

Primary Magnesium Tracking Report

1Q 2023

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INTERNAL



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Picture: ICL

Ongoing Mg primary projects		2Q 2022	3Q 2022	4Q 2022	1Q 2023
Canada	Alliance Magnesium International	Improvements incorporated in 2022 to the design of the planned primary 25 000 t/y facility for 2024 resulted in a significant decrease of the estimated CO2 eq/t Mg from 4.41 to 1.35 excluding credits. This improvement was made by using more hydroelectricity and less natural gas as energy supply in the process.	Organisational changes: Michel Combes has been appointed Chairman of the board and François Perras has been appointed President and CEO. Main operating activities: The current magnesium recycling plant operations continued. The feasibility study on the upgraded 37 000 t/yr magnesium plant design is progressing and is due for completion at 2022 yearend. The permit modification request for the revised 37 000 t/yr magnesium plant (25 000 primary plus 12 000 secondary) is under way.		The Alliance Magnesium project is progressing well, with the Feasibility Study scheduled for mid-April. Production start-up is still planned for the fourth quarter of 2025, with a capacity of 25 ktpa of primary Mg, 12 ktpa of recycled Mg, plus 44 ktpa of amorphous silica. New contact: Marie-Claude Fournier/Director of Environment. E: mcfournier@alliancemagnesium.com
			Alliance Magnesium Appoints New Chairman of the Board; Alliance Magnesium names new President and CEO https://alliancemagnesium.com/en/press/		<u>News (23.1.2023)</u> Alliance Magnesium and Triple M Metal enter into a strategic partnership supplying and recycling critical minerals in North America https://alliancemagnesium.com/en/alliance-magnesium-and-triple-m-metal-partnership/
Australia	Latrobe Magnesium	Quarter Activity Report (30.6.2022) - LMG concludes its \$23M project financing facility and draws first \$10M advance enabling the company to enter into agreements for its long lead capital items and continued funding for its Demonstration Plant - Once the demonstration plant is operating successfully, a commercial plant will be developed to a capacity of 10,000tpa - Latrobe Magnesium has awarded a Pre-Feasibility Study (PFS) for its 100,000 tpa magnesium plant to Bechtel, a global engineering, construction, and project management company. https://www.latrobemagnesium.com/investor-center/announcements	<u>Up-date:</u> Latrobe progresses magnesium plant as engineering and equipment packages near completion <u>Up-date:</u> Latrobe Magnesium advances magnesium production strategy in Australia and overseas <u>Up-date:</u> Latrobe Magnesium investing \$39 million for Stage 1 of 'green' magnesium production plant in regional Victoria <u>Up-date:</u> World's First Magnesium Extraction Process Production by Tenova Technology https://www.latrobemagnesium.com/news	<u>Up-date:</u> VEEM: The contract is to supply the 1,000 tpa Latrobe Valley Stage 1 Demonstration Plant, which is fully funded and expected to be operational by mid-2023. <u>Up-date:</u> LMG executes upgraded USA distribution agreement for sale of Latrobe Valley Magnesium - A minimum firm commitment of 8,000 tpa of magnesium; - A minimum initial term with a rolling annual renewal; - A minimum floor price for the purchase of the magnesium. https://www.latrobemagnesium.com/investor-center/announcements	<u>News (17.1.2023):</u> Latrobe Magnesium upgrades magnesium distribution deal into the Americas LMG has had a relationship with MEC since 2019 when it first signed its initial sales agreement. The upgrade of this agreement follows LMG's current expansion plans to its demonstration plant and expanded 10,000+ tonnes per annum capacity. The agreement now includes: • updated dates; • a minimum firm commitment of 8,000 tonnes per annum of magnesium; • a minimum initial term with a rolling annual renewal; and • a minimum floor price for the purchase of the magnesium. https://www.proactiveinvestors.com.au/companies/news/1003406/latrobe-magnesium-upgrades-
		Latrobe Magnesium has awarded a Pre-Feasibility Study (PFS) for its 100,000 tpa magnesium plant to Bechtel, a global engineering, construction, and project https://www.latrobemagnesium.com/investor-center/announcements	Interview CEO David Patterson (Small Caps) https://www.youtube.com/watch?v=iLaS0xpnCDg&list=TLGGUMTFu4Y8kEwNzExMjAyMg&t=3s	Latrobe IMARC Presentation: https://www.latrobemagnesium.com/investor-center/announcements	<u>News (5.4.2023):</u> Latrobe Magnesium picks Malaysia for 100,000 tonnes per annum magnesium plant https://www.proactiveinvestors.com.au/companies/news/1011292/latrobe-magnesium-picks-

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		2Q 2022	3Q 2022	4Q 2022	1Q 2023
China	Qinghai Magnesium Alloy casthouse)	<p><u>Quarterly Activity Report 25.7.2022:</u> In the six months under review there was no commercial activity at QSLM's Qinghai magnesium electrolytic plant and no supply to Magontec's adjacent magnesium alloy cast house. QSLM, our partner at the Qinghai facility, have told us that the first dehydration line is operating satisfactorily and is producing qualified feedstock for the electrolytic process. As at the end of July no electrolytic cells have yet been brought back into production and Magontec has been given no guidance on re-commencement liquid pure magnesium supply to its magnesium alloy cast house.</p> <p>http://magontec.com/de/investor-centre/asx-announcements/</p>	<p><u>Magontec Quarterly Report 3Q 2022:</u> QSLM now expect to recommence supply of liquid pure Mg to Magontec's Qinghai facility in late 2023. As Magontec waits for supply from the QSLM factory we continue to operate our adjacent magnesium alloy cast house. We have a team of nearly 60 people at Qinghai, including highly experienced operators, administrators and managers who will be critical in bringing mass production on stream next year.</p> <p>http://magontec.com/de/investor-centre/asx-announcements/</p>	<p>Salt Lake Trimag Magnesium(Anhui) in Hanshan County, Anhui Province: The die-casting project, with output of 5kt/a of Mg/Al alloy die-casting products, is invested and is an important project by Qinghai Salt Lake Industry to go out of Qinghai and locates in the eastern coastal areas, which marks the operational extension of related industry chain.</p> <p>Source: Sunlight Metal (IMA website)</p>	<p><u>Magontec Investor presentation (14.3.2023):</u> Primary Mg alloy manufacturing: At Golmud in Qinghai province PRC Manufactures Mg alloys from pure Mg and other alloying element raw material - Adjacent to electrolytic Mg smelter - Installed capacity 60k mtpa - ~ 90% renewable energy - Auto / other Mg alloy die cast customers - Operating at reduced capacity, smelter not commissioned</p> <p>https://magontec.com/de/investor-centre/asx-announcements/</p>
US	Western Magnesium Corporation	<p><u>Press release 15.7.2022:</u> Western Magnesium sees 99.83% and 99.62% magnesium recovery during calibration run of pilot plant</p> <p>https://www.westernmagnesium.com/news</p>		<p><u>Press release 6.12.2022:</u> Western Magnesium Signs Memorandum of Understanding with CCMA, LLC to be Exclusive Sales Agent</p> <p>https://www.westernmagnesium.com/news/western-magnesium-signs-memorandum-of-understanding-with-ccma-llc-to-be-exclusive-sales-agent</p>	<p><u>Press article (3.2.2023):</u> Western Magnesium Provides Technical Update</p> <p>https://www.westernmagnesium.com/news/western-magnesium-provides-technical-update</p>
		<p><u>Press article 14.7.2022:</u> Magnesium Metal Purity Results Received from Second Calibration Run of Commercialized Pilot Plant</p> <p>https://www.westernmagnesium.com/news</p>			<p><u>Press article (21.2.2023):</u> Western Magnesium Plans West Coast Expansion</p> <p>https://www.westernmagnesium.com/news/western-magnesium-plans-west-coast-expansion</p>
Romania	Verde Magnesium	<ul style="list-style-type: none"> - Cooperating with mining companies in the EU which are able to source MgO based feedstock or even to produce MgO at a certain specification that will be suitable for the process we aim to develop - Identifying 3-4 locations in the EU that have direct and cheap access to green electricity where to build the smelter (few locations were already identified in 3 EU countries, but the selection process will continue) - Partnering with industrial customers for metallic Magnesium in EU for testing the Magnesium and by-products - Developing a pilot plant in EU by the end of 2023/early 2024, followed by an industrial scale smelter in 2026 / 2027 	<p>SC Verde Magnesium SRL Romania (VerdeMg) and Big Blue Technologies USA (BBT) have agreed on a partnership aiming at the construction of the first industrial modular system (SIMS) for the production of metallic magnesium in the EU (several locations have already been identified and are under analysis in Romania, Germany, Austria, Spain, Greece, Holland, etc.). The success of this partnership will lead to the resumption of production of primary magnesium metal in the EU. The EU's total dependence on imports for this critical raw material will be reduced and phased out through the local production of a green metallic magnesium, which will not only strengthen EU industry supply chains, but help many industries and companies achieve their sustainability objectives.</p>		<p>Verde Magnesium releases new YouTube videos:</p> <p>https://www.youtube.com/watch?v=GCws7brapVA</p>
		<p>The project is listed in the project pipeline of the EU Magnesium Working Group.</p>	<p>https://www.agerpres.ro/ots/2022/09/26/parteneriatul-dintre-verde-magnesium-romania-si-big-blue-technologies-sua--648217</p>		<p>https://www.youtube.com/watch?v=ihlHUiFYEnA</p>

	2Q 2022	3Q 2022	4Q 2022	1Q 2023
Romania	<p>WET has developed a processing route where it will extract minerals from the COPR to produce Magnesium Oxide (MgO) > Magnesium metal, Chrome Oxide Green (Cr2O3) and Calcium Chloride (CaCl2).</p> <p>Mures Magnesium (former: Wastes Ecotech Srl)</p> <p>The project is listed in the project pipeline of the EU Magnesium Working Group; and obtained KAVA funding approval (EIT RAW Material/ERMA)</p>	<p>The company was renamed to Mures Magnesium Srl (MMG) to represent the project and the region where the company resource and future processing site is located. The 5.5 mEUR co funded EIT RM project ("EU Magnesium") kicked off was end July 2022 and the focus has been the designing of the upgraded pilot plant (MMG site based). Pilot plant renovation works will start in Dec 2022 with installation of the new equipment likely to start end Q1 2023. Test work on the upgraded pilot plant will start Q3 2023. MMG is working with a solar developer which will build a 65 MW solar park besides the future processing site using 42 ha from its 84-ha site. A further 7 MW will be built on the MMG site directly using surplus land and the roof space of the planned logistics facility. Load balancing will be done via the 45 MW cogeneration plant also to be built as part of the project. Preparatory site works will commence in Q1 2023 with a view to starting geo tech drilling work in March 2023. Permitting for the geo tech works is ongoing at this time. MMG looks to a late 2026 / early start-up of the commercial plant contingent of accessing early financing allowing preliminary design works to start from Q4 2023.</p>	<p>The company owned 1,94 m tonnes Chromium Ore Process Residue or COPR feedstock for processing and aims to produce 22 mt/year of Mg metal. The EIT Raw Material co-funded project develops with an industry consortium the MgCl2 > Mg reduction. MMG will continue to seek EU grants and Romanian state funds.</p>	<p><u>News (6.2.2023):</u> EIT RawMaterials awards 55 million to secure sustainable raw materials pipeline for Europe EU Magnesium – Sustainable Mg supply for Europe is one of the funded projects (Mures Magnesium). EIT RawMaterials closed funding rounds as part of the latest Calls for Innovation & Education Projects (KAVA 9 and 10). Among the top 32 projects, the EIT RawMaterials community is working on securing access to critical raw materials for key industrial ecosystems, designing materials solutions and closing production loops to foster Europe’s transition to a green, digital and circular economy. All projects contribute to the EIT RawMaterials Lighthouses programs, which address critical and specific raw materials challenges for Europe, such as Responsible Sourcing, Sustainable Materials and Circular Societies.</p> <p>https://eitrawmaterials.eu/eit-rawmaterials-awards-55-million-to-secure-sustainable-raw-materials-pipeline-for-europe/</p>
Bosnia	<p>MFE Magnesium For Europe GmbH was founded in 2021 to develop a climate neutral magnesium production on the basis of an existing and fully controlled dolomite (calcium magnesium carbonate) deposit near Kupres, Bosnia Herzegovina, 50km away from the current EU border.</p> <p>Recent expert test results confirmed the suitability of Kupres dolomite for a state-of-the-art production process which yields high quality magnesium, PCC, Spinel, and dry ice whilst minimising the emission of CO2 due to the abundance of green energy available in Bosnia Herzegovina.</p> <p>MFE owns a production site close to the dolomite deposit and is currently in the process of obtaining relevant permits and financing. MFE is also discussing with industry participants potential strategic alliances and investments. Production start is scheduled for 2025/26.</p> <p>The project is listed in the project pipeline of the EU Magnesium Working Group.</p>	<p><u>Raw material quality:</u> The high quality of the dolomite was confirmed in tests with independent renown labs. Two PERC studies were conducted in 2020/2022 by DMT/TUV Nord which confirmed the quality and quantity of the dolomite. The suitability of the dolomite for the Al-thermic process and the high quality of the outputs have also been confirmed.</p> <p>§ In the Al-thermic process, c. 13mt of Kupres dolomite yield 1.0mt primary Mg, 2.1mt Al-Mg-Spinel, 7.2mt PCC and c. 3mt CO2 / c. 1.2mt Dry Ice.</p>	<p><u>Raw material quality:</u> The high quality of the dolomite was confirmed in tests with independent renown labs. Two PERC studies were conducted in 2020/2022 by DMT/TUV Nord which confirmed the quality and quantity of the dolomite. The suitability of the dolomite for the Al-thermic process and the high quality of the outputs have also been confirmed.</p> <p>§ In the Al-thermic process, c. 13mt of Kupres dolomite yield 1.0mt primary Mg, 2.1mt Al-Mg-Spinel, 7.2mt PCC and c. 3mt CO2 / c. 1.2mt Dry Ice.</p>	<p>New production process: CO2 study / LCA from DLR - Alu-Scrap < 2 t CO2 pro t Mg - Aluminium < 2,5 t CO2 pro t Mg</p> <p>Source: MFE presentation Gmunden 30.3.2023</p>

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Norway	Silmag	Information that from Hydro; Magnesium related assets at Porsgrun are set to be demolished in 3Q 2022		Information that from Hydro; Magnesium related assets at Porsgrun are set to be demolished in 3Q 2022	
Canada	Mag One Products	No Up-date	No Up-date	No Up-date	No Up-date
Australia	Magnium	<p><u>Article: 17.6.2022:</u> Green magnesium refinery proposal for Collie reaches milestone</p> <ul style="list-style-type: none"> - Pre-feasibility study completed into establishing a state-of-the-art carbon neutral magnesium metal refinery - McGowan Government commits to next steps for the project - Up to \$2 million for detailed study to be undertaken into producing magnesium hydroxide from wastewater <p>https://www.mediastatements.wa.gov.au/Pages/McGowan/2022/06/Green-magnesium-refinery-proposal-for-Collie-reaches-milestone.aspx</p>		<p><u>Article 25.11.2023:</u> Game-changing industries shaping the future of Collie:</p> <ul style="list-style-type: none"> - International Graphite opens new Collie processing facility - the first of its kind in Western Australia - New \$2 million investment to expand Quantum Filtration Medium's Collie manufacturing facility - New investment of almost \$2 million for the next stage of Magnium Australia's proposed Collie magnesium refinery - Projects set to create more than 400 permanent jobs in Collie <p>https://www.mediastatements.wa.gov.au/Pages/McGowan/2022/11/Game-changing-industries-shaping-the-future-of-Collie.aspx</p>	
		<p><u>Article: 11.7.2022:</u></p> <p>https://thenewdaily.com.au/finance/2022/07/11/allan-kohler-end-of-coal/</p>		<p>CSIRO: MagSonic slashing emissions at the speed of sound</p> <p>https://www.csiro.au/en/work-with-us/industries/mining-resources/Resourceful-magazine/Issue-28/MagSonic-slashing-emissions-at-the-speed-of-sound</p>	
US	Big Blue Technologies		West High Yield (W.H.Y.) Resources Ltd. Signs Memorandum of Understanding Regarding Magnesium Metal Ingot Processing Technology License	Big Blue Technologies is working with Verde Magnesium, West High Yield Resources, and Magneto Metals for regional deployment of our technology.	Big Blue Technologies (BBT) has initiated operation of its electrified aluminothermic process with three successful test runs. Samples have been sent to select potential customers and stakeholders. BBT will continue ramping up and performing process characterization to begin the design of a commercial production system.
India	Tremag Alloys	No Up-date	No Up-date	No Up-date	No Up-date
Australia	Pact Renewabl	No Up-date	No Up-date	No Up-date	No Up-date

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Current Mg primary producers		2Q 2022	3Q 2022	4Q 2022	1Q 2023
Brazil	Rima	Operating at full capacity of 22.000 mt	Rima Mg plant during 3Q 2022 still running the plant at full capacity, 22.000 MTY level.	Mg Plant at full capacity (22.000 MTY) during 4Q2022.	Mg Plant at full capacity (22.000 MTY) during 1Q2023.
Israel	Dead Sea Magnesium			<p>ICL New video: The magnesium product range includes oxides, hydroxides, carbonates and chlorides</p> <p>https://www.icl-ip.com/specialty-minerals/sm-product/magnesium/</p>	<p>The carbon footprint associated with the production of Magnesium from ICL Dead Sea Magnesium (ICL DSM) operations has been undertaken with the results compared to other products of a similar nature. The assessment has been completed in keeping with PAS 2050: 2011</p> <p>Up-dated Dead Sea Magnesium LCA value of 7,78 to CO2eq/1 to primary magnesium</p> <p>Internal Communication</p>
US	US Magnesium	Traders and consumers said US Magnesium has given no projected date to return to its previous full output and additional volumes may be delayed until September. Some customers with multi-year contracts are getting allocations but less than expected, so they are seeking additional spot or quarterly coverage.	Great Salt Lake defenders turn out in protest of US Magnesium’s plan to access more water As US Magnesium presses forward with securing permits to extend its intake canals, dozens showed up at a public meeting Wednesday to rally in defense of the Great Salt Lake....	<p><u>Article: With Great Salt Lake at rock bottom, lawmakers aim for rescue</u> The lake’s decline pushed U.S. Magnesium, the country’s largest magnesium producer, to apply to extend canals that are used to take in and evaporate lake brine to mine the metal. The Utah Department of Environmental Quality denied its application late last year.</p>	Utah Department of Environmental Quality (Update 29.12.2022) US Magnesium Canal Continuation Project Section 401 Water Quality Certification Decision
			https://article.wn.com/view/2022/10/20/Great_Salt_Lake_defenders_turn_out_in_protest_of_US_Magnesium/	https://www.nbcnews.com/science/environment/great-salt-lake-rock-bottom-lawmakers-aim-rescue-rcna65737	https://deq.utah.gov/water-quality/us-magnesium-canal-continuation-project-section-401-water-quality-certification-decision
Turkey	KAR MİNERAL MADENCİLİK (ESAN)	No Up-date	Traxys closed a global marketing agreement until 2029, and supported KAR in buying the magnesium plant from ESAN. Further investments (9 mio US) are planned to produce 600 lb T-bars for Al customers. An additional solar plant will also reduce the carbon emissions.		No up-date
Kazachstan					
Russia	Solikamsk				
Russia	VSMPO - Avisma				
Iran	Shemsh Felez Royal Co.				
		Please check comprehensive and regular update on News section of IMA website.	Please check comprehensive and regular update on News section of IMA website.	Please check comprehensive and regular update on News section of IMA website.	Please check comprehensive and regular update on News section of IMA website.

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		2Q 2022	3Q 2022	4Q 2022	1Q 2023
China	all	https://www.intlmag.org/default.aspx	https://www.intlmag.org/default.aspx	https://www.intlmag.org/default.aspx	https://www.intlmag.org/default.aspx

Primary Magnesium Production Processes:

	Unit	Horizontal P.	Vertical P.	Al Thermic	Electrolysis
Process		Pyrometallurgy	Pyrometallurgy	Pyrometallurgy	Electrolytic
Capex	USD/t Mg	4000 - 5000	4500 - 5000	5000 - 6000	12.000 – 15.000
Raw material		Dolomite	Dolomite	Dolomite	Sea Water, Brine
Raw material consumption	t/ t Mg	11,5	11	12,6	13,08
Reducing agent					
FeSi	t/t Mg	1,08	1,05	-	N/A
CaF ₂	t/t Mg	0,19	0,17	-	
Al Scrap	t/t Mg	-	-	0,8	
Consumables					
Flux	% / t Mg	03-May	03-May	03-May	N/A
Retort	Qty / t Mg	0,25	0,15	-	
Electrode	Qty/ t Mg	-	-	-	
Energy source					
N. Gas	m ³ /t Mg	2.200	1.700	1.500	1.830
Electricity	Kwh /t Mg	2.200	2.200	9.500	10.500 - 13.200
Water consumption	m ³ / t Mg	15	10	16	13
Working temperature	°C	1250	1250	1150	550 - 800
Vacuum	Pa	<15	<15	<15	Atmosphere
Workforce	Person/10 ktpa Mg	235	225	200	N/A
CO ₂ footprint	t CO ₂ /t Mg	15 - 28	15 - 25	< 5	5 – 10
Slag		yes	yes	no	yes
By-product		no	no	CaCO ₃ , Mg Al Spinel	HCl
Mechanization		no	semi	yes	yes
Cycle	h	10-Dec	08-Oct	05-Jul	Continuous

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IMA repor	IMA report 2020	Own DSM publication	Magnium; Own indicative report	Latrobe Annual Meeting 2022 (10.000 mt fly-ash)	Latrobe Annual Meeting 2022 100.000 mt Ferro Ni slag	Alliance Magnesium information 16.8.2022 25 000 t/y for 2025	MFE DLR report 3/2023 15.000 t/y for 2026
	inc. credits	inc. credits	kg CO2eq/kg Mg	kg CO2eq/kg Mg	kg CO2eq/kg Mg	kg CO2eq/kg Mg	kg CO2eq/kg Mg

External databases

Ongoing Mg primary projects

Canada	Alliance Magnesium International	4,41				1,35 (excl. credits)	
Australia	Latrobe Magnesium	7,35			10,2	1,5	
China	Qinghai Magnesium Alloy casthouse)	5,20					
Bosnia	Magnesium For Europe						<2,0 Al scrap; <2,5 Al
Canada	Mag One Products	5-8					
US	Big Blue Technologies	0,5-12					
Australia	Magnium			5,5			

Current Mg primary producers

Brazil	Rima	10,10					
Israel	Dead Sea Magnesium		7,78				
US	US Magnesium						
Turkey	KAR MİNERAL MADENCİLİK (ESAN)	20,00					
China Pidgeon	Producer Gas	28,38					
China Pidgeon	Coke Oven Gas	19,44					
China Pidgeon	Semi Coke Oven Gas	19,26					
China Pidgeon	Natural Gas	25,86					
China Pidgeon	weighted average	21,80					

Mg World average	21,30						
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Al primary production	IMA study 2020	Source:					
North America	7,88	AAA 2013 LCA report					
Europe	6,70	EAA 2018 LCA report					
Europe	8,60	EAA 2018 LCA report					
China	20,00	World Aluminium 2017					
Global average	18,00	World Aluminium 2017					

Al Carbon Footprint		Source:					
Primary Al China Scope 1,2,3	20,00	Aluminium International					
Primary Al Global Scope 1,2,3	17,00	Aluminium International					
Primary Al EU ma Scope 1,2,3	8,60	European Aluminium					
Primary Al Production Scope 1,2,3 Europe	6,70	European Aluminium					

IDEMAT LightLCA

			(CO2eq/kg)	Euro/kg
Magnesium	Magnesium secondary	Landfill (dumping ground)	0,49	0,19
	Magnesium market mix	Landfill (dumping ground)	23,34	3,30
	Magnesium, CRM, virgin	Landfill (dumping ground)	25,87	3,64
	Magnesium, secondary	Waste treatment & open loop recycling	0,49	0,07
	Magnesium market mix	Waste treatment & open loop recycling	23,34	3,17
	Magnesium, CRM, virgin	Waste treatment & open loop recycling	25,87	3,52
	Magnesium, CRM, virgin	Closed Loop Recycling & Confiring	0,49	0,07
Magnesium, secondary	Closed Loop Recycling & Confiring	0,49	0,07	
Aluminium	Aluminium secondary	Landfill (dumping ground)	2,86	0,51
	Aluminium market mix	Landfill (dumping ground)	8,08	2,37
	Aluminium virgin	Landfill (dumping ground)	8,82	2,63
	Aluminium secondary	Waste treatment & open loop recycling	2,86	0,38
	Aluminium market mix	Waste treatment & open loop recycling	8,08	2,24
	Aluminium virgin	Waste treatment & open loop recycling	8,82	2,51
	Aluminium, virgin	Closed Loop Recycling & Confiring	2,86	0,38
	Aluminium secondary	Closed Loop Recycling & Confiring	2,86	0,38
	Aluminium, market mix	Closed Loop Recycling & Confiring	2,86	0,38
Steel (selection)	Carbon steel secondary	Landfill (dumping ground)	0,65	0,23
	Carbon stel market mix	Landfill (dumping ground)	0,96	0,32
	Carbon stel secondary	Waste treatment & open loop recycling	0,65	0,10
	Carbon steel market mix	Closed Loop Recycling & Confiring	0,65	0,10
	Carbon steel, secondary	Closed Loop Recycling & Confiring	0,65	0,10

IDEMAT LightLCA Database/App: <http://idematapp.com/>
 Background information: <https://www.ecocostsvalue.com/eco-costs/>

GaBi by SPHEIRA

Magnesium	China: Magnesium technology mix, primary production production mix, at plant	Database: Indian database, Professional database		Aggregated process
	China: Magnesium (Renew. electr. LC) technology mix, primary production production mix, at plant	Database: Extension Database XXIII: Materials based on 100% purchased renewable electricity		Aggregated process
	China: Magnesium, electrolysis, primary ingot electrolysis from carnallite MgCl ₂ -KCl single route, at producer	Professional database		Aggregated process
	China: Magnesium, pidgeon process single route, at plant	Professional database		Unit process
	China: Magnesium, pidgeon process, primary ingot primary production, pidgeon process single route, at producer	Indian database, Professional database		Aggregated process
Magnesium	Israel: Magnesium, electrolysis, primary ingot, by-products Cl ₂ , KCl electrolysis from carnallite MgCl ₂ -KCl single route, at producer	Indian database, Professional database		Aggregated process
Magnesium	India: Magnesium (approximation) technology mix, primary production production mix, at plant	Extension database XXI: India, Indian database		Aggregated process

Sphera (GaBi) <https://sphera.com/>

ecoinvent

ecoinvent <https://ecoinvent.org/>