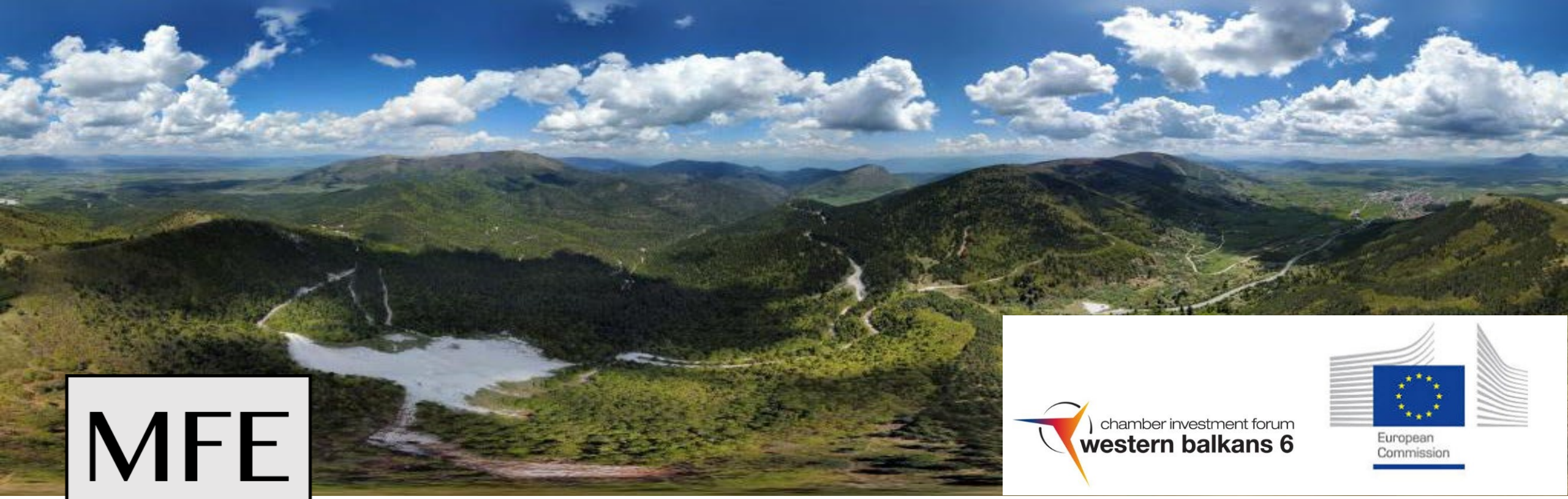

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For Europe

chamber investment forum
western balkans 6

European
Commission

Sustainable & Green Magnesium Production in Europe

April2024

Critical Raw Material Act

Setting benchmarks by 2030 for domestic capacities
The Act sets these benchmarks along the strategic raw materials value chain and for the diversification of the EU supplies

- **at least 10% of the EU's annual consumption for extraction**
- **at least 40% of the EU's annual consumption for processing**
- **at least 15% of the EU's annual consumption for recycling**

no more than 65% of the EU's annual consumption from a single third country

(https://single-market-economy.ec.europa.eu/sectors/raw-materials/areas-specific-interest/critical-raw-materials/critical-raw-materials-act_en)

Why Magnesium has a strategic importance for Europe

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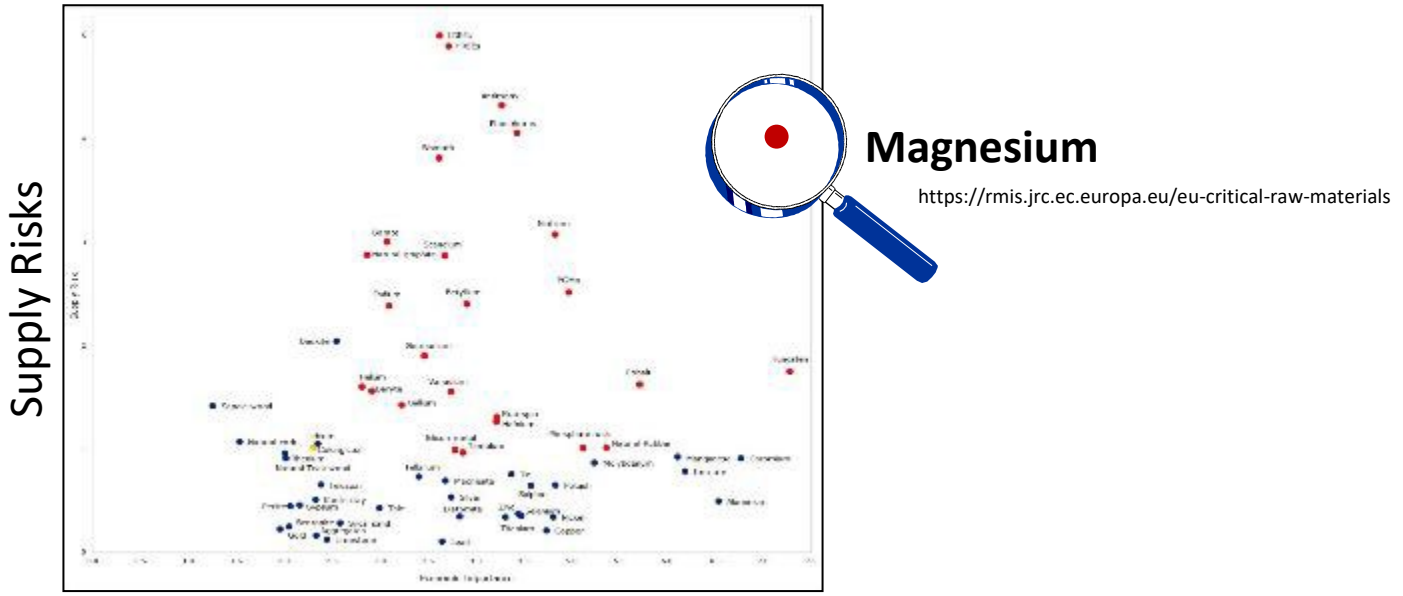
What is Magnesium?
The lightest structural metal: 70 % lighter than steel and 33 % lighter than aluminum – but much stronger than aluminium!

The importance of magnesium is not only due to its favorable properties of weight, stability and vibration damping, but is also irreplaceable as an alloy for aluminum in particular!



What ist new regarding Magnesium?
The modern way to store and transport hydrogen!

Why We Need European Mg Production

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The Problem

- European industry is entirely dependent on one single Mg supplier.
- No Aluminium without Magnesium
- No light EV´s without Magnesium
- China expand its own use in EV-Industry of Magnesium 10 times until 2030 to save on batteries (weight/range-ratio)
- Magnesium as a hydrogen storage and transport is rolled out globally (MgH2)

Challenge

Re-establish Magnesium production in Europe! But this time green, clean, sustainable and competitive.

Solution

The very rare combination of a **green technology,** a **very pure**, homogeneous and **large raw material deposit**

and **abundant green energy**

⇒ **European industry requires a solution for its growing Magnesium need and to avoid another potential Magnesium supply crisis**

Why MFE is strategic for Europe

MFE Magnesium For Europe

MFE Magnesium For Europe GmbH has the potential to meet European demand for years to come

MFE completed ist full-scale industrial test with LGE/ZRI, audited by DMT/TUE NORD!

European market: Magnesium: ca. 200.000 MT p.a.

World market: Magnesium: ca. 1.100.000 MT p.a.

MFE total production potential next 50 years: Magnesium: ca. 9.000.000 MT

Environmental and social aspects of the project

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Magnesium
For Europe

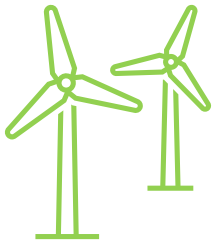
The Environmental and Social Impact Study according to European standards started last year and will be finished Q2 2024

Neutral impact on the environment

- No degradation of land, no habitat- or biodiversity loss
- The project will be realized on former industrial land
- Almost no CO_2 emissions < 1 mt CO_2 / 1mt Magnesium
- Innovative technology envisages conversion of separated CO_2 gas into dry ice which prevents its release into the atmosphere
- No resettlement needed, no negative impact on livelyhood
- Low water usage & closed water loop
- Zero waste production

Technology: Al-thermic Process = green & competitive

MFE Magnesium For Europe

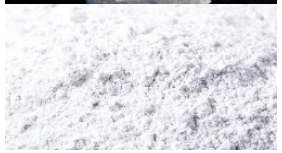


Mg Production 2.0

Al-thermic Process

Green electricity; 1150 ^{0}C

- Dolomite
- Calcination → Dry Ice
- Ca-Mg Separation → PCC ($CaCO_3$)
- Blend with Al-scrap as reductant
- Reduction → Aluminiumoxid
- Refining → Mg



Al-thermic Process

- 4 valuable output products
- Zero waste
- CO_2 footprint: < 1 mt CO_2/mt Mg
- Established, in use, audited process

Al-thermic combined with **very marketable**, **highest purity by-product production** constitutes a **quantum leap in Mg Production efficiency,** benefitting output value and environment.

As the **by - products cover large parts of production costs, so we will not be affected by dumping strategies.**

MFE - Project Status

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Planning stage close to completion with few tasks outstanding

Pilot test for industrial design and equipment specification
4Q 2023 – 1Q 2024

ca. $80-200m capex
Funding s.t. extent of backward integration
3-4Q 2024

Environmental & Social Impact study & Local permit (incl. building & environmental approval)
2Q 2024

General contracting*, equipment order, **construction**
4Q 2024 -

Now: 2024

Plan: 2026

** LOI signed with ATILLA (Turkey) as General Contractor & Operator*

Why this particular place is so unique for Magnesium production

MFE Magnesium For Europe

MFE benefits from a highly advantageous location in Bosnia and Herzegovina

Purest Raw Material

- **High quality, proprietary running & active (since 2007) Dolomite open pit deposit** just a few meters away from MFE's future production site
- **Very large deposit (>100 Mio. mt)** sufficient to run a 15-50 kt p.a. Mg plant for well over 100 years

Green Energy

- Kanton 10 is generating **only green energy** (mainly hydro and wind power) and will add substantial capacity in coming years
- MFE is **considering the establishment of an own wind and solar park (56 MW)** given the very favourable local conditions

Good Infrastructure

- **located only 150 km from the Croatian Port of Ploce** the major gateway for goods
- **Public investment in electricity infrastructure: substations and transmission lines is needed**

European Location

- Bosnia-Herzegovina (BiH) is **strategically well positioned** on the border of the EU and has EU candidate & accession negotiations status
- **No duties and trade restrictions** for industrial products
- Solid legal system

How Bosnia and Herzogovina profits from the MFE Project

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The MFE project is a catalyst for the region Kupres/Kanton 10

Creating Jobs

Attracts skilled and unskilled workers from the region & abroad

Production 15/later 50 K Mt Magnesium/Byproduct

- Up to 400 direct jobs
- Up to 2.500 indirect jobs

Infrastructure

Accelerating the expansion of the infrastructure

- Availability of green energy
- Digitalisation (Internet)
- Roads etc.

Lighthouse Project attracts further European Industry

Establishment of processing industry

- Nucleus for further local investment opportunities for European Industry
- Up to date technology transfer

Higher local Income

Increase local income

- Increase municipal income
- Increase Kanton income
- Increase VAT income

Please join MFE in its endeavours to establish

a clean, green, competitive and reliable

Magnesium production in Europe

Thank you for listening to our presentation:

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Appendix : MFE - Project Work Streams

MFE Magnesium For Europe

Technology	▪ Al-thermic process, now the most efficient Mg production process available
Supply Chains ▪ Raw Material ▪ Energy ▪ Al-Scrap	▪ Dolomite sourced from local high-quality deposit ▪ Pre-negotiated PPA's with local grid operator and private electricity generators ▪ Al-Scrap from local Al-producers with whom LOI's are being entered into
Product Sales & Markets ▪ Mg & Mg Alloys ▪ PCC ▪ Al-Mg-Spinel ▪ Dry Ice / Liquid CO^2	▪ CM Group advised MFE on the long-term dynamics, supply-demand relationship and expected pricing in the global Mg and Mg-alloy markets ▪ fmi consulted MFE on current state and outlook for the global, and more importantly regional markets for the three by-products
Production Site	▪ 77.000 m^2 of industrial land purchased. Building & Environmental Permit application process well under way
ESG Compliance	▪ Total CO_2 emission of less than 1 mt per 1 mt of Mg + c. 12 mt of by-products

Appendix: By-Products and Markets

The high quality of MFE's Dolomite allows for the production of **Magnesium and three high quality by-products**; all of them benefit from increasing demand and large regional markets

PCC (Precipitated Calcium Carbonate, $CaCO_3$)

- Many applications, high purity, well-ordered particle size make PCC the white filler of choice
- Global PCC market expected to grow at c. 10% p.a. and reach c. US$11 bn by 2030 (Regional Research Reports, 2/2023)

Al-Mg-Spinel ($MgAl_2O_4$) and Aluminium-Oxide

- Primarily used as a refractory material for a variety of applications
- Global Al-Mg-Spinel market forecast to grow strongly. West, Central & Southeastern European Markets alone to grow from c. US$6 bn to over US$10 bn by 2033 (fmi, 4/2023)

Dry Ice and liquid CO_2

- Several new applications such as e-frigeration of foodstuff in electric delivery vans and airplanes
- As a result, Eastern European and Balkan sales of Dry Ice are expected to almost double to c. US$620 m by 2033 (fmi, 5/2023)

Appendix: MFE Magnesium for Europe GmbH

It is MFE's strong ambition
to re-establish a primary Magnesium production in Europe,
offer clean, green and competitive Magnesium,
become the supplier of choice for European industry, and create
a win-win-win situation for European industry, Bosnia and Herzegovina,
and Europe as a production location for technology value chains.

MFE's mission started in 2019 and was motivated by

- A majority controlled high quality raw material: Dolomite (Calcium Magnesium Carbonate) deposit in Kupres, Kanton 10, Bosnia and Herzegovina ("BiH")
- Progress in Magnesium production technology
- hydro power plants & wind farms: Fichtner study result : offshore wind conditions
- The regional availability of all other important inputs

Appendix: MFE Founder / Management Team

Albrecht von Kempis, GM, Strategy & Sales

Experienced executive with more than 30 years of experience in industrial minerals and Dolomite. Ex-CEO of OMYA Switzerland AG.

Ilhan Göknel, CTO

Mining Engineer, MSc. with >35 years of experience in mine development and beneficiation of industrial minerals and metallic mines.

Jan Wever, GM Local Operations BiH

Dipl. Kfm. with more than 28 years of experience in project management and consulting, focus on real estate, financing.

Jure Brekalo, Local MFE-Representative BiH

Experienced manager with broad local relationship network. 30 years of business development and board level experience.

Mark Pohlmann, Managing Director

Ex investment banker, asset manager, and investor with >30 years of experience in developing and financing companies in various sectors.

Richard Radtke, GM, Strategy & IR

Dipl. Kfm., 15 years with Deutsche Bank, experience as founder/board member of several companies.