



 **VERDE MAGNESIUM**

The EU's dedicated primary Magnesium producer  
Aluminium 2022 – 28<sup>th</sup> of September in Düsseldorf

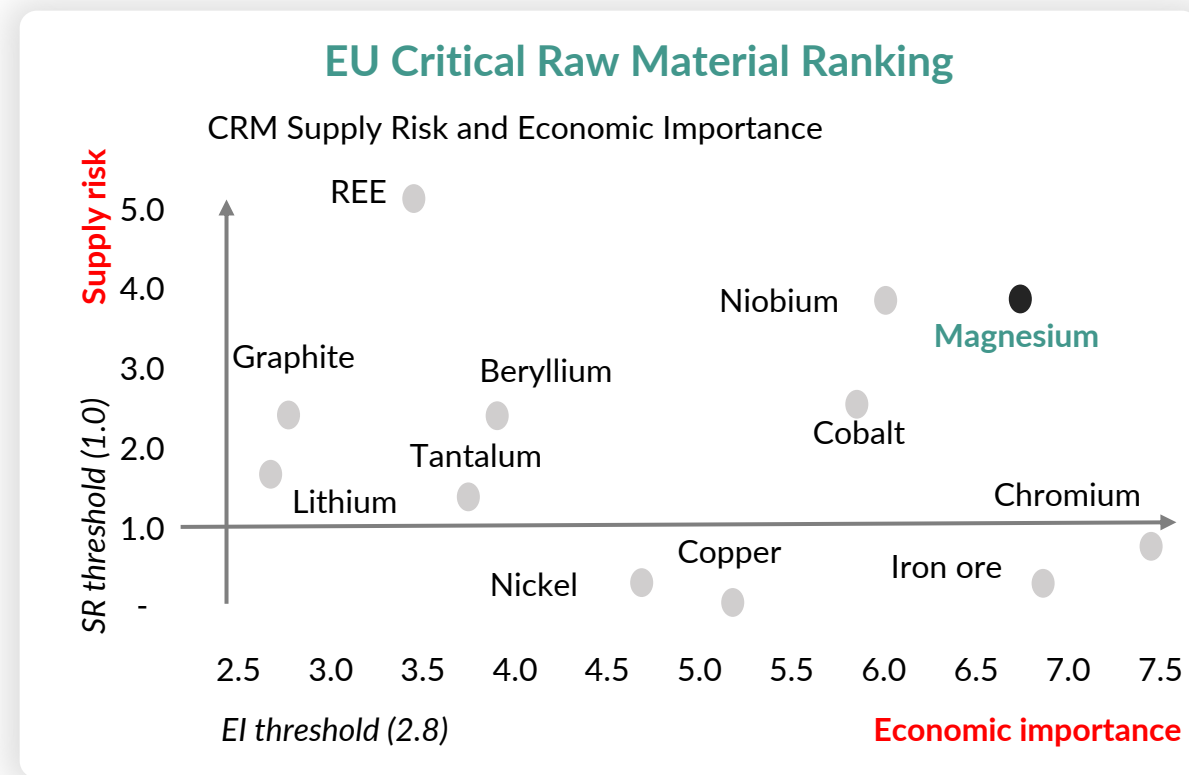


light weighting



# Critical Raw Materials (CRM) in EU

- EU's mining & metals production has suffered across the periodic table
- China: ultra-cheap labor and energy and no environmental protection
- Criticality raised further by pandemic, Ukrainian conflict, energy crisis
- Robust supply-chains are a must for:
  - ✓ Transition towards decarbonization and digitalization
  - ✓ New lightweight constructions for automotive and aerospace
- Long term competitiveness, sustainable development and welfare -> **restart of local production of CRM in the EU**



# Magnesium as a CRM in EU



## EU Market

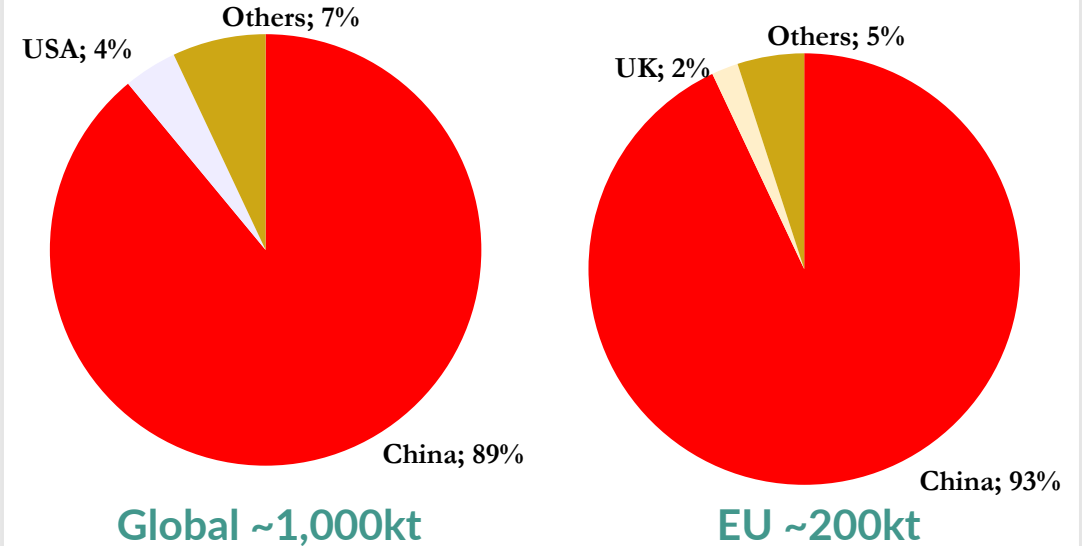


Potential locations for Mg smelter in EU

- Last smelter closed in France in 2001
- EU consumption is around **180 kt per year** and it is expected to reach **350-400 kt per year by 2035**
- EU is rich in MgO content minerals: dolomite, magnesite, carnallite, forsterite, brines
- EU misses a reliable technology able to produce primary Mg in a sustainable and economically feasible manner



## Est. 2022 Mg Supply



### Magnesium use in EU Industry :

- Aluminum & other alloys manufacturing
- Steel desulfurization
- Die-casting: Automotive, Aerospace, Defense
- Healthcare, Electronics

!!! Magnesium content in an EU produced car is lower compared with an US or Chinese produced car

# Verde Magnesium – an EU for EU initiative

- Verde Magnesium, **the EU's dedicated primary metallic Magnesium producer**
- Supplying Europe with up to 50% of its demand
- EU is rich in mineral resources
- EU source will improve the robustness of supply chains for automotive, aerospace and aluminum sectors
- Sustainable process aligned with the EU Green Deal and EU Industrial Strategy
- World class management team with successful track-records in Mg Industry
- US equity sponsor with strong investment track-record in building natural resources ventures
- Strong support from major European industrial groups
- Interest in project financing already received from: one of the top 5 global trading houses, a PE fund specialized in sustainable investments, an International Financial Institution and private investors

Verde Magnesium  
Memberships:

 euromines

 EUROPEAN  
RAW MATERIALS  
ALLIANCE | ERMA

 IMA International  
Magnesium  
Association

 CRM Alliance  
Critical Raw Materials

# EU industrial customers, supporters of Verde Magnesium project

- Volkswagen** EUR 230bn sales, global leading carmaker
- BOSCH** EUR 71.5bn sales, global leading technology, mobility, energy group
- ThyssenKrupp** EUR 34bn sales, global leading steel and industrial equip producer
- Novelis** EUR 12bn sales, global leading aluminum sheet producer
- ZF Group** EUR 30bn sales, global leader in mobility industry
- Autoliv** EUR 7bn sales, global leading supplier for automotive industry
- Stihl** EUR 4.5bn sales, global leader in chainsaw, outdoor power equipment and light-metal die casting
- Georg Fischer** EUR 3.2bn sales, leader in lightweight casting components in vehicles
- Speira** EUR 2.3bn sales, EU leading aluminum sheet producer
- Castwerk** specialist in Mg die cast and thixo molding parts
- Almamet** EU market leader for iron and steel desulphurization solutions
- Luxfer** supplier for aerospace and defense industries specialized in highly engineered advanced materials



# New Process

Verde Magnesium is cooperating and executed successful primary Magnesium production tests using aluminothermic reduction technology with:

- Zhengzhou Nonferrous Metals Research Institute of Chalco (ZRI) – China
- Big Blue Technologies (BBT) - USA

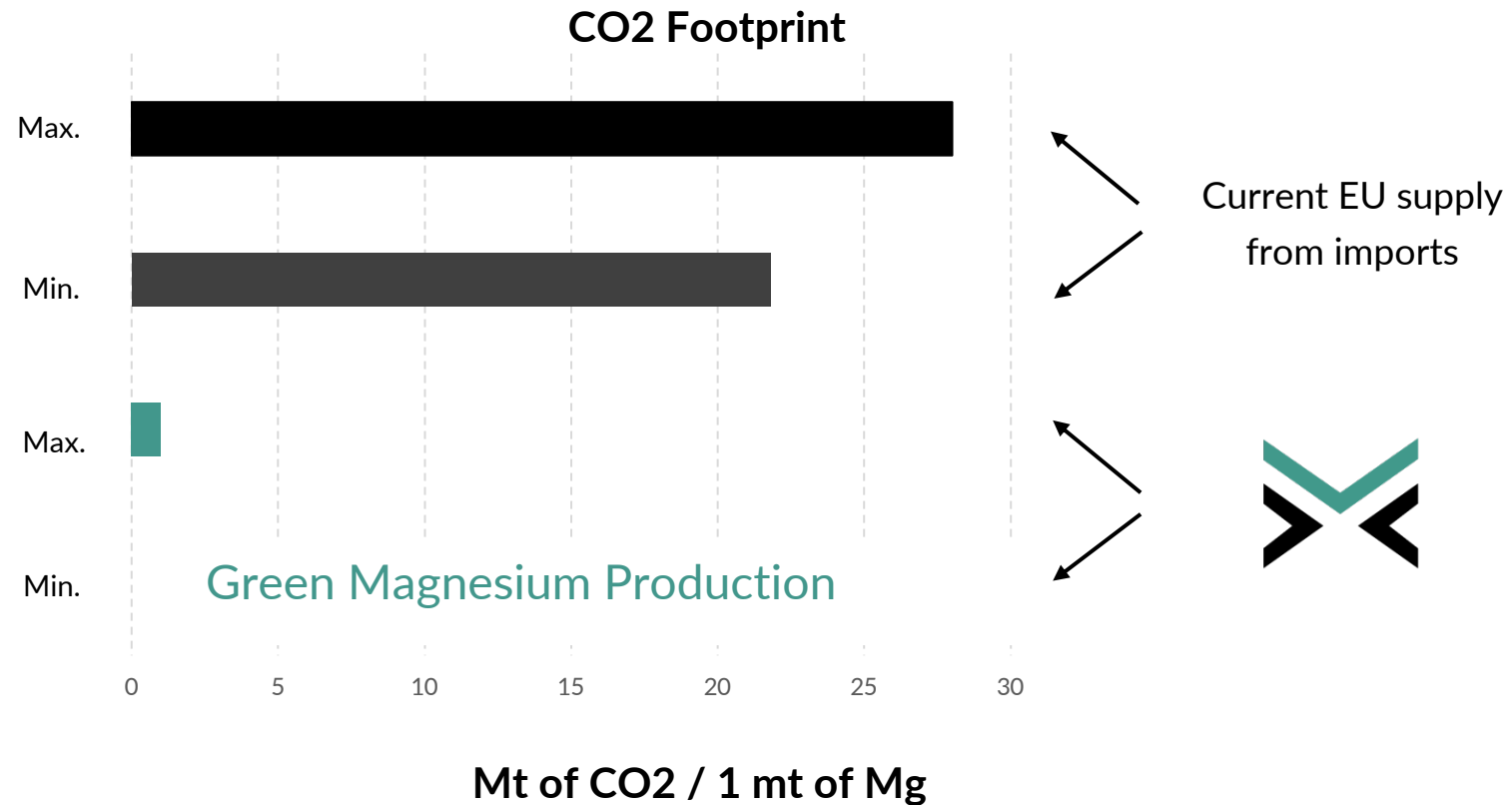


- ZRI Pilot Plant (300 mt/year)
- TRL 9
- 180 kt/year industrial facilities under development in China
- 40 kt/year industrial facilities to be commissioned in 2023



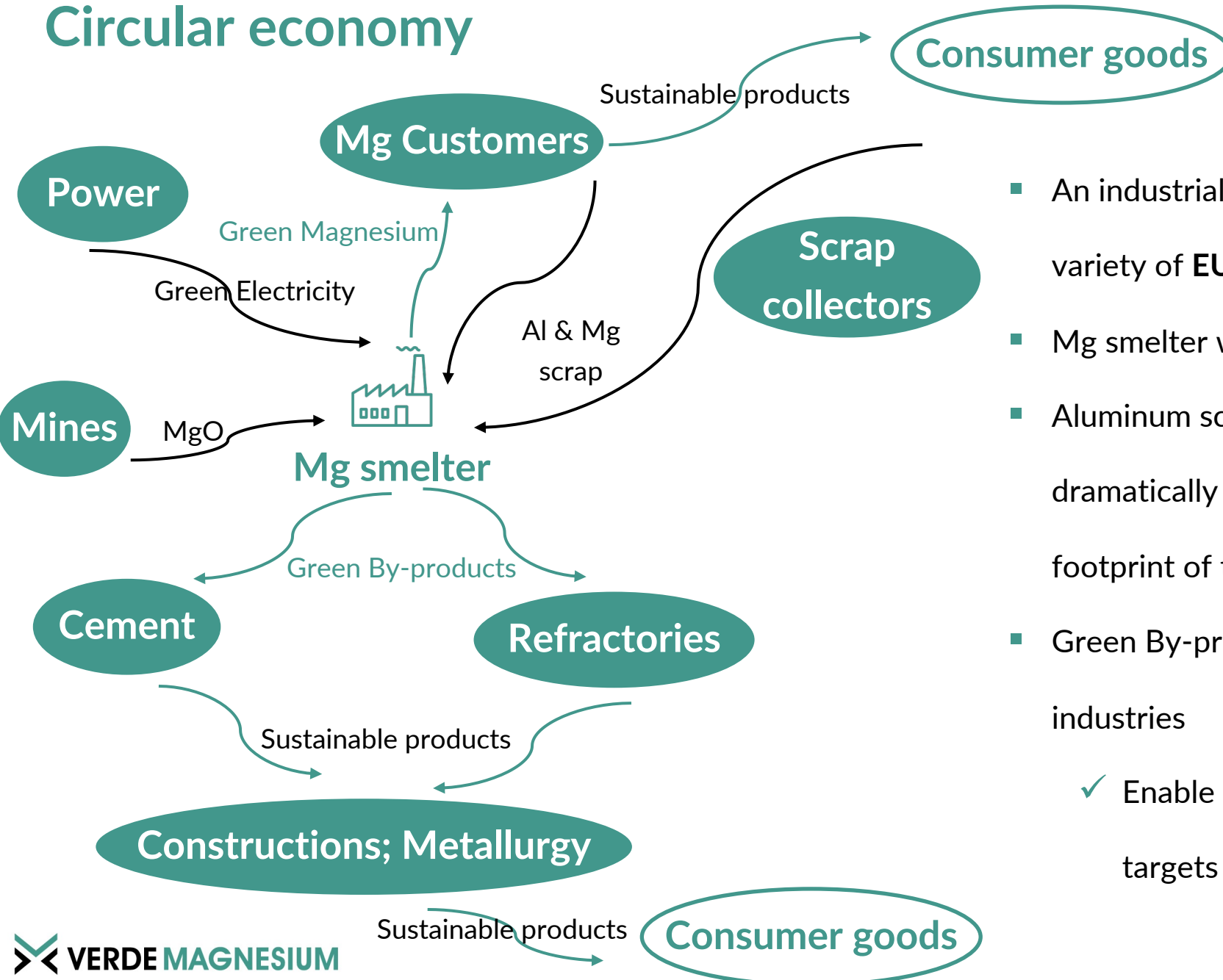
- BBT Pilot Plant (40 mt/year)
- TRL 5
- Reach TRL 9 in 2025
- 1<sup>st</sup> small size commercial furnace 2026/2027

# Sustainable Technology



- Emissions below 1 mt of CO2 / 1 mt of Mg confirmed during tests
- A 90kt/year Mg smelter will generate **3,5 mn tons/year of CO2 savings:**
  - ✓ 2,5 mn tons compared with imports
  - ✓ 1 mn tons by using Al scrap as reductant

# Circular economy



- An industrial **Mg smelter** supplying feedstock from a variety of **EU mines**
- Mg smelter will also close **Al & Mg recycling loops**
- Aluminum scrap was successfully used as main reductant dramatically reducing the energy intensity and CO2 footprint of the produced Mg
- Green By-products for cement and refractory materials industries
  - ✓ Enable these industries to reach their sustainability targets



# Main Drivers

Mg smelter development in EU Main Drivers	Verde Magnesium Project Evolution
<b>GENERAL</b>	<ul style="list-style-type: none"> <li>✓ <b>Achieved Milestones</b></li> <li>▪ <b>Undergoing / under preparation activities</b></li> </ul>
<ul style="list-style-type: none"> <li>▪ Process for green Mg production</li> </ul>	<ul style="list-style-type: none"> <li>✓ Cooperation with US and Chinese technology providers</li> </ul>
<ul style="list-style-type: none"> <li>▪ Expertize in the industry</li> </ul>	<ul style="list-style-type: none"> <li>✓ Own technical team, cooperation with Polish Institute for Non ferrous Metals, a reputable German engineering company, Australian light metals consulting company CM Group, Romanian mining institute Ipromin</li> </ul>
<ul style="list-style-type: none"> <li>▪ Support &amp; interest of EU customers</li> </ul>	<ul style="list-style-type: none"> <li>✓ Agreements under negotiation with EU industrial customers</li> </ul>
<ul style="list-style-type: none"> <li>▪ Capital</li> </ul>	<ul style="list-style-type: none"> <li>✓ Term Sheets and LOI's from: one of the top 5 global trading houses, a PE fund specialized in sustainable investments, an International Financial Institution, private investors</li> <li>✓ Talks undergoing: EIT Raw Materials, European Raw Materials Alliance</li> </ul>

# Main Drivers

Mg smelter development in EU Main Drivers	Verde Magnesium Project Evolution
<b>SPECIFIC (related to a Location)</b>	<ul style="list-style-type: none"> <li>✓ <b>Achieved Milestones</b></li> <li>▪ <b>Undergoing / under preparation activities</b></li> </ul>
<ul style="list-style-type: none"> <li>▪ Access to Al scrap</li> </ul>	<ul style="list-style-type: none"> <li>✓ Advanced discussions with Al recycling companies and Mg customers for closing the loop of Al (&amp; Mg) recycling</li> </ul>
<ul style="list-style-type: none"> <li>▪ Access to cheap green electricity</li> </ul>	<ul style="list-style-type: none"> <li>▪ A combination of RES projects development and partnerships with existing producers and developers</li> </ul>
<ul style="list-style-type: none"> <li>▪ Permitting (access to raw materials, green-light industrial activities, standardization, etc)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Partnering with various EU mining companies from Germany, Holland, Austria, Spain, Greece, Romania. In the process to obtain own mining license in Romania</li> <li>▪ Selection of existing and already permitted industrial platforms in EU with good infrastructure on site</li> </ul>
<ul style="list-style-type: none"> <li>▪ Cooperation with local communities, central and local authorities for reliable long term development</li> </ul>	<ul style="list-style-type: none"> <li>▪ Creation of well paid jobs and pay-back to the community</li> <li>▪ Big direct and indirect investments</li> <li>▪ Significant taxes to local and central budget</li> <li>▪ Know-how transfer</li> </ul>

# Board of Directors



Dr. Bernd Martens

- Audi AG, Board of Management, Head of Procurement and IT 2012-2020
- Volkswagen AG, SVP of New Product Management (within Procurement), 2005-2012
- Volkswagen do Brasil, Director of procurement, 2002-2005  
Director of Product Planning and Product Management, 1997-2002
- Roland Berger, Project Manager in Automotive, 1995-1997
- Mercedes-Benz AG, PhD student
- University of Kaiserslautern Studies in Industrial Engineering



Dr. Andor Lips

- European Commission. External Expert, 2010 – 2020
- Eldorado Gold. European Strategy & Corporate Sustainability Manager
- Lydian Intl. Technical Director
- ING Bank NV. Senior Banker mining finance
- Commodity Discovery Fund. Fund Manager
- PhD and MSc in Geology from University of Utrecht, the Netherlands, Fellow of the Institute of Mining Minerals and Metallurgy.



Sorana Baci

- EBRD, Senior International Advisor, 2017-present
- World Bank, External Advisor
- Secretary of State, Romanian Ministry of Economy, 2015-2016
- OMV Petrom, Strategy&Corporate Development Director
- Porsche Financial Group, Board Member
- ING Bank, Investment Banking & Strategy, 1997-2004
- BCom, Academy of Economic Studies Bucharest, MA Economic Policy Management, McGill University Canada



Jonathan Winer

- Regulatory attorney specializing in national security law and cross-border regulation
- Senior Counselor at APCO
- Former U.S. Special Envoy for Libya
- Former U.S. Deputy Assistant Secretary of State for International Law Enforcement
- In 2016, received the highest award granted by the Secretary of State, for “extraordinary service to the U.S. government”
- Former Counsel to United States Senator John Kerry

# Management Team



Alex Rosu

CEO

- Alex Rosu has 20 years of experience in natural resources sector, serving as a regional head for Amerocap and deputy CEO for a European refinery. Alex brings good business development experience in Romania having negotiated large commercial and M&A contracts in energy and commodities.
- BA, Academy of Economic Studies, Bucharest



Ilhan Goknel

VP Metallurgy

- Ilhan is a mining engineer with great expertise in non-ferrous mineral projects, from his 30+ year career.
- He was the former Project Manager and Plant Manager of the Esan, Turkey Magnesium Mining and Processing; the sole such asset built outside China in the last 20 years.
- MSC, Mining Engineering, Technical University of Istanbul and RWTH Aachen



Serghei Gheorghe

Commercial Manager

- Serghei has 30 years of expertise as a top commercial executive mainly in primary metals (non-ferrous) production and mining.
- He was the Procurement Manager and Board Member of Romanian Aluminum Smelter, VIMETCO-ALRO, being also involved in the alumina refining and bauxite mining activities of the Group.
- DSC Structural Engineering – Brasov University, MSC Engineering - Bucharest Polytechnic University

# Successful track-records in Magnesium Industry

Verde's VP developed Sole Mg Smelter ex-China this century

- Our VP Metallurgy, Ilhan Goknel, was the Project Manager and Plant Manager of Esan, Turkey, which developed the sole Mg smelter built outside China in the last 20 years (real picture below)
- Currently, the Esan plant is operating, producing and selling 15kt of Mg p.a. primarily into the US



# Benefits to EU, National Government and Local Community

- Sole European Magnesium Industry Hub, attracting major EU companies to further invest and develop their production facilities
- Increase the production of various industrial minerals to strengthen the supply chains of domestic industry
- Development of a new industrial sector, a pillar of economic growth
- Know-how and cutting-edge technology development
- Creation of well-paid jobs
- Reliable long-term development of local community
- Active environmental protection: reforestation, renewable power generation, recycling
- Infrastructure development (roads, utilities, education, sports, etc)
- Boost the activity and business opportunities for SME's



**\$1 – 3 bn**

Over 20 years in national government revenues



**\$0.5 – 1.5 bn**  
**\$5 – 10 bn**

Direct &  
Indirect investments



**200 – 1,000**

Direct jobs



**Up to 10,000**

Indirect jobs



**Sustainable activity**

Reliable long-term development

# Next Steps (reduced)

## 2023-2025:

- Industrial tests in US and China
- Test & identify the best EU feedstock for production of primary Mg and set-up partnerships for feedstock off-take
- Send Mg samples for testing to EU industrial customers
- Certify the sustainability of the product
- Select the best location for Mg smelter in EU
- Banking Feasibility Study for the 1<sup>st</sup> small industrial smelter with a capacity of ~2kt/year

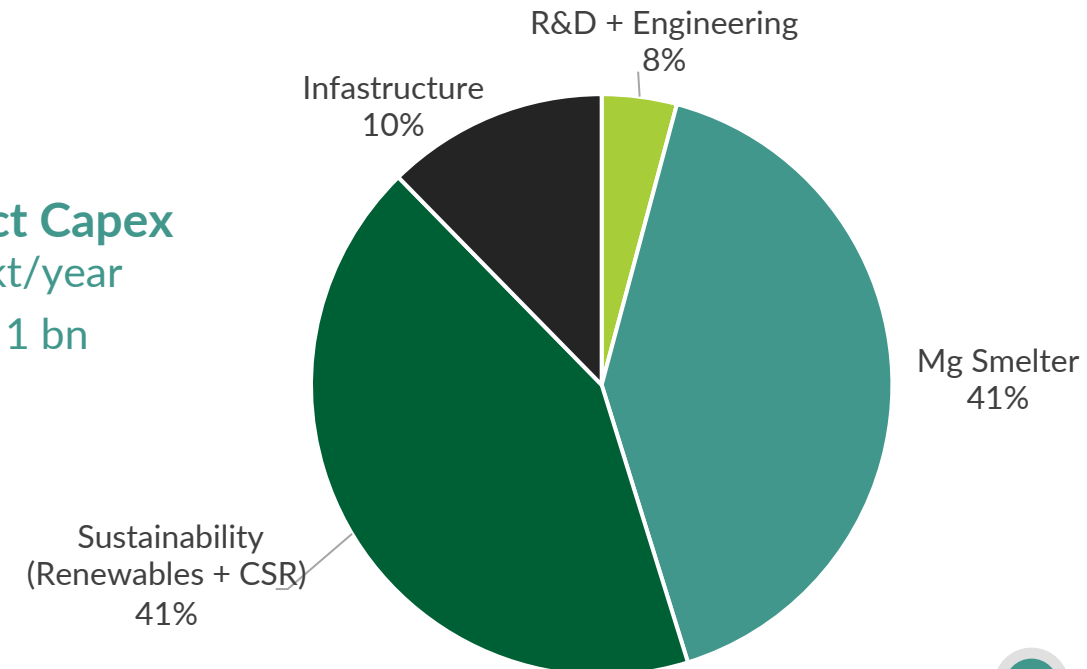
## 2025-2026:

- Develop the 1<sup>st</sup> small industrial smelter, bring it in parameters, certify product quality with EU customers
- Compliance with REACH, BAT, BREF and all EU standards
- Complete permitting

## 2026 - 2034:

- Big Industrial smelter of ~ 20kt/year
- Ramp-up production capacity up to 90kt/year
- Green power generation capabilities
- Circular loops for Al and Mg recycling, but for by-products (Mg-Al spinel, slag) as well
- EU's dedicated hub for Mg Industry next to the smelter

**Project Capex**  
90 kt/year  
€ 1 bn



# Stakeholders Support Needed

- Successful implementation depends on the support of:
  - ✓ **EU:** a mechanism to protect the investment by offering an incentive for bringing on the market a sustainable product (CO2 credits, CBAM, etc.)
  - ✓ **Member states:** support and flexibility in permitting
  - ✓ **Local communities:** social license to operate a sustainable production process
  - ✓ **EU customers:** need to encourage EU stakeholders to restart EU mining & metals industry while redesigning their supply chains



# Project Highlights

- Verde Magnesium Project tackles from the root of the problem aiming to bring in a modern, environmentally friendly, and efficient process, able to restart primary Magnesium production in the EU
- Such an initiative will allow the valorization of EU's rich natural resources in a sustainable manner while catalyzing R&D and strengthening long-term reliable competitiveness
- Within two to three years, with the proper development, the Project can deliver the first Single Industrial Modular System (SIMS) for Mg production in the EU (~2kt/year), followed immediately by a big Industrial Smelter (~20kt/year) whose capacity will be scaled up step-by-step (90kt/year).
- The success of the Project will allow EU's industry supply chains to regain strategic autonomy and alleviate total dependency on imports while reaching sustainability goals.
- Project needs the support of EU stakeholders for implementation and successful operation.

# Bernd Martens

**Chairman**

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# Alexandru Rosu

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