INVESTMENT PROGRAM ALUM 2021

Investment Program of SC ALUM SA for the year 2021, although imply high costs is a program absolutely necessary to:

- Ensuring the operational continuity by extending the lifetime of the red mud pond in compliance with the provisions of the environmental agreements to which ALUM is obligated to comply with;
- Increase the degree of automation and control of the plant;
- Reducing the specific consumption of natural gas, industrial water and energy;
- Increasing the safety in operation of static and dynamic equipments necessary to carry out the activity of ALUM's departments;
- Reducing the alkaline aerosol emissions in the White Filtration Building;
- Achieving savings in fuel consumption / primary energy prince of high efficiency cogeneration processes.

Executive Summary:

ALUM's investment program for the year 2021 requires a total estimated budget of **7,377,000 USD** and contain 15 investment projects,

US$'000

Company	***No. of investment projects***	***Necessary Capex***
		2021
ALUM SA Tulcea	***15***	***7,377***

from which:

- 3 environmental investment projects started before 2021 (2,280,000 USD) and will be completed in the year 2021;
- 12 new investment projects (5,097,000 USD)

The 15 investment objectives of the Investment Program of SC ALUM SA for 2021 are structured in two chapters as follows:

- **Chapter 1 - Environmental projects to ensure operational continuity** – includes 3 investment objectives with a necessary forecasted budget of **2,280,000 USD**;

- **Chapter 2 - Projects for ensuring the operating conditions and production process safe continuity** – includes 12 investment objectives with a necessary forecasted budget of **5,097,000 USD.**

The capacity of performing investments is decisive for the future of SC ALUM SA and the evaluation of investments is a very important task for ALUM S.A.

The main key aspect of investments request is financial evaluation and budgeting the investments objectives spending.

Financial effort of these investments will be assured both by internal financial resources and by loans, like leasing financing or credits.

Chapter 1 – Environmental projects to ensure operational continuity

Includes a number of 3 investment projects absolutely necessary mainly for:

- Reduction of accidental leakage of lesions;
- Reduction of sodium hydroxide solution losses when unloading them from railway auto-tanks;
- Extending the lifespan of the redmud pond by continuing the staged and safe elevation of the red mud dams by 10 m in the next 6 years according to a new solution proposed by the Technical University of Constructions Bucharest. This estimates an increase in the life of the pond by approx. 16 years;
- ensuring the operational continuity of the pond (and of the plant) for a period of time of at least 14 years by purchasing 30 hectares of land;
- Modernization of the alumina plant.

Objective Code	Objective name
D-072.18.SRR.01	**Increasing the storage capacity of the red mud pond by elevating the dikes throughout the perimeter** This investment objective is scheduled to be completed in November 2021 and is necessary to continue the safe operation of the red mud pond and increase its lifespan and has a total estimated budget for 2021 of **1,390 thousand USD**.
D-083.21.SRR.01	**Extending the surface of the red mud pond and securing the red mud storage in the SE area (30 ha)** This investment objective is scheduled to be completed in December 2021 and is necessary to ensure the operational continuity of the installation and maintain compliance with the new provisions of the legislation on the environmental line on the safe storage of red mud. Has the total estimated budget for 2021 of **600 thousand USD**.
D-079.21.CET.01	**Construction of industrial installation for the efficiency of the soda unloading process from railway wagons and autotanks** This investment objective is necessary to reduce accidental leakage of leach, reduce the losses of sodium hydroxide solution and has a total estimated budget for 2021 of **290 thousand USD**.

Chapter 2 – Projects to ensure the operating conditions and the safe continuity of the production process

It includes a number of 12 absolutely necessary investment projects mainly for:

- Replacement of spare parts belonging to used equipment that no longer have the functional characteristics for which they were initially purchased and which are strictly necessary for the realization of the production plan;
- increasing the safety in operation of static and dynamic equipment necessary for the activity of ALUM departments;
- increasing the safety in operation and observing the ISCIR norms in force;
- obtaining an increased cooling capacity, which leads to obtaining results superior to the current ones in the following aspects: production volume, hydrate quality, observance of specific norms of hydrate fractions;
- prevention of possible incidents and accidental stops due to the deterioration in time of the erasures from the foundations of the Precipitation vessels;
- increasing the efficiency by reducing to less than 1.5 g / L the solid substance content;
- reduction of alkaline aerosol emissions within the White Filtration building;
- improving the control of aluminum hydroxide granulation in the crystallization process;
- reducing the consumption of compressed air used to transfer the aluminum hydroxide suspension from the tank to the tank;
- insularization of compressed air circuits related to grinding, leaching, evaporation and red filtration;
- increasing the efficiency of heat transfer of leaching autoclaves;
- eduction of carbon emissions related to fossil fuels (cogeneration effect);
- decrease of the electricity purchased by Alum from SEN.

Objective Code	Objective name
D-075.21.FAD.01	**Improving the process of filtering and reslurryng the coarse seed by purchasing and installing a new disc filter** The project consists in the purchase and installation of a new modern filter for coarse seed that will ensure, if it works alone, the automatic filtration of a gross primer flow of at least 650 m3 / h at a solids content of at least 500 g / L and at a temperature of 58 ± 4 degrees C. The total budget forecast for this investment objective in 2021 is **1,210 thousand USD**.

D-082.21.FAD.01	**Increasing the performance of precipitation vessel agitation systems and the efficiency of the Precipitation process by mounting four agitation systems** The project is intended to increase the performance of the agitation systems of the precipitation vessels and the efficiency of the Precipitation process based on a study prepared by Mr. Gérard Bégon. The total budget forecast for this investment objective in 2021 is **70 thousand USD**.
D-084.21.FAD.01	**Optimization of a precipitation line by modifying the pulp transfer systems between precipitation vessels (troughs)** The project is intended to standardize the stationary times of the two precipitation lines and reduce the granulometric variations on the hydrate, the total budget forecast for this objective in 2021 is **80 thousand USD**.
D-085.21.ALM.01	**Increasing energy efficiency and improving the monitoring of the steam and compressed air distribution system** The project consists of: ➢ reconfiguration of the compressed air distribution system in White Filtration, Precipitation and Red Filtration; ➢ the insularization of the compressed air circuits related to the Grinding, Leaching, Evaporation and Red Filtration installations and the purchase and installation of compressors with high energy efficiency and low flows corresponding to the consumptions of the insularized installations; The total budget forecast for this investment objective in 2021 is of **255 thousand USD**.
D-087.21.ALM.01	**Progressive reduction of specific electricity consumption by replacing pumps with advanced degree of wear with high energy efficiency pumps** The project is intended to reduce electricity consumption by replacing pumps with advanced wear with high energy efficiency pumps, the total budget forecast for this objective in 2021 is **250 thousand USD**.
D-081.21.FRL.01	**Modernization of a Digestion line by replacing the registers from the preheating and rehabilitation autoclaves agitation system (Amber)** The project consists in increasing the efficiency of the thermal transfer of the digestion autoclaves and the observance of the legislation, norms and standards in force, in the field of environmental protection. The total budget forecast for this investment objective in 2021 is **270 thousand USD**.
D-060.21.SFR.01	**Eco-efficient investments meant to reduce the use of primary resources and to increase waste recycling in the technological process ALUM SA** The project is intended to increase the service life of the red mud pond, increase the stability of the pond, increase the amount of liquid red mud phase returned to the red mud washing line in the plant to recover hydroxide and alumina and to comply with BAT provisions to reduce stored red mud moisture. The total budget foreseen for this investment objective in 2021 is **100 thousand USD**.
D-080.21.ALM.01	**Rehabilitation of 6 kV electricity distribution system** The project consists in increasing the operational safety of the equipment that presents the physical and moral wear of the components and the total elimination of the incidents generated by the improper operation of the electrical equipment. The total budget foreseen for this investment objective in 2021 is **190 thousand USD.**
D-070.21.ALM.01	**Maintenance Capex** he objective is expected to be completed in December 2021 and consists of:

	➢ ensuring the constructive conditions for increasing the filtration capacity, the competitiveness and the quality of the alumina produced; ➢ increasing the safety in operation and observing the ISCIR norms in force; ➢ prevention of possible incidents and accidental stops due to the deterioration in time of the erasures from the foundations of the Precipitation vessels; ➢ continuing the uniform storage of sludge in the Alum red mud pond. The total budget forecast for this objective in 2021 is **960 thousand USD**.
D-071.21.ALM.01	**PPE 2021** he total budget forecast for this investment objective in 2021 is **813 thousand USD**. ➢ Atlas Copco repair kit; ➢ Boiler supply node adjustment valve 1 and 2; ➢ Heat-exchangers with welded plates and aluminate / pregnant liquor gaskets; ➢ Flocculant dosing electric pumps; ➢ Centrifugal pumps with magnetic coupling. ➢ Etc.
D-066.21.ALM.01	**Endowments 2021** The total budget forecast for this investment objective in 2021 is **899 thousand USD**. ➢ Autosweeper, vans and telehandlers; ➢ Weighing platforms; ➢ elevator cabin for Precipitation; ➢ X-ray diffractometer; ➢ Particle counter. ➢ Etc.
D-086.21.CET.01	**12 MWe high efficiency cogeneration power plant** The project aims to: ➢ Achieving savings in fuel / primary energy consumption through high efficiency cogeneration processes; ➢ Superior capitalization of the thermal potential of waste gases from industrial processes; ➢ Reduction of carbon emissions related to fossil fuels (cogeneration effect). The total budget forecast for this investment objective in 2021 is **0 thousand USD**. The start-up in 2021 consists in the elaboration of the feasibility study and of the documentation necessary for the co-financing.

The net budget requested for approval is 7,377,000 US$.

The key decisions necessary to be taken for investment plane implementation are as follows:

- investment program approval
- development of investment program accordingly with detailed diagram
- establishment and approval of detailed action planes for each one investment project.

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