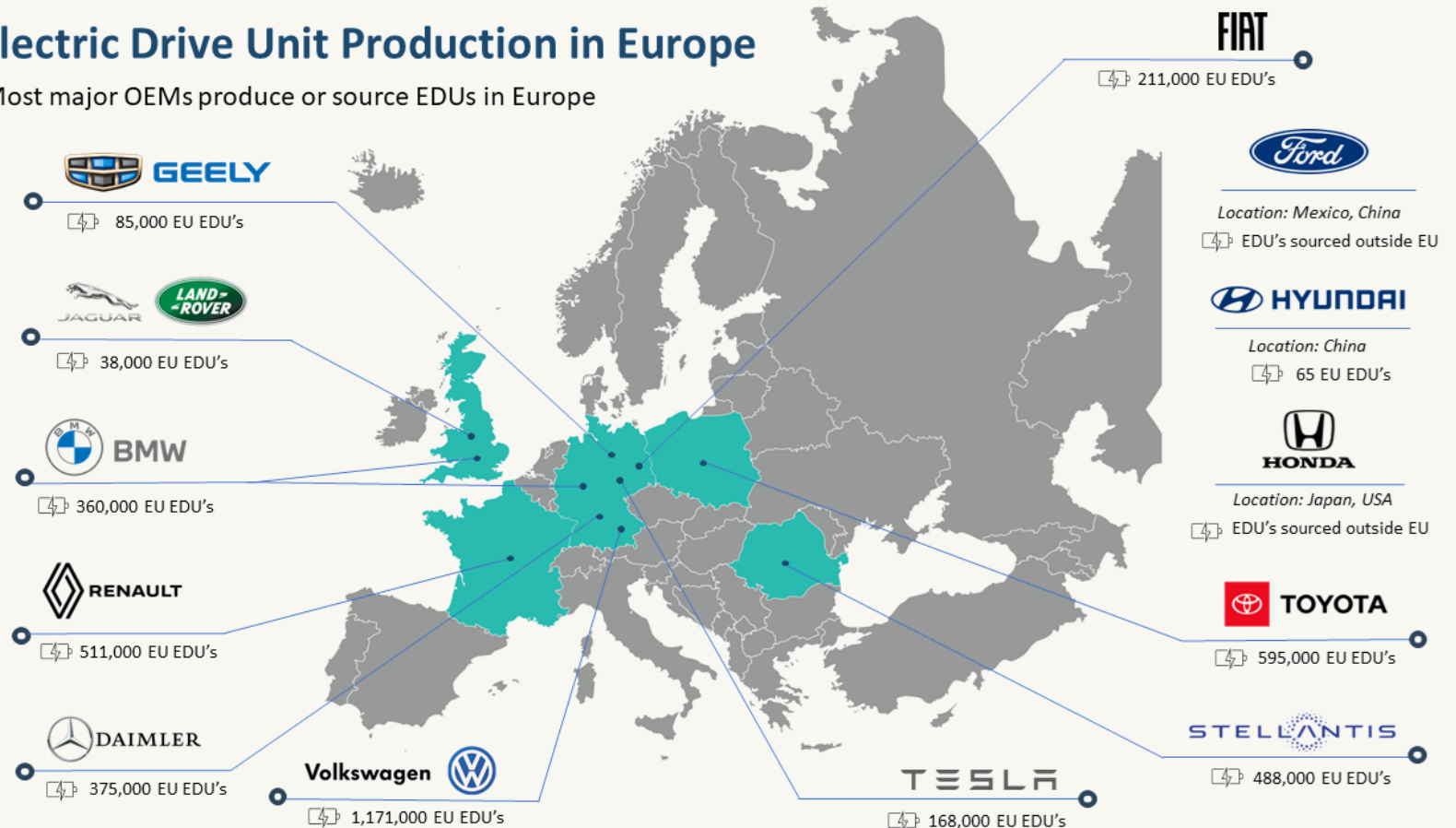
A Fellow of the Chartered Management Institute, Nigel has held senior project management positions with international engineering organisations, managing large white-collar and blue-collar delivery teams here in the UK and in the Asia Pacific.

# Saltend's growing importance as an independent and sustainable supplier to European OEMs

- By 2025 Europe will produce approximately 6.6 million EDUs.
- Exporting globally to support the burgeoning demand for electric vehicles.
- Europe expected to follow the recent US Inflation Reduction Act mandate for non-China based sourced critical minerals.

## Electric Drive Unit Production in Europe

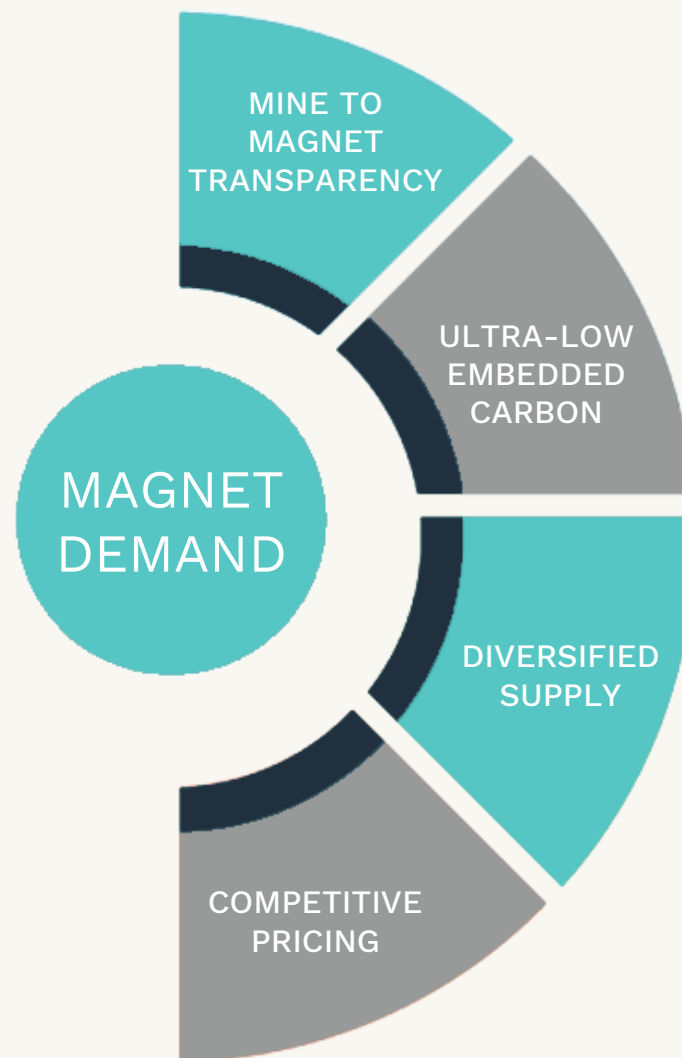
Most major OEMs produce or source EDUs in Europe



# Meeting Customer Demands

Pensana is committed to producing competitively priced rare earths which are:

- **traceable**
- the industry's **lowest embedded carbon**
- and aiming for **Net Zero** across the value chain by 2040.



Mercedes-Benz

CO2 targets as a key criterion and 50% diversified supply chain.

## Polestar

Net-Zero by 2030. Responsible sourcing: Ethical and transparent supply chain.



Net-Zero 2039. Full transparency for all supply chain partners.



# Polestar 0 Project

Research needed, here and now



- Pensana is partnering with Polestar (Nasdaq: PSNY) on its moon-shot goal of creating the first truly climate-neutral car by 2030.
- The scope of the Polestar 0 Project is to identify and eliminate all greenhouse gas emissions from the extraction of raw materials to when the car is delivered to the customer and onwards to the end of vehicle life.

Chairman Paul Atherley with Hans Pehrson Project Lead, at the Stockholm launch of Polestar's moon-shot climate-neutral car.

Pensana has **embedded ESG at the heart of everything we do** and has already **delivered** substantial ESG interventions.

**PARTNERSHIPS FOR INNOVATION**

Pensana has developed strategic partnerships with other businesses who share our sustainability values including Polestar and Equinor.

**CHEMICAL REAGENT RECYCLING**

*\*Pensana will reuse and recycle chemical reagents within its processes.*

**COMMUNITY ENGAGEMENT**

Pensana has established strong community relations with the communities around both the Saltend and Longonjo operations and already delivered a strong and effective phase 1 resettlement action plan.

**LOW CARBON DESIGN TOWARDS NET ZERO**

Pensana has embedded deep and meaningful low carbon design into its projects, including electrifying energy intensive plant and location adjacent to ports and railway lines and aims to be net zero no later than 2040.

**CLIMATE MITIGATION AND GLOBAL NET ZERO**

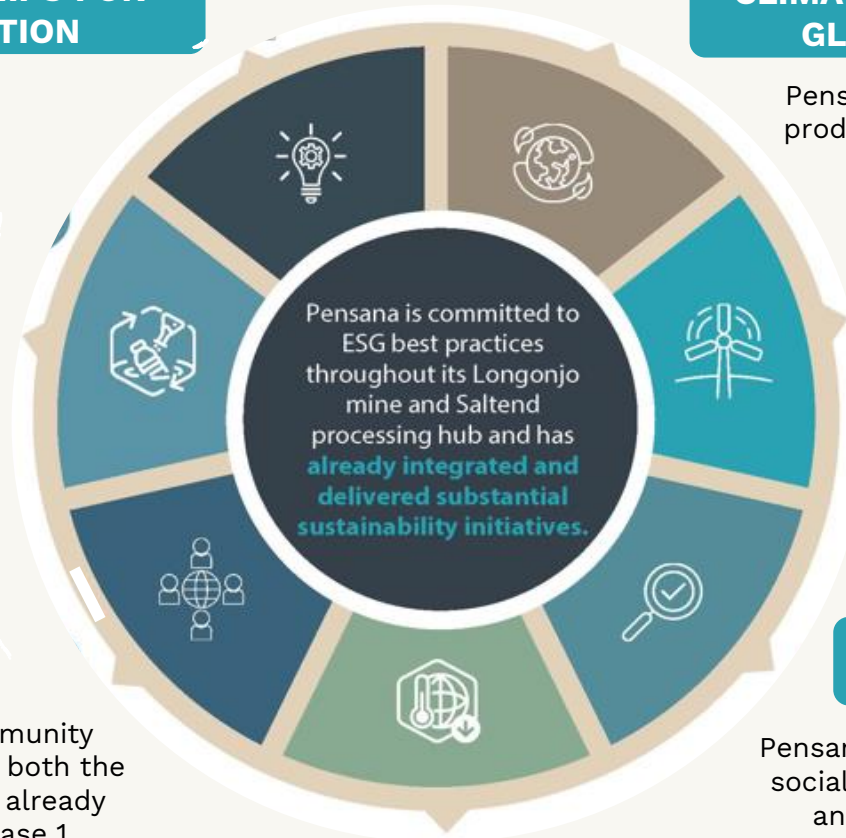
Pensana will produce rare earth products, which are essential to reach global net zero.

**RENEWABLE POWER**

*\*Pensana has agreements to power its UK and Angola sites with renewable energy.*

**ESG RISK EMBEDDED**

Pensana has embedded environment, social and governance management and risks within the business.

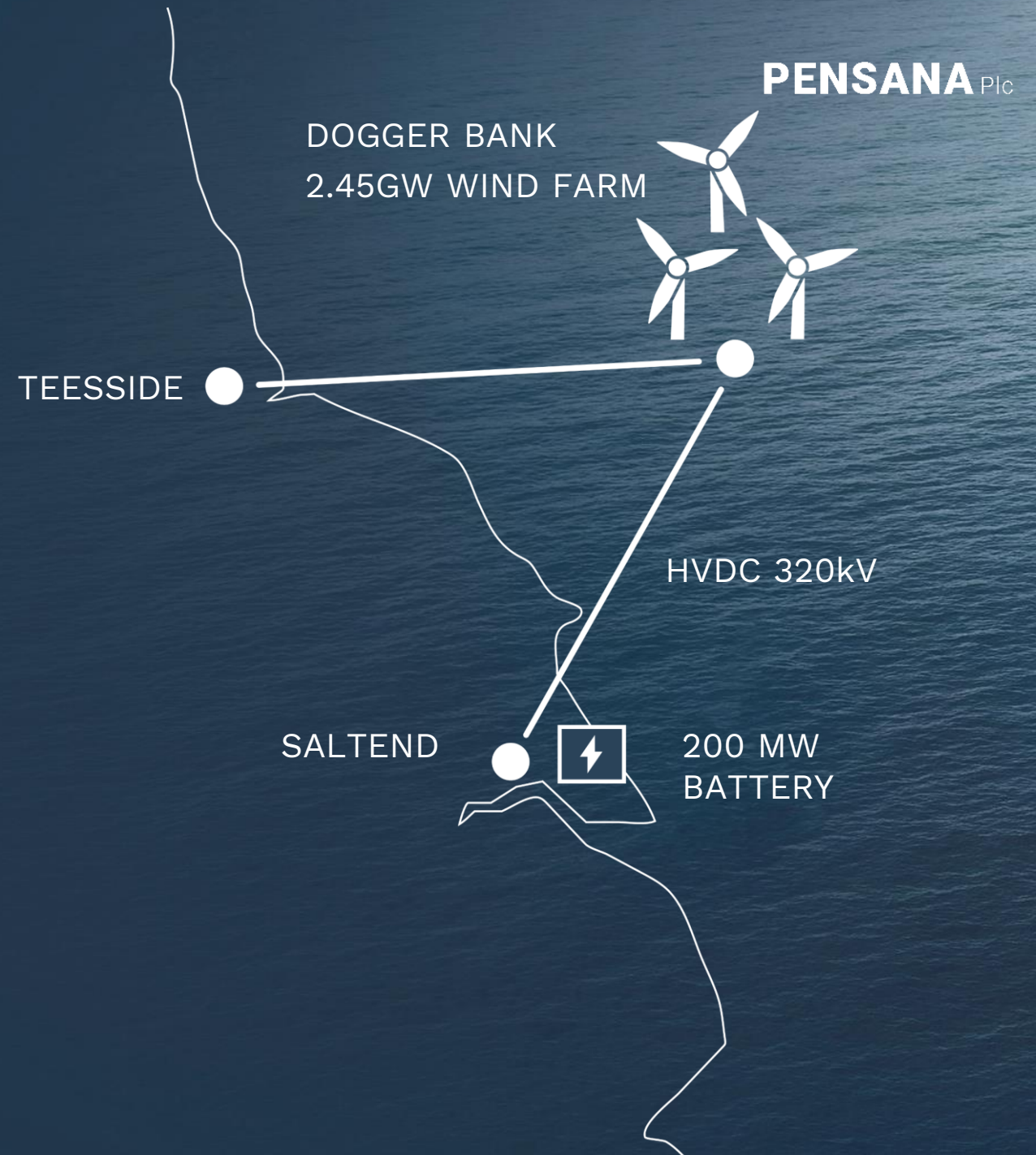




# Private Wire connection to the world's biggest Offshore Wind farm

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

As Offshore Wind expands, negative Electricity pricing becomes increasingly common as operators have to pay to dispatch electricity during periods of high wind and low demand.





# ZERO STARTS HERE

Cooperation Agreement between  
Pensana and Equinor to Recycle  
Offshore Wind Turbine Magnets at  
Saltend using Low Carbon Hydrogen



# Building an Independent and Sustainable supply of rare earths

- Pensana LSE.PRE market capitalisation US\$168 million
- Major shareholders FSDEA 24%, M&G 7%, Directors and Management 5%
- Independent Board and highly experienced Management team
- Saltend Processing facility and Longonjo mine both fully permitted
- Project delivery team in place and working with EPCM contractors
- Working with financiers to finalise funding arrangements
- Immediate commencement of main construction on finance