The raw materials contribution to the implementation of the EU Sustainable Finance Action Plan

Euromines Position on the draft Regulation establishing the framework to facilitate sustainable investment (EU Taxonomy)

June 2019

As the recognized representative of the European metals and minerals mining industry, Euromines welcomes the Commission's **Sustainable Finance Action Plan** for a greener and cleaner economy and agrees that a socio - economically efficient, sustainable and flexible financial system is essential for long-term value creation.

In November 2018 the European Commission underlined the importance of continuing exploration and extraction in its document, *A Clean Planet for all*, a strategic long-term vision for a prosperous, modern, competitive and climate-neutral economy by 2050. "Raw materials are indispensable enablers for carbon-neutral solutions in all sectors of the economy. Given the scale of fast growing material demand, primary raw materials will continue to provide a large part of the demand."

The European mining industry plays a critical role in underpinning economic growth. The development of mineral resources is a pillar for many national economies, in terms of contribution to gross domestic product, foreign direct investment, tax & royalty revenues as well as other governmental revenues. Even more, the mining industry produces more than 42 different metals and minerals and employs 350.000 people directly and about 4 times as many indirectly. Modern extraction and processing of minerals and metals has brought huge benefits to society while reducing pressures on the environment, addressing green-house gas emissions, tackling pollution, minimising waste and improving efficiency in the use of natural resources. Even more, the mineral industry will continue to enable downstream sectors to realise all these improvements.

In this context, we believe that the Sustainable Finance Action Plan should ensure an integrated approach, providing consistency, stability and predictability along the whole value chain by:

- Continuing to fulfil our current needs without compromising the ability of future generations to meet theirs;
- Keeping finance and investment available to all, both to those that are trailblazers and to those that are in need of finance to modernise and upgrade toward achieving these targets, including SMEs;
- Markets, industries and companies in transition need assistance if we are to achieve our shared goals;
- Integrating the research, development and innovation potential in sustainability reporting;
- Maintaining the system's flexibility and dynamism according to the social, economic and environmental evolution;
- Using accurate definitions and methodologies that are both aligned and coherent with existing principles;
- Fostering transparency and providing clarity to the markets through a common understanding of sustainable investments and their environmental impacts;
- Keeping reporting duties to an efficient and functional minimum;
- Using relative and not absolute indicators or even qualitative ones as metrics of selection. An absolute value is a value compared to an absolute standard which currently does not exist or cannot be uniformly applicable in assessing how different mining sectors contribute to the development of low carbon technologies.
- Encouraging investments into generic new business developments such as sustainable exploration, which would secure the supply of resources for the future.

Additionally, Euromines would like to make the following comments with regards to the Proposal for a Regulation on the establishment of a framework to facilitate sustainable investment (EU Taxonomy):

1 European mining-related activities are environmentally sustainable and comply with the sustainability criteria, as follows:

- They contribute substantially to the environmental objectives set out in Article 5 in accordance with Articles 6 to 11 of the draft, Regulation on Taxonomy, including by enabling other economic activities to improve their environmental performances with regards to one or more of these objectives;
- They do not significantly harm any of the environmental objectives set out in Article 3 of the taxonomy proposal;
- They are carried out in compliance with the applicable safeguards and procedures implemented by the undertaking that is carrying out an economic activity;
- They comply with the technical screening criteria.

2 Euromines is committed to contribute substantially to climate change mitigation

Article 6 of the Taxonomy Regulation proposal states that "an economic activity shall be considered to contribute substantially to climate change mitigation where that activity contributes substantially to the stabilization of greenhouse gas concentrations in the atmosphere at a level which prevents dangerous anthropogenic interference with the climate system by avoiding or reducing greenhouse gas emissions or enhancing greenhouse gas removals […]"

With this in mind, the European mining companies not only continuously explore methods of decarbonisation in order to efficiently and effectively fulfil the continued increasing demand for resources but also enable other economic activities to improve their environmental performance.

Greening of: The European mining sector reduces the emissions of mining-related activities. Different European mining sectors have already taken the necessary measures to reduce the mining–related emissions and have already opted for investing in their own alternative electricity generation and supply or switched to a 100% renewable energy source for their electricity supply.

Most major mines in Europe are currently heavily investing in electrification and remote operation of their internal transportation, transport lines and machinery including investments in battery technology, electric mine trucks, electric trolley lines, electric conveyor belts and transport routes.

Other contributions to the climate change mitigation include the use of both conventional and technological innovations to improve recovery per unit of energy used (use of new IT, Big Data, precision mining and earth observation technologies), energy saving programs and Energy Management Systems, the implementation of energy-saving projects across mines and mill sites, investments into alternative energy supplies such as wind power and use of biofuels for heating instead of gas oil.

Together with the downstream industry, the mining industry is investing in new and further research in developing raw material feeds that will allow reduction in carbon emissions in further processing. LKAB for example has initiated research along with the international mining and steel industries for new reduction processes with reduced or no carbon emissions. In partnership with the steel company SSAB and energy company Vattenfall, it is currently running the HYBRIT project with the aim of making steel with no carbon emissions whatsoever[1].

1 Source: Sustainability Report, LKAB, 2017, https://www.lkab.com/en/SysSiteAssets/documents/finansiell-information/en/annual-reports/lkab_2017_annual_and_sustainability_report.pdf

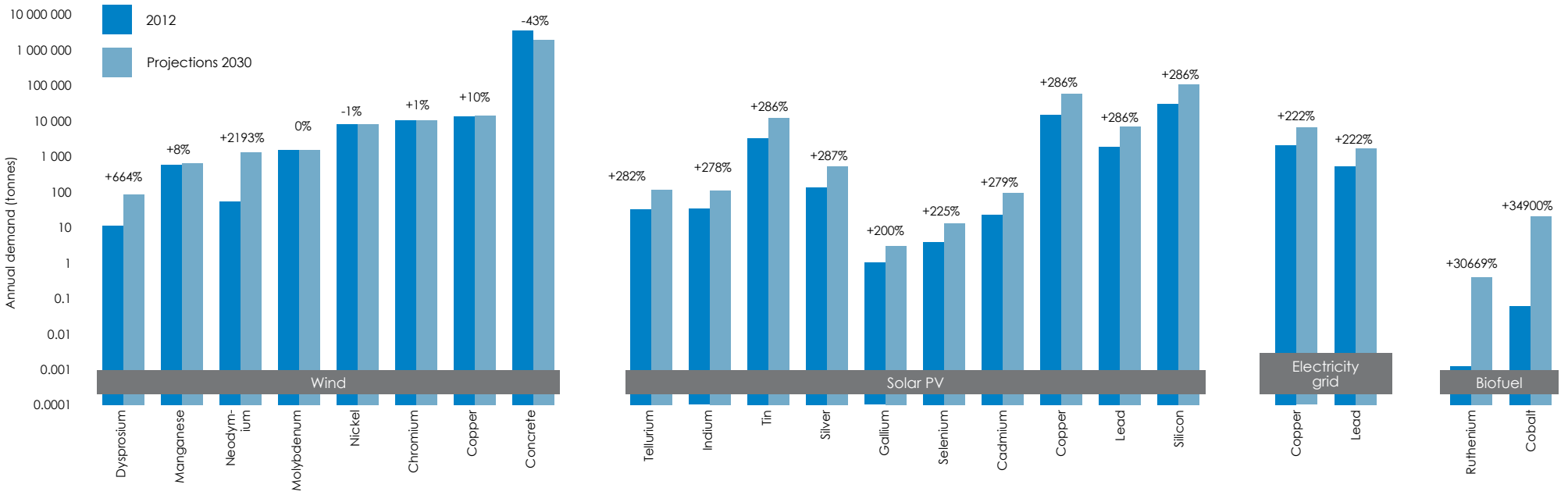
Greening by: European mineral products also trigger emission reductions in other sectors of the economy. For example, the new infrastructure for the alternative energy sector requires an increased use of metals and minerals, in particular steel for pipelines and mining equipment, copper and graphite for electricity cables, generators and electric motors, aluminium, primarily for electricity cables, and a host of other metals and minerals including phosphorous, potassium and nitrogen for biomass production.

Also, producing a 3-megawatt wind turbine requires 335 tonnes of steel, 4.7 tonnes of copper, 1,200 tonnes of concrete, 3 tonnes of aluminium, 2 tonnes of rare earth elements as well as zinc. This illustrates the volume of raw materials we need for the green transition. (Maroš Šefčovič, the European Commission Vice-President in charge of the energy union)

Figure 1: Projected variation in the EU's annual demand for raw materials in selected low-carbon technologies from 2012 to 2030 [RMS, 2016]

Solar photovoltaic panels and thermal systems use a combination of up to 22 non-ferrous metals, silicon, chemicals (e.g. organic electrolytes) and a specific type of flat glass. Innovation in light-weight flexible photovoltaic films is also enabled by the development of advanced polymers. Improvements in solar energy cells are shifting some of the materials needed, and now include gallium arsenide, gallium indium phosphide and germanium. Besides these elements, solar panels may also contain molybdenum, zinc, cadmium, sulphur and aluminium.

Metals and minerals are essential for manufacturing any renewable "green" energy supply technologies. Low carbon technologies require significant amounts of steel, iron, copper, aluminium, zinc, nickel etc. as well as a vast array of speciality metals. In most cases, the annual demand for raw materials used in certain low-carbon technologies is projected to increase significantly by 2030, as shown in the figure below and also in Annex 1.



3 Euromines is committed to contribute substantially to climate change adaptation

A continuously changing climate generates a series of risks to mining operations. These industries are often located in challenging geographies, they rely on fixed assets with very long lifespans, include global integrated supply chains and have to deal with environmental and climate sensitive resources. Increased temperatures, changes in precipitation, sea level rise, earthquakes and extreme events have already become stressors with the potential to negatively affect the mining activity.

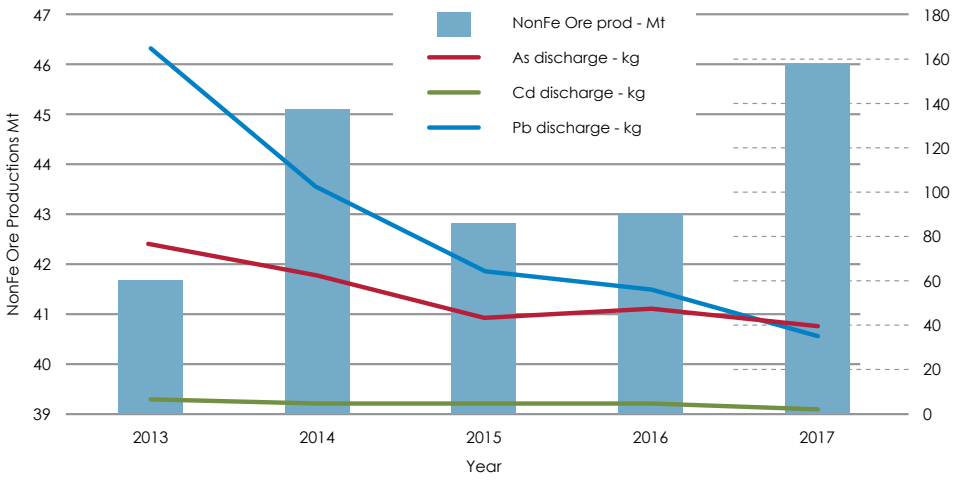
With this in mind, the European metals and minerals industries are dedicated to continuously identify and assess risks so that disruption and damage arising from acute or chronic effects of climate change are minimised. The measures include but are not limited to:

- Continual planning and risk management:
  - ensure a more efficient use of natural resources,
  - support R&D of appropriate environmentally sustainable technologies,
  - better measure and report on adaptation progress;
- Reinforcing assets to withstand current future dynamic climate conditions (e.g. storm surge, sea level rise, higher temperatures, heavy rainfall episodes);
- Amending the engineering design standards, design criteria and contract specifications to account for a changing climate (e.g. increased capacity in water and waste handling capabilities);
- Basing the frequency of maintenance and monitoring of assets upon indicators of risk including sensitivity to weather effects;
- Protecting against risks:
  - Increase flexibility to reinforce and/or increase the capacity of assets and operations in the future;
  - Strengthen relationships with local communities with regards to implementing adaptation actions, potential risks and early-warning systems;
- Remedying impacts:
  - Incorporating adaptation considerations into existing contingency and emergency management planning (e.g. planning for drought, extreme precipitation events, tropical storms, heat stress, community health);
  - Increasing resilience to water scarcity through increasing efficiency in arid or water-stressed regions, companies are taking action to improve water efficiency, do more with lower quality water inputs and develop new water sources;
- Monitoring, evaluation and reporting:
  - Validating the results of risk and opportunity assessments, ensuring that resources are being utilised effectively on high-priority issues;
  - Identifying emerging trends that could have implications for different activities;
  - long-term environmental and climate monitoring, and monitoring effects on regional stressors, such as water availability, ecosystem integrity, changes in flora and fauna varieties, and frequency and magnitude of extreme events;
  - periodic review of the design basis for equipment and infrastructure to determine whether the original climatic assumptions are still valid;
  - tracking implementation and effectiveness of adaptation actions and measuring performance against planning targets or goals;
  - incorporating adaptation considerations into existing monitoring of system components; for example, tracking maintenance and repair records to assess the impacts from historical extreme events or more gradual effects from incremental changes in historical temperature or precipitation;
  - public reporting on climate change impacts, adaptation activities, and progress towards performance goals or planned targets.

4 Euromines is committed to contribute to the sustainable use and protection of water

Euromines welcomes and supports the European Union commitment to achieve good qualitative and quantitative status of all water bodies and supports society's development in line with the UN sustainable development goals. The provisions of the Water Framework Directive (WFD) provide for the improvement of water conditions in Europe and contribute to a sustainable water policy inter alia through the integrated management of river basins, and the raw materials industry fully complies and implements them. Over the last decades the industry has reduced discharges to water dramatically leading to a significant improvement of the status of European waters. The figure below presents an example from Sweden where, in the period from 2013 to 2017, discharge of heavy metals was reduced, despite increasing Non-ferrous ore production (sources: Swedish National Emission Register www.naturvardsverket.se, and Swedish Geological Survey https://apps.sgu.se/geolagret).

Swedish annual NonFe ore production (Mt) and As/Cd/Pb discharge (kg) 2013-2017



5 Euromines is committed to contribute to the circular economy

The EU Circular Economy policy is focussed on maintaining the value of resources rather than necessarily reducing their use; it explicitly acknowledges the important role that primary raw materials will continue to play and is structured to reflect the different needs and capacities of sectors when it comes to resource use, waste generation and waste management. The transition to an even more circular economy will increase the critical need for a sustainable and secure supply of metals and minerals.

The European mining industry contributes to the circular economy through its operations which aim at improving efficiency of raw materials usage, reducing waste and improving recyclability. The contribution is made also made through products containing various minerals and metals, e.g., by facilitating light-weighting and extending the lifetimes and recyclability of products and materials.

6 Euromines is committed to contribute to the protection of healthy ecosystems

The European mining industry assumes full responsibility regarding conservation and management of biological diversity and aims to always have a net positive impact on biodiversity and ecosystems.

Our commitment to identifying and assessing biodiversity opportunities and contraints throughout the entire mining cycle from exploration to rehabilitation, and our hope to always have a net positive effect help us better understand biodiversity issues and deliver long term business value.

7 Euromines welcomes an integrated value chain market mechanism as a low-carbon economy enabler

Assessing and ensuring a long term efficient contribution requires multiple actors along the entire value chain to act simultaneously towards the same objective. Therefore, a shift is required towards a systemic approach. When determining the contribution brought by a specific economic activity, three strategic segments should be addressed simultaneously: the sustainable supply of the raw materials needed to support the deployment of low carbon technologies; the contribution of production processes of upstream and downstream industries and the closure of the material loops (the shift from linear to circular thinking). Only through an integrated value chain approach can real advances in low carbon technologies be understood, achieved and evaluated on a long term.

Using a value chain approach would make it easier to boost the contribution of existing economic activities, but also to create and develop new more efficient low-carbon activities, through the introduction of new materials and investments.

8 Euromines welcomes initiatives aiming at fostering transparency and providing clarity to the markets through a common understanding of sustainable investments and their environmental impacts

However, it is essential to ensure the current proposal is proportionate, practical and implementable, in line with EU competition rules and business confidentiality requirements and therefore

- it includes voluntary alternatives and options with no legally binding requirements where appropriate; the non-binding disclosure guidelines remain a voluntary tool for all companies, without singling out one sector in particular, such as banks and insurance,
- sets out clearly the role and application of climate-related information in relation to other information in the public domain,
- All commercially or economically sensitive information is not disclosed publicly.

Raw material	Contribution to low carbon technologies					
	Transport	Wind	Solar	Batteries	Securing the EU base load	Enhancing recycling
Bauxite and aluminium	• Every kilogram of aluminium replacing steel in car manufacture reduces the overall weight of the vehicle by a further kilogram. • Using 100 kg of aluminium in a car reduces CO_2 emissions by up to eight grams per kilometre travelled, saving up to 46 litres of fuel per year. • Each kg of aluminium in today's articulated trucks saves 26 kg of CO_2 throughout their life-cycle.	• Wind turbines can require several tonnes of aluminium in parts such as the gear box. • The composite technology employed in the aluminium honeycomb delivers a core material that combines high strength with low weight, highly desirable in the development of wind turbines, rotor blades and turbine core	• For solar thermal collectors (flat-plate and evacuated tube collectors), aluminium is mainly used in absorbers, casings and frames. Studies support the trend of increased aluminium use in absorbers. Out of 289 systems analysed 34% use aluminium absorbers[2].	• Aluminium-air batteries have demonstrated the ability to power an electric vehicle for up to 1,000 miles. The Al-air battery consumes aluminium as a fuel. Aluminium's energy density far surpasses conventional battery technologies and can rival gas and diesel fuels.	There are only three bauxite mines (GR) and one alumina plant (IE), one anode plant (NL) and three cathode plants (F, PI, UK) left in the EU. The mines are in the process of full electrification to eliminate CO_2 emissions from fossil fuel. They represent a major electricity consumer in their regions.	Aluminium recycling rates from construction materials are in the order of 80%.
Copper	By 2025: • An additional 350 kt of copper will be required to meet energy infrastructure, charging and storage needs • An additional 950 kt of copper will be consumed by the auto sector to meet EV requirements By 2030 • An additional 1 Mt of copper will be required to meet energy infrastructure, charging and storage needs • An additional 3 Mt of copper will be consumed by the auto sector to meet EV requirements	• The insulated copper cables running down from the generator carry huge currents. A wind turbine contains an estimated 5 tonnes of copper. In a typical wind turbine, copper is used in the power cables, control cables, instrument cables, cooling and heating systems, the generator, transformer, and grounding system. Additionally an average generator weight may equal 8.5 tons and be composed of 35% copper and 65% steel.	• Copper leads up to 8 times more heat that other materials. • Copper is ideal for heat exchangers and especially for solar thermal systems, which are more sustainable than traditional ones. Solar water heaters made of copper can help save up to 34% of energy.		Here are a number of copper mines and smelters across the EU (B, BG, ES, D, P, PL, S, Ro).The mines are in the process of full electrification to eliminate CO_2 emissions from fossil fuel.	Today 50% of EU's copper demand comes from recycled material because the life span of the materials can be decades and the demand is outpacing the return of the material.

2 Jan Maurice Bödeker (project management), Marc Bauer, Dr. Martin Pehnt: Aluminium and Renewable Energy Systems – Prospects for the Sustainable Generation of Electricity and Heat, Heidelberg, September 2010.

Raw material	Contribution to low carbon technologies					
	Transport	Wind	Solar	Batteries	Securing the EU base load	Enhancing recycling
Iron Ore	High-strength structural steel plates and long sections for tower structures, concrete-reinforcing bars for foundations and electrical steels for generators.	Wind turbines are made of 84% iron and steel materials. A single wind turbine can contain as much as several hundred tonnes of steel. A variety of iron-based materials are used throughout a turbine. Electrical steel producing the specific magnetic properties that optimally convert motion to energy, cast iron or forged steel are used for holding the blades in the rotor hub and important structural elements of bearings and rings are made of high-tech steel.	Saw wires used to cut silicon wafers as building blocks for photovoltaic solar cells.		There is only one major iron ore mine and two smaller ones operating in the EU. There are in the process of full electrification to eliminate CO_2 emissions from fossil fuel. They represent a major electricity consumer in their regions.	This steel is fully recyclable after a lifespan of about 30-40 years. Steel from construction is recycled at 93% already today.

Raw material	Contribution to low carbon technologies					
	Transport	Wind	Solar	Batteries	Securing the EU base load	Enhancing recycling
Nickel		In onshore wind power nickel is used mainly in the gearing and generator components. Offshore, given the corrosive marine environment, there are many more opportunities for stainless steels. Copper-nickel alloys can also offer fouling and corrosion protection in the splash zone. Tidal power and emerging wave power systems face similar marine corrosion and fouling environments. Hydroelectric installations use turbines which can use nickel-containing alloys for both erosion and corrosion resistance to ensure the longevity of the plant.	Nickel-containing stainless steels may be used for the collector and associated pipes. Concentrating solar power uses arrays of mirrors to concentrate the solar radiation onto receivers, where the temperature can reach 500°C. The heat is transported using molten salts in heat- and corrosion-resistant stainless steel tubing. Stainless steel tanks containing molten salts are also used to store the heat. Photo-voltaic systems generate electricity directly and may use stainless steel for the panel frames.	Many types of rechargeable battery chemistries exist, each with their own characteristics, such as energy storage capacity for a given weight, operating temperature range and discharge rates. Lithium-ion battery technology has been evolving rapidly and has found widespread application in electric vehicles as well as portable tools and electronic equipment. Two of the most commonly-used batteries, Nickel Cobalt Aluminium (NCA) and Nickel Cobalt Manganese (NCM) use 80% and 33% nickel respectively; newer formulations of NCM are also approaching 80% nickel. Most Li-ion batteries now rely on nickel. Nickel in car batteries is delivering a longer range for vehicles. Nickel is an important part of LED bulbs that are 80-90% more efficient than conventional.	Here is only three nickel ore mine operating in the EU (Fin, GR). There are in the process of full electrification to eliminate CO_2 emissions from fossil fuel. They represent a major electricity consumer in their regions.	Enhancing recycling Nickel is amongst the most valuable of the common non-ferrous metals and the world's most highly recycled substance. Nickel and nickel-containing alloys can be returned to their original state or converted to a different, but still valuable, form. Examples are nickel-containing stainless steel scrap being turned into new stainless steel, or nickel from recycled batteries being used for nickel-containing stainless steel.

Raw material	Contribution to low carbon technologies					
	Transport	Wind	Solar	Batteries	Securing the EU base load	Enhancing recycling
Zinc		Off-shore wind farms foundations		Modelling of Zinc Energy Storage System for Integration with Renewable Energy[3] Zinc-air batteries	There are 15 zinc ore mine operating in the EU. There are in the process of full electrification to eliminate CO_2 emissions from fossil fuel. They represent a major electricity consumer in their regions.	Zinc is an inherently recyclable non-ferrous metal and can be recycled indefinitely without any loss of physical or chemical properties. At present, approximately 70% of zinc comes from primary refining of zinc ores (including 10-15% from recycled sources) and 55% of end-of-life zinc is recycled in Europe covering 30% comes directly from recycled zinc due to rising demand. 60% of all zinc produced worldwide are still in use.

3 Emad Manla and Adel Nasiri, Power Electronics and Electric Drives Laboratory, University of Wisconsin-Milwaukee / Michael Hughes, ZBB Energy Corporation: Modeling of Zinc Energy Storage System for Integration with Renewable Energy; www.researchgate.net/publication/261111349

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