



# Mkango Resource

来自非洲温暖之心——马拉维的稀土项目

2020年10月





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Scientific and technical information contained in this pres relating to the mineral resource estimate has been approved and verified by Jeremy Witley Pr. SciNat of The MSA Group Pty Ltd, who is a "Qualified Person" in accordance with National Instrument 43-101 – Standards of Disclosure for Mineral Projects.

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# 稀土对电动汽车行业发展至关重要

用于电动汽车（EV）的最重要稀土是钕和镨（NdPr），它们用于永磁电机制造

**MKANGO**

- LCD Screen
  - Europium
  - Yttrium
  - Cerium
- Diesel Fuel Additive
  - Cerium
  - Lanthanum
- Glass and Mirrors Polishing Powders
  - Cerium
- Hybrid NiMH battery
  - Lanthanum
  - Cerium
- Component sensors
  - Yttrium
- Hybrid electric motor and generator
  - Neodymium
  - Praseodymium
  - Dysprosium
  - Terbium
- Catalytic Converters
  - Cerium
  - Lanthanum
- Headlight Glass
  - Neodymium
- 25+ electric motors throughout vehicle
  - Neodymium magnets

>90%的电动汽车使用稀土永磁电机

每台永磁电机使用0.7公斤的NdPr

由于电动汽车销量快速增长，2019年至2025年电动汽车牵引电机对稀土的需求将增长275%

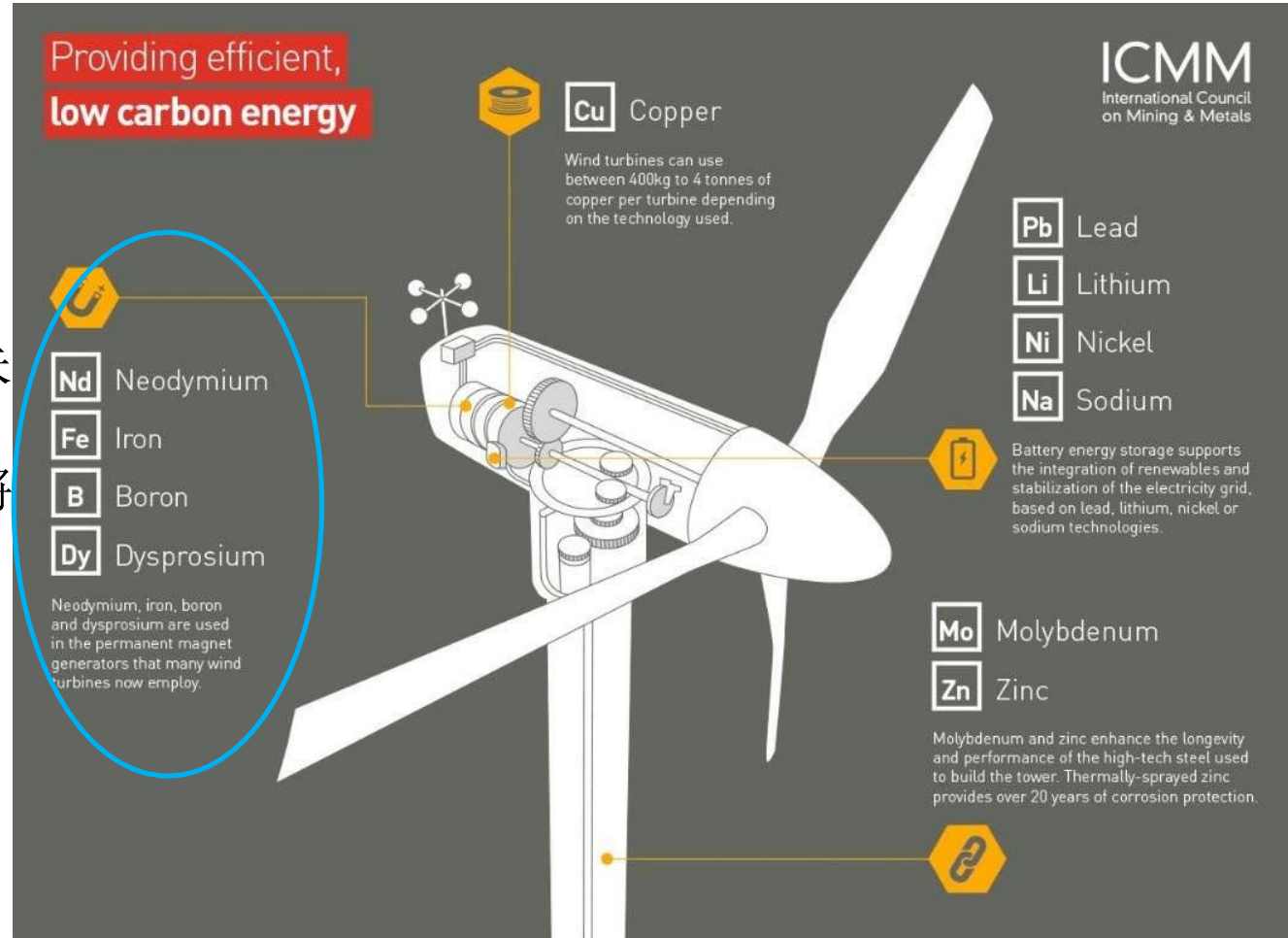




# 海上风电需求日益增长

每台3兆瓦直驱风力涡轮机使用约1.7吨钕铁硼磁体

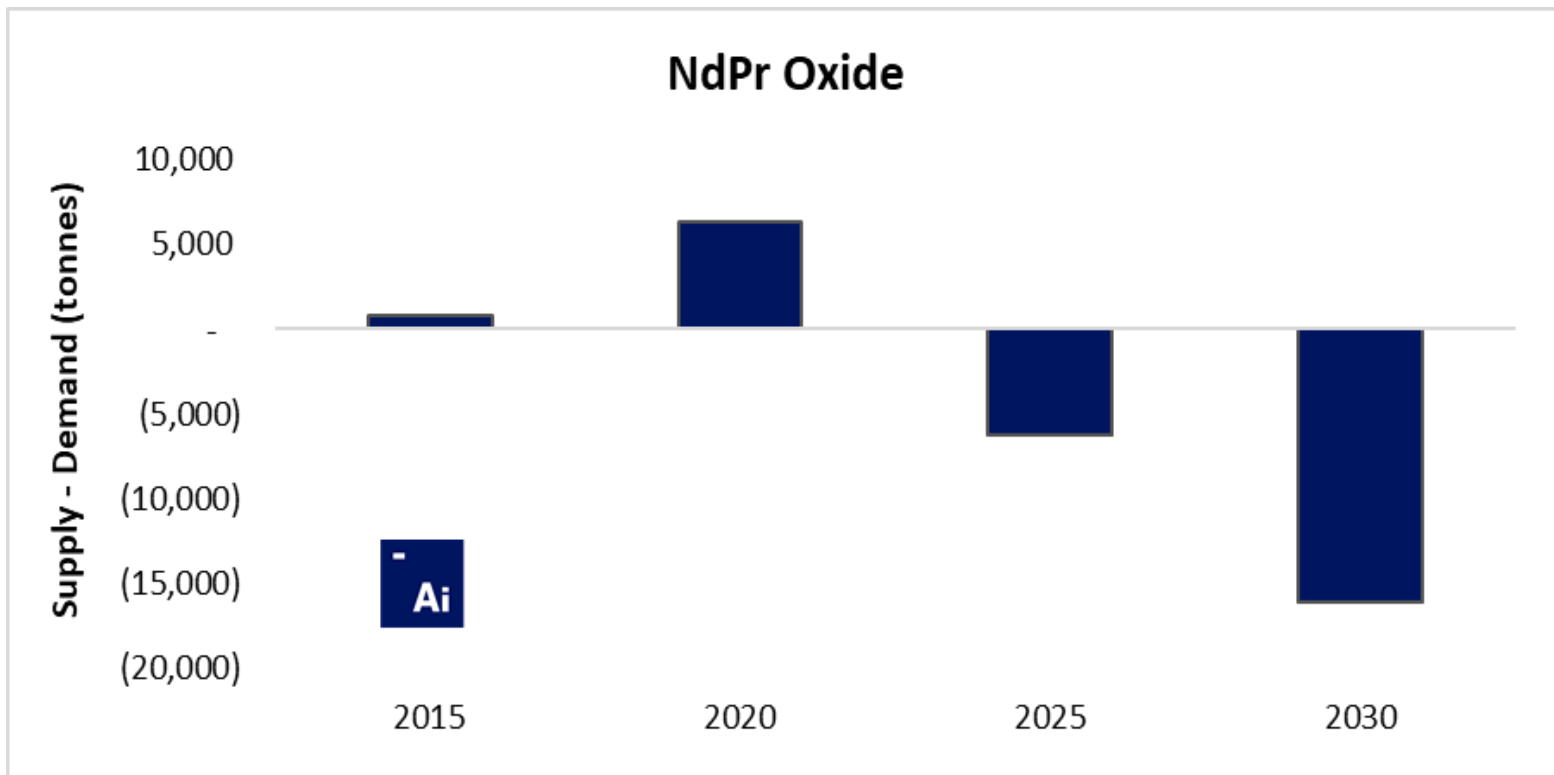
据国际能源机构预测，未来5年，海上风电装机容量将翻一番，到2030年将增长5倍



当前能够满足电动汽车和风力发电需求增长的高阶段稀土项目寥寥无几



# 供需缺口——持续扩大

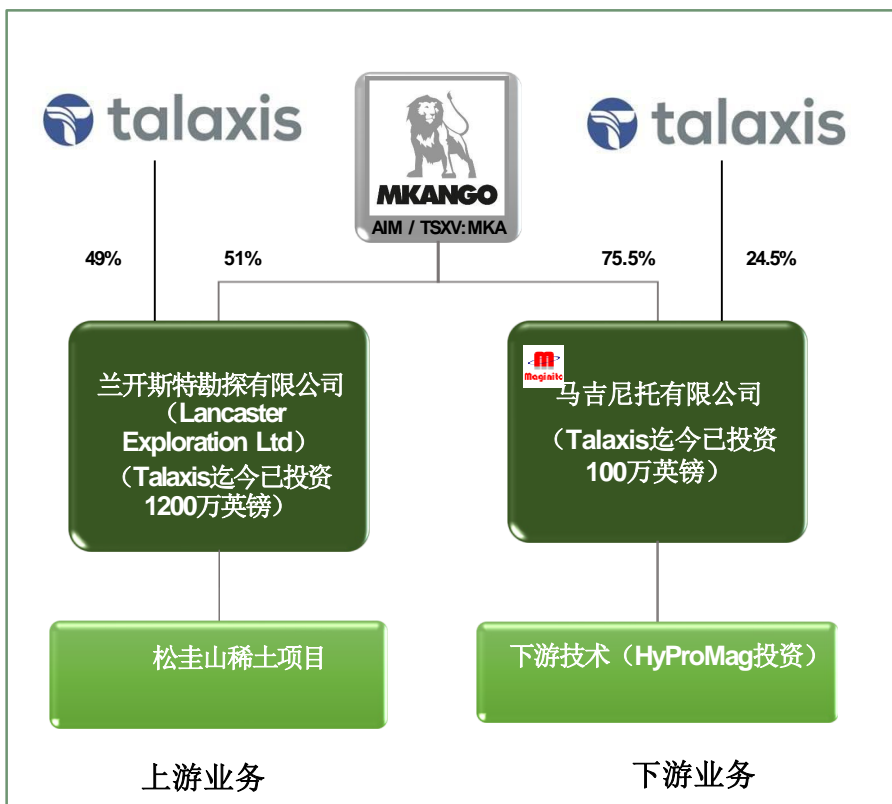


尽管中国的稀土产量大幅增长，而且中国境外新增稀土氧化物（REO）产能已达到**55000吨/年**水平，但是阿达马斯情报公司预测，**2030年**，钕镨氧化物的供应缺口仍**将达16000吨**，这相当于生产约**2000万辆**电动车牵引电机所需的材料量

资料来源：阿达马斯情报公司



# 姆坎戈资源公司概况



- 松圭山 (Songwe Hill) ——位于非洲马拉维的一处高阶稀土项目，目前正在由战略合作伙伴Talaxis有限公司资助，进行可行性研究
- 马拉维——不仅属于稳定的投资区域，而且还拥有主要的开发基础设施
- ESG——可持续发展和企业社会责任是姆坎戈公司愿景的一部分
- 马吉尼托有限公司 (Maginito Ltd) ——这家专注于回收利用并拥有下游技术的子公司——在英国一家致力于稀土磁铁回收利用公司HyProMag中拥有战略性权益

- 正在研究稀土分离方案——评估稀土分离方案，用以生产钕镨氧化物，在马拉维境外确定潜在建设地点，目前正在进行概略研究和尽职调查
- 在马拉维拥有丰富的勘探性资产——金红石、黄金、镍、钴、铀、钽、铋
- 拥有经验丰富的国际型董事会和以技术为主导的高管团队——在马拉维有12年的工作记录，与政府有着长期的关系



# 公司一瞥

2011年1月在加拿大创业板上市 (TSX-V)

2016年6月在英国另类投资市场实现两地上市 (AIM)

2020年6月现金头寸640万美元

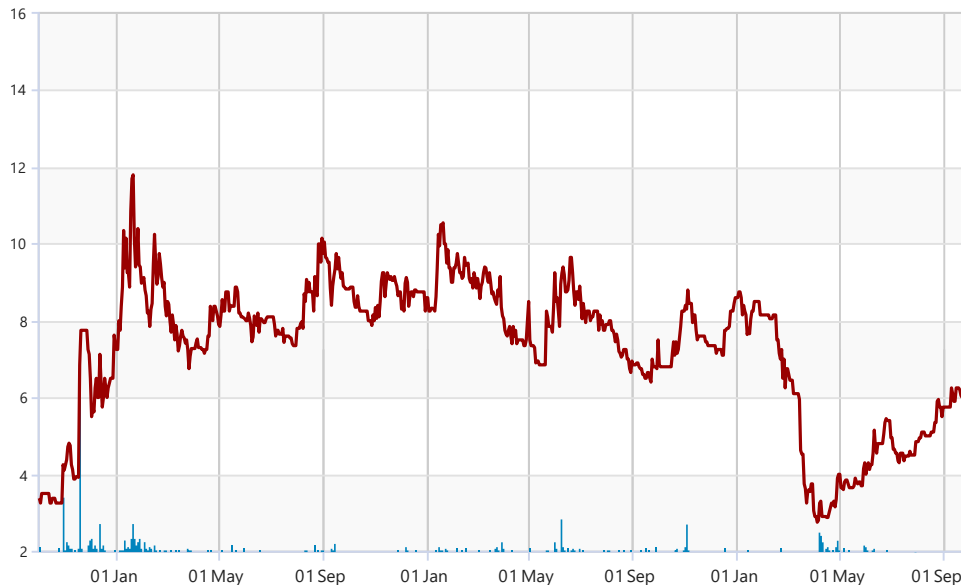
## 资本结构 (TSX-V/AIM)

股价(10月2日):	0.056英镑 / 0.11加元
发行在外股份:	约1.33亿股
认股权证:	1200万份 <sup>1</sup> @ 0.066英镑 120万份 <sup>2</sup> @ 0.066英镑
期权:	550万份@0.06加元 240万份@0.07加元 70万份@0.16加元 150万份@0.14加元 170万份@0.11加元
全面摊薄后:	约1.58亿股
市值(10月2日):	约740万英镑 / 1460万加元

<sup>1</sup> Talaxis持有的认股权证

<sup>2</sup> 董事Shaun Treacy持有的认股权证

## 为期3年的股价走势 (英国另类投资市场)



## 主要股东

Talaxis (来宝集团 (Noble Group))	10.7%
RESOC	10.1%
Leominex <sup>1</sup>	6.4%
Derek Linfield (Chairman)	3.9%

<sup>1</sup> W Dawes和A Lemon各持有Leominex公司17.3%的股份





# 经验丰富的国际型董事会

在马拉维拥有**12年**的工作记录

高管团队以技术人员为主，与政府保持着长期关系

**威廉·道斯 (William Dawes) —— 首席执行官兼联合创始人**

- 地质学理学学士，矿产勘探理学硕士
- 超过**25年**的勘探、业务开发、投资银行业务经验
- 曾在力拓、罗伯特弗莱明 (Robert Fleming)、大通曼哈顿和摩根大通工作过

**亚历山大·莱蒙 (Alexander Lemon) —— 总裁兼联合创始人**

- 地质科学理学学士，矿产勘探理学硕士，
- **25年**以上勘探、业务开发、运营管理经验
- 有Aled Commercial, Consolidated Contractors Company的工作经验

**德里克·林菲尔德 (Derek Linfield)，非执行主席**

- Stikeman Elliott (伦敦) 律师事务所前执行合伙人，在伦敦拥有超过**18年**的非洲采矿和油气行业工作经验

**苏珊·缪尔 (Susan Muir)，非执行董事**

- 在采矿业和资本市场有超过**30年**的投资者关系经验。巴里克黄金公司 (Barrick Gold) 负责投资者关系的前副总裁

**肖恩·特蕾西 (Shaun Treacy)，非执行董事**

- 高级战略和财务顾问。私募股权投资公司——阿雷特资本合伙人公司 (Arete Capital Partners) 首席投资官。拥有在摩根大通、雷曼兄弟、野村证券和瑞银负责高级投资银行业务的经验

**阿德里安·雷诺兹 (Adrian Reynolds)，非执行董事**

- 在自然资源行业有**30年**以上的工作经验，曾在Randgold黄金公司工作**15年**，Digby Wells Environmental公司前董事长，Geodrill公司的非执行董事



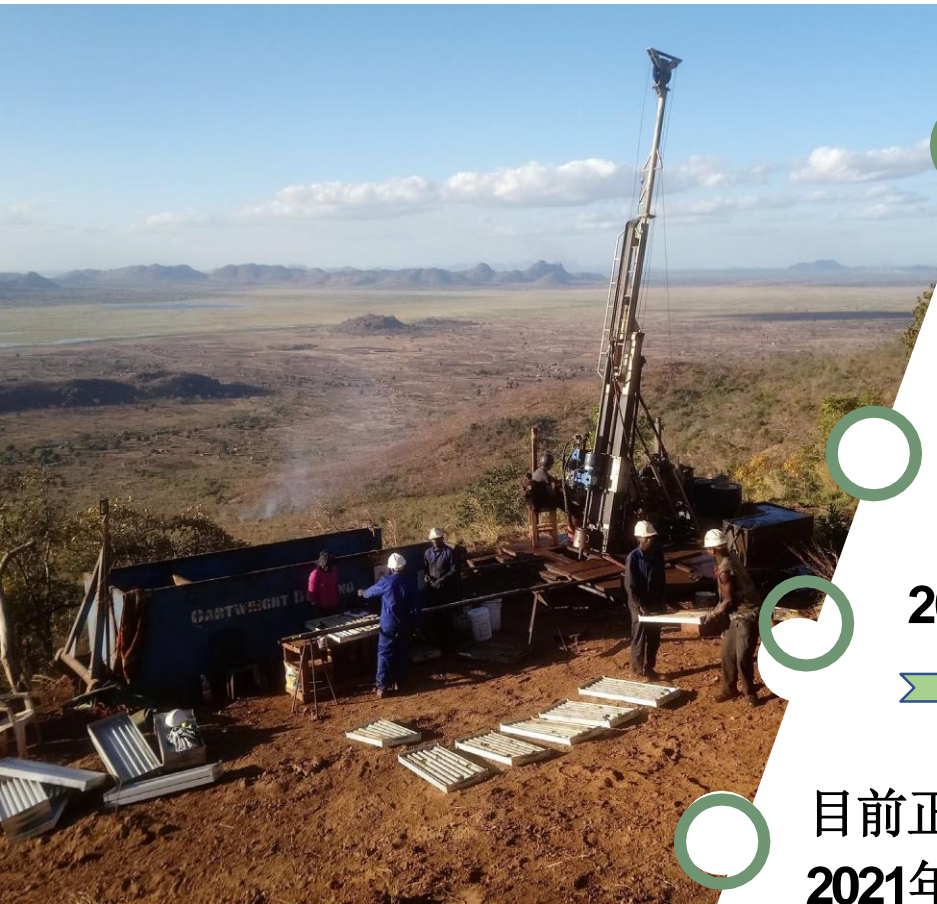
# 战略合作伙伴——遍及全球



- 作为来宝集团的子公司，其在亚洲和世界其他地区拥有广泛的贸易和分销网络
- 专注于那些对于绿色技术供应链至关重要的资源
- 对全球稀土公司有战略股权投资，与它们签有承购/营销安排
- 迄今为止，Talaxis公司已在松圭山（Songwe）和马吉尼托（Magnito）投资1300万英镑
- 在银行级可行性研究完成后，将制定松圭山项目的开发方案



# 松圭山稀土矿床



2011年和2012年姆坎戈公司实施了初步钻探计划

➔ 根据NI 43-101标准编制了第一份资源报告

2015年完成了预可行性研究

2019年实施了加密和探边钻探计划  
➔ 探明和控制资源量增加了60%

目前正在进行可行性研究——计划于2021年下半年完成

矿化带以碳酸盐岩为主岩  
氟碳酸盐为主要的稀土矿物

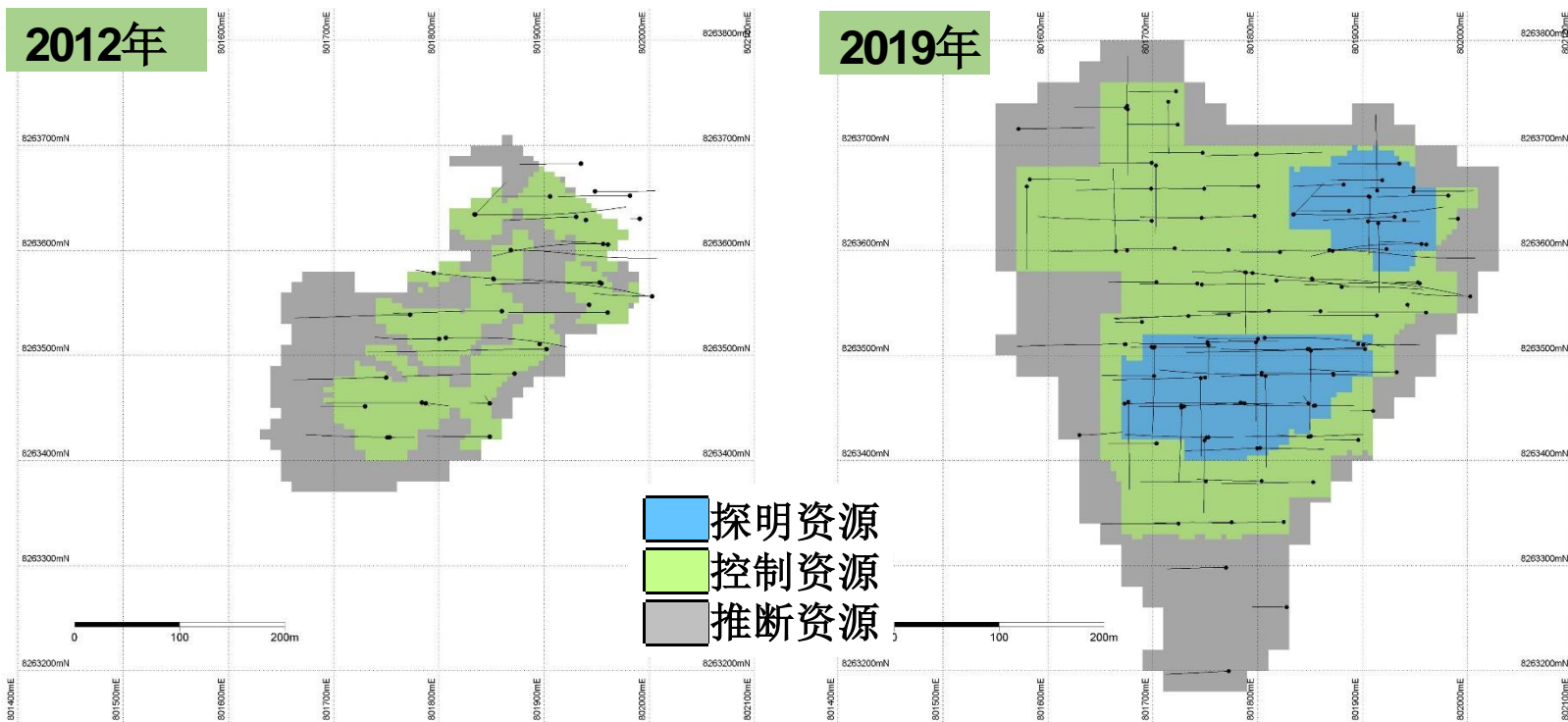


# 2019年资源规模进一步扩大

平面图

预可行性研究

正在进行的可行性研究



基于2019年扩大后的资源规模，正在进行可行性研究  
目标是年生产2000 Nd/Pr氧化物，服务年限20年以上





# 马拉维——最佳的投资地区

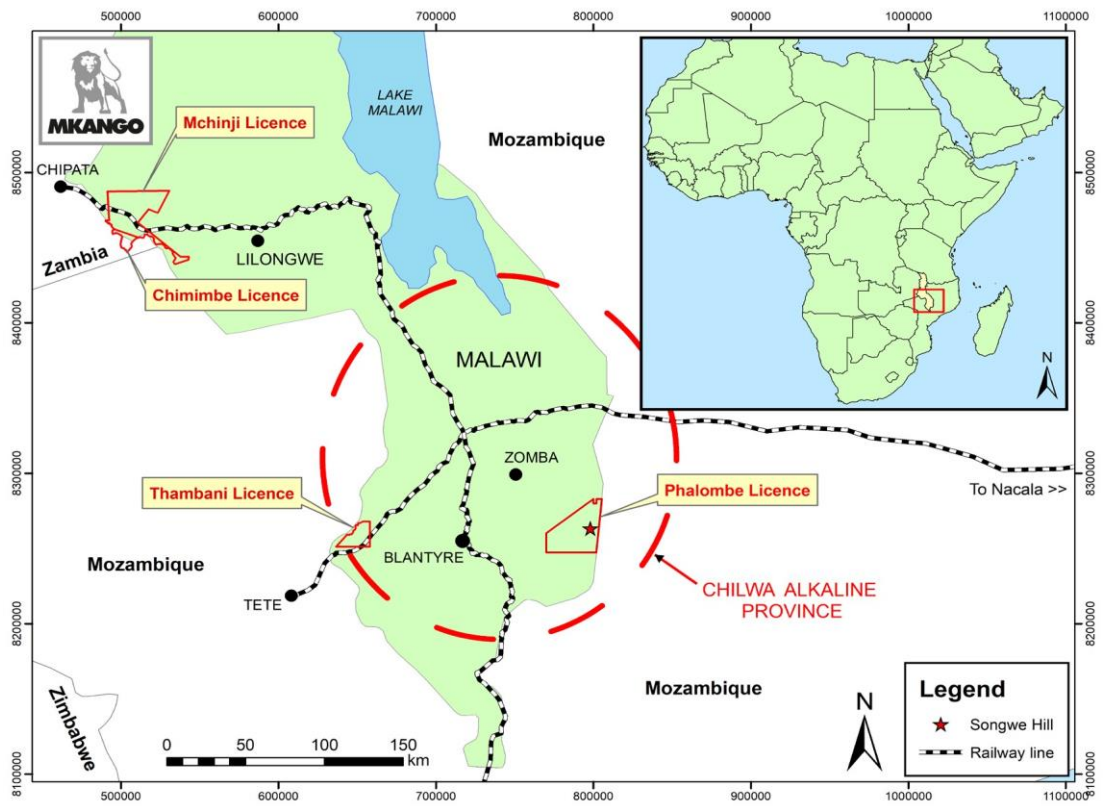
自项目开始以来，高管层一直很稳定，也意味着可与政府和当地社区保持着长期关系



加法尔 (Gaffar) 部长阁下在访问



英国高级专员霍利泰特 (HolyTet)



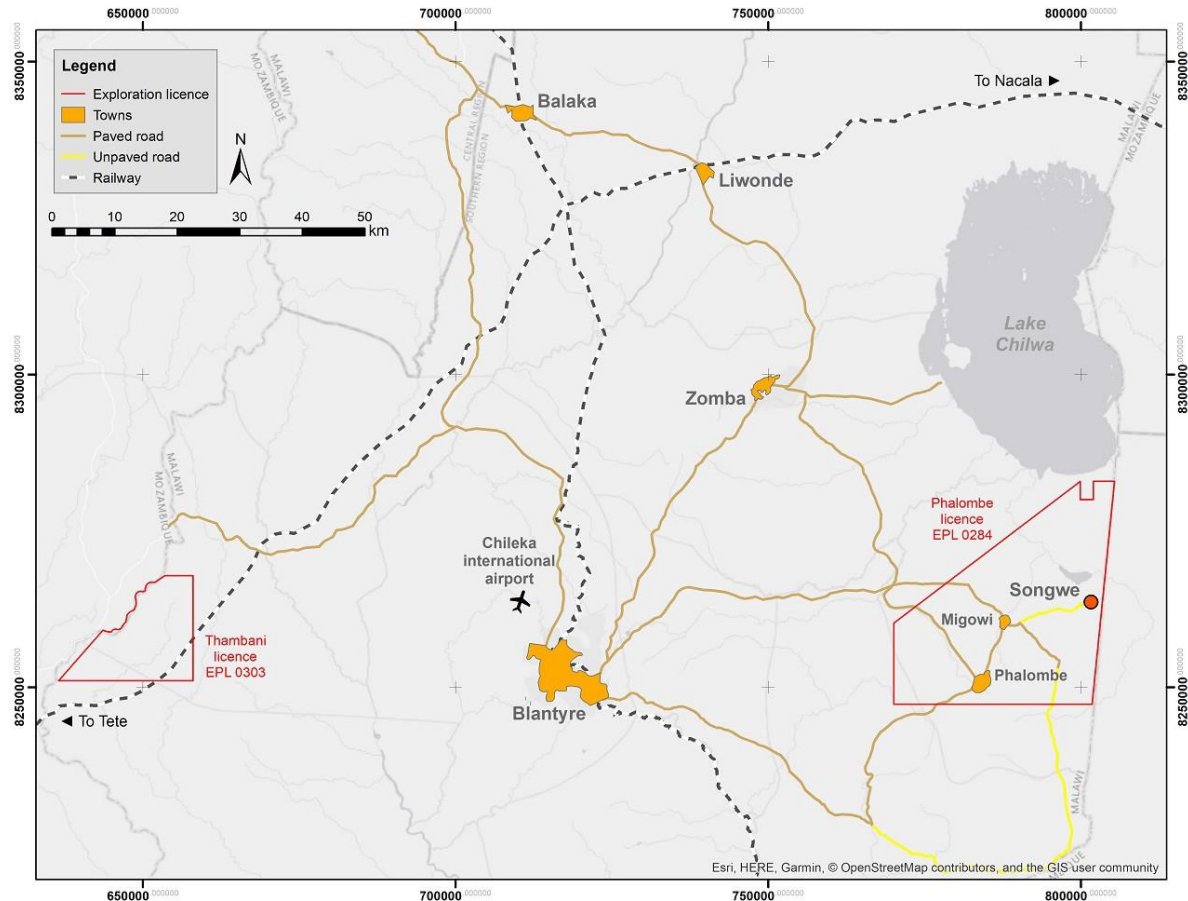
- 马拉维为新兴矿业地区，政府态度非常积极
- 非洲首个稀土矿产地区
- 基础设施投资正在释放矿产潜力





# 拥有良好的基础设施

- 选矿、湿法冶金和制酸厂将位于马拉维
- 将产出纯净、高品位、混合碳酸稀土产品
- 产品将通过铁路和公路出口，并进口药剂
- 主要商业中心——布兰太尔（Blantyre），为铁路始发站，并拥有国际机场，距离现场仅两个小时航程
- 硫酸装置将实现热电联产，辅以电网和太阳能供应





# 活跃在社区里的姆坎戈

## 与bo非政府组织建立全球合作关系

参与快乐教室项目

改建3所地方小学

24间教室可实现图文并茂教学

## 建立奖学金和食物计划

为来自3所当地小学的前6名学生支付中等教育费用——迄今为止已有24名学生获得资助

Langar零饥饿项目——让2000名小学生每天都有饭吃

## 投资当地社区基础设施项目

建设了5口水井并安装了水泵，在当地修复了15口水井

进行桥梁施工，对道路进行大规模整修



以前——教室简陋不堪



目前——经过装修后的教室明亮整洁，教室墙上图文并茂绘有教学大纲



供水水泵Mphembezu



新建桥梁

# 可持续发展与企业社会责任 ——姆坎戈公司愿景的一部分



# 以可持续发展态度开采稀土资源

- 马拉维松圭山项目将生产高价值经过纯化的混合稀土碳酸盐产品，将作为马拉维境外的一家选矿厂的原料，并将对众多选别方案进行评估
- 根据可行性研究，计划为矿山和选矿厂提供的能源主要为可再生能源——目前正在马拉维进行水电和太阳能开发
- 目前正在根据马拉维法律、国际金融公司的绩效标准和赤道原则，完成环境、社会和健康影响评估报告。企业社会责任是姆坎戈公司在马拉维愿景的组成部分
- MWEITI——本公司是马拉维采掘业透明倡议（MWEITI）的创始成员
- REIA——也是全球稀土行业协会（REIA）的创始成员，专注于可持续性、供应链认证和透明度



○ 该公司是由姆坎戈公司和和Talaxis公司共同成立的清洁技术成长型公司，旨在寻求稀土供应链的下游技术机会



○ 对于HyProMag的初始投资于2020年1月完成，重点是利用氢基技术回收短回路的钕铁硼磁体

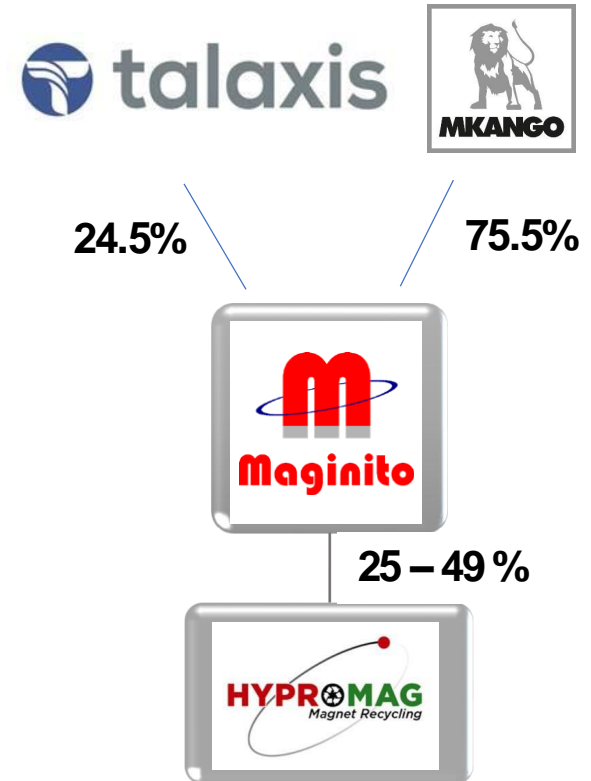


○ 根据2020年5月宣布的260万英镑创新英国赠款资助的RaRE项目，投资满足了HyProMag的配套资金要求，同时投资的还有宾利、优百特（Unipart）、Advanced Electrical Machines、Intelligent Lifecycle Solutions、伯明翰大学

○ 目前正在评估项目的各项资源情况，包括互补技术和进一步配套的融资机会



- 该公司持有HyProMag 25%的权益，且有100万英镑的期权，可将权益增加至49%——使用期权收益为额外赠款提供配套资金
- 优先向HyProMag供应初级稀土原料，用于与回收的钕铁硼粉进行混合
- 对于HyProMag生产的钕铁硼粉拥有承购权和销售权
- 对于马拉维松圭山稀土项目生产的碳酸盐型稀土和稀土氧化物拥有承购权



公司使命——专注建立一个具有互补性的下游绿色技术投资组合，包括钕铁硼磁体回收、新的且具有低冲击的稀土合金和稀土分离技术，并以可持续来源的初级和次级原材料的销售业务为支撑



- 除了20万英镑的可转换贷款，马吉尼托公司（Maginito）还投资了30万英镑，初步购买了HyProMag 25%的权益。并有选择权将权益提高到49%。
- HyProMag已经获得了一项专利技术，可以从含在废料和冗余设备的磁铁中提取钕铁硼合金粉末，并进行消磁
- HyProMag的创始董事包括名誉退休教授雷克斯·哈里斯（Rex Harris）、艾伦·沃尔顿（Allan Walton）教授和两位荣誉研究员约翰·斯佩特（John Speight）博士和大卫·肯尼迪（David Kennedy）先生，他们是稀土磁性材料、合金和氢技术领域的世界领先专家，拥有丰富的行业经验
- 马吉尼托的30万英镑初始投资将完全满足HyProMag的配套资金需求，符合三年期、260万英镑的英国创新基金资助项目“电子设备稀土回收”（“RaRE”）要求



## HPMS——HDD音圈磁铁总成

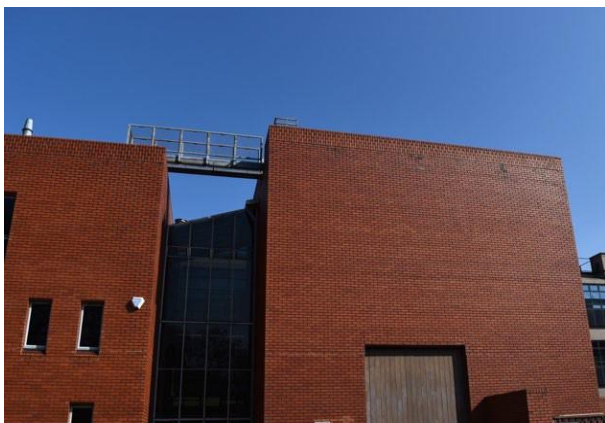


RaRE项目将首次建立端到端的供应链，将回收的稀土磁铁纳入电动汽车中——回收的磁铁将植入辅助电机内，最终形成商业性辅助电机套件开发的基础。

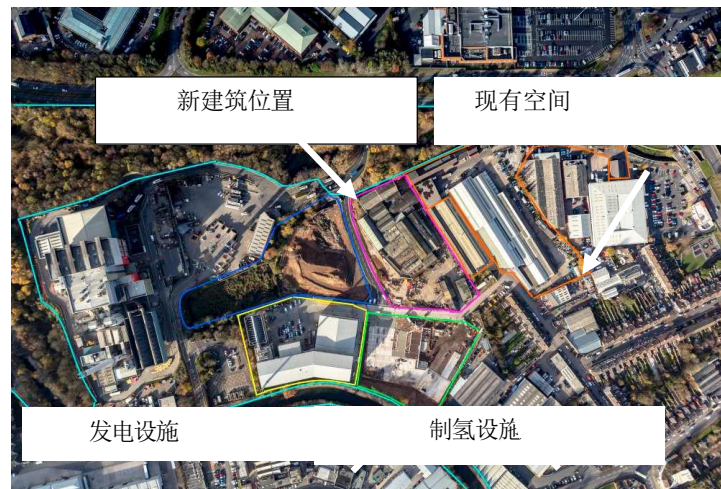
除了HyProMag和伯明翰大学外，RaRE项目还拥有一批具有互补专业知识的强大合作伙伴：

- 先进电机研究有限公司（Advanced Electric Machines Research Limited）——拥有为客户设计电机的丰富经验，包括空客和英国新创公司——Tewa电机公司
- 宾利汽车有限公司——一个标志性的汽车品牌 and 大众集团的一部分，世界上最大的汽车制造商之一
- 智能生命周期解决方案有限公司（Intelligent Lifecycle Solutions Limited）——全球领先的电子废弃物处理公司，与财富500强公司和英国政府机构有着合作关系
- 优百特动力系统应用有限公司（Unipart Powertrain Applications Limited）——英国最大的1类汽车合作伙伴之一，是全球公认的批量汽车供应商

- 目前正在英国伯明翰的泰斯利能源科技园建立稀土磁性材料制造厂。
- 正在评估四种潜在的商业开发产品：
  - ✓ 适用于磁铁生产商的**氢爆（HD）消磁粉末**
  - ✓ **用HD粉末重熔的合金锭**。适用于合金原料或磁铁生产
  - ✓ 粘结磁体用各向异性合金粉末（**HDDR**）。
  - ✓ RaRE项目要求用于汽车的**烧结型钕铁硼磁体**



伯明翰大学校园内的磁铁生产设施



最初曾获得伯明翰大学工艺开发部门的支持，经过两年多的时间，已经分阶段转入泰斯利科技园区





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