

NON-TECHNICAL SUMMARY
OF THE PROJECT ENVIRONMENTAL IMPACT:
"DEVELOPMENT AND FIRST INDUSTRIAL IMPLEMENTATION OF
INNOVATIVE BATTERY RECYCLING TECHNOLOGIES
LITHIUM-ION AND CATALYSTS
WITH METAL RECOVERY OF STRATEGIC IMPORTANCE"

INVESTOR:
ELEMENTAL STRATEGIC METALS SP. Z O.O.



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1. Introduction

The purpose of this report is to present the environmental impacts of the project called "Development and first industrial implementation of innovative technologies for recycling lithium-ion batteries and catalysts, where metal recovery plays strategic importance". The project was presented as part of the Important Project of Common European Interest - Batteries (IPCEI - Batteries) and was approved by the European Commission. It is currently in the R&D phase, while in 2021 it is assumed that the phase of the industrial implementation and construction of a pilot installation will begin.

2. Project Description

2.1 Investor

This Project will be implemented by the Elemental Capital Group, through a special purpose vehicle established for this purpose - Elemental Strategic Metals Sp. z o.o.

Elemental Capital Group is a global leader in the recycling of platinum group metals (hereinafter PGM), a European leader in the recycling of printed boards and electronic circuit boards, and a regional leader in the recycling of non-ferrous metals. Elemental Capital Group, with the help of subsidiaries, focuses on activities including urban mining activities, as well as collection and recycling of: batteries, waste electronic and electric equipment, electronic boards from printed circuits, materials containing platinum group metals, used industrial and automotive catalysts.



For over a dozen of years of its activity and presence on the market, GK Elemental has built a large collection network of the above-mentioned materials in Europe, the Middle East and the United States. This network consists of professional plants with the necessary environmental permits, equipment, infrastructure, car fleet, personnel and know-how. Depending on the segment of activity, GK Elemental uses various methods of processing collected waste in order to recover key raw materials. As part of their activities, the entities included in the Elemental Capital Group use the latest management technologies and standards, including environmental management according to the methodology adapted to the specificity of the industry (certified, among others, according to ISO 14001: 2005), in order to maximize the positive impact on the natural environment and implementing the concept of a circular economy.

For the purposes of this project, the Investor appointed a team of high-class specialists - scientists with extensive knowledge and achievements in the field of metal recovery, in particular metals used in the battery industry and belonging to the platinum group, and a project management team of the highest competencies.

Elemental Holding SA attempts to participate in social life initiatives, both in local communities and in other areas of non-professional activity. Irrespective of its core business activities, GK Elemental supports nationwide charity campaigns, continuously cooperating with social organizations and foundations. Elemental Capital Group has also started cooperation with institutions responsible for human safety, mitigating the effects of environmental disasters. In this regard, amongst other things it provides the premises of its facilities for State Fire Brigade exercise routines, which are aimed at evaluating their skills in atypical production plant and preparing fire brigades to eliminate hazards in waste storage and processing plants as well as developing options for extinguishing fires of waste household appliances and electronics.

Elemental Group makes every effort to build awareness of responsibility for the natural environment among the society. Therefore, in addition to operational activities consisting of the implementation of normative solutions, companies from the Elemental group engage in educating the youngest in the field of recycling and environmental protection. Moreover, representatives of the group take an active part in initiatives and campaigns for environmental protection and those related to the idea of sustainable management of natural resources.

Understanding the essence of social involvement, included in a wide range of activities, Elemental Holding SA also supports the promotion of health and physical activity. As a sponsor of the Elemental Tri Series triathlon competition, it supports Olympic talents in triathlon as part of the Elemental Tri Team program.

Bearing in mind safety in road transport and taking into account the risks it carries, CG Elemental pays special attention to training aimed at improving the driving culture of drivers and the safety of road users. In cooperation with insurance companies, training in driving improvement techniques is coordinated.

2.2 General information about the business

The project involves the construction of a new production plant in the greenfield formula (Libiąż, Zawiercie, Sosnowiec) or brownfield formula (Świętochłowice). The plant will carry out technological processes of recycling and production of metals in two separate technological lines. The basic raw materials will be used lithium-ion batteries and used automotive and industrial catalysts, although the use of other raw materials is also envisaged, as detailed later in this paper.

Raw materials will generally be delivered in “big-bag” sacks or metal or plastic drums, metal or plastic containers (lithium-ion batteries). Annually, the plant will receive:

- up to 4,000 tons of lithium-ion batteries
- up to 6,000 tons of automotive and industrial catalysts, as well as other raw material and consumables described later in the report

Thanks to the implementation of the Project, the Investor intends to gain a significant position in the battery industry value chain, filling the identified gap between the consumer market and collection networks for used lithium-ion batteries and catalysts, and their producers, who could use recycled raw materials in their operations, as opposed to fossil. This project represents a model example of the implementation of the circular economy concept. The closing the cycle of raw materials in the economy, realized in this way, is a model example of the implementation of the circular economy concept. Importantly, this goal will be achieved based on the recovery of residual energy from recycled batteries and energy from renewable sources (produced in a photovoltaic power plant belonging to the enterprise). Regardless of the implementation of the above-described main objective, the Project will also implement a number of spill over effects, thanks to which it will spread ideas and innovations that are the axis of the Project and support the transformation of the European economy from a model based on fossil fuels to a model that is sustainable and neutral for climate. For this reason, a decision was made to implement the project in one of the regions, with particular dependence on the industry based on the extraction and

use of hard coal - southern Poland - thus implementing the Just Transition concept and enabling employees leaving companies based on coal, to acquire new competences and a place on the labour market.

2.3 Project location

The project will be implemented in southern Poland. Currently, 4 potential locations are being considered. The final property selection is expected to be made in the first half of 2021. All possible locations are situated in industrial areas and far from protected or valuable for the natural environment. Moreover, in order to ensure that the activities of the planned plant will not have an impact on local communities, it is assumed that the production installations will be located in parts of the property away from residential buildings.

The locations considered are listed below.

2.3.1 Libiąż

The area where the Project may be implemented is located in the western part of Libiąż, away from the city centre, in the area of the Janina Ruch II Mining Plant. Almost all construction facilities have been demolished and the area has been levelled. Post-mining water settling tanks are situated on the property. The area on the north-west side is separated from the forest area by the main railway route running along the borders of the property in question. From the east, the area is limited by Paprocia Street. On the north side there are industrial and service areas.

Residential areas are located on the other side of Paprocia street and on the southern side of the site, at a distance of at least several dozen meters from the boundaries of the project site.

The area on which the project will be located is included in the urban planning conditions study, which is a document preceding the adoption of the local development plan. According to the study, the area will be earmarked for industrial development.



2.3.2 Zawiercie

The considered investment area is part of the Zawierciański Industrial and Technological Park and is located on the western outskirts of Zawiercie, in a typically industrial area, in which there are already numerous production plants and a municipal waste landfill. Currently, the property is temporarily used for agricultural purposes, awaiting an investor. The area is limited to the east by Inwestycyjna Street, from the west by a landfill, from the north by Myśliwska Street, and from the south by Podmiejska Street. The nearest residential areas are located at Myśliwska Street, approximately 100m from the investment site.

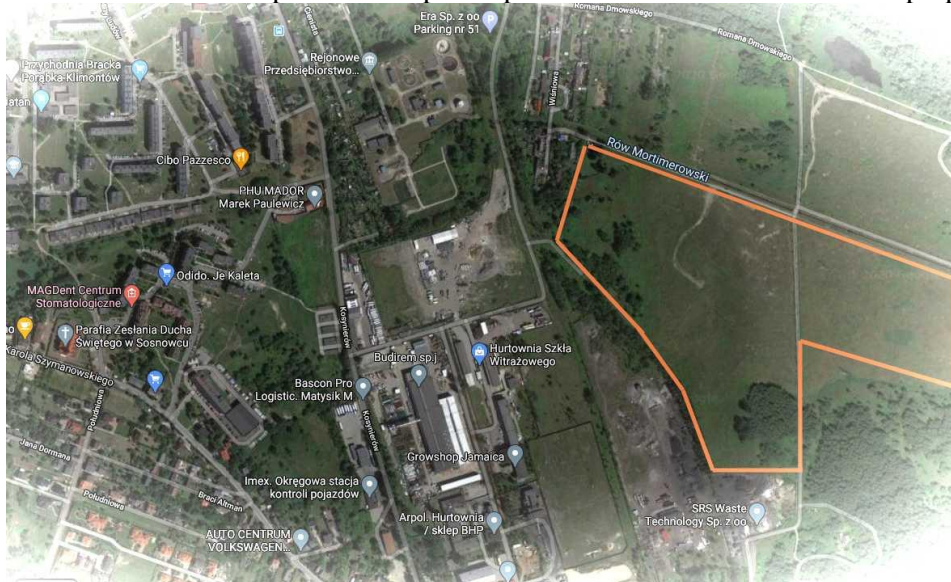
The area is included in the local spatial development plan and is intended for industrial purposes.



2.3.3 Sosnowiec

The property in question is located in the eastern part of Sosnowiec, at Lenartowicz street. The area is bordered on the west side by a disused railway line, on the east by a forest (farm) area, on the north by an artificial watercourse (the so-called Mortimerowski Trench), and on the south by a storage of recyclable materials. Currently, the property is not used for economic purposes, while in the past it had settling tanks (currently filled) from technological processes related to the processing of hard coal from the closed Kazimierz-Juliusz Coal Mine.

The area is included in the local spatial development plan and is intended for industrial purposes.



2.3.4 Świętochłowice

The area discussed by the proposal is located in the city centre of Świętochłowice, in the industrial part of the city. It is a degraded area of the closed and liquidated Florian Metalworks. The area on the northern side is separated from the residential part of the city centre by the main railway route. The residential areas are also located on the north-west side of the site and are separated from the project site by Hutnicza Street. From the west and south, the entire area is limited by Metalowców Street and Wojska Polskiego Street, which are one of the main communication routes in the city. An active railway line

runs through the site, which is used for transport to and from the operating ArcelorMittal plant located in the close vicinity. The area on which the project will be located is included in the local spatial development plan for industrial purposes.



2.4 Project land development

As part of the project preparation, preliminary land development plans were prepared (which will be adapted in subsequent stages to the provisions of the decision on environmental conditions for the project implementation). As part of the planning process, it was assumed that the plant will have one main security guardhouse, at the entrance. Parking space for trucks waiting for entry and for passenger cars (employees and visitors of the plant) were designed. A complete communication system inside the plant has been designed, with internal roads, fire safety and manoeuvring areas. The entire plant area is fenced.

It is assumed that the plant will be divided into the following zones:

- green: area outside the fence, for public parking,
- yellow: project area, with access to the battery recycling hall and part of the catalyst recycling hall, offices, delivery locations of raw materials and waste and sewage collection,
- red: strictly protected area with access only to employees who work in this zone, including part of the catalyst recycling hall and the entire metal refining hall.

The project involves the construction of, amongst other, the following facilities:

- Office building: around 1,000 - 1,500 m²,
- Catalyst recycling warehouse: around 4,000 - 5,00 m²,
- Li-Ion Battery recycling warehouse: ok. 2,000 - 2,500 m²,
- Refining warehouse: ok. 5,000 - 6,000 m²,
- Guardhouse/ Concierge: around 200 m²,
- PGM Portal Frame: 1,000-1,500 m²,
- Li-Ion Battery: 1,000 - 1,500 m²,
- Office and social facilities next to PGM and Li-Ion Battery Portal Frames,
- On-site wastewater treatment plant,
- Gas reduction station,
- Electric switchboard,
- Other: auxiliary buildings, installations and technological facilities (e.g. tanks, pipelines, truck scales, etc.).

Detailed requirements for buildings, their dimensions and technology of execution will be determined in accordance with the guidelines of the decision on environmental conditions for the implementation of the project.

2.5 Production process main characteristics

The project plans to recover industrial metals, in particular: platinum, palladium, rhodium, cobalt, nickel, lithium from raw materials and waste supplied by authorized entities. Recovery will be carried out through:

- 1) pyrometallurgical processes (high-temperature melting of metal alloys),
- 2) hydrometallurgical (dissolution and extraction of metals in acids and bases),
- 3) electrometallurgical (mainly through electrolysis).

These processes will be implemented in two separate technological lines. The main raw material for the smelter and metal refinery will be: used lithium-ion batteries (also known as LIBs) and used automotive and industrial catalysts (also known as SACs).



The plant will be equipped with the necessary technological lines, as well as accompanying infrastructure, such as roads and manoeuvring yards, a guardhouse, gas, electricity, water and sewage networks, as well as a rainwater sewage system with rainwater retention.

The scope of the project also includes the construction of a photovoltaic power plant with a capacity of up to 2 MWp with an energy storage with a capacity of up to 1 MWh and accompanying infrastructure. Their main purpose is the production of electricity from renewable sources (using solar energy) for the purposes of supplying the battery and catalyst recovery installations, which are part of the project, and the recovery of residual energy from discharged batteries undergoing processing.

All technological processes used in the plant will comply with the BAT requirements ("Best Available Techniques") specified in the reference documents prepared in accordance with the IPPC directive.

Block diagrams of technological processes to be carried out in the plant are presented in Annex 1 to this study.

2.6 Utilities and raw materials consumption

The project involves the use of, amongst other things the following essential raw materials:

- As part of the battery recycling processes: used lithium-ion batteries, black mass from battery processing, calcium carbonate, sodium hydroxide, sulphuric acid, hydrogen peroxide, argon, nitrogen, copper foil with a graphite layer, aluminium foil with a black mass layer, cathode waste.
- As part of catalyst processing: used catalysts, lime, magnetite, coal or coke, cationic resin for

water treatment, anionic resin for water treatment, process resins (MRT), hydrochloric acid, nitric acid, sulphuric acid, chlorine, hydrogen, hydroxide sodium, sodium bromate, sodium chlorate, 50% hydrogen peroxide, glycerine, hydroxylamine, ammonium chloride, 5m ammonium chloride, 5m ammonium bisulphite, ammonium hydroxide, acetic acid, sodium bicarbonate, demineralized water, argon, LPG, oxygen.

Main products manufactured in the plant include:

- From battery recycling processes: cobalt sulphate, nickel sulphate, manganese sulphate, lithium carbonate or hydroxide, copper sulphate, sulphur, graphite, gypsum, aluminium granulate, cobalt, nickel, manganese dioxide, copper.
- From catalyst recycling processes: rhodium sponge, platinum sponge, palladium sponge, iron sulphate.

The project will use electricity in an estimated amount of about 10 MW. Natural gas and water will be used as well.

2.7 Expected types and amounts of emissions, including waste, resulting from the operation of the planned project

Used lithium-ion batteries and automotive catalysts are not hazardous waste. The plant processes materials of high value but low in quantity compared to other metallurgical and hydrometallurgical processes. The latest technologies will be used to reduce emissions to the minimum levels.

The implementation, operation and decommissioning of the project will be associated with relatively low emissions of pollutants into the air, noise emission, waste and sewage. Their main source will be mainly technological processes and the means of transport used. For each impact category, devices will be applied to reduce pollution levels, described in detail in the further parts of this study. Impacts of each category will be within the limits set by applicable regulations.

2.8 Information on biodiversity, the use of natural resources, including soil, water and land, and the impact on protected areas

All considered locations of the project are areas that have been transformed anthropogenically, non are part of habitats of naturally valuable species. The project will not reduce the number of species within the considered areas and their vicinity. Therefore, the possibility of significant negative impacts on biodiversity should be excluded.

The plant cover and its structure are strongly transformed anthropogenically, these areas do not show any natural value. In the areas designated directly for the project there is no forest cover, shrubbery, ponds and peat bogs of key importance for biodiversity.

The planned project is located outside the areas protected under the Nature Conservation Act. When analysing the scope of the planned project, the activities are planned to be undertaken in order to minimize all emissions and impact on individual elements of the environment. It is not expected that the plant could have a negative impact on the protected areas, including Natura 2000 areas.

The area of the planned project is located outside the ecological corridors. Due to the significant distance of the planned project from the boundaries of ecological corridors, it is possible to exclude any impact of the planned project on these areas.

According to the impact analysis of the project, based on the basic criteria for assessing the state of ground and surface water bodies, it was found that the implementation of the investment will not affect the achievement of the environmental objectives and does not violate the provisions of the Act of 20 July 2017 Water Law (i.e. Journal 2020 item 310 as amended).

2.9 Serious industrial accident risk

Regardless of the implementation of the project in accordance with the latest scientific and technological knowledge and the planned implementation of the highest standards of production process management

and solutions ensuring safety, the planned plant will belong to plants with an increased risk of a serious industrial accident due to the raw materials used - chemical reagents.

2.10 Natural disaster risk and climate change risk

According to the sensitivity analysis carried out, the project in question is characterized by an average sensitivity to:

- violent winds,
- heat waves,
- deep frost,
- violent storms,
- heavy snowfalls.

Taking into account the type, scale, location of the project and activities aimed at maintaining the investment in a proper condition, it is not expected that climate change will significantly affect the project's sustainability. The investment is sufficiently protected against progressive climate change, and the area of the planned project is located outside the zone at risk of flooding and significant impacts related to the current or past exploitation of fossil resources.

3. Project Impacts

3.1 Impact of the investment on the land surface and soil

The implementation of the investment envisages for the construction of new buildings as well as auxiliary facilities and installations. During the preparation of the investment, the efficient use of the land was ensured. During the performance of construction works, all measures aimed at protecting the soil and water environment will be maintained, e.g. storage of construction materials in a designated place on a hardened ground, hardening of access roads, location of a parking lot for construction vehicles on a hardened ground, which will ensure protection of the environment against petroleum substances from possible accidents of construction equipment. In addition, constant control of the equipment, construction site and neutralization of places that may cause a possible threat will be ensured.

The planned project will be located in areas which are already subject to significant human presence. The land surface in the locations under consideration has been already transformed both in terms of topography and soil condition. Therefore, the project will not be implemented in the area of natural, unconverted agricultural or forest land of high quality and great importance for agricultural or forestry production. As a result of the implementation of the project, no mining or other works aimed at transforming the earth's surface or soil erosion will not be carried out. The project implementation and operation will therefore have only a slight impact on the earth's surface.

Moreover, due to the fact that all area will be sealed from ground access, all rainwater and snowmelt water will be pre-treated and only then discharged to the environment. There will be no contamination of the ground environment.

3.2 Impact on surface water and groundwater

The project will implement closed cycle water management. Most of the water used in the process will be recycled for reuse.

There are no natural water reservoirs or groundwater intakes in the immediate vicinity of the areas intended for the implementation of the planned investment, therefore in the phase of investment formation, there will be no negative impact on surface water and groundwater. All equipment used for construction works will be technically efficient. Due to the labour of construction workers on site,

domestic sewage will be generated, it is assumed that during the construction of the project, about 6 m³ of household sewage will be generated per day. This wastewater will be stored in temporary sealed tanks and then transported to the municipal sewage treatment plant. The construction stage of the investment will not have a negative impact on the water environment. Constant control of the operating equipment will reduce the risk of leakage of the substance from operating machines and will enable immediate action to be taken in the event of such a leak.

The plant operation phase will not carry negative impacts on surface water and groundwater, thanks to the appropriate design of production processes, installations and construction facilities. Domestic sewage generated on the premises of the plant will be discharged to the sanitary sewage system, and therefore will not pose any threat to the soil and water environment. Industrial wastewater will be treated in the on-site wastewater treatment plant and its residues will be collected by an authorized recycling entity, and therefore will not pose any threat to the soil and water environment.

3.4 Environmental impact on the atmosphere (including human emissions)

The plant has very low atmospheric emissions. This is mainly due to the small amount of processed materials, low emissivity of technology and the use of solutions resulting from the best available techniques.

The construction stage of the plant will consist of the construction of a new facility and the modernization of an existing facilities. During construction works, dust lifting during the operation of machines and devices carrying out earthworks and emission of exhaust gases from machines and means of transport may occur. The aforementioned inconveniences will be short-lived, and the impact of the works at the stage of implementation on the atmospheric air will be limited to a small zone around the investment, not posing a noticeable threat to local residents. Therefore, it was concluded that the construction phase will have a short-term, transient and local impact on the air quality.

In the operation phase of the plant, the technological process of producing industrial metals such as: platinum, palladium, rhodium, cobalt, nickel, lithium will be carried out by melting alloys (pyrometallurgical processes), hydrometallurgical and electrometallurgical processes. Attention should be paid to small amounts of processed materials, low emissivity of the technology and the associated low total emission. The operation stage of the planned investment will involve organized and unorganized emissions. The source of organized emission will be the technological process and the combustion processes of high-methane natural gas, mainly for the purpose of heating the buildings. On the other hand, the source of fugitive emissions will be the combustion of fuels in vehicles running on the open premises of the plant. In addition, there will be emission of pollutants related to starting the pumps in the fire-fighting pumping station during their periodic inspections and running the power generator during possible periodic interruptions in the supply of electricity.

Heating of the office building, refining warehouse and laboratory rooms will be carried out through the gas boiler room equipped with a boiler with a thermal power of up to 1000 kW.

According to the calculations, which are presented in Annex 2 to this study, showed that during the operation stage the emission will be kept at a low level and there will be no excess concentrations, far from approaching permissible levels.

3.5 Environmental impact in terms of acoustic impact (including human emissions)

The investment in question is characterized by a few sources of noise, both point and spatial, and a small number of means of transport.

In accordance with the applicable regulations, the noise limits in acoustically protected areas, which are mainly residential areas, are as follows: 55 dB for the daytime and 45 dB for the night time.

Carrying out the analysis of the acoustic nuisance of the project on the environment:

- sources of noise for the project were inventoried,
- acoustic parameters of noise sources have been defined,
- the A-equivalent noise level for noise from the grid investment was calculated,
- the range of acoustic impact has been determined,
- the results of the calculations were interpreted in the light of administrative requirements.

The impact during the implementation phase will be limited. During construction works, short-term noise emission to the environment may occur, the sources of which are primarily:

- traffic of trucks, tippers and concrete mixers,
- operation of heavy construction equipment such as backhoe loaders, bulldozers, cranes, etc.,
- operation of other construction equipment such as welders, grinders, drills, mechanical saws, compactors, concrete mixers with a capacity of approx. 200 l.

Already at the planning stage, the principle was adopted that the impact of noise sources, both internal and external, would be limited, e.g. by appropriate location, i.e. placing as many noise sources as possible inside buildings, locating them in a part of the warehouse away from protected areas, etc.

Noise emission sources of the investment will include:

1. Movement of transport vehicles,

2. External point noise sources, such as:

For the battery recycling warehouse:

- 2 air intakes for compressors - located on the roof
- afterburner - located at ground level

For the catalyst recycling warehouse:

- 4 air inlets for compressors - located on the roof
- filter including 6 bag filters - located at ground level
- 4 scrubbers - located at ground level
- 3 afterburners - located at ground level
- 2 roof exhaust fans for firing and cooling the furnace - located on the roof

For the refining warehouse:

- 6 vapour extraction fans - located on the roof
- 3 laboratory ventilation and air conditioning units - located on the roof

For the office building:

- air handling unit for the office part
- 6 outdoor air conditioners units

3. External, cubature noise sources, such as: battery and catalyst recycling warehouses and the sewage treatment plant. In the catalysts and batteries recycling halls, their mechanical fragmentation will take place. Equipment such as mills, shredders, compressors, fans and pumps

will be installed. There will be pumps and vacuum distillers with a noise level of up to 80 dB in the sewage treatment plant.

It is an undeniable fact that the acoustic impact of all sources in the environment accumulates. On the other hand, due to the logarithmic way of summing up the impacts on the acoustic climate in the environment, the dominant sources play a decisive role, and the influence of the remaining ones is often negligible. In the areas where the project is being implemented, such a dominant role will be played by the existing traffic.

It should be noted that the investment in question is characterized by a small number of noise sources, both point and spatial, and a small number of means of transport engaged. With such a small number of noise sources and so little traffic compared to the number of vehicles in the vicinity of the possible investment areas, the phenomenon of cumulative impact of the plant with other sources of industrial nature, and their interaction can be considered negligible.

According to the design assumptions, the functioning of the investment will not be a source of excessive noise emission to the environment. Summing up, there are no objective grounds for refusing to conduct the planned activity in the proposed scope and a technological variant for reasons of protection against noise.

3.6 Waste management

The plant will have modern infrastructure built according to the best available techniques.

During the implementation of the investment, waste typical for construction works will be generated. A place for temporary storage of waste will be designated on the construction site. This place will be marked, waste will be collected selectively in containers. Hazardous waste will be stored in a sealed container on a hardened ground.

According to the diagnosis, the emission of typical industrial waste will occur during the operation. Individual types of generated waste will be stored selectively on the premises of the plant in a designated and marked location with a hardened surface or designated storage areas protected against weather conditions and access by third parties, only in places to which the investor has a legal title. Hazardous waste will be stored in containers made of materials resistant to substances contained in the waste, with a tight enclosure protecting against uncontrolled waste release. The plant will be equipped with a set of sorbents that will be used to remove any leaks. The used sorbent will be stored in a specialized, described container and transferred for management to an entity with appropriate waste management authorization.

The waste disposal process will be in accordance with the applicable legal regulations. It will also be a multi-stage activity:

- minimization of generated waste in accordance with the R principle: Reduce, Reuse, Recycle,
- ensuring recovery in accordance with the principles of environmental protection,
- ensuring that waste is disposed of in accordance with the principles of environmental protection.

The generated waste will be transferred only to authorized entities, i.e. those that have obtained permits from the local government authorities for waste management activities (recovery, disposal, transport, collection).

In order to minimize the amount of waste generated:

- devices and materials of high durability and efficiency will be used,
- plans to optimize the use of raw materials, optimization of processing, delivery and transport processes will be implemented,
- systematic checks, inspections and modernizations are planned, minor defects will be removed on an ongoing basis in order to prevent rapid wear of the devices,
- optimal procurement planning will be carried out, which reduces the risk of surplus materials and the use of collective packaging and feedback,

- ecological education of the employees will be conducted,
- principles of clean production will be implemented, consisting of minimizing waste "at source".

The investor will be obliged to keep systematic quality and quantity records of generated waste.

3.7 Influence on electromagnetic fields

During the implementation of the project no devices, which could pose a threat to the environment in terms of emission of electromagnetic radiation will be used. The only source of electromagnetic radiation in the range of medium waves and microwaves are going to be stationary geodetic devices, used for precise surveying measurements using the GPS standard, such as radio reference points. Due to the very low power of these devices, the range of their impact is small, limited to a few centimetres area around the transmitting antenna.

At the stage of its operation, the investment in question will not pose a threat to the environment in terms of generating electromagnetic radiation. The planned project will not be a source of electromagnetic field of 50 Hz frequency or electromagnetic radiation with values higher than the permissible values.

The implementation of the project will not affect the quality of the radio and television transmissions, it will not interfere with radio link transmissions and will not disturb the operation of electronic equipment.

3.8 Climate impact

Based on the environmental impact assessment in terms of emissions to air under the planned project, it can be concluded that the investment's impact on the climate will be negligible.

3.9 Protection of the interests of third parties

Limiting the impact of the intended investment within the plot area, to which the Investor has a legal title (investment area) in terms of: acoustic protection, compliance with the permissible pollution standards outside the investment area, proper waste management, described water and sewage management as well as the adopted technical and organizational solutions, guarantee the protection of the interests of third parties.

3.10 Possibility of cross-border impact of the planned investment

It is clear from the detailed assessment of the impact of the planned investment on individual elements of the environment that this impact will be limited to the area covered by the investment. In view of the above and due to the fact that the area of the planned investment is located at a considerable distance from the state border, there will be no transboundary environmental impacts of the facility within the meaning of the Espoo Convention of February 25, 1991 and specific provisions of national legislation.

4. Planned solutions to protect the natural environment

When assessing the impact of the project implementation on human health and life, the key part of the assessment are the impacts resulting from: the impact of noise, dust and gas pollutants introduced into the atmospheric air, electromagnetic impact, impact on material assets and the possibility of social conflicts, impact on groundwater, including protection of water supply to the population.

4.1 Solutions protecting the acoustic environment

The operation phase of the investment will not result in excessive acoustic impact on people. Referring to the acoustic analysis, the use of devices minimizing the acoustic impact is assumed, giving a chance

for effective protection against excessive noise impact in areas subject to acoustic protection. The land development of the plant combined with internal communication systems help to minimize noise emissions.

In order to minimize the impact of the investment in question on the acoustic environment, it is planned to:

- use of primary noise reduction techniques, e.g. selection of technological devices taking into account acoustic power and the level of generated noise level, plant design and location of noise sources in a way that limits its emission outside the project implementation area,
- organization of the plant's operation in a way that reduces its acoustic nuisance, in particular limiting processes generating higher noise levels at night, using methods of unloading raw materials with lower noise emissions (transportation of raw materials in big-bags and unloading using forklifts, instead of transporting in bulk and dumping from the car kit),
- if it is necessary to further reduce noise, it is planned to apply technical noise reduction measures in the form of acoustic silencers,
- in addition, it is planned to switch off the engines of the vehicles during loading and unloading,
- use of technical inspections and ongoing repairs to ensure that machines and devices are kept in a proper technical condition and to eliminate potential sources of noise.

4.2 Solutions reducing air pollution

The conducted calculations of the amount of gaseous and dust pollutants emitted into the air prove that the selected investment implementation variant will not have a negative impact on air quality. It is assumed that the technological processes will be carried out tightly (hermetic grinders and mixers, built-in conveyors, closed process tanks).

In order to minimize the impact of the investment in question on the condition of the atmospheric air, it is planned to:

- keep all emission devices in good technical condition and in full working order,
- use low-emission fuel for heating purposes,
- restriction of vehicle routes.

In addition, the Project involves the installation of a number of devices to reduce pollutant emissions, such as:

- afterburners in which possible volatile organic compounds will be burned,
- neutralizers and scrubbers, allowing to reduce the content of sulphur compounds in exhaust gases and process vapours,
- bag filters, allowing the capture of nearly 100% of dust pollutants.

It is worth emphasizing that these devices have an efficiency levels close to 100%. Taking into account very low emission levels, this means that the level of the plant's impact on the air will be negligible to low, even before accounting for the above-mentioned devices that reduce these emissions.

4.3 Solutions to reduce electromagnetic radiation

The planned investment will not generate electromagnetic radiation.

4.4 Waste management

Properly conducted waste management, i.e. properly conducted waste processing, appropriate waste storage and waste segregation create conditions in which the environmental impact is reduced to a minimum.

With each type of activity, waste emissions must be taken into account, it is important to store and transfer them properly to authorized entities, which will take place in the case of the planned project.

In order to minimize the amount of generated waste, it is assumed that:

- processes shall be conducted according to strictly defined procedures,
- use of materials with low environmental impact,
- systematic checks, inspections and modernization of machines as well as removal of minor defects will be carried out on an ongoing basis in order to prevent rapid wear of the devices,
- optimal purchase planning in order to limit the formation of surpluses and disposal of materials,
- use of returnable collective packaging,
- conducting ecological education of the employees,
- running the so-called "Clean production", which involves minimizing waste "at source",
- using waste segregation and preventing mixing of different types of waste,
- storing waste in a manner that does not adversely affect the environment.

It is worth emphasizing that the project in question will carry out the processes of recycling and recovery of metallic raw materials, which means that its impact on this aspect of environmental protection will be positive.

4.5 Solutions for the protection of surface and ground waters

Domestic (municipal) and industrial wastewater will be generated in the area of the investment in question. Industrial wastewater will be treated in the onsite water treatment plant and/or condensed using innovative evaporation technology at reduced pressure (with distillate water recovery), the implementation of which is assumed by the Investor. In the case of wastewater not suitable for treatment using the above technologies, it will be collected in leak-proof tanks and collected by an authorised entity specialized in required purification processes.

In order to minimize the impact of the plant in question on the soil and water environment, the following measures are assumed:

- efficient water management,
- storage of raw materials and fuels in closed, leak-proof tanks,
- storage of used batteries in a way that prevents contamination of the soil and water environment,
- use of closed water circuits, both for process purposes as well as cooling,
- reuse of weak acid streams,
- discharge of domestic sewage to the municipal sewage system,
- industrial wastewater treatment in the on-site wastewater treatment plant,
- prevention of rainwater and meltwater contamination through constant control of the cleanliness of the paved surface,
- collection, retention and utilisation in facility processes.

The applied solutions guarantee the minimization of the amount of generated wastewater, water recovery for re-use and proper management. The project will not have a negative impact on the water environment, it can be concluded that the migration of pollutants to the soil and water environment will not occur.

4.6 Energy efficiency

The plant provides solutions to ensure a high level of energy savings. For this purpose, the application of the following measures is recommended:

- use of materials and devices with valid approvals for use in the construction industry that meet all energy efficiency requirements,
- implementation of an automatic control system enabling periodical reduction of the parameters set for the installation, taking into account the periods of shutdown of the installation from normal use,
- system of automation, control and monitoring of systems with detection of emergency states for optimal operation of all devices,

- equipment fitted with energy-saving lighting.

Moreover, a register of environmental aspects will be kept in the analysed plant, including registers of consumption of energy factors, raw materials and fuels.

5. Description of the forecasting methods used to prepare the relevant analysis

5.1 Atmospheric air

To calculate the amount of emissions, the emission factors and data obtained mostly from potential suppliers of equipment were used. Calculations of the atmospheric air pollution during the operation of the investment were carried out according to the methodology of modelling the levels of substances in the air specified in the Regulation of the Minister of the Environment of January 26, 2010 on reference levels for certain substances in the air (Journal of Laws 2010 No. 16, item 87) with the computer program "Operat FB" for Windows v.6.6.5. On the basis of provided data, the program determines which range of calculations will be used for individual pollutants, calculates the maximum and average concentrations at individual points of the adopted calculation grid, determines the points where reference values are exceeded in relation to the applicable legal standards in this area.

5.2 Noise emission

For noise propagation analysis, the LEQ Professional modelling program is used, the calculation algorithm of which is based on the PN-ISO 9613-2 standard and ITB instructions No. 308 and 338. The above standard presents mathematical models for calculating noise attenuation in the environment, so that the noise level can be predicted at a distance from its source. With this methodology, an equivalent continuous sound level can be predicted, taking into account weather conditions.

In this calculation model, the principle is that each source is a point source, that is each of its linear dimensions (height, length, width) is less than half the distance between the source and the nearest observation point.

5.3 Wastewater

To determine the amount of wastewater the following was used: data provided by the suppliers of equipment and technologies, the Investor's experience and committed environmental consultants. The calculation methods included in the Regulation of the Minister of Infrastructure of January 14, 2002 on the determination of average water consumption standards (Journal of Laws No. 8, item 70) were used.

5.4 Waste management

To determine the types and amounts of generated waste, the required data was based on the analysis of the technologies in question. The information was obtained from suppliers of individual devices, the experience of the Investor and relevant environmental consultants.

6. Application of the Circular Economy guidelines

Circular Economy is an economic concept in which products, materials and raw materials should remain in the economy as long as possible and the generation of waste should be minimized as much as possible. This idea takes into account all stages of the product life cycle, starting from its design, through production, consumption, waste collection, to its management. It is therefore a departure from the linear economy, based on the principle of "take - produce - use - dispose", in which waste is often treated as the last stage of the life cycle. In a circular economy, it is essential that waste, if it is generated, is treated as secondary raw materials. All pre-waste activities are to serve this purpose. At the same time, the

circular economy approach, implemented e.g. in relation to product design or production processes, aims to increase the innovativeness of European entrepreneurs and increase their competitiveness in relation to entities from other parts of the world.

The analysed Project is in its essence a model template of the application of the Circular Economy concept to metals of strategic importance for the most advanced industries. Thanks to the Project implementation, metals (mainly cobalt, lithium and platinum group metals) will be recycled, which would otherwise end up in landfills. The use of metals from primary (fossil) sources will generally be reduced, the negative impact of which on the natural environment is incomparably higher than that of metals obtained in the recycling processes. An additional, extremely important consequence of the Project implementation will be the reduction of the dependence of European Union countries on the import of metals of strategic importance from socially or politically unstable regions. The project will also be based on the recovery of energy from recyclable batteries and renewable energy. It is also planned to build an energy storage, which will further reduce the dependence of the plant on energy produced from fossil fuels.

During the plant operation phase, the Investor will apply the so-called "green chemistry" to minimize the impact on the environment. Specialized units will be established to ensure and monitor the highest standards of environmental protection and occupational health and safety. The plant's impact on the natural environment will also be monitored, including in the field of waste management, emissions and water management. The investor plans to provide the most important data in this respect, within the scope resulting from the principles adopted on reporting non-financial data.

It is assumed that management systems will be implemented in the operational plant, including according to ISO 9001 and ISO 14001 standards, certification and monitoring during the life of the Project is foreseen.

It is also considered to conduct research to calculate the environmental footprint of the Investor's installation products (environmental footprint is all or selected environmental impacts of a product, service or organization) using the LCA (life cycle assessment) methodology. According to the ISO 14040s standard, the life cycle is defined as "successive and interrelated stages of a product, from obtaining or producing a raw material from natural resources to its final disposal". Performing such a test may contribute not only to reducing the negative impact on the environment, but also to measurable financial savings, e.g. by identifying the least effective stages of the production cycle (increasing the efficiency of energy and raw materials usage).

7. Additional information

Any questions regarding the environmental impact of the Project will be answered by:

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Appendix No. 2

List of maximum values of concentrations of air pollutants

Name of the pollutant	Maximum concentration (µg/ m3)		Maximum frequency of D1 exceedances (%)	
	Calculated	Acceptable	Calculated	Acceptable
PM-10 dust	20.9	280	0.00	< 0.2
Sulphur dioxide	29.8	350	0.00	< 0.274
Nitrogen oxides as NO ₂	48.7	200	0.00	< 0.2
Carbon monoxide	5.5	30000	0.00	< 0.2
Ammonia	0.9	400	0.00	< 0.2
Arsenic	0.00205	0.2	0.00	< 0.2
Benzene	0.06	30	0.00	< 0.2
Chlorine	0.58497	100	0.00	< 0.2
Fluorine	0.00253	30	0.00	< 0.2
Cadmium	0.00051	0.52	0.00	< 0.2
Sulphuric (VI) acid	0.1	200	0.00	< 0.2
Hydrogen chloride	2.92748	200	0.00	< 0.2
Copper	0.00205	20	0.00	< 0.2
Nickel	0.00205	0.23	0.00	< 0.2
Lead	0.00205	5	0.00	< 0.2
Mercury	0.00010	0.7	0.00	< 0.2
Aromatic hydrocarbons	6.5	1000	0.00	< 0.2
Zinc and its compounds	0.00205	50	0.00	< 0.2
Chromium compounds III and IV value	0.00205	20	0.00	< 0.2
Thallium	0.00051	1	0.00	< 0.2
Aliphatic hydrocarbons	6.5	3000	0.00	< 0.2
PM 2.5 particulate matter	20.9	n/a	n/a	n/a